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HOW TO SUPERVISE (AND BE SUPERVISED) ON A RESEARCH DEGREE

Tips and tools for supervisors and students

Frank Rennie and Michael Rayner

How to supervise (and be supervised on) a research degree: tips and tools for supervisors and students

Frank Rennie* and Michael Rayner+

* UHI Professor of Sustainable Rural Development and Head of Research and Postgraduate Development at Lews Castle College, University of the Highlands and Islands

+ UHI Professor of Higher Education and Dean of Research at the University of the Highlands and Islands.

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Getting started

Getting started on a research degree, such as a PhD, is pretty much like starting on a journey. You probably know at which destination you want to arrive; you have a fair idea of how you hope to get there, and you have a rough idea of how long this journey will take. You will also have only a very vague idea of the other things that will happen on this journey – the potential obstacles, the opportunities, or the people that you will meet along the way – or how you will cope with these new experiences. Like many big journeys, you will start out with a mixture of excitement and apprehension. Unlike most geographical journeys, however, the experience of undertaking a PhD provides the student traveller with an expert support-team to guide and advise on each step of the way. This support-team is called a supervisory panel. For them too, the new research project will be a new experience, for though they have experience in the academic discipline, the unknown factors are the precise nature of the study and the interaction between the

student(s) and supervisor(s). Usually there will be a Director of Studies, who is the main supervisor, and a Second supervisor, who will bring supplementary or complementary experience to the advisory process. There are a lot of diverse factors that will help to determine the quality of the final PhD submission, but essentially it is the nature of the interplay between the student, the subject matter, and the (usually two) supervisors that is at the core of the whole experience.

We will deal later with each of these components in turn, but for now let's just focus on getting started. Usually the student embarking on a PhD has already performed well in a relevant undergraduate degree (or perhaps also a taught Master's degree) and wants to get more deeply engrossed in the subject area. This is a good start, but it is not enough. There is a key responsibility at a very early stage for the lead supervisor to help articulate quite clearly the shape of the tasks ahead. By this we mean, not just helping to define the wording of the main research question (or the hypothesis) important though this stage is, but also to give very clear and gentle guidance on the level of what is

expected, the standards to aspire to, and to inspire confidence that this complex task can be simply broken-down into manageable, well-paced sub-tasks, which the student is perfectly capable of undertaking.

It is also crucial not to hype-up the PhD study process so that the student is intimidated and deflated before they even make a proper start. There are many aspects of self-directed research that are daunting, challenging, and frustrating, but the role of the supervisor is to work with the student to put these challenges into perspective and to seek a way through to the next level. It is therefore important that a balance between realism and optimism is struck during these early stages. The supervisor should not minimise the likely challenges ahead – breaking new ground is part of the attraction for all researchers, young and more elderly – but neither should a responsible supervisor seek to ‘scare’ a student into action by emphasising the scale of the obstacles. We have often told students that a PhD is only 70% intelligence and 30% stamina (we can argue about the exact figures later!) and the point of this is that lots of clever people embark on research for a doctorate but never

complete it. This is not because they are stupid people, they have already demonstrated that they are not that by their ability to get accepted for a PhD registration. Rather it is because the long slog of research at this level – the scoping, preparation, leg-work, desk-work, frustrations and imponderables that have been discovered – is simply more than they are prepared to endure for the rewards on offer.

It seems, therefore, that starting to study for a PhD is much like starting on any new job. On your first days at work you want to feel comfortable, both with your environment and your colleagues. The induction is simple, and after all, mainly common-sense. The student needs to know where to find things that are going to be useful, everything from the desk and chair where they are going to sit, to the facilities that they will be using – the tea-room, the toilets, the laboratory, the library, and so on. They also need to be introduced to the people they will be working with – their fellow postgraduates, the academic staff, the support staff, and most of all, their supervisors. This is going to be the case whether the student has newly arrived at the university or has already studied there for several years. In the latter

case, the evolution from undergraduate to postgraduate might be deceptive, because although there might already be an established familiarity between the students and staff, this relationship will be necessarily but subtly changed. When a postgraduate student embarks upon a PhD they are normally treated as an honorary, if temporary, member of staff. They will have more generous permissions for library and IT services than they had as an undergraduate, they might be encouraged, or even expected, to acquire a teaching commitment in the department, and they will certainly be expected to hold their own in academic discussions when their subject area comes up.

In all of these changing circumstances, the supervisor has a mentoring and advisory role for the student, and this relationship needs to be established at the outset. Although the precise topic of the PhD study may have been decided by the supervisor, who has raised the money to support a student, then interviewed and appointed a likely candidate, the fact is that from the moment of embarkation, the research topic is owned by the student, not the supervisor. The student must go from a standing start to becoming a

recognised expert in this area of research, and this can only be achieved if the student makes the subject their own territory. The role of the supervisor(s) is to help the student to develop the skills to complete the task. Obviously, the supervisors have a vested interest in the student reaching a successful outcome, but this stops short of actually doing the work for them. The distinction is that the supervisors have already won their own PhD, it is up to the student to rise to the occasion and prove their own abilities.

To start with, this is hard. Possibly the student is over-awed by the reputation of the institution, or the supervisors or by the academic language that is used to phrase the nature of the challenge. Conversely, they might initially think that this is a continuation of their undergraduate work and that they just need to turn up in class often enough and take good notes in order to pass. Traditionally, PhD students have normally been based on the same campus as the main supervisor, although second and third supervisors might be located on a different campus, or even in a different university. Increasingly, however, the use of digital communications, the internet, online library resources, and

more flexible ways of work and study, have liberated the PhD study out of the cloisters and into the digital world of distributed education. There are a lot of tools and techniques to encourage and support tuition and the supervision of PhD research at a distance, and we would like to draw attention to these as we explore the experiences of the PhD student and the roles of the PhD supervisor in a digital environment. Like all tools and techniques, the suggestions made are just suggestions, there is no compulsion to rush out and adopt them uncritically. In addition, the usual caveat applies when discussing digital resources, in that this is a very fast-changing subject area, so software applications and services rise in popularity and disappear without trace; they are improved, superseded, and adapted to suit other purposes. So, much like the PhD process itself, their use is a voyage of discovery and transformation that can lead to new ways of thinking about old problems.

Supervision at a distance

Increasingly, services which we used to consider could only be delivered face-to-face, are being offered through online media. The supervision of research students is no exception to this trend, and although there is a belief among some supervisors that the PhD student needs to be ‘just along the corridor’ from the supervisors, really this is more for the comfort of the supervisor than the student! In fact, with some aspects of the work of postgraduate research students, there is an argument that the student can get more attention, and perhaps better attention, by combining face-to-face with online opportunities. In our work, a recurrent question is, ‘How can I do this activity with a student who is at a distance’? In some cases, it might simply be making use of video-conferencing software (for which there is an increasing diversity of sophisticated software available) to have an in-depth discussion; in other instances the student can be referred to a host of useful online resources to enhance their skills and knowledge.

In our experience, almost every instance of thinking through the issue of how a face-to-face educational experience can be moved (at least partially) online, means that the re-thinking process strengthens the pedagogy and the educational rationale. In part, this may be because we are fundamentally re-thinking what is really essential in the educational activity itself (as opposed to how the 'lesson' we deliver has evolved away from what we initially started with). On the other hand, experience tells us that there is more than one way of learning/teaching a subject, so adding various online educational resources might be considered simply extending the tool-kit that we have at our disposal, and that we are prepared to share with the student.

A helpful online resource when getting started on a PhD is http://www.findaphd.com as this combines a number of useful resources and networks. Obviously, it can be used to find a PhD position which the prospective student might consider applying for, but the resource goes way beyond this. Details of funding opportunities and different types of PhD offers can be viewed and compared. There are

sections on the ‘nuts and bolts’ of what constitutes a PhD, as well as advice on how to cope with the most common difficulties, and suggestions of help from a variety of sources – including other PhD students. An interested surfer can browse through the PhD opportunities that are currently on offer, compare the details, and even contact the proposed supervisors in a variety of countries for more information on their research proposal. Most importantly, the surfer can access this information at their own convenience rather than travelling for an hour to ask a question that requires a three-minute answer. For these reasons, we make a point of investigating new online opportunities for each teaching and research activity that crosses our paths.

http://www.findaphd.com is a freely available, open-access site, and you can register to get regular updates emailed to you. On the site, you can search for various topics and guidance suggestions, such as ‘working with a supervisor’, ‘what to expect’ and ‘preparing for study’. The supporting text has short articles on a wide range of issues such as what is meant by ‘critical thinking’, how to select and justify

your research methods, and tips on how to organise and present your research so that other people can appreciate your work.

Like all of these sites, this one will not answer all of your questions, but it does contain different perspectives and useful information from people who have a lot of experience. When you are just starting out on your PhD research, not all of this advice will seem equally relevant. It makes good sense, however, to familiarise yourself with the variety of information on the site, and to bookmark the URL, because you might want to return to these topics later in your studies as these issues take on a new relevance. This advice also applies to the supervisor, because you might wish to direct your student to read the advice which will reinforce (or give a different perspective to) guidance that you give to students in tutorial sessions.

The suitability of the research student

What sort of person makes the best PhD student? What characteristics and attributes should a supervisor look for? Fortunately there is no blueprint that needs to be rigorously

imposed. Each and every student is different, but there are some common attributes. Obviously, every supervisor hopes for the perfect student, who will be meticulous, self-motivated, well-disciplined, and a competent all-rounder! The reality is that most students who make it as far as being registered for a research degree will have all of these attributes in some measure... and they all bring their own challenges. Student levels of confidence, competence and performance will vary throughout their period of study, and part of the job of a supervisor is to moderate, encourage, and develop these competencies, and perhaps to add a few more skills as the need occurs. The journey of the PhD research student is essentially and fundamentally a voyage of transformation. The person who successfully completes a PhD is really a different person from the one who began; more confident, more skilled, and more competent, with a fundamentally changed outlook on their own professional abilities.

In the old days, it was felt that the only way the student could acquire this change of state was for the student to inhabit the same environment as the professor. Not in the

same room, of course, but certainly living within shouting distance. What really intrigues us in contemporary academia, is the ability to utilise a wide range of digital technology to narrow the conceptual distance between a supervisor on campus and a research student at a distance. We frequently take for granted the diversity and sophistication of the digital technology within our easy reach. From ‘simple’ email and Skype, to more complex social media, screen-sharing, and file-sharing protocols, there are lots of digital tools that, while they have not been specifically designed for academics, are amply suited, with perhaps minor adaptations, to the intimate world of research student supervision.

According to the stereotype, traditionally, one, or perhaps two, academics would get together to think about a burning research question that interested them. They would then seek funding to cover the costs of employing a student, meet the needs for associated costs such as tuition fees, library and IT resources, possibly travel and equipment for field work, and so on. Then they would advertise, interview, and appoint a research student, who would come to work

full-time under their instruction, usually for around three years, until the student completed writing up and defending a research thesis that (usually) generally supported and was an extension of the life-work of the main supervisor.

This is still a common model, but fortunately the flexibility and innovation that has evolved at all levels of progressive education, has resulted in a wide range of new study options. It is increasingly frequent for research students to be self-funded, (or part-funded by an employer) and studying part-time. These students will normally be working as fees and other bills have to be paid, and they may also have family responsibilities such as the care of young children or elderly parents, that would make full-time study impossible. On the other hand, what they lose from the energy and momentum of working full-time on an absorbing research project can be made up for by the increased time-span for reading, cogitation, and gathering data.

There are two key considerations that apply to any student, whatever their mode of study, and it is imperative that the supervisory team make these clear from the outset. Firstly,

it needs to be understood and emphasised, by both student and staff, that the research project belongs to the student; and only the student can make a success of this. The supervisors should provide initial direction, and will offer constant advice and reinforcement throughout the period of study, but the important decisions – for better or worse – need to be made by the student. It is the student who will need to advocate and defend the thesis, and who will reap the rewards.

Secondly, the supervisors need to provide an appropriate induction for the new student as soon as they start working. No matter how smart and self-confident a new student might be, it is wrong to assume that they will just ‘pick things up’ as they go along. Whether it is the simple matter of making introductions to co-workers, or the more complex business of learning specific research methods and IT technical skills, a common-sense approach dictates that the supervisors should assume a zero baseline of experience until proven otherwise. Research has clearly shown the benefits of a good induction for students starting on undergraduate courses, and it makes no sense to assume

that it would be otherwise for postgraduate research students. In fact, it is very likely that the research students will soon begin to overtake the supervisors, perhaps in the details of their specific research methodology, their awareness of just-published journal articles, or their adoption and use of new digital applications such as social media services. This is to be encouraged.

For these reasons, it makes sense to have an online, or at least a digital and accessible, version of the required skill-set and supporting resources that will be issued to research students at their induction. No matter how good your memory is, or how copious your note-taking, there are a lot of new things to remember and the new research student is unlikely to remember them all accurately. Nor do they need to. An online repository of relevant information, either on the institutional intranet, or on the open internet, immediately allows users different levels of access. Slow learners can reread and re-visit the information at a later date; all learners can visit the information for revision, or when the need-to-know becomes necessary. Fast learners and those who have specialised needs can delve into layers of

additional information – the extras that are nice-to-know in greater depth but cannot normally be covered in generalised induction sessions.

Another important point in favour of compiling a suite of resources online is that the very act of being required to think through in advance all the possible situations and resources that might be needed by the research students, tends to mean that a really comprehensive resource can be built up. The need to prepare in advance for an asynchronous reader at a geographically distant location, rather than photocopying last minute, ad hoc guidance to be handed out in a classroom, usually results in a better designed set of resources. Of course, an additional beauty is that these resources can be updated easily and they are available 24-7, unlike any supervisor that we know!

Enjoy the process!

One of the very first things that we say to a new PhD student is that they need to have fun! This is not quite as counter-intuitive as it might at first seem. Usually we say first that actually stamina is at least as important as intelligence in

completing a doctorate by research. We have known several very clever people who, for one reason or another, could not manage to finish the PhD that they started. This is not as surprising as it might appear, because a PhD is, almost by definition, a hard thing to complete. If you do not have the staying power when the going gets tough, the temptation to throw-in the towel and go off to do something more interesting with your life, becomes very enticing. This is why the student (and the supervisor!) needs to really enjoy the subject that they are studying in great depth. When data and competing concepts get confusing and complicated (as they inevitably will) it is worth a lot to be able to enjoy the difficulties of the subject, even to relish them. If the topic surrounding your research question does not make you want to really absorb yourself in the fun of finding out more, then you are probably doing the wrong job.

A regular ‘safety-valve’ is helpful, whether this is a change of task – (such as a spell of fieldwork) or a routine that allows a healthy balance between reading, writing, sport, family, and socialising with friends. The contented student

should be able to take a short break and return to the academic battle the next day with just as much (or more) enthusiasm as when they first started. At sporadic intervals We like to send our research students a link to a funny story, or a cartoon, such as can be found at www.phdcomics.com to poke fun at some aspect of the PhD research process. This website has hundreds of cartoons on almost every aspect of the PhD experience, and some of them ring so true that they are almost painfully funny. It certainly helps if we can laugh at ourselves and see things in perspective, but by far the best solution is to spend a lot of initial thinking-time considering exactly what is the best wording of the research question (and sub-questions) so that at the end of the studies both student and supervisor can honestly say that, whatever else, they had a lot of fun in the process!

The main research supervisor

In the course of a normal year, we frequently help to organise introductory training sessions for new research students and for lecturers who are just starting out to supervise research students for a PhD. Naturally, one of the

issues that we address is to consider what makes a good supervisor. This is both very simple and quite intangible. The simple version is that the good supervisor guides, advises, and supports the research student through the entire process – from the first tentative steps, to the final success at the viva and subsequent graduation. This seems rather obvious, and it is fair to ask for a more detailed breakdown of the roles of a research supervisor, and this is where it gets a bit more complex. Firstly, there are two main roles for a supervisor – the Director of Studies, and the Second (or Third) supervisor. Let's deal with the main supervisor first.

The Director of Studies (or lead supervisor) is normally the most senior of the supervisors, though this is not always the case. The main supervisor will be responsible for the week-by-week guidance of the research student, although the frequency and extent of contact time will vary widely for different students and subject areas. This supervisor will be the main link between the student and university administration, possibly a Graduate School or similar research management section. There will be regular

progress-monitoring reports to complete (perhaps six-monthly), and those will normally be based upon regular formal meetings with the student to discuss the progress of the research. In addition, there will probably be lots of intervening meetings, of both short and long duration, as the supervisor responds to questions from the student, suggests tasks to perform, or recommends reading to enhance some area of knowledge that the student might benefit from. Some of these meetings might be quick, ad hoc conversations in the corridor or the café, while others will be formal reviews between the student and the whole supervisory team.

Normally the only professional requirements are that a) the supervisor has a PhD already; b) that they have some area of expertise in the subject area that they are proposing to supervise; and c) that they are attached to an academic institution. Frequently, (although this is not always the case) the main supervisor is required by the university to have successfully supervised at least two PhD students to completion, usually undertaken in the more junior position of Second or Third supervisor. In certain circumstances, a

non-academic expert may also be appointed as an Advisor, rather than a supervisor, if this person has some relevant specialist skills or knowledge, for instance an important industrial contact.

Like all walks of life, some Directors of Study are more diligent than others, and have greater or lesser social skills and leadership qualities, but basically they all have a vested interest in assisting the student to complete their PhD. Usually the supervisors share a common enthusiasm for the research topic with the student, and this can help to co-create the voyage of discovery. Even with the best supervisor, it would be foolish to expect them to know the answers to everything, but hopefully their level of experience should be able to suggest a logical way to discover these answers. We like to give detailed (line by line) feedback on the first pieces of academic writing from the student, so that some guidance on the style and standards of academic writing, the level of detail, and the quality of the text can be established, but some supervisors may take a less hands-on approach. We consider that our role is to help the student to understand and deal with the

academic challenges that they face during the research project, but it is also to guide and offer advice on how they might tackle these challenges, to provide some scaffolding to support, but not to do the work for them.

The Second (or Third) supervisor

Although the main research supervisor normally has the most contact with a research student, the role of the Second supervisor can also provide a useful balance in that relationship. Normally the second (and perhaps a third) supervisor has limited contact with the student, perhaps as little as three or four formal discussions per year, but the input they can provide is also valuable. It might be because the two supervisors cover different aspects of the same research problem and so can give different suggestions to cope with problems faced, or they may favour slightly different research methods or emphasis in the investigation. Even when the advice is similar from both supervisors, it can provide a useful triangulation to reassure the student that they are on the right (or the wrong!) track. Educational research has indicated that the way that we supervise

research students is often heavily influenced by the manner in which we ourselves were supervised at the same stage. Some supervisors prefer a distant role, only making contact through formal meetings to check that the research is progressing well. They expect their research students to be independent-minded and self-motivated and see a supervisor's role as a combination of safety-net (for consultation in times of trouble) and manager (ensuring that all the key stages of development and reporting are taken care of).

At the other end of the spectrum there are supervisors who seek to micromanage the PhD project. Resist this temptation! Although the supervisor has a strong self-interest in ensuring that the student's research project is successfully completed, the work needs to be done by the student, including making the mistakes, false starts, and the hours of working out the best way(s) forward. The relatively light touch provided by the second supervisor can easily be provided via Skype or other such distance-shrinking audio-visual technology. If it is done on a regular basis, perhaps with some periodic face-to-face meetings, this can also be

an option for the main supervisor. A benefit of this is that the supervisory team can be brought together on the basis of the skills and enthusiasm that they provide, not simply because they happen to be co-located in the same building or campus. Gone are the days when a PhD student needs to be based just along the corridor from their main supervisor – and anyway, many research students who were residentially based near their supervisor's office will tell you that their supervisor was so busy globe-trotting to conferences and fieldwork that they hardly saw them for months at a time. Although the UK universities insist upon an external PhD examiner from a different university to ensure the equivalence of the level of the degree, it's a pity that there is so much emphasis attached to supervision by single institutions as this would seem to be a great opportunity to bring together cross-institutional expertise at the supervision stage, as well as at the final viva voce.

Using videoconferences for research supervision

Over the past few years we have been experimenting with the use of videoconferencing for conducting tutorial discussions with PhD students (and also for an occasional viva). There are several reasons for this. Firstly, in a geographically distributed institution like the University of the Highlands and Islands, we are not all located in the same building, or even the same part of the country. The catchment area of the 'local' university covers a geographical area bigger than a small country. Both staff and students who are participating in a tutorial or seminar might be participating from widely dispersed locations and may rarely meet face-to-face. It used to be a presumption in most universities that the research student would be based in a room just along the corridor, or somewhere convenient within the department, convenient that is for the main supervisor. With the increasing number of part-time research students and the benefits of communications technology, we would argue that this is no longer necessary, and possibly no longer even desirable.

The advantages of using videoconferencing are several, whether it is the high-definition system which is available at the UHI, or the quick-and-easy software connections for less formal meetings. Services such as Skype and Facetime are in common public use, and similar techniques can be extended into non-work activities. (Normally institutions such as universities and health trusts prefer dedicated software that provides secure access, rather than open solutions, but the process is generally similar). Firstly, although it is not always imperative to see the person to whom you are talking, the ability to see facial cues does give an extra quality that is not available in simple telephone conversations. In the same way that co-location in the same room allows speakers to see the body-language of their audience, the video presence enables participants to see their colleagues smile, nod their head in agreement, or simply watch their eyes glaze over! We have found this very useful to observe if viewers actually realise when a joke is being made!

Secondly, probably the most convenient advantage of vc (videoconferencing) is the ability to connect people from

almost anywhere. A regular meeting between the main supervisor and the research student at a distant location can be joined by another supervisor at a third location. This provides the best opportunities for networked support, regardless of where the expertise is based. Meetings can be a highly structured discussion with a formal agenda, or a quick, ten-minute focus on a specific point of deliberation. The participants can join from home, or work, or even from the middle of fieldwork, and the media is sufficiently simple and easy-to-use that even short, ad hoc meetings to discuss the wording of a single paragraph, can be arranged at the drop of a hat.

Thirdly, most video communications services have the ability to record the meeting. This is probably not going to be used on every occasion, but for key presentations, or for intense sessions of very complex discussions, the participants have the advantage of being able to replay the meeting, analyse the dialogue, and take notes at their convenience.

In many institutions, whatever the official rhetoric, the contact time between the research students and the main supervisors can be sparing, not to say sporadic. The ability to video-link with the supervision team at prearranged times, wherever they are in the world, is a great tool to give meaningful and networked support to the research student, and to provide quality time when it is most needed.

Whose project is it anyway?

One of the very first things that we say to a new PhD student, and we repeat this on several future occasions just to make sure that the point is well made, is that this research study is their project, not ours. This might seem obvious, but there are good reasons for reinforcing this responsibility early in the research student-supervisor partnership. It is to be expected that any supervisor has a vested interest in getting their student(s) successfully through the PhD process. By definition, the research topic that the student becomes immersed in is of common interest to the supervisor(s), who may already have spent many years of their lives researching similar or allied topics.

In addition, supervising successfully a number of research students to gain their doctorates is looked upon as a merit-worthy academic enterprise, and success in supervising should reflect well on the career aspirations of the supervisor. Finally, there may be other benefits, such as new ideas, new ways of thinking and the 'original contribution towards knowledge' of the research topic which, by definition is the mark of the PhD. This should also stimulate, inspire, and breathe fresh life into the academic thinking of the supervisor(s). So, all round, there are lots of justifiable reasons why it is in the supervisor's best interests that the research student (whom the supervisor presumably had a say in appointing) is bright, vibrant, innovative, and successful in the completion of their PhD.

There are limits, however. Although the supervisor wants the research student to write well, they will not write the dissertation for the student. The supervisor can recommend, guide, discourage one activity and encourage another, however when the student walks into the final viva to defend their thesis, they must be able argue their own case and justify their own decisions and conclusions. Some

supervisors may get too close to the student's research topic, resulting in a wish to influence it, or steer it very firmly in a different direction, and up to a point this is natural. One student associate eventually parted company with his supervisor because the new research evidence of the student was indicating that it was beginning to undermine the views held by the supervisor over a long career. Rather than embracing the change, the supervisor sought to influence a different interpretation; the research student resisted, and was awarded his PhD in due course.

Our job as supervisors, with every student, is to listen to their thoughts on the research topic, make suggestions, discuss the latest academic reading, bounce ideas off, encourage experimentation and exploratory thinking, encourage them to write down their ideas and their results, and to work together as a team to analyse what these results actually mean. We give feedback verbally, and in a written form, and while we expect the student to listen to what is said, we do not expect them to necessarily agree with everything. The final decision on what to include and what to omit from the dissertation, on how many samples or

how many interviews are needed, must be the decision of the research student. It is the students who will need to defend their decisions to the academy, not us.

The path of study for a PhD is much more about learning the process of research and hoping at the conclusion there will be some good results which might make a difference. Above all the role of a good supervisor is to help the research student learn the rules and tools of the trade, and to be supportive in that process – even if that support requires some rather blunt advice which the student does not initially welcome and means that more hard work is required!

Chapter 2:
The review of relevant literature

Most PhD students start out with at least a superficial knowledge of the key issues in their chosen research topic. They will already have completed a relevant undergraduate degree to a high standard (usually a first-class or a 2:1) and may also have done a Master's degree in a related area. The working title of the student's research topic, and probably the primary research question, will also have been discussed. So where does the student actually start working? Quite frequently, the student exhibits one of two contrasting behavioural states. Either they are a bit stunned to find themselves actually doing a PhD and a bit overwhelmed by the task ahead, so they do not really engage with anything very constructive; or else they are so enthusiastic with the idea of research that they want to go out immediately to start collecting samples, or interviewing, or running an experiment! As is so often the case in life, the reality needs to be somewhere in between these two extremes.

As it is unlikely (possible, but unlikely) that your research student will invent a whole new epistemological discipline, a whole new branch of science or humanities, the supervisor needs to direct the student to obtain a good knowledge about what is already known about their research topic area. There are several ways of doing this, which we will come to later, but the guiding principle is firstly, to read widely and deeply. Starting with a few of the most important papers which have been published in the academic literature, the student needs to explore the subject, follow leads (some of which will be blind alleys) and take notes of the salient points. The temptation is to read a few papers then rush out to gather new data, but this would be a mistake. Many research students are surprised (some are delighted) when they are told to spend the first three or four months (at least) doing nothing but reading and taking notes of what they have read. Slowly, with a systematic approach, a picture will begin to build up. The student will develop a deeper understanding of the subject area, probably discovering whole new areas of subtle variations to consider, and by elimination they will discover the important areas of the subject that are less well-known.

This reading is not just for pleasure, and while it should start to tail off as the student becomes familiar with the academic landscape, keeping up-to-date with the academic literature is essential right up until submission of the dissertation. The first six months are the most crucial, as the seminal papers are identified, read, and critically summarised. This information forms the backbone of the literature review, which in turn is the foundation of the introduction to the research topic. Supervisors in some subject areas like their students to start the dissertation with a short background chapter and then do a literature review, but for others the literature review *is* the introduction to the topic, so it needs to be well-considered, well-structured, and reasonably comprehensive. Getting research students to begin their studies by immersing themselves in the literature for months at a time is actually no soft option; systematically done, it's a lot of hard but essential work.

Where to start reading?

This sounds like a trick question, but in a similar way that a long walk, or a marathon, begins with the first step, so the

literature review begins with the first academic paper that the student reads. Normally, when starting out, the supervisor will direct the research student to three or four good papers which are especially relevant to the research topic under consideration. The student will read these, take notes, and then turn to the reference list at the end. As a guiding rule, the researcher should follow-up any and all of the references cited in the text of the paper which are in any way interesting, challenging, or crucial to the argument that is being made. From these first few papers, the research student will possibly discover half-a-dozen or more references in each paper, which now also need to be read. At this level of study there is an expectation that if the researcher is going to quote anything, or even make a reference to any previous academic work in context, they really need to have read the original article. It is not enough to say, ‘As was noted (Bloggs in Somebodyelse, 2015) it is clear that…’ because it may be that the way that Somebodyelse used the idea(s) of Bloggs was wrong, or not how Bloggs intended that data to be used. There is always the danger of misinterpretation. The student needs to read the original text and reach their own understanding.

Over a period of time, the student will read a lot of academic articles, track down the evidence which is cited in these articles, then read these follow-up articles too. And so on. From an initial 3 or 4 papers, the lines of follow-up investigation spread out like the roots of a tree. One of the signs that will tell the student when they are coming to the end of their required reading, is when they start to see the same papers crop up again and again. There will undoubtedly be some blind alleys, when the reading slips off in one particular direction or another that is not really useful to the current research project. This might be because the papers referred to are old and the knowledge has been surpassed in later years (this will vary between subject areas, such as fast-moving subjects in science, computing, or e-learning). In some subjects it will be necessary to reference much older publications, either because they set a marker in the development of the subject, or because you want to contrast them with contemporary methods and disciplinary thinking.

A good idea is to visit the college library collection of previous PhD dissertations to check for a similar or related

subject area. Our preference is to search EThOS (the British Library online index of UK PhD theses) which is free to access. This gives access to every PhD abstract that has been produced in the UK, and an opportunity to order a copy if a particularly interesting match is found. The object of seeking out a similar PhD is not simply to read about the subject area (which you will extend and surpass anyway) but also to get a feeling for the structure of the PhD dissertation, and to get a fast-track on the references that were used to provide the evidence for this thesis. In the old days, people used to talk about students 'reading for a degree in X' rather than studying it, and it is certainly true that the more effort that is initially spent on reading about the background and the latest information on the subject, the better placed the student will be to make informed decisions when they begin to gather their own research data.

Keeping track of articles

One of the key skills in any research project is good organisation. This is especially true for a PhD research

project, which normally takes at least three years of full-time study, or up to seven years part-time. Students start off by reading two or three seminal articles relating to their research topic, but the field of reference will grow dramatically within the first six months, and citations will continue to be added to the reference list right up until the final version of the dissertation is submitted. Even then, the external examiner(s) might insist at the viva that the student needs to give more consideration to a particular area of the research which will require further reading. Without a careful system, it does not take long for this growing pile of references to become unmanageable!

Some researchers swear by the old ‘traditional’ system of individual index cards, alphabetically filed for each reference. This has the advantage of being able to add notes, summaries, questions etc., and also it is not dependent on technology, so does not require electricity or a battery. On the other hand, a file of cards is not very portable, can be a bit clumsy to sort, and not being digital, is less flexible to re-purpose. There are a number of software packages, both free and commercial, that allow

you to store and sort references on a computer. A product such as Refworks provides an online database to manage bibliographic data, and this type of software has numerous advantages, including being able to manipulate the data to display in different academic styles, create bibliographies for different publications, and also to access the data from different devices and locations. The university may subscribe to this product or some comparable service. Personally, we often use a simple word processed file. This does not have the flexibility of customised bibliographic management software, but it has the advantage of being easy to create and use without specialised training. To create a bibliography for a new article you simply cut-and-paste from your master list (not forgetting to keep back-up copies of the master-list in other locations!)

In addition, Mendeley https://www.mendeley.com/ is free software for managing and storing references and pdf documents which can then be used to annotate the articles and share online with students and other colleagues. It is easy to use, (see the instructional videos on YouTube) and allows the creation of a personalised library collection,

enabling access from any internet connection. So, for example, a researcher could import an article, store it in a personalised online space, add comments and questions to the file, then share with an online social network that could include a research team, supervisors, or a cohort of students. Whatever filing system for research articles is used by a PhD student, it needs to be able to store, display and allow easy retrieval of anything that has been read over the entire duration of the study, which is not a simple task when this means five or six hundred individual references.

The need to know and the good to know

There are two main purposes of the literature review of research, firstly to provide a background introduction to the chosen research area, and secondly to provide a justification for the research about to be undertaken by documenting how the topic under investigation relates to previous research. To do this, the researcher will need to cast a net widely and be open to an extensive range of prior research which is directly, or indirectly, relevant to their own specific research topic. This is where the first problem might

arise. How does a new researcher know if something is essential, or relevant, or simply something of tangential interest?

There is the ‘need to know’ information and the ‘good to know’ information, and both are required. The literature review can come in different styles, normally as the opening chapter to a dissertation, but the review could also be spread throughout several chapters, especially in a multi-disciplinary study. It is a bit like a detective story – the text has to let the reader know what the key issues are, how the research area has developed, and what has been tried before. In setting out the highlights of the history of the specific research topic, the reader needs to know the details of what is already known about that research topic, and consequently, what aspects are less well-known and might be the subject of the subsequent research by the student. We like to think of this as the ‘landscape’ of the proposed research – the high-points and the low-points, the obviously recognisable landmarks and perhaps some of the hidden depths. By the end of the literature review, the reader should have a good understanding of the main features of

the topic, why it is important, and what the academically contested areas are.

Then there is the ‘good to know’ information, and this can be more problematic. In the body of previous research, there will have been many false-starts and blind alleys. There will be respected academic literature which has investigated the topic, set out their results, and given an interpretation of the known facts, only to have been overtaken by subsequent research and shown to be wrong, or at best only partially informed. This is good information to know because it might save time by indicating a line of enquiry which has been tried and found to be fruitless, or perhaps a method of gathering data which has since been improved upon and might therefore be worth looking at again. The longevity and the depth of study required for PhD research means that the student has opportunities to explore the realms of the possible, the unusual or off-chance lines of investigation which just might lead to a breakthrough, or a new way of thinking about the research problem. As long as this ‘off-piste’ work is kept within reason, and not allowed to detrimentally influence the main

flow of the research thinking, it is to be encouraged, because there are many great discoveries which have started when someone thought, ‘What if I do *this* instead…?’ The evidential basis for many of these directional changes in thinking should be included in the review of the known academic literature. That is why it is good to read widely, read deeply, and read often.

Description versus critical review

In constructing a literature review of any proposed research topic, especially for new arrivals to research, there is often a tension between giving a straight description of the relevant academic articles rather than providing a critical analysis. This is understandable. The main purpose of the literature review is to provide subsequent readers with an introduction to the subject area of the research, and this is done by constructing a narrative – a story – of the evolution of the subject area to the stage that we understand at present. This description describes the ‘landscape’ of the research subject area – the significant and salient points and the less well-known or contested points. The literature

review, however, needs to be more than just a simple description of each significant article, more than a sort of He said… then she said…' list of opinions.

The literature review, to be really useful, needs to critically evaluate the importance of each article, as well as providing a description of what was said, what methods were used, what degree of reliability the data has, etc. The reader has not only to understand the history of the development of the research topic, but to appreciate the relative merits of previous work. This is relatively easy at the start of the project, but by the end, juggling several hundred citations becomes a challenge.

A number of students and colleagues have drawn our attention to various computer software (or apps) which enable the compilation of a reference list very quickly. Once a (generally free) account has been created on the app, entries of citations for books, journal articles, and lots of other artefacts can be added easily, building up a library and/or a bibliography. This reference list can be built-up and accessed from any device with a web connection.

Reference lists can be divided into separate (or connected) lists for particular projects (articles, conferences) and each list can be exported to various formats, including a simple word document. Each citation can also be annotated, so using a simple set of phrases and tags, a critical reference list can be compiled in minutes. Some apps also allow citations to be input manually, which is required for older publications and those without a barcode, or by scanning with a mobile phone. (Some e-journal providers enable citations to be exported directly to your bibliography with just a click). There are several easily accessible referencing systems available at present, but the selection keeps changing and updating as new apps appear or merge. Do your own homework either online and/or by consulting peers and colleagues) before you decide on your choice of referencing software).

Whichever method is used to compile the reference list, there are two golden rules to adhere to. Firstly, start early to compile the reference list and keep on top of it. As an article or book is read, and if you know it is going to be referred to in the text of the dissertation, it should be

immediately and accurately added to the reference list. Secondly, keep a note on each article, not simply the list of all the references. Copy the citation and add short notes on each reference so that you can remember easily what grabbed your attention when you first read it. Do not trust your memory to remember details such as page numbers (for direct quotations) and DOI numbers (for direct web access), or even for the key points of analysis and critique. As the numbers of citations begin to mount, the details begin to blur and disappear. Your notes should act as a memory jog, and also as a useful item to share with colleagues to discuss the merits and demerits of individual articles. As time progresses, because they are focussed on one specific research topic, the PhD student will discover relevant articles which the supervisor(s) may not have seen, and anyway, there is life after the PhD so you might want to refer to some of this material again, years down the line. Do not trust your memory!

Maintaining a balance

A common question from research students, when the first self-indulgent spell of reading begins to weary them, is 'When will I know I have read enough?' Our answer usually is, 'You'll know!' This might not seem very helpful, but it is certainly accurate. The students start off with a few key articles, then extend their reading list by following up interesting-looking references cited in these early papers, and then systematically searching for relevant new articles using Google Scholar, online library search-engines, and journals with promising titles. Eventually, the circle begins to close, and most of the helpful articles being discovered are those that have already been mentioned (and read) in earlier articles. Within the broad area of the chosen research topic, the student will have identified a high percentage of the most relevant journal articles and books that will be needed to give a comprehensive description of the highs and lows of this research topic. But the question will still be asked, 'Is this enough?'

There are several answers to this. At its simplest, it is never enough. There will always be the possibility of missing important articles, either because they have been published in less well-known journals, or because they are older than a cut-off date (this is more important for fast-moving research areas), or simply because the keywords, meta-tagging, or article titles simply fail to attract the researcher's attention. So, if we accept that it is difficult to identify 100% of the relevant literature on a particular research topic, the supervisor can encourage the research student to do two important things. Firstly, to establish a clearer focus for their research by using their now-extensive knowledge of the relevant literature on their topic to define a tighter area of interest for further study. By now it will be obvious that the research could branch out in any number of new directions, but also obvious that this 'scatter-gun' approach is less likely to be effective, in time and effort, in obtaining any meaningful answers. To solve many complex problems it is normally necessary to identify a number of problematic research questions, and then investigate them one-at-a-time.

Secondly, and this is crucial, the supervisor now needs to encourage the research student to articulate their chosen research methodology, identify the best methods of gathering new data, and then make a start in gathering that data. The student can read and read and read, but at some stage they also need to jump into the unknown. There are only two common characteristics of all PhD research, regardless of the discipline or the research methods; firstly, the finished presentation (usually the dissertation) needs to be demonstrably the work of the student (students in a team need to clearly identify their own contribution), and secondly, it needs to make a contribution (however small) of original work to expand upon our understanding of the research subject. In reality, the student will continue to read and add relevant new citations right up to the moment of submission (and possibly afterwards, if the examiners require it!). However, there are also other critical tasks to attend to. The initial reading should provide a good baseline of understanding for the student to quickly move on to other stages in the research process. In addition to writing the literature review, understanding the significance of previous research will help in deciding on the data collection

methods needed, in obtaining ethical clearance, and getting down to the exciting stage of breaking new research territory.

Chapter 3:
Deciding the general direction of the research

By their definition, PhD studies are seeking to untangle complex ideas and produce original thoughts on their subject matter, which are backed-up by a thorough examination of the evidence available. For this reason, deciding the aim of the research can be rather broad at first. When students' start-out and get asked the question, 'So, what is your PhD about?' the typical answer will be a rather hesitant, half-page explanation. Ask this question again when they are on the point of completing the PhD and the reply is likely to be a very concise and quite specific, single sentence. The process of systematic research casts its net widely, then refines and re-focuses subsequent investigations to reinforce, or challenge, previous ideas and insights. Seeing the process as a little piece of a much larger, complex mosaic of ideas can be helpful, but a bit daunting.

To help the process of the distillation of knowledge, there are some basic techniques that any researcher can use. Firstly, it is wise to recognise that the PhD, as with almost any complex task, can be broken down into a number of smaller tasks, and that the role of the dissertation is to explain these tasks logically and clearly. In compiling the dissertation, the research student needs to effectively present the story of the research, from the introduction to the conclusions, in a way that makes it easy for the reader to understand what might be complicated and challenging issues. To make a start on this story-board, some people might like to utilise the concept of mind-maps to graphically link and make sense of the multitude of tasks that it will be necessary to write about. Mind-maps do not really work for everybody, so you might prefer to construct a hierarchical list of all the possible sections and subsections. This has the advantage that such a list can very quickly be edited to provide the contents pages to the dissertation. Other people may have different techniques to create some structure for their subsequent work. For those who like diagrammatic checklists but struggle to find mind-maps useful, another way to help to identify the tasks that are required is to use

software to create an easy-to-construct flow diagram which uses simple text and drag-and-drop shapes to (re)organise the sequence in which the research tasks need to 'flow'.

Whatever planning style is adopted, and regardless of whether the research student starts with a question, a hypothesis, or simply a broad subject title, the aim of the research planning at this stage is to lay out with a broad brush the likely trend of the enquiry. Obviously the actual course of the research is likely to change tack several times during the PhD as new ideas emerge and light is thrown in some currently-dark corners, but the directional trend of the story, from the first sentence of the introduction to the last sentence of the conclusions, should remain relatively constant. To some extent, it helps at this stage to be as specific as possible in the identification of each possible section and subsection of the future research, but obviously this itemisation needs to be treated lightly so that it is flexible enough to change and modify. Treat it like a storyline which can be embellished or contracted as the research student's knowledge of the topic deepens and

extends. Like all good stories, there should be a beginning, a middle, and an end, with a path to link them up.

Revising the research question

As we wrote earlier, once the student becomes better acquainted with the research area, it will probably become necessary to slightly revise the original research question. There could be several reasons for this, but largely this is because the review of the previous academic literature on the subject has helped to clarify what the academic community already knows about the topic and what still remains to be discovered. Hopefully this will result in minor adjustments, rather than huge changes of emphasis, but it is important to recognise that this is an ongoing process which will require a bit of settling down. For some people, in certain subject areas, this settling-down process will take longer than others, and a crucial resource to help the process along is – surprise, surprise – the research supervisor! It might seem obvious, but when the research student becomes enmeshed in the research problem, it

seems that sometimes they forget to communicate effectively with their supervisor(s).

While we always emphasise that the research project belongs to the student, the supervisor also has a very direct interest in the success of the study, and regular discussions between the student and the supervisor are essential. The definition of ‘regular’ can be a bit loose. Does this mean weekly, or monthly, or what? In practice, meetings are usually closer together at the start and towards the end of the PhD, and a bit further apart during the middle period when the student is really getting into the data-gathering and analysis. Perhaps meetings might be every 2-3 weeks at the start, to help orientate the student and discuss the broad plans, and about the same regularity in the later stages to discuss feedback on the writing as each chapter gets produced. Normally, it is helpful to meet every 6-7 weeks in the middle phases of the study, just to keep on top of what the student is working on at that time.

Similarly, the word ‘discussion’ can be a rather misused term. We do not just mean quick chats in the corridor or tea-

room, and we do not mean that the student is brought in to hear a monologue from the supervisor. Discussion means both parties exchanging their views. A level of trust needs to be learned – trust that the student's half-formed thoughts and ideas can be shared and developed; trust, too, that the supervisor has the student's best interests at heart and will give detailed feedback which is both supportive and useful. The student is learning the business of advanced research, so it is unrealistic to expect perfection from the outset, yet many students are reluctant to share their ideas and their writing with their supervisor, perhaps in apprehension of looking inadequate. This is completely the wrong attitude. As supervisors, we cannot give advice unless the student tells us what they are thinking; we cannot give written comments or suggestions until a student submits some text for us to read. The more we learn of how the research project is developing, the more we can share our own thoughts and expertise. After each formal meeting we get the student to email all the supervisory panel a half-page summary of what has been discussed and agreed. No-one else needs to see this summary, but it is a useful record to look back upon as the research project evolves.

The effective research supervisor should be both approachable and knowledgeable, and ideally is the best critical friend that a research student could have. For a bit of light-hearted reinforcement of this almost symbiotic relationship, check the parable at http://www.cosy.sbg.ac.at/~held/fun/thesis_advisor.txt.
Don't say you have not been warned!

What do you need to know?

This is another difficult question when starting out on a PhD - for both the supervisor(s) and the student. If you knew the answer to that, then perhaps you would not need to undertake the PhD in the first place. It gets more complicated still (and yet, at the same time, more straightforward!) Obviously, the initial broad area of investigation will get parsed down into a more specific, more manageable topic, with a particular 'research question' or perhaps a 'research problem' which the student then attempts to explore in detail. The PhD, however, is more than simply a research project looking for a clever answer (although, it can be that as well). The most

important component of the PhD is to be able to demonstrate that the doctoral candidate fully understands the process of advanced research at this level. In the context of the research project, this means knowing (or learning) when to explore a new area (or branch of academic literature) and when to narrow the options and investigate in greater depth. It means learning when to stop reading and start gathering new data; when to start writing and when (and what) to re-visit, edit, and revise. As the student becomes more deeply embedded in the research topic, this becomes more important, because a fondness for the topic might obscure critical judgment, leading to an attempt to have a comprehensive investigation of everything, rather than developing a speciality which advances knowledge about the subject. Regular, open discussion between supervisor(s) and student is a crucial element that should help to make better sense of all of this.

Part of this learning process is also about correct timing. Students frequently complain that they ‘don’t have enough time’ to complete the project successfully, but this is often because they are trying to squash a six-month project into

three months. Bad planning means that something has to be sacrificed. It is always difficult to be deterministic about how long it will take to do each stage of a PhD, because each person and each research problem is different. As a rough guide, however, it is not uncommon that over three-years of full-time PhD research, the student will spend the first 6-9 months just getting to grips with the literature. During this time they will perhaps complete the draft of a literature review, giving a constructive narrative on the main events and key articles on the research topic to date. Towards the end of this period, the student will be developing a more intimate feel for the methodological approach and the methods of gathering new data that they wish to adopt. The methodology chapter can probably be drafted quite quickly at this point, although it will usually be necessary to revisit it later to 'tweak' the proposal to reflect what was actually done (as opposed to what was intended to be done in an ideal world). Having established the preferred research methods, ethical permission to conduct the research can now be applied for and hopefully speedily approved.

The PhD now enters the really interesting point – the 'meat' in the sandwich – where the student can now begin to conduct the research and gather new data. This period (subject to the above caution that every project is different) may last from the end of the first year (of full-time study) until the beginning of the third year. The student will be writing drafts of the results chapter towards the end of this period, and the final six months or so will usually be spent on writing the discussion/conclusions/recommendations chapter and tidying up the dissertation. Do not underestimate how long it will take to check all the spelling, grammar, citations, references, figure numbers, diagrams, and general formatting! A part-time PhD will obviously take longer than the three-year full-time project (normally 5-6 years) but this rough time-line can be adapted to suit. With a clear initial research question, and a careful approach to each subsequent stage in the process, 'what you need to know' usually emerges from the academic mist!

Where can new data be discovered?

Having prioritised what information the PhD student needs to know in order to make progress towards answering the research question, the next step is to consider where new data can be found. An initial role of the supervisor is to direct the student towards existing data, then to discuss what sort of data might be required to build upon this prior knowledge in order to give new insights. This might not be quite so simple as it at first appears. In an idealised view of research, the problem is articulated, the types of information needed to answer the problem are identified, and then the researcher goes out and collects that data to be analysed. In the real world, there are several problems to be addressed. Firstly, the data that the researcher needs might be hidden, unavailable, or simply difficult to get. Secondly, even if it is accessible, the data needs to be collected in a way that is impartial, systematic, and allows subsequent analysis. Thirdly, there may be problems with the design of the data collection methods, such as obtaining ethical approval, or enabling cross-comparison with previous data,

which need to be resolved before the primary research activities can proceed.

The role of a good supervisor is to help smooth the path of the research student without actually doing the data collection work for them. This certainly entails casting a critical eye over the research design and giving friendly feedback. It may require the supervisor to provide a covering letter of introduction for the student, to open doors and archives and to confirm that the student is a serious researcher worth giving some time to. In some situations it may be that the student is directed to existing data sets, either online or in archives, which can be used to provide preliminary analyses. Perhaps the supervisor has done some research on the subject already, so there are practical tasks which they can advise on – the selection of data-gathering methods, the construction of questionnaires or interview schedules, and of course ensuring that any ethical issues relating to the proposed research are adequately covered.

In considering what sort of data are needed to answer the research question, and where this data might be found, the research student and the supervisor have a common interest to ensure that sufficient thought goes into the pre-planning process. Thinking carefully in advance about the possible obstacles involved in collecting robust new data to explore the research topic, is time well-spent. Knowing what to ask will be critical for the study but knowing who to ask could be more important still. Depending on the subject discipline, and the nature of the study, the identification of key contacts, or an appropriate population of study participants, could make the difference between a perspective which gives a blinding flash of the obvious versus an exciting and innovative research discovery. It will not be possible to foresee every possible angle of the research process but having a clear idea of where data can be found, or with whom, is a big step in the research project design.

Writing the methodology

When starting a PhD, there is often a great mystique surrounding the selection (and writing-up) of the proposed methodology. It is important to remember that the term ‘methodology’ means more than simply describing the methods that are intended to be used for the collection of research data. The methodology is the whole style of approach to the study, including philosophy of the research and the means of gathering new data. Importantly, in order to understand the data which might be generated by the research, it is critical to first understand the rules which govern the various research methods selected, their strengths and their limitations. The selection of a variety of methods will enable the researcher to gather different types of data, and to look at the research area from complementary angles. As always, it is the role of the supervisor to help the research student put together the best methodology for the research project, that is to say, the best combination of methods through which the student proposes to gather new data on the topic. In most circumstances the supervisor will already have an

established preference for one or more methods. It might be necessary to include a second, or third, supervisor who has expertise in a complementary or different set of methods, particularly for multi-disciplinary research.

There are many ways of gathering research data, but broadly they can be divided into three major methodological approaches; these are quantitative, qualitative, and mixed methods. We do not propose to go into much more detail here – there are whole volumes written on even the specific subcategories of these approaches – but briefly, quantitative research explores through the *measurement* of phenomena, while a qualitative researcher looks for the emergence of *themes* or patterns in the evidence provided. A 'mixed-methods' approach is not simply a randomly constructed 'a-bit-of-one-and-a-bit-of-the-other' style, (the mixture must serve a particular purpose) but it does use both qualitative and quantitative analysis to provide an integrated perspective on the same research topic.

The reason that so much early attention is given to establishing the methodology of the proposed research

project is partly because the confirmation of the methodology will determine how the researcher looks at the world emerging through the data. Partly, also it will condition the forms of analysis, the reliability, and the compatibility of the research data produced. Any fool can go out and collect data, but getting hold of the type of data which will allow reasonably reliable conclusions to be established is a different matter. In some cases, the choice will be easy. There may be a very limited number of tried-and-tested ways in which an experiment can be constructed, or there might be a very similar study already published, and the replication of those methods to the new subject area might facilitate a useful extension and comparison of knowledge. The supervisor may even have pioneered a particular combination of methods over a long research career and therefore be in a good position to give the research student advice on the very practical issues, as well as on the theory. The literature review is, of course, one element of the methods of gathering together new data, and the published academic records will likely reveal a quite precise range of potentially fruitful options to follow. In any event, it is worth thinking hard right from this stage, in order

to avoid false starts and perhaps gathering false data later on.

What methods will help to answer the research question?

This is where it starts to get hard, not simply because the research student is venturing out into the unknown, but also because selecting the methods through which the research will be conducted will differ hugely between cultures, between disciplines, and perhaps between research subjects within the same discipline. There is no one-size-fits-all template which will allow a pick-and-go approach to selecting the most appropriate methods. In one sense, this could be an easy step, because it may be pretty obvious from the outset what methods will be needed in order to answer the research question(s). Almost all academic research methods will involve reading, either to follow-up on what has already been said about the topic or to put it into a wider context. After that, the methods might include interviews, experiments, observations, questionnaires, focus groups, and a host of other activities which will

change in emphasis from discipline to discipline. Getting the ‘correct’ mixture of these methods is what will determine the methodology, which is, the total system of procedures for further research.

Here is where high technology can come in. We say ‘high’ technology because even using a pen-and-paper or driving a car to conduct an interview is using technology, but of course we generally mean computer-based technology. In educational circles you will frequently hear the assertion that ‘the technology should never lead!’. This is certainly true, to an extent, but not entirely. For instance, if there are two (or more) ways to record research data, and one way entails using a high-technology solution which makes it easier, more flexible and/or more secure, then surely most sensible people would vote for the use of that technology. Examples might include, the use of specific software to compile the dissertation reference list and store it on the cloud; using Mendeley to store the articles online; the use of a survey service to conduct a questionnaire online rather than face-to-face, giving time-flexibility, wider geographic coverage, and the ability to utilise automatic data analysis

and presentation tools; the use of a free voice-recorder smartphone app to record interviews, the use of an app to give a written transcription of an audio recording … the list could go on and on.

A crucial factor in all of this is to consider carefully – right at the start – how these methods will allow you to analyse and hopefully make sense of the data which will be gathered. It makes little sense jumping off a high-point without knowing, even approximately, where you might land. Similarly, it makes little sense to gather mountains of data without any ideas how to begin to make sense of it. The supervisor should be able to give some clear directions, but ultimately each situation, each carefully worded question, is slightly different, and will have different constraints on time, resources, and abilities, so the student will need to be fully comfortable with the methodology before even starting to gather any new data. Prior studies in a similar area can help to provide some direction, but the precise mixture needs to be decided for each individual research project.

Chapter 4:
Implementing the data collection methods

Getting research ethics approval

Teaching someone about what we mean by the term ‘research ethics’ is one thing, but unless a person actually understands why ethical standards are essential, then everything else is fruitless. It is relatively straightforward to present examples of good ethical practice (and what happens when this practice is ignored) but this simply underpins the implementation of the ethical standards, not the need for them. Fortunately, there are lots of detailed guidelines and professional codes describing the expectations of ethical behaviour, many of which are readily available on the web. We say ‘lots’ because the ethical standards vary widely in content and detail, dependent on the subject discipline, the research methods employed, the level of study, and several other factors. This might sound

vague, but think about it. There will be a different level of scrutiny required if a researcher seeks access to the confidential medical files of patients, rather than simply asking patients to respond to a few verbal questions. There will be different standards again if the researcher plans to work with animals, or children, or vulnerable adults with diminished responsibility. There is also an ethical code for internet-mediated research, although this is new, variable, and highly contextual, so it is an evolving set of guidelines. The ‘copy-and-paste’ command has opened the door to a whole new set of rules and responsibilities for working in the digital environment. Despite these various differences, the purpose of research ethics is the same in each case – namely to prevent causing harm to the participants, to preserve their dignity (for example their right to anonymity) and to enable them to withdraw from the study without any undue pressure or penalty.

The supervisor has a crucial role in talking through with the student all of the possible ethical issues which might impact upon the research. Frequently, the ethical issues can be resolved very easily, and the research can proceed, but the

simple fact of working through the range of possible issues which might arise, and sharing experience on how they can be satisfactorily dealt with, is an important part of the professional training required by the student.

Every university, and most professional associations which come into contact with research, will have codes of conduct and formal procedures for scrutinising and approving research ethics proposals for research projects with which they are involved. This will require specific application forms, a scrutinising committee, and a formal code of research behaviour with which researchers are required to conform. Some procedures to gain ethical approval for research are particularly detailed, for example anything requiring contact with the health service, such as patient notes, contact with patients, or any engagement with either health staff or medical procedures, is likely to involve substantial detail and very careful research design.

For these reasons, there is a crucial stage between deciding on what research methods are to be adopted for a study, and the commencement of data collection. This

crucial stage is where the researcher submits the details of the design, methodology, and any issues relating to the collection and storage of data, for approval by the university ethics committee. Only after ethical clearance has been approved can the student begin to collect data. Failure to obtain approval before data is collected may result in the university deciding that this data is not admissible for inclusion in the study. If there have been any severe breaches of ethical responsibility, the study may be terminated or the student de-registered. For this reason, the ethical approval of a student research project is a gate-keeper stage of every study.

Key concerns in all research ethics matters are to avoid causing harm, to respect confidentiality, and to maintain high standards of moral integrity. The latter, for instance, might refer to a very wide range of ‘common sense’ standards such as to refrain from cheating, plagiarism, falsifying results, vested interests, and so on. Though they may seem ‘common sense’ to most of us, we tend to forget that many of these issues are perceived differently by different cultures, and influenced by pressures which might

be applied – internal and external to the institution – to 'encourage' researchers to produce favourable results one way or another. It is for these reasons that gaining the approval of the research ethics committee is a fundamental gateway for any research project before it can be seriously undertaken.

Fortunately, most research projects have fairly straightforward ethical requirements which are easily satisfied in full. A lot of the ethical safeguards might be regarded as 'simply common sense' (and so they are) but you might be surprised by the number of times people say 'Oh, there are no ethical issues with my research!' This is almost certainly wrong. Even the issue of whether the researcher with half-formed ideas should be 'wasting' the time of an interviewee who almost certainly has something better, perhaps crucial, to do, is an ethical issue. For these reasons, seeking ethical approval for research should be a serious matter, but not something to fret unduly about, if the researcher has properly thought through the research design. Once the ethical approval has been obtained, the researcher is able to jump out of the starting blocks to

engage with data collection, and this is where the real fun part starts.

Pilot studies

Before rushing off to take the final leap into the swimming-pool of the main data gathering exercise, it is usually advisable to conduct a quick reality-check. In some form or other, a short pilot study, which samples just a small part of each data gathering method, is a useful activity at this stage. Depending on the diversity of the selected data-gathering methods to be used in the main study, it could mean asking 3 or 4 people to complete a questionnaire, or trying out the interview questions on a few ‘volunteers’, or perhaps conducting a trial run of a bench experiment, just to make sure that things progress in practice as smoothly as they have been envisioned in theory. A pilot study can do several things. In the first place, it allows the supervisor to observe just how much thought, care, and background research has been already conducted in the formulation of the research methodology of this study. There may be some opportunity for improving the methods, or there might

simply be a reassurance that things have been well-planned… so far. Feedback at this design stage may avoid making elementary mistakes or designing a method which will lead to incorrect or misleading results.

For the research student, the pilot study can have multiple benefits. The reassurance of the supervisor is useful, but the feedback from the pilot participants can be even more critical. This is the time when slightly ambiguous questions can be reworded, and research methods can then be tweaked to make sure that they do what it is hoped that they should do. If a participant reports that the wording of a question is difficult to understand, or that there is no relevant category of response, this suggests that other people in the larger study will encounter the same difficulties. The error created will become multiplied when the full study progresses, and may become significant. The fault in the misunderstanding lies with the researcher, not with the participants being questioned. It is up to the researcher to construct questions which are unbiased, not leading towards a particular response, and are clearly understandable by participants in the sample population.

Similarly, with experimental design, if the experiment has a fault in its design, it is much better to find out at this stage through a short pilot study, than to run the experiments several hundred times before finding out that there is a fundamental problem.

Writing up a description of the pilot study is an integral part of the methodology chapter in the dissertation. If there were changes made to improve the design of the main research survey, (and even if not) then this is a good place to note the changes, justify them, and demonstrate that the researcher has not simply woken up one morning and plucked a research design idea from thin air. Demonstrate that thought and care has been invested in this. Even the experience of codifying and analysing a few results from the pilot study might give the researcher (and the supervisor) a good sense of the ease (or difficulty) which the final main data-set will present, and allow for a simplification or clarification as appropriate. It is a huge mistake to seek a ‘short-cut’ by avoiding pilot studies!

Recording data

Starting to record the new data which is being gathered as part of a research project, whether a long-term study like a PhD, or a quick toe-in-the-water project, is the most crucial, but perhaps the subtlest stage of the research. If you gather too little data, the project may flounder even before it gets started; too much data, and a metaphoric mountain of results can be generated by cross-correlation and individual analysis, which can paralyse a project almost as quickly as having no data at all. Then there is the question of what is the ‘right’ data? ‘How will I know it when I see it?’ In reality, it is as likely to be different for every individual project as the diversity of methods of data gathering. The correct procedure, of course, is to recognise that recording the correct data is integrally dependent on selecting the correct research methodology, and in carefully selecting how the data will be collected, coded, and stored in the future.

One of the most impressive records of research data that we can remember, is from a scientist who was studying birds of prey, and his handwriting in an old notebook

recorded what seemed to us to be almost every conceivable factor which might influence nesting success, including several factors that most other researchers would never have begun to consider relevant. He was of course correct, for it is often the correlations with hidden, and often apparently spurious, information which leads to the really stunning breakthroughs in research projects. There are many different ways of recording research data that you might collect, and there is no one-size-fits-all solution. If you are interviewing people, there is a choice between taking notes, audio recording, or video recording; all these methods have their advantages and disbenefits. Taking notes is less obtrusive, but also can be distracting for the researcher. Audio recording can be done easily with a digital recorder, or a suitable app on a smart-phone, but some people may be more guarded in their responses when they are being recorded (at least until they begin to relax into their conversation). There is also the problematic issue of what to do with all the data you have gathered. Gathering a huge mass of data can be attractive, but it needs to be proportionate to the scale of the project, because there is little point in generating a mountain of data

if 80% is left unanalysed and unused. Great care needs to be taken to strike a balance between collecting a good data-set which provides rich possibilities for future analysis, against de-motivating your participants by presenting them with huge questionnaires or over-long interviews. Similar constraints apply when conducting laboratory experiments, fieldwork, or desk-top studies.

Finally, in addition to having to consider your recording requirements in terms of how you propose to codify and analyse the potential results (there is little point in collecting data so randomly that it cannot be interrogated effectively) there are the issues of long-term storage and access to the data. The research supervisor has a crucial role here, not simply in helping to shape what the research student proposes to gather, or how that might be analysed and interpreted, but in providing the continuity which may extend over several decades and overlap with numerous related research projects. In an increasingly digital and open educational society, not simply the research results, but also the raw research data is also becoming more open and accessible. It is becoming more possible and more

likely that scholars coming after you will read not just your conclusions, but also your original data recording notes, so think carefully about what you collect and how you record it!

Storing and archiving data

When doing a PhD, it is possible to have hundreds of photocopies of academic papers stacked in small piles on according to their theme and relevance to the different sections being written about. The raw research data, however, is likely to be compactly contained in electronic format in the form of tables and graphs; row after row of numbers on spreadsheets which could be tabulated and correlated in any format desired.

Now, when we generate research data, it is almost entirely in electronic format, and it is automatically stored in several separate places. We will probably have a personal space in the memory banks of the university computing system, and this space is automatically backed-up overnight to an institutional cloud-space, so that the information can be accessed from different devices and geographical

locations. Usually, we also store data for individual projects on a separate, encrypted, memory stick or portable hard-drive. The digital age means that after two or three clicks, we can be assured that copies of our data are safely held in four or five independent locations. Research students can simultaneously share data with a colleague or supervisor in a different part of the world without even leaving their own desk. A key responsibility of a supervisor is to ensure that a research student is adequately trained and aware of the various ways to ensure that important (often confidential) data is securely stored and accessible only to approved people.

This is only the tip of the iceberg, however, because the production of digital data raises almost as many questions as it provides innovative opportunities. There needs to be an early discussion in the supervisory team, for instance, about not simply which data will be stored, but where will it be stored, for how long, and who will have access to it? This is not simply an issue of security, although security, confidentiality, and appropriate use of the data will certainly figure in the discussion. There is a growing awareness that

when public money is used to fund research, there needs to be a transparent return on public interest. Initially this has meant that research results, reports, and journal articles, should be made freely available to the public. This is being extended in the next Research Excellence Framework in the UK to insist that if the journal article is not already published as an open resource, it needs to be added as an open source on the digital repository of the relevant institution. But there's more.

The argument for openness has been extended to include the research data generated by the public funding, so the datasets themselves are trending to become open and shared property. Whether the raw data is numbers, interviews, audio recordings, photographs, or other recordable results, the likelihood is that the data being gathered by a researcher today, is probably going to be a shared resource tomorrow. It will be possible for other researchers, in subsequent years, to access your raw data, perhaps combine it with other sources of raw data, and re-analyse, re-interpret, and publish their conclusions. It now begins to matter a great deal more seriously exactly who

can gain access to your research data, and for what purposes. As the law currently stands, a bona fide researcher can have access to open datasets for up to ten years after they have been deposited. But here is the catch – if any researcher accesses this data after nine years, the open-access clock is automatically reset for a further ten years. This ensures the certainty that data which is being collected and digitally stored just now, might be still openly available long after the initial researcher has moved on from that research topic, perhaps changed institutions, changed careers, maybe even passed away. The raw data of open access digital resources is now guaranteed to have a lifetime longer than the career-span of many individual researchers. So think carefully about what you gather, how you organise and store it, and what your legacy of research data will be!

Data analysis

The data analysis stage is one of the main research phases where the supervisory team can really make a significant contribution to assisting the research student. Obviously,

the student still needs to do the work for themselves, but this is a stage in the PhD process where the depth and breadth of experience of the supervisors should shine through and help the student to make sense of a complex set of tasks, and make them a bit simpler to complete. Having collected a mass of data, perhaps even coded and categorised this data according to exacting and laborious protocols and methods of analysis, the student needs to understand what this data is actually saying. This might be a simpler task for some projects than for others, according to the amount of data collected, the form in which it was collected, how detailed or exact the observations or calculations are, or what methods for codifying or interpreting the raw data have been employed during the research.

To the beginner, this might seem a straightforward task, but there is no ‘one-way’ to analyse data, because there are many, many different forms of data. That data might be collected at different levels of granularity, different levels of accuracy, and embody different assumptions and methodological approaches. At some early stage of the

analysis it is usually a good idea for the research student to sit down with the supervisory team, spread the collected data out on a table, and look at it together. The student needs to identify a number of key attributes of this data, such as what does this data actually indicate? How robust is the data? What is its accuracy and what are its limitations? Are there any correlations (positive or negative) and so on, leading to the penultimate question, which is what does this data actually tell us? Hopefully there will be a new insight, or a discovery which, at least in part, will address the initial research question(s). The final challenges are then, how should this information be presented so that it is understandable to others who have not been involved in this research, and how transferable is this knowledge to other (present and future) researchers? The ability to repeat certain methods, or to re-combine and re-use data (and the results of its analysis) are particularly useful features to enable contrast and comparison with other projects in similar or related subject areas.

It may seem a bit ironic, or a perhaps a bit of a paradox, given that we are often seeking to reveal hitherto unknown

facts, and ‘answers’ to high-level research questions, but usually it is better to be less ambitious in the interpretation of the conclusions, but to be absolutely sure of the reliability and credibility of our data, rather than to propose over-ambitious conclusions (exciting though they may seem) which are based on assumptions, sketchy evidence, and correlations which are skating on thin ice. If the research can be shown to produce solid, incontrovertible evidence, regardless of how large or small the breakthrough, then this small advance can be built-upon by subsequent researchers. If the conclusions are like a house built on thin ice, then there is always a doubt about the stability and credibility of the data, or its interpretation, and therefore the value of the research output is devalued. With data analysis, it always pays to check, cross-check, consider the constraints and limitations, then double-check each stage before you venture to draw conclusions to be shared with a wider audience.

Chapter 5:
Starting to write

Sorting the structure

When is the best time to start writing the PhD dissertation? This really depends on what you have to say that is of any importance. Some people try to start too early – before they have done any primary research – while others attempt to put the writing off for as long as possible! Like any skill, writing gets better with practice, so the usual advice is to start early – perhaps within the first couple of months – but be prepared to edit, revise and if necessary, throw away, your early attempts. As supervisors of research students, we normally like to see the early attempts at writing in order to give some constructive feedback and help the student 'set the tone' at the correct level of the academic writing. This early writing does not need to be dozens of pages long, but it should come in fully constructed sentences – not bullet-points – and there should be a logical narrative which sets the scene of the research activities. It should be spell-

checked, fully referenced, and grammatically correct. In the initial stages, detailed comments and suggestions are required, perhaps using the 'track-changes' function, to give the student a clear idea of the standard required of the final text (the student is then free to accept or ignore this advice – and that response will tell a lot about the professionalism and the level of engagement of the student). Giving this level of feedback might not be true for all supervisors. In fact, we know of some established academics whose grammar and sentence construction lets them down badly, so they are unlikely to be very keen or useful critics of the finer nuances of the English language, however good they are in their own subject area. Our view is that the quality and impact of our writing is a reflection of us, and by implication, the work of one of our students is an indirect reflection on us. We therefore want students' writing to be as good as possible and to show their ideas in a good light.

The quality of writing is important, because the production of a written dissertation – usually a maximum or 100,000 words in the UK – is the central work of the PhD, around which everything else hangs. The brilliance of the research,

the care and skill in crafting the research process, the novelty of the solutions and conclusions – even the defence in the viva – are dashed to nothing if the student is not able to communicate clearly and engagingly. In a nutshell, if the dissertation is laborious and difficult to read, if it contains silly errors, lack of references to evidence, or simply is written in a tortuous style or in ambiguous language, the readers (including the examiners) will become frustrated, confused, and perhaps overly critical. If they look for faults in the student's work, they will surely find them. On the other hand, if the dissertation is a pleasure to read, if it is well constructed and well presented, the reader might skip over any minor faults in their enthusiasm to follow the story. The examiners might overlook minor issues or even suggest how these could be easily improved. The skill is to construct a narrative which guides the reader through the research story, in much the same way as a novel, or a detective story, in which each chapter leads smoothly and logically into the next. Like most skills, writing is improved by training and practice, so starting a contents page with a skeleton list of the likely chapter headings and subheadings for the proposed dissertation might be useful. Encouraging the

student to break up the text into short sections and subsections, which can be edited and linked together in an ongoing process, helps to develop the storyline. (The headings can be rearranged, deleted, or added to as the writing progresses). The PhD dissertation does not need to be written in a totally linear manner, and it is quite common to double-back to add, modify, or delete earlier sections of writing as new facts become available or new academic articles are discovered. A key requirement is to be organised, and to approach the write-up methodically and systematically in easy stages.

Setting a routine

Graham Greene used to say that he aimed to write 500 words every day. The novels were soon created. This might not sound like a lot of words, but there are two great advantages to this method. Firstly, 500 words every single day, even when some of the words are later amended or discarded, soon builds up to a substantial narrative. This narrative can then be edited, refined, extended or reduced. Secondly, and perhaps more importantly, the routine act of

writing down 500 words each day cultivates a mind-set which develops with constant practice, so that it becomes easier to express your ideas in writing. For some people, it may never become easy, but for most people it does become easier. It helps if the writer is also a regular reader. To become familiar with the way other writers express themselves in text, even if their language or the style is unfamiliar or even disliked, is a useful skill because it enables the writer to understand their own style, and how to capture in words ***precisely*** what they want to say.

Most academic writing has a different appearance in style to other forms of literature because there is a different purpose behind it. Scientific writing can also be creative, but analytical writing for an academic purpose – whether this is for science, arts, or the humanities – demands that the text is anchored in such things as theories, concepts, and evidence. Most non-academic writing (apart from things such as biographies or popular histories) do not normally require citations (such as '(Rennie, 2017)' but these citations are essential for academic work to provide the

sources of the evidence on which your subsequent ideas are based.

In order to get into a routine which suits your own working style and personality, you need to experiment a little. Some people, like Graham Greene, prefer to set-aside some time each day to write. Others only write when the mood takes them, when they feel inspired, or when a deadline looms over them. We might find writing very easy to do, and enjoy it, or we may have different behaviour patterns for different situations. We might be able to sit down and produce something very quickly when we need to (like a report of work done), but for deeper and more complex work (such as a journal article or research paper) we may simply start off with a working title and some headings to give the article a bit of structure. With the general ‘story-line’ in mind, we can then sit down to write the various sections when we think we know what we want to say. The article can be built up steadily, perhaps over several weeks, reading it again, and making any minor changes that are required. Getting new information or receiving feedback from a reviewer may require substantial re-writing to expand upon some point of

explanation. So, a routine is necessary to establish what the writer wants to say, building up the article as a story, then tweaking the final draft until everyone is satisfied. Other writers may write, re-write, and re-re-write as their ideas change and the article evolves. A key point in all of this is that the finished piece of text, whether it is a research paper or a dissertation, should be enjoyable for the reader, so try to avoid long, cumbersome sentences and clearly signpost the direction of your discussion. Numbered headings and spell checking is also important, so make sure that you develop your own routine to check and double-check each stage as you progress with your text.

Setting the tone of academic writing

There is a lot of nonsense talked about ‘academic writing’ in some circles. A central myth is that it needs to be ‘complex’. In fact, exactly the reverse is the case! In writing an academic text, the author needs to be aware of some of the same key issues as any author, whether the writing is fact or fiction, science or humanities. Firstly, the text needs to convey information to the readership. Even complex

ideas and intricate research can be conveyed as a story which captivates the reader's attention and (hopefully) helps their understanding. So good academic writing is not simply about the message, it is also, to some extent, about the style. A well-written chapter or article will be a pleasure to read and will stimulate the interest of the reader, even if they may not follow (or even agree with) everything that is claimed. For this reason, it is just as important to pay close attention to spelling, grammar, and the structure of an academic article as it is for a good piece of journalism, or a good book.

An academic article requires another couple of essentials, however, and these are 'evidence' and 'analysis'. The main reason for writing an academic article (or a PhD chapter) is to make known to the readership some new ideas – perhaps the results of a new experiment (or the confirmation by repetition of an earlier experiment) or perhaps simply bringing together scattered information to present a new way of thinking about the topic. Either way, the 'story' that is written will probably build upon earlier work, perhaps quoting some examples, or statistics,

attempting to construct a picture of how the new information was obtained. In this synthesis, it is imperative that the writer identifies the sources of evidence which are being referred to – even in passing – in the construction of the storyline. This sometimes gives academic writing a bit of a staccato appearance, with frequent interruptions e.g. (Rennie and Smyth, 2017) to the flow of sentences that differentiate it from a non-academic article. Nevertheless, these citations to the sources of evidence are absolutely essential in order to place the new piece of writing within the context of what is already known about the topic. Remember, the purpose of research, and the PhD in particular, is to make an original contribution to knowledge, by extending what is known into an area which is less well known, and by definition extending the sum total of our knowledge of the discipline. There are different conventions on how to draw attention to the sources of evidence which are used to give support, reliability, confidence, to the new ideas being expressed, and these citation styles – such as Harvard, Vancouver, APA – will vary with different academic disciplines. Students should check with their

supervisors on what is most appropriate (sometimes the required styles will vary between different journals).

With respect to the 'analysis' component of the writing, this will vary between different academic levels, and even within the same subject discipline. For instance, early-stage undergraduates may be allowed to be more descriptive in their writing, but late-stage undergraduates are expected to be more highly analytical, rather than purely descriptive. By the stage of embarking on a research degree, the student is expected to understand the importance of critical analysis, (and practice it) so that although a literature review chapter may in broad terms describe the state of current knowledge about the research topic, the reviews of the individual sources of evidence should not be solely descriptive, and should critically evaluate the strengths, limitations, and possible weaknesses of the source publications.

For this reason, we try to give particularly thorough feedback on the early work of any research student that we are supervising. We might use the ‘track changes’ function

to comment on every missing comma, typographic error, lack of citation, or inappropriate style format. If a supervisor can quickly and clearly set the tone required for the relevant level of the student's work, a benchmark can be established, and thereafter the student should be clear about the quality, style, conventions, and expectations required for the final product. At least, that is the theory...

Giving feedback

For the supervisor, feedback is perhaps the most difficult aspect of the whole supervision process. The intention of feedback is to enable the recipient to benefit from critically helpful comments and suggestions on what is being done, but getting the correct balance is often difficult to find. To put it simply, the supervisor wants to provide the student with helpful advice to enable them to improve their performance, but to stop short of actually doing the work for the student. Viewed in this context, any feedback should consist of three parts; a note of what the student has done well; the identification of what can be improved; and suggestions for making improvements in the future. It is not

sufficient to say that, ‘Your citations are terrible’ without explaining how they can be improved. Simply listing the faults can be demoralising and is not sufficiently helpful for learning. We may or may not follow the trend to include a ‘Feed-forward’ paragraph, because we belong to the tradition that good feedback always includes within the commentary some instructions on how to make future work even better, so the need for a separate ‘feed-forward’ section is redundant.

That is the broad context, but the level of detail that a student can expect to receive, and the timeliness of such feedback, can be very much case-by-case, and diverse according to different supervisors. When we receive the first pieces of writing from a student, as they complete drafts of individual chapters, we may choose to give a detailed root-and-branch response, using the ‘track-changes’ function. We appreciate that not every supervisor considers this to be part of their role, but we take the view that it is our job to set the benchmark of quality for the student in the presentation of their dissertation. To do this, we can only give them an idea of the standard of writing that we

personally would be comfortable with if this was our own presentation. We do not tell the student ***what*** to write, but we encourage them by example to present their own work in the best and most appropriate manner. We work on the (possibly naïve) idea that every student wants to exert themselves to the highest standards possible, and therefore when we make suggestions on how to improve their work, these suggestions are made with the best intentions to benefit the student. We leave the decision on whether or not to accept our changes and comments to the wisdom of the student. If they feel that their original version is better, that is their decision, but if the External Examiner demands the same changes that we have suggested, at least we know that it is not because the student has not been given that advice by us, merely that they have not chosen to heed it.

Timing is another variable issue. At our university we are required that ‘normally’ (a wonderful word) we are expected to return feedback to students within fifteen working days of the submission deadline, and we think this is fair. The purpose, after all, of feedback is to help the student to

improve their future work, and this is best done while the submitted work is relatively fresh in their memory, and before the student starts making similar mistakes in the next piece of work to be submitted for assessment. In practice, with research students, ongoing feedback can be given in a variety of ways – written or verbal – using a diversity of media, including text, telephone support, chats in the corridor, and formal sessions either face-to-face or using video-chat. One of our colleagues prefers to make an audio recording of his feedback and email that to the students; another colleague would rather give feedback using Skype. It is wise to explore very early in the supervision process what works best for the individual student and the individual supervisor.

Editing – deciding what to keep

Deciding what actually needs to be in the final version of the text in a dissertation or a journal paper can be a tough job. Some people do revision after revision, chopping and changing, cutting and adding, re-working the text until they are satisfied. Others might think the subject through, then

write the complete text straight off, only making minor changes later before submitting the final version. Whatever way works best for the author is the correct approach. The most important thing to remember is that whatever topic, the dissertation should tell a logical story to the reader. The role of the supervisor is often crucial at this stage, because the writer can frequently get so immersed in the subject matter that it can be difficult to see the wood for the trees. At worst, the writer wants to include everything that they know about the topic – just to be on the safe side. At the other extreme, the writer assumes that the readers will understand how the author is thinking, and tends to skip on the details, leading to ambiguity or misunderstanding by the readership. Having a 'fresh pair of eyes' read over the text can be of immense value – whether it is a friend, a partner, or a supervisor, just having a colleague giving an unbiased view can help to iron out any possible areas that might cause future confusion. Listen to them and try not to be too defensive: if they have the courage to question you, listen to their opinions. Try not to be pedantic – verbosity and clarity rarely go well together – and consider carefully if your

sentence actually contributes towards understanding the text, or is it just padding?

Usually, when writing something as chunky as a 100,000 word PhD dissertation, we would advise that each chapter or section should be drafted, then parked, until the general structure of the full text becomes more clear. Before starting to write the final chapter – the conclusions and any recommendations of the research – the author should pause, go back to the very start of the text, and re-read everything that they have written – making the necessary final amendments. Constructing complex narratives, such as dissertations or academic articles, need not be written in a completely linear fashion (i.e. from page one all the way through to the end) so re-visiting the advance draft gives an opportunity to shift paragraphs around, or add/delete information, and generally tidy up the text. This is also a good time to check that all the relevant citations to be referenced evidence are included, as well as inserting accurate place-holders for tables, diagrams, and images. The advantage of pausing before starting the last chapter and finalising the earlier text, is that the ‘story’ of the

narrative is now fresh in the memory (it may have been a very long time since the author wrote the first few paragraphs of the dissertation). Fundamentally, it is in the best interests of the writer that any readers can follow clearly and understandably the points that are being made. Spelling errors, overly long sentences, clumsy wording, ambiguous statements, and a lack of referenced evidence all serve to make it more difficult for the reader to understand, and ultimately this reflects badly on the appreciation of the text. A happy reader means a happy examiner, and a better chance that the work will be more widely read and esteemed.

Chapter 6:
Starting to get results

Building the picture

Take a step backwards. Perhaps the most confusing part of any research project is when some results start to emerge – but this is also one of the most exciting stages. There are three main reactions to the early arrival of research data; firstly, delight that results are finally coming through, as evidence that progress is being made; secondly anxiety that the 'correct' information is emerging; thirdly trepidation, if not outright confusion, in attempting to make some sense of the results. All of this happens in quick succession, perhaps even all at once! Hopefully, the cautionary approach to the main data-gathering phase, by way of a short pilot study, should at least give the research student some confidence that the right research questions were being asked. There may remain doubts that enough data has been gathered – enough interviews generated, enough experiments conducted, enough field investigations made –

but the answer to this question will only appear when the research study runs its full course. Despite the temptation to gather AS MUCH data as possible, the experienced supervisor will caution the research student about two hidden dangers that lie in the shallows. One is to remember that gathering the data is only the first part of the story, and the more data that is gathered the more there is to be recorded, collated, analysed, interpreted, archived, and all the other ancillary tasks that need to be accomplished in order to secure a robust research project. Secondly, is to recognise the obvious, but often neglected, reality that the quality of the data collected is much more important than the quantity. Gathering a huge mass of data is not much good if the wrong questions have been asked, if important considerations have been missed, or mistaken assumptions have been made at the earlier stages.

Assuming that the methodology is appropriate, and that the data-gathering methods were systematic, robust, and effective, then every researcher – whether engaged on a small project or a mammoth one – is faced with the same question. ‘So what does it all mean?’ There often comes a

natural limit when collecting research data – a point at which it becomes apparent that simply collecting more and more data is not going to substantially change the conclusions. A point is reached of diminishing returns on effort expended. At this point, the ‘So what?’ factor kicks in. It might be necessary to back-track and do some fine-tuning, perhaps to look at some small specific areas in greater detail, or to conduct some follow-up research to fill in some gaps. Perhaps there is a need to explore some ancillary research questions which are tangential to the main research question, but will hopefully provide a better context in which to consider it. Sometimes it helps to simply present the raw results, devoid of attempts at interpretation, to a few trusted colleagues such as supervisors, to obtain some feedback and get some reassurance on the question, ‘Do these findings make any sense?’ Or perhaps it is time to draw the data-gathering to a halt – even temporarily – and begin to re-assemble the results to piece together what pictures emerge. This is the time when simply getting all the research results down in a systematic, logical, readable form is the main task, and hopefully this will provide a new platform to analyse what the results actually mean.

Reportage or commentary?

When the time comes to record the research results in writing, there are two basic choices, and the writer needs to decide upon one of them. Either the raw results are presented without embellishment, followed by a separate chapter on their analysis, or else the results can be presented alongside a running commentary or analysis. Both styles have merits and demerits and each academic discipline will have its own preferences and standards, so an important role of the supervisor is to coach the research student in the form that is conventional for that academic subject.

The straight presentation of results is a simple, clear, relatively uncomplicated option, which is subsequently followed by a chapter devoted to the analysis and interpretation of those results. Benefits of this style are that systematic links can be made with the research methodology, connecting the chronology of the data-gathering activities with the presentation of data that was gathered. This allows the reader to experience the research

process in a similar manner to the researcher, stepping from one ‘result’ to another and enabling the readers to form their own opinions and judgements as more and more information is presented. In the next chapter, the research student can then present an in-depth analysis of the results, drawing attention to key features, analysing the contrasts and connections, and finally presenting interpretations and conclusions of the research project. Separating the presentation of the results from the analysis section allows a clean break in the narrative and gives the researcher a good opportunity to expound in detail in the analysis and interpretation chapter to convincingly present their own, original ideas. This is the chapter where the student can really shine and unload all those brilliant insights and personal observations that have been suppressed during the earlier phases of the research.

The other format of presentation, the running commentary, is a different style altogether. This form will also reveal the results of the research activities stage-by-stage, but with each revelation there is an accompanying narrative which explains and contextualises those results. The text

commentary is used to build-up the research data and an accompanying analysis of its relevance to the research question. This is then developed in a step-by-step process to bring the research project to a conclusion. This format requires clear thinking, because it is easy to stumble around from one idea to another and produce a disorganised story which is neither sufficiently analytical nor convincing. When it is done well, it can read like a good detective story, gripping the readers and leading them onwards through the research discoveries to the final exposé of ‘the solution’ or ‘the answer’, but it does not suit every style of academic research. It can be a useful style when the writer wants to discuss and elaborate on the data as it is presented, perhaps to emphasise social nuances, or to consider the wider possibilities of experimental assumptions, or in situations where the interpretation of the results is not a straight black-or-white option.

Either style is acceptable, but they cannot really be effectively combined: the researcher needs to think carefully about the story that they want to leave with the

readers, and then present this version as clearly and unambiguously as possible.

Timing and deadlines

As the student gets towards the end stages of creating the dissertation, it might seem odd to return to the issues of timing and deadlines, but this is a crucial period to study the demands of time. Many students go right to the wire with the time taken to produce a completed thesis for submission, indeed a great number of students go beyond their deadlines and end up trying to juggle the completion of their research with the demands of a new job and other important new responsibilities. That can be a very difficult situation and it is to be avoided if at all possible. In some cases the deadlines will be self-determined, so there may be no harm done if they slip a little. In many situations, however, there is a formal limit to the student's registration, so missing this deadline could prove disastrous. Normally, the students and the main supervisor need to indicate to the Graduate School of the university about three months in advance, that the student is preparing to submit the

dissertation manuscript on a certain date. This is to enable the university to set the wheels in motion to select internal and external examiners, to check their suitability to examine at this level of study, and to arrange the administrative details for the viva event. Up until this point, most work 'deadlines' were convenient milestones which were self-imposed to provide guidance and structure. The final submission date is a real deadline and needs to be treated seriously. It makes sense to work back from this agreed date-of-submission and plan the last few months of the PhD research like a military campaign.

Firstly, although getting the dissertation printed and loosely bound should only take a few hours, do not leave it to the last minute, because if anything unexpectedly goes wrong (e.g. the printer breaks) then the carefully choreographed timetable is shattered. Similarly, do not underestimate how long it will ***really*** take to get the ***exact*** wording for the final analytical chapter and conclusions, or for the inevitable few weeks that will need to be spent 'snagging' the final text. Apart from a final double-check on spelling and grammar, the captions of any illustrations will need to be cross-

checked, as well as making sure that the page numbering corresponds to details on the contents pages and that every reference cited in the text has been itemised correctly in the reference list at the end of the dissertation. Insufficient attention to the details of spelling and referencing is often what makes the difference between a clear pass and getting a condition of ‘minor revisions required’. All this will take more time than an optimistic student expects! It is critical that some extra time is built-in to any work plan in order to provide some slack for the likelihood of delays, deliberations, and minor disasters. The student will have spent so long in direct contact with the text that sometimes even the most obvious errors and omissions are not picked up until the very last moment. Five or six months before the anticipated submission date, sit down with the whole supervisory team and set a schedule of ‘soft’ (desirable) and ‘hard’ (i.e. not moveable) deadlines to punctuate a work-plan leading to the final submission of the manuscript. Be realistic, then stick to the plan and do not get side-tracked with interesting but fruitless tangents which distract from the main goals.

Using statistics in research

A golden, unbreakable rule is, never use any statistics if you do not really understand what they mean! This might seem obvious, but it is surprising how frequently statistics get misused or misinterpreted to support an argument that actually has no real basis in fact. The famous saying that there are three types of lies – 'lies, damned lies, and statistics' is attributed to Prime Minister Disraeli, but when properly used, statistics can be clear, unequivocal, and very supportive in communicating complex data simply. The main problem(s) are often started by people deliberately selecting the information that they want to hear and then seeking statistical back-up which looks impressive and difficult to challenge. Secondary problems occur when people either do not properly understand what the real statistics are saying, or thirdly, when people choose to deliberately select or twist the statistical information which seems to support their preferred point of view. Ultimately, all three problem areas both devalue the use of statistics and also take us even further away from a clearer

understanding of the situation that we are trying to accurately interpret and communicate.

A good ‘rule of thumb’ is to stick to the simplest means of statistically expressing the results that you want to communicate. Percentages, pie-charts, and histograms might look fairly unadventurous if you are trying to impress an examiner, but they have the advantage that they are quick to produce, clear to interpret, and easy to understand. Fancy calculations may look more impressive, but they are frequently harder to produce, more difficult to fully understand, and have a greater chance of either the creator or the reader making errors of interpretation. A common error is to quote percentages rather than give simple numerical values for small population samples. If 7 out of 12 of your interviewees agree, say ‘7 out of 12 agree that…’ rather than ‘58.33%...’ A difference of 1 person immediately gives an 8% error and is clumsier. Keeping it simple gives both a truer impression of the data and an easier comparison with other results. Similarly, we have seen some very impressive and complex diagrams, complete with 3-D shading and vector trends, which actually do not

tell us very much at all because the detail is lost in the artistic flamboyance. They look fancy but add nothing to the discussion.

Quite often, certain disciplinary areas will have their own conventions as to which statistical procedures are common, or preferred, and how they are presented. The supervisors should be able to advise on these common standards, and the benefit is usually that the new research data can both make use of earlier research results and can be easily contrasted or compared with already published data in the discipline. Some statistical procedures can look complicated to calculate but are actually quite straightforward to use. All universities will have opportunities for research students to attend courses on statistical methods which are appropriate for different subject areas of research, so students should get their training early to avoid any subsequent false starts. There are lots of self-guided short courses on the web, and of course in text-books, but self-tuition is also open to misunderstanding, so it is always best, in the first exploration at least, to work through the procedure(s)

alongside someone who is already very familiar with the statistical technique(s). Bear in mind, contrary to some current political rhetoric, there are no ‘alternative facts’ simply facts that you acknowledge and facts that you might prefer to ignore. Research is about improving knowledge, not picking just the bits that you like.

How to illustrate your results

When one of us was writing up his own PhD (in the antediluvian days before personal computers, desktop publishing software, or graphics packages!) he was given a very useful lesson by the professor who was supervising. In agonising about how good the hand-drawn graphs and maps needed to be, how precise the individual, hand-printed, stencil lettering needed to look, the supervisor said, rather drily, for that was his preferred style, that the PhD was ‘… training to be a geologist, not a draughtsman!’

From that response it was understood, correctly, that if the diagrams are clear and accurate enough to convey the key point(s) then a point of diminishing returns is quickly reached on the time spent labouring over them. There is no

need to produce a ‘work of art’ – it is about ‘communication’. The situation is slightly different now, for there are lots of clever software packages, in Excel and elsewhere, which can quickly produce lots of impressive diagrams that can be ‘cut-and-pasted’ into the text with minimal effort – but the two fundamental points remain the same. Firstly, if the initial data is weak and/or disorganised, then any resulting illustration is hardly worth the effort of trying to interpret with any degree of real meaning. As computer programmers are taught early – GIGO – (Garbage in, garbage out)! Secondly, a diagram (or a map, or a graph) needs to convey something meaningful. It is a visual expression of something that the author is trying to convey to the reader, so if this can be communicated clearly and simply, that is sufficient. There are far too many elaborate diagrams that are over-designed, and the result can appear so complicated that it is the diagram, rather than the results, that needs to be explained to the reader.

In some subjects, there are more-or-less standard conventions for diagrammatic representations, such as histograms, bar-charts, tolerance diagrams, or pie-charts. It

usually makes sense to abide by these conventions because it can help comparison with similar studies elsewhere. Usually, simple is best. Let the eloquence of the diagram communicate the data for you. Sometimes, particularly due to the speed and ease with which computer-generated diagrams can be generated, there can be a tendency to ‘graph every variable against every other variable’ in the hope that a stunning correlation is unexpectedly revealed. While this can happen, it is more likely that a blinding flash of the obvious is revealed, without contributing anything more than confusion to the current understanding of the topic. As with the use of statistics, it is always better if the author actually understands what they are trying to do before attempting the activity. It is too easy to drop into the text a ‘pretty photograph’ or a diagram of a rather obvious feature, without actually conveying much real information (e.g. a pie-chart of the male/female split of respondents; it is probably better just to give the numbers or the percentage figures).

In some cases, the use of a few clever diagrams, such as fishnet images of topography, or bar-chart information

superimposed on a map to show geographical abundance, can produce a stunningly visual interpretation, but these should be used sparingly. There are a few great infographic programs on the internet, but care needs to be taken in their use (not least because the manufacturers may reserve the rights to retain and re-use your raw data). While it is true that a (good) picture can say a thousand words, the tokenistic use of photographs, diagrams, or graphs can simply clutter up the main text, and require additional text to explain the image to the reader. A good illustration actually says something clearly and makes a positive contribution to help the reader understand the accompanying text and data.

Chapter 7:
Interpreting the data

Establishing the storyline

One of the first things that both the supervisors and the research students need to remember is that although the dissertation is the justification of an academic thesis, it also needs to tell a good and convincing story. There is little point in making a wonderful discovery if you cannot properly communicate with other people to tell them about it. Research is about discovering something unknown, and like any good mystery story, there needs to be an introduction to set the scene for your readers, (the literature review) there needs to be a storyline to develop the research agenda (starting with the methodology) there need to be clues discovered as the story develops (the results chapter(s)) and there needs to be a moment of final revelation of the object of your search (the analysis and conclusions).

The delivery of this story requires a certain writing style – it needs to follow the academic conventions of the subject discipline; it is not a novel – but that should not mean that the ‘story’ that the researcher wants to tell should not be easy to read. There are some simple tips, such as to first lay-out using numbered subheadings, the main headlines in the ‘story’. The separate sections can then be written under these headings and linked together to form the chapters. A good idea is to begin by drafting the contents page of the dissertation, listing the chapter headings (1. Literature Review, 2. Methodology… etc.) and then entering the various headings of likely sub-sections. In addition to helping to establish a coherent storyline (which can be amended as the writing progresses) this enables the dissertation to be written in a manner which is not necessarily linear (sub-sections can be skipped and returned to at a later date) and built up piece-by-piece while still keeping within the framework of the story. It is also a good tool for discussions between the research student and the supervisor about the stage-by-stage progress (This technique might be combined with red (not-done) green (completed) and amber (working on it) highlights, to help

students prioritise what bits of writing need to be tackled next).

The bottom line is that the research student needs to craft a good story to introduce, explain, and discuss their research project, and if this is easy to read, then it will be easier for readers to follow and perhaps build-upon in subsequent projects. This includes correct spelling, good grammar, and simple tactics such as to avoid l-o-n-g and cumbersome sentences (We had one student who wrote a sentence containing the word ‘and’ seven times! This was really three separate sentences and would have been far easier to understand if it had been written in a simpler style.) Another avoidable error is to include sentences which give ambiguous comments. If there is a way in which your comments can be misinterpreted, it is human nature that someone will take the wrong meaning, and this can be easily avoided by actually saying what you really mean and keeping this in simple language that cannot be misunderstood. Using hierarchical numbering for the chapters, sections, and sub-sections not only helps to

create a clear storyline, it also helps to allow cross-reference to earlier (or future) comments in the dissertation.

It is the role of the research supervisor to read and give comments to help improve the direction of the writing process. The student does not need to like these comments (and indeed, at their own risk, may chose to ignore them) but they should heed them because it is the duty of the supervisor to direct the work of the student to ensure that they give the very best presentation possible of their work for examination and further scrutiny.

Building on existing knowledge

A key role of any supervisor is helping the research student to bridge the gap between the fundamentals about what is currently known about the research topic, and the new results which have been generated through the research activities of the student. All research is built upon some level of pre-existing knowledge of the subject, even if existing knowledge is patchy or otherwise insubstantial. In the literature review chapter, the student will have built up the profile on what is already known about the research topic

and how that information can be backed-up by evidence from the academic literature available. In the analysis chapter, the first task is to provide some interpretation for the new, primary research conducted by the student, but a significant secondary task is to relate this back to the previously discussed evidence and underpinning theories which were explained in the earlier chapter(s). This can be a tricky task because the new research results might either fully support earlier work (in which case, what's new about the research?) or else directly contradict it (in which case how do you prove the superiority of the new results?).

It is a useful tip to bear in mind that hindsight is a wonderful perspective, so try to avoid feeling too smug about the wonderful flashes of insight produced by the new research. Always assume (unless proven otherwise beyond doubt) that the earlier researchers did the best job that they could with the information, equipment, and currency of information at the time they were doing their research. It is easy to look back in history and wonder why our predecessors could ever have believed some of the accepted wisdom and 'common sense' of the time, but in

fact we are no different: we simply have much more information in a greater level of detail, but it would be a fool or a knave who would claim to know every last thing about the chosen subject. In most circumstances the research will tweak prior definitions, and then throw a clearer light on an existing area or a way of understanding. Alternatively, it might provide new data to enable the researcher to propose a different way of thinking about the existing data and justifying that new approach with new evidence (or a new way of interpreting the existing evidence).

Either way, the first stage of research analysis is to compare the new information with what has already been understood, and then go beyond this to open up a new area that is worthy of further research (and/or proposing a different way of understanding the subject). Two common failings at this stage of the research process are either to appear to present the conclusions as if nothing important had ever preceded the current research (thereby inventing a whole new branch of epistemology) or else failing to restrict the conclusions to the ***actual*** results of the current research, and instead attempting to make grand

conclusions for the whole of the discipline (rather than just for the current research project). Either way, understanding the real importance of the new research, and using it to build upon earlier research results to improve our knowledge of the subject, is a fundamental step in the dissertation.

Going beyond

Perhaps surprisingly to most novice researchers, a research degree does not need to provide 'the complete answer' to a problematic question, only to demonstrate the competence of the researcher in their ability to conduct a systematic investigation and to 'make an original contribution' to the disciplinary area. Getting an 'answer' might be a nice way to demonstrate some added value, but more than likely the results of the research will only clarify a small area of interest, and will probably raise a whole lot of new questions which require investigation. An essential aspect of presenting and interpreting the results of a PhD or Master's research project is to show clearly what is known about the specific topic at the start of the research,

and what can be added to the sum total of knowledge by the time the research is concluded. This ‘original contribution’ might be quite small, and it could appear in a variety of ways, such as a new method of experimentation, or more detailed results than have been presented previously, or simply being able to contrast and compare with prior studies to accentuate the similarities and differences which allow us to form a clearer image of the ‘big picture’. All the same, there needs to be something new which is contributed to the subject by the research, even if it is only to be able to challenge or verify previous ideas from an enlarged sample or from a different angle. Simply reviewing the existing state of knowledge on the subject, or repeating exactly a previous study, will not generally qualify for a doctorate. There needs to be a clearer demonstration that the sum of knowledge is being advanced.

This is what we might call the ‘So what?’ stage.

The student has usually progressed step-by-step through the research project, following the normal, familiar stages that have been identified between the student and the

supervisor(s) and is now lining up for a big finale. Already, good documentation will have been provided on the nature of the research problem, as well as a critical review of the existing academic literature, a detailed explanation of the methodology used in the study, ways of gathering and analysing new data, and an extensive section presenting the results of the study. All of this has taken a lot of work to produce the dissertation to this stage. So what? What does all this mean? Why does it matter?

To answer these questions, the researcher needs to show that the study has been based on the quality work of previous researchers, but has now gone beyond this, even only in a modest way. The result should have something new and significant to say about this research topic. This is perilous ground, because the research student needs to show that they have extended the pool of knowledge, but not gone so far out on a limb that the conclusions are hard to justify and support. Partly it is about having confidence in the revelations uncovered by the study (and the researcher's interpretation of these) and partly it is about not being too cocky about what the results *really* mean in

the great scheme of things. Yes, there are PhDs which dramatically change the course of the discipline by careering off in a completely new direction, but those are quite rare, and most research can be shown to be a clever and intuitive progression on existing research which pushes just a little further. The research methods and the resultant conclusions need to be based on the evidence collected and need to be defendable. All studies have their limitations, so these need to be acknowledged and then shown how they have been minimised. Do not claim to have found the alchemist's stone just because it looks like the results might be heading in that direction. It is much better to keep the claims modest and stoutly defendable, rather than stretch the imagination (and the credibility) of the readers without being able to provide the required evidence to substantiate the claims or justify the conclusions.

Areas for future research

There comes a time in drawing together the conclusions of any piece of research, whether it is a long PhD study or a shorter project, when there is a realisation that there is SO

much more to do. This is not necessarily a bad thing, although a novice researcher might consider it a sign of weakness. Every single study has its own set of limitations relating to the level of accuracy, comprehensiveness, and study conditions. In the normal course of events, the research team needs to consider carefully these possible limitations, then attempt to minimise or eradicate them, or perhaps just simply acknowledge the limitations and explain their concerns. It is much, much better to be able to recognise the limitations and try to reduce them, than to blissfully (and mistakenly) soldier onwards as if there are no limitations whatsoever.

Normally, towards the end of the concluding chapter of a dissertation, it is wise to include a short section which identifies ‘opportunities for further research’. This only needs to be two or three pages long, because longer might suggest that there are too many things unknown about the study, (and one short paragraph might suggest that there is nothing more to find out), which will be interpreted as either arrogance or ignorance, and either way is bad. A common term which is used in this context is that our own research

has been ‘built on the shoulders of giants’ which implies that we are able to see further or in more detail, not simply because we are more intelligent, or have better vision, but because we have benefitted from the work of the people who have explored these issues prior to our research.

Analysing further research opportunities brings into sharp focus three important aspects of the PhD award. Firstly, it helps to make clear the new contribution of the researcher towards a better understanding of this research topic and the discipline as a whole. Remember, making ‘an original contribution to the subject knowledge’ is one of the two key requirements of a PhD (the other being to demonstrate that it is the student’s own work). Secondly, this section of the dissertation identifies other possible research projects which can build upon the present study. It might be to recommend an extension of the study – more participants, a wider geographical area, more samples analysed etc. – or it might refer to various offshoot projects on tangential ideas which were revealed during the present study, but the researcher did not have the time (or the money, opportunity, equipment etc.) to undertake at the time. Highlighting this is

useful because it helps to demonstrate that the researcher is aware of other possible research directions (and potential limitations to the current study) rather than blindingly missing obvious avenues to explore in the future (which might provide a greater depth of knowledge on this topic). Thirdly, in identifying potentially fruitful areas for further research, the researcher is helping to place the current dissertation in the context of the bigger picture of ongoing work on this topic. It is effectively offering this PhD dissertation as another 'shoulder' on which future researchers can build upon to gain a better understanding of this subject area. It is effectively adding another level onto the foundations of earlier research.

So, for a brief flash of time, the student is a world-leader in this particular research topic, a state-of-the-art expert in the why, wherefore, and significance of this very specific research question – only to be eclipsed by the next upcoming researcher who will take this a stage further. A good reason to celebrate and enjoy the celebrity while it lasts!

Conclusions and recommendations

For the award of a PhD, indeed for most academic research, the researcher is judged as much on the quality and justification of the research method, as for getting 'the answer'. The interpretations of the results, the conclusions, and any possible recommendations are also a pretty important part of the outcome. There are three common mistakes made by early career researchers for which supervisors must be on the lookout, but basically they all revolve around the one question – do the conclusions relate directly to the evidence produced by the research?

It might seem a rather obvious question, but it is important to address this first. Frequently the writer of the conclusions will have very weak, generic conclusions that seem to fade out and say nothing in particular. Sometimes it seems that an experienced researcher could write those sorts of conclusions before even starting the research – they lack clarity and do not really say very much at all. Secondly, is the opposite extreme, the temptation to read too much into the data and make conclusions or predictions for which

there is no real evidence. This is almost worse than understating the results, for a critical reader would begin to wonder if the whole of the research project had been influenced by this optimistic speculation and the evidence tailored to fit the conclusions. It would certainly make us re-read the data analysis more carefully to see if the researcher displays any suggestion that they 'knew the results of the research' in advance, and looked favourably on the data in order to 'find' the answers that they wanted. In this phase of the research, the supervisor has a crucial role as a critical friend, to challenge the research student into justifying their conclusions, and relating these directly back to the evidence displayed by the analysis of the data.

A third common error in writing research conclusions is that the writer describes very plausible conclusions, which actually have little or nothing to do with the research project that has been undertaken. The researcher has become so immersed in the research that they have lost a sense of the boundaries of the project. Everything seems to be connected to everything else, and while some of the text

seems to make sense, there is a lack of focus on what is really relevant, or evidence led.

For the supervisor, this is the ‘so what?’ moment. The student has designed a research project, identified a key question and related it to the current knowledge of the subject, then gathered a load of new primary data which has been analysed to reveal some ‘results’. So what? What does this actually mean? Sometimes the results suggest what cannot currently be proved, and this can be almost as important as getting ‘an answer’. Knowing what the evidence does ***not*** show, or where there are blind alleys in the data gathering, can be critical in the design of a new research project that advances our knowledge a stage further. What do the results ***really*** say? What claims can solidly be based on the research and what does it tell us about the research question that is an original contribution to the subject?

In this respect, the advice from a supervisor needs to be offered carefully, in order not to discourage or demoralise the student, for this is a time for honest self-reflection. It is

better to be slightly less ambitious in the research aims but be more robust in the collection and interpretation of data, rather than to strive for an idealistic but very ambitious research aim that is undermined by careless data collection, too many assumptions instead of hard evidence, or joining the dots to make speculative predictions rather than making comments based on robust evidence that can be justified by the data. We frequently tell research students to take a pause after they have written the penultimate draft of their data interpretation chapter, then go back to the very start of the dissertation. Read every section afresh, as if for the first time, and make the final tweaks to the narrative. Then, fresh with this knowledge of where they are and how they got there, try to write the conclusions by answering the 'so what?' question.

The abstract

The curious thing about an abstract is that although, after the title, it is the first text to be read, it is usually the last thing to be written in the dissertation. The reason is quite simple. Writing an abstract is a highly developed skill. On

one page, or less, the author needs to summarise the entire body of the research work, describing the research question(s), the methods used to gather new evidence, how this evidence was analysed, list the key findings, and say why these are important. This is a tall task, demanding a number of difficult decisions about what to include and what to leave out of the text. The added pressure is that this might be the one and only part of your research that a browsing researcher of the future will read, so you need to captivate their interest in half a page or so. On websites such as https://ethos.bl.uk/ which is the British Library catalogue of the entire output of completed UK PhDs, are the abstracts that researchers consult to decide whether to read the whole PhD dissertation, or not. This is a good site to consult to gain an idea of what is needed, but creating a good abstract takes practice.

For this reason, a good supervisor will encourage the research student to finesse their skill at abstract writing by trying several versions before the culminating attempt. It is sometimes said that to ask a research student what their PhD is about at the beginning of their studies is to get a

verbal paragraph in response, but to ask the same question at the end gets a succinct response of five or six words. This is because over the intervening period, the researcher has honed their analytical skills and (hopefully) their ability to separate what is really important, from that which is interesting but incidental to the main research question. The abstract is about what the reader needs to know, rather than the wider perspective on what might be nice to know.

Writing a concise abstract is a skill that will also serve an author well if/when they progress to submitting a paper to an academic journal. Again, the objective is to capture the essence of the article and grab the attention of the prospective reader. In a society awash with information, it is the ability of information to attract our attention that will distinguish it from the things that do not get noticed, and do not get passed onto future generations. In 'the attention economy' getting noticed is perhaps even more important than the information itself. If no-one ever reads your brilliant idea, it slowly moves to the graveyard of good ideas. There is a careful balance to be achieved between sensationalist headlines and dry-as-dust reporting, and though the title

needs to reflect this, the real meat of what the text is about is contained in a cleverly worded abstract. Ask yourself, what does this abstract ***actually*** tell us? For this reason, it is almost never too early for a research student to begin studying the structure of a useful abstract. According to Polonius (in Hamlet) 'brevity is the soul of wit' and it is also a very powerful academic skill.

Chapter 8:
Heading for completion

Checking citations and references

It is amazing how many students get into a muddle over the simple process of ensuring accurate links to the supporting evidence for their claims. Let us get this right; it is not the supervisor's job to check that citations and references are correct, but the External Examiner of the degree certainly will check this. For that reason, it is the supervisor's job to make sure that the research student gets it right. It is not a difficult task, but it can be time-consuming, so the task needs meticulous care.

To lay down some ground rules, when researchers make a claim or a statement of 'fact' in their writing, they need to establish the source of that claim. There are two ways to do this; either the information is new, i.e. as a result of the new research, or it is derived from previous research. When it is the latter, the normal way to credit the source of the

evidence is to include a citation in the text, (such as, ‘There are …. (Rennie and Smyth, 2019)’ or ‘Rennie and Smyth (2019) claimed….’ This then flags the full reference, which is then listed in alphabetical order at the end of the document, which in this case is, ‘Rennie, F. and Smyth, K. (2019) Digital Learning: The Key Concepts. London: Routledge’. (It is also becoming good practice to include the ISBN – International Standard Book Number – for books, and the DOI – Digital Object Identifier – for journal articles, to ensure that subsequent readers can locate the item.) Crucially, if a claim or a ‘fact’ is given without a citation to the supporting evidence, then it is assumed that the information source is the writer. If it is ***not*** the writer, then the missing citation is regarded either as shoddy workmanship at best, or plagiarism at worst. Plagiarism – knowingly misrepresenting some other person’s direct words/ideas as your own – is regarded a major misdeed in academia, so an important role of the supervisor is to ensure from an early stage that the student treats accurate referencing very seriously.

We encourage our students to adopt the same rigor that we do, which is, firstly, start to compile the list of references right from the *very start* of the research project. Always write out the references in full, and do not leave any information out – the chances are that you will forget to go back to correct it. When we find new relevant articles, books, or other resources that we know we want to include in our writing, we add the references to the master list as we read them. Secondly, when we have completed the final draft text (and usually a couple of times before then) we sit down with a printout of the main text on one side, and the list of references on the other. We go through the main text, marking with a highlighting pen every citation that we come across. We then turn to the list of references and highlight it there too. By the time that we have read the whole of the text, every citation should be highlighted, and every reference should also be highlighted. If there are any missing references, or articles included in the reference list that we have not actually mentioned in the text, then this is the opportunity to update the reference list by either adding or removing the relevant items. It is a laborious process, but it is fool proof.

The danger of not doing this becomes obvious when a particular citation catches the eye of the External Examiner, and they turn to the reference list for the full details. If the reference is missing, they do not know whether the writer has made a one-off mistake, or if there are many more missing references. The result is an almost mandatory viva condition to ‘Check all references’ before passing the dissertation, rather than getting a ‘no corrections required’.

Appendices and archives

As with every piece of substantial research, it can be a problem to decide what needs to stay in the main text and what can be left out without substantially impacting upon the ability to understand the narrative. This is where appendices can be useful, and an important role of the supervisor is to give gentle guidance on what needs to go into an appendix and what is simply best kept in an archive. The temptation of the early career researcher is to believe that everything is necessary, and in the classic ‘can’t see the wood for the trees’ mentality, to cram loads and loads of supplementary data into appendices that are rarely (if

ever) read subsequently. The golden rule of an appendix is that it should contain information that is not so important that it needs to be in the main text, but that it can still substantially contribute to understanding the background detail of that main text by providing supplementary evidence. A good example of this would be a large table of numerical results (in a quantitative study) or a key interview transcript (in a qualitative study). Both of these types of appendix can furnish crucial raw data that can enable an experienced reader to ‘get behind’ those research results and help them to make their own interpretations (or understand the decisions made by the research student).

An appendix is not an excuse to dump all the information that has been collected for which the researcher has not been able to find a place in the main text. Crucially, the appendices (and footnotes/endnotes) are often included in the word count for a dissertation submission, so weighty appendices risk robbing space for the more substantial (and more important) presentation of the main text arguments. If a point is critical to the development of the research conclusions or interpretations, then it should probably be in

the main text; if it is important but not crucial to see in detail and can be summarised in the main text, then perhaps a fuller account can be included in an appendix. There will also be some information that has a background relevance, but should neither be included in the main text nor the appendices, but this does not necessarily mean that it can be thrown away. There will be information such as lists of consultees, or anonymised participants codings, or transcripts of (most) interviews that might be needed in the months following completion of the research. Reading these are not germane to understanding the narrative of the main text, but they might be useful, for instance, when writing a subsequent article for publication.

In some cases, for example if the researcher does not intend to continue with the research topic, some of this background research might be archived with the university library, or with the research supervisor. Increasingly, it is a common requirement, for research that has received public funding, that the raw data should be made publicly available, and this creates new opportunities and new difficulties. Currently the data is required to be publicly

accessible for ten years (or ten years from the last time the data was accessed) so it is conceivable that the raw data will be openly available for far longer than any individual research project, and possibly even longer than the lives of individual researchers. This places an important new responsibility on the researcher to be very organised and very transparent in their collection and use of data. It also requires an accentuated awareness by the supervisor (and then the student) about the inclusion of relevant information for the successful completion of the dissertation, what can go into an appendix, and what should be kept in an archive.

Reviewing and revising

One of the strange but common occurrences in producing large pieces of writing is that the writer frequently becomes so close to the text that small (and even some large) errors get completely unnoticed. We sometimes tend to read what we think we have written, and spelling mistakes or misplaced words simply get overlooked. Supervisors have different ways of dealing with this. Normally we would give a detailed commentary chapter by chapter, and then quickly

read a revised version, but do not subsequently revisit it unless a later chapter forces some sort of re-think. It is usually emphasised from the very start of a PhD that the research project should ***belong to the student***, not to their supervisors, and as the final draft of the dissertation approaches completion, this is a crucial time for the student to assert their ownership. In the oral defence of the thesis at a viva, it is the student who will be held responsible for any errors and misspellings, but the supervisors can effectively support this process by timely guidance.

Firstly, in addition to supervisors reading every chapter as it is drafted, students should be encouraged to review and revise the entire dissertation just before they start to write the final chapter that brings everything together. In this way writers can check for any small typos and at the same time refresh their memory about what they have written earlier. (It can be a relatively long time between the start and the end of the writing process, and memory can play tricks!) Next, it is usually a good idea to get an extra person (apart from the writer and the supervisor) to read through a document (in stages) to give some feedback. Although it

helps to have someone who is knowledgeable about the subject material, the main thing is to have someone that can be trusted to tell you the hard truth. A friend or partner can be a great source of guidance to clarify the writing ('what *exactly* do you mean by this sentence?'). Thirdly, it is a good idea to re-read the dissertation (yet again!) after you think that it is finished – perhaps not every single page, but certainly to dip into sections and check that the detail still makes sense. Do not skim over the small things such as tables or the caption of diagrams, these are just as likely to contain errors as any other paragraph.

It seems superfluous to say it, but as each section or chapter is backed up for security, it is important that each saved copy has a date and/or version control number on every page. With multiple back-ups and multiple versions of revised copies, it can be very easy to create confusion. Ultimately, however, there comes a time to stop tinkering or tweaking the text and let it stand on its own merit. In some universities, the submission of the dissertation requires to be countersigned by the supervisor to agree that it is now in a fit state to be sent to an External Examiner for

evaluation, but in other institutions the supervisors are simply informed. Either way, the student is responsible for the final contents and its appearance, and the supervisor is responsible for helping the student to produce the best submission under the prevailing circumstances.

In the hot-seat – defending the thesis

One of the unusual aspects in studying for a PhD is that the final examination of competence (and quality) is based not simply on the written dissertation but, perhaps more importantly, by giving a verbal defence of the work in response to external scrutiny. Normally this takes the form of an extended question-and-answer discussion over a couple of hours with an External Examiner from another university and an Internal Examiner (representing the host university). The student is tested to ensure their authorship of the dissertation and to justify the methods of data-collection, analysis and the formulation of conclusions. What exactly is the new contribution made by this piece of knowledge to the subject discipline as a whole? Is it really new primary research? Across the universities network, the

regulations might be applied slightly differently, ranging from a quiet discussion with just the examiners present (the supervisors are not admitted) to a full public audience (as in Scandinavian universities) with almost anyone who has an interest in the subject being able to spectate.

As students will not have any previous experience of the viva voce – the oral defence – of their work, it goes without saying that the supervisory team have an obligation to prepare the student about what to expect. This can be done either as a series of conversations, or as a full ‘mock viva’ in which academic colleagues of the supervisor will role-play and raise the sorts of questions or problems that the student might be expected to encounter during the real viva. Student responses can be explored and rehearsed. Normally the viva is not a confrontational event, but it can certainly be ‘robust’ and very demanding for the student. Almost any aspect of the research can be explored, and the student needs to be able to explain and justify what they did (and did not do) to reach the conclusions of their thesis. Common questions ask the student to summarise the research, to indicate their unique contribution made to the

subject, to interrogate the quality of the results, and to explain in detail how those results have been achieved. The selection of External Examiner is usually as a result of a nomination to the university by the research supervisors in a shortlist of potential academics that have an expertise in the subject area. The student has a right to expect that the examiners will be objective and fair, but almost nothing is off limits for commentary, from simple errors in spelling or grammar, through gaps in the literature review, to the logic of data-collection or the presentation of the results.

In some cases, the examiners might challenge the student about what they have written, while at the same time being in broad agreement with the student – but they want to gauge the student response. The examiners want to be confident that the PhD student ***really*** does have an intimate understanding of both the subject matter and the processes of advanced research. The viva report that is fed back to the university will not only make a recommendation of a pass, or 'pass with amendments' (it is possible, but rare, to have absolutely no 'corrections') there may also be recommendations that need to be met before the award is

confirmed. These recommendations might simply be spell-checking or entering a missing reference or two, but there might also be a requirement to re-write, extend or remove some aspect(s) of the dissertation – such as the addition of more up-to-date references, a clarification of technique, or a re-working of the conclusions. Whatever the recommendations might be, the student now has an unambiguous written list of things that they need to address in order to gain the PhD and a time requirement for these changes to be made. It is perhaps the clearest guidelines that they will ever have had during the entire PhD study, and a small price to pay for the award of the highest academic degree.

Polishing the finished product

At the end of the viva there are various mixed emotions swirling around, for both the former student and the former supervisor. Relief that it is ‘all over’, happiness or displeasure with the final outcome, and, almost inevitably, speculation about what happens next. All of these reactions need to be recognised and addressed before the situation

can move on. By the time the student actually progresses to making a submission of the final draft of the dissertation, the entire text should have been checked and rechecked by both student and supervisor, so outright failure is comparatively rare. The act of submission of the dissertation triggers an independent evaluation of the entire work, and probably without exception there will be several errors, gaps, and/or ambiguities revealed. It is uncommon for a student to pass with absolutely no corrections (though it does happen!), so the examiners will usually make several observations, recommendations, and conditions before the award of the degree is confirmed. These observations set a backdrop to the report and might cite examples of how well the student performed, such as in the write-up of key aspects of the dissertation, or in the cut-and-thrust of the viva interview. The recommendations are usually a mixture of optional improvements, such as suggestions to make the narrative a bit clearer, or encouragement to re-work a couple of key sections for subsequent journal publications. The critical commentary, however, is the list of conditions given, for these need to be

completed satisfactorily before the award of a pass is confirmed by the university.

There are three broad types of conditional statements; firstly, what everyone hopes for, is the award of a pass ‘with minor modifications’. This usually means relatively light corrections, such as correcting spelling and grammar, perhaps missing or badly cited references, and minor formatting such as captions to diagrams or ‘widows and orphans’ in the text. Probably the bulk of successful PhD vivas end up in this category. Secondly, there could be a condition of ‘pass with major modifications’. This is not necessarily as serious as it might sound at first, for major adjustments might simply mean the reorganisation of sections of the dissertation, or the removal, addition, or extension of text that has already been presented. In some cases, the student has gone off at a tangent to the main topic, in other submissions there are important gaps, such as the omission to reference some up-to-date or key academic works. These conditions need to be addressed adequately in order to lift the final dissertation to the level required for the award of a PhD. The third category, which

no-one ever really wants (including the examiners) is the requirement to ‘resubmit the dissertation’. In reality this means that there is evidence of the student having completed a reasonable body of research, but this is offset by a range of serious omissions and/or lack of attention to detail which cannot simply be ‘tweaked’ into an acceptable format, so a complete ‘failure’ at this stage is comparatively rare.

The good output of any viva is that the candidate for the PhD will be told exactly what they need to do next in order to bring the dissertation up to the mark. Sometimes a full list of typographical errors will be supplied by the examiners, while on other occasions the student will simply be told to ‘check all spelling and references’. These conditions normally come with a recommended time-frame; frequently 3-6 months for ‘minor’ amendments and 6-12 months for ‘major’ changes, although in fact the amendments rarely take that long. Minor changes are usually checked and approved by the Internal Examiner, while major changes will normally be sent to both examiners for approval. With the confirmation of the final award, the relationship between

the supervisor and student alters subtly to become an association of professional colleagues, and that is a whole new experience.

Chapter 9:
What to expect

Help and support from professional services - non-academic

Along with support that is provided by your supervisors, for your academic needs, there is also a range of other help and support available to you on your way through your PhD (or other research degree) journey. In addition to your supervisor(s), there will be assistance available from your institution's Professional Services team. Sometimes this is provided by the offices of either an institutional level, or faculty (or school) level Graduate School. However, there are various models of support across UK Higher Education Institutions (HEIs), and so you will need to check to see which model is applied in your own institution. Nevertheless, somewhere in your institution a range of support provisions specifically for you will be available. This chapter will seek to explore some of the most relevant and

important of these, from the stage of initially thinking about undertaking a postgraduate research degree, through to moving on from your studies into the workplace armed with your award.

Before you begin – identifying an institution and applying to study

Help will be available to you in various written and online forms, in respect of your initial considerations of where to undertake your research degree studies. Institutions are able to provide advice and guidance about their research areas, the type of institution they are, and their approaches to research degree studies, along with a range of other relevant matters. They are also geared up to helping you with aspects of the application process itself. There is usually a dedicated area of the university web site that is devoted to Postgraduate Research students, and this will contain a great deal of helpful information relating to the application process as well as the more general aspects of your present and future studies.

These university web pages contain all the academic information you will need in order to ensure that you meet the basic entry requirements, and they usually contain information and links to funded studentship competitions and associated opportunities, some of these may be offered by the institution itself while others are linked to external providers. There will be details available on the application process, fees, registration, induction, training, supervision, monitoring and progression, as well as support for mental health and wellbeing, and for special education needs. There will be a range of documents (which are important, if sometimes a bit dry and dense) relating to codes of practice, policies, ethics, quality assurance, and the ways that students' voices can be heard, both in the form of representation and, if required, via a complaints procedure. In sum, a comprehensive suite of advice and information will almost certainly be available to you.

In all these matters, you should rest assured that the chief aim of all staff involved in your PhD studies (which actually amounts to a fairly large number of people), no matter which institution you choose to attend, is to help you navigate your

way through your studies and on to the successful attainment of your research degree. Often, the advice and information available is practically oriented, and it usually contains a list of contacts and other relevant information and forms for specific purposes that are normally clearly labelled. These will include links to both internal and external support and advice where this is thought to be useful to students and prospective students.

At first sight, the information available might appear to be somewhat bureaucratic and can sometimes be discounted as not being relevant. This is not the case, and the investment of a modest amount of time to become familiar with the basic content of these pages at an early stage, and to note the sorts of information they contain, can save a significant amount of time and effort later on. This is especially important when you are looking for that one piece of advice or information that you are sure must exist, somewhere.

Within these pages there are likely to be a number of key documents and guidance information that you should read

in detail both before joining an institution and in the first few months after having joined. You will quickly learn which areas of the website should be visited frequently and which sections should simply be noted for future reference. It is likely that the most relevant areas of the site will be clearly signposted in the form of appropriate section headings, such as; ‘Before you Apply,’ and ‘induction’, and so on.

We would also encourage you to note that these resources and documents, and indeed the existence of the entity known as the Graduate School (or its equivalent by another name), are there to help you. These provisions are not intended to put unnecessary or overly burdensome extra requirements in the way of you getting on to/with the really ‘fun stuff’, your research. Instead, they are intended to help you navigate your way easily and successfully through the university’s processes (e.g. to apply to study, or to seek funding to attend a conference etc), and also to give you some basic information on how your studies will be organised and run.

Applying for admission and for studentships

The first thing you have to decide is your area of study, and the second is likely to be the institution (or a shortlist of institutions) in which you wish to undertake your degree. Following this, you can then begin the application process for a place. This can be done in advance of you knowing the final results of an undergraduate degree programme, but quite often these days, the application will be done after graduating and while undertaking a Master's level degree. However, there still remain a good number of students who take a break from academic study before deciding to return for a doctoral degree after a few years (and sometimes after many years).

Normally, prospective students will have identified someone who they wish to act as their Director of Studies, and not infrequently this is the result of initial informal contact with an academic member of staff or someone in the Graduate School Office, who may be able to introduce you to academics who are researching in your chosen area of study.

With all these preliminary things decided, your thoughts will almost inevitably then turn more directly to the question of ‘how to pay for this?’. Traditionally, annual fee charges for UK research degrees have actually been quite modest when compared to the actual costs incurred by the university in supporting PGR students through their journeys. Nevertheless, the fee is only part of the financial equation to take into account, because a student also needs to survive during their period of studies, and perhaps even to have a bit of a social life while doing so! In addition, they could have other commitments that also need to be taken into account. Therefore, it is important to try to ‘weigh up the full cost’ of the PhD before embarking upon it – and this includes social and other costs, as well as impacts on family etc. This point is not being made in order to put you off – far from it – but simply to say that it is necessary for you to enter the journey with your eyes wide open, and to factor in the various elements that comprise the ‘cost’ of advance level research studies, which are more than financial alone.

Usefully, but depending on the time of year that you begin the process of applying for a university place, there are likely to be a number of studentship competitions that are available, to which a prospective student may apply. Normally, a good number of these competitions commence formally in September or October each year, for entry the following September/October, but the application process can take many months. Therefore, it is best not to place all your eggs in a single basket, and also to look ahead and prepare as well in advance as possible for any likely application you may wish to make.

Many of the studentship opportunities in the UK are actually UK Government funded provisions of one sort or another. Not infrequently, these are discharged through UK Research and Innovation (UKRI) and the various Research Councils that operate across the UK, such as the EPSRC (Engineering and Physical Sciences Research Council), ESRC (Economic and Social Research Council), AHRC (Arts and Humanities Research Council) etc). In many cases, these opportunities provide full scholarships that amount to a non-repayable grant in the region of £70,000,

spread over a 3.5 year period. This money is meant to cover the student fees, a modest stipend (c. £13k per annum at the time of writing in 2021, and possibly an element for equipment, training and development needs, sometimes known as the Research Training Support Grant (RTSG).

However, there are also a number of institution-level scholarships/studentships that can be made available, many of which provide partial funding towards the full financial cost that you will incur. These institutional studentships vary considerably in value and duration, so you will need to check carefully the fine detail of what the studentship will cover, and any attendant terms and conditions.

Beyond this, there are part- or full-funded studentships that are also available, which can be allied to businesses, companies, charities, bequests, and so on. For example, the Carnegie Trust provides an annual studentship competition and awards highly sought-after, and highly competitive full studentships. In the case of industry-

provided studentships, you might well find that the award is related to a specific topic of research investigation that needs to be undertaken rather than giving you a completely free hand to choose your own research topic. So once again, look at these carefully as they may require you to make presentations or formal reports to the funder on the way through the degree and/or at the end.

Then, there is also the option to cover the cost of your research degree as a 'self-payer'. While there are many self-funding students in UK Higher Education, it is not unusual for these students to opt for part-time study rather than full-time, so that they can continue to provide an income to help cover their other living costs and commitments while studying. While this is often a pragmatic and necessary approach, and can be undertaken very successfully, the part-time route necessarily extends the period of studies significantly, and so requires careful thought (and ideally the positive support of your employer, if necessary) before embarking on it. However, some institutions do allow for a change in study mode, either from full time to part time, or from part time to full time, if a

student's circumstances change. Rarely, though, will a funded studentship permit a change from full-time to part-time, although this can occasionally happen when certain personal circumstances dictate that this is a necessity and where the funding body is prepared to accept the change.

It is worth noting that international student fees are likely to be considerably higher than the 'home' fees paid by UK nationals. Interestingly, there is a fee differentiation across the countries comprising the UK at the undergraduate level, but this differentiation does not currently exist at the PGR level. In all cases, the fee level and any additional costs associated with the fee (e.g. laboratory or fieldwork fees/costs) should be checked carefully in advance. Information about these important matters should be available and clearly stated in institutional websites and prospectuses for PGR studies.

It should be noted that not all studentship awards will cover the full fee cost of international students and therefore either the student or some other body will need to cover the difference between the home fee and the international fee.

Others, though, will not provide resources to cover any part of the international fee but will instead provide what is known as a ‘stipend-only award’, which helps cover living costs and other expenses. Those studentships that will cover full international fees and a full stipend as well, can be relatively hard to find and are likely to be highly competitive. At the other extreme, there are a number of studentships that do not accept applications from international students at all. A further complication currently exists in the UK in respect of BREXIT, and it is not yet fully clear (at the time of writing) how studentship providers will classify European citizens in the future, but it is likely that they will no longer be charged the ‘home fee’ rate.

There are also a number of alternative funding sources available, from some unexpected places. It is worth checking out these ‘alternative funding’ opportunities, and the Graduate School might be in a position to point you to some sources of information about these. Some of these have very specific requirements, so, if you happen to be the second daughter of the MacKenzie Clan, and have lived for a time in Benbecula, then who knows, you might be in luck!

All students, whether as part of an application process for a studentship or as a self-payer, will formally need to apply for a place to study at the institution of your choice. This will often entail an interview/discussion of some sort together with the completion of the admission request document, which students normally submit with input from their prospective Director of Studies. This will require the identification of the subject area, the supervisory team, details of the research topic, and a range of other important information. The application form will be submitted for approval to the university committee responsible for postgraduate research student admissions, and a decision will be taken about whether or not to offer a place, as well as any conditions that may need to be applied, e.g. confirmation of the undergraduate degree classification or the successful completion of an English Language competency requirements (e.g. IELTS). In addition, if there are any issues relating to international students' visa applications or requirements, these are often identified in the application form and, if the application for a place is approved on academic grounds, then help will almost

certainly be provided thereafter with the visa application process etc.

As an aside, while on the subject of covering the costs of your studies, there is often the possibility (although it cannot be guaranteed) of a student being able to undertake some paid work in respect of contributions to teaching (or other relevant form of academic-based work) while undertaking a PhD, in the institution in which they are undertaking their studies. However, most institutions strongly advise that there should be no more than a few hours of such activity undertaken per week (a maximum of 6 hours is an oft-quoted level) when also seeking to undertake full-time PhD studies. Anything more than this can create a considerable and unhelpful intrusion in your academic work, and so needs to be carefully managed. Some institutions, and indeed some discipline areas within institutions, are in a better position than others to make such opportunities available to interested students, and so it is worth looking into the matter carefully.

Early days as a research student

Without repeating the advice and information contained in other sections of this short book, it is worth highlighting briefly a few things that you might need to engage with, or consider finding out about, early in your time as a PGR student.

The first of these (aside from introductory meetings and the engagement with your supervisory team), is likely to be the highly important Induction meetings and associated events, which will usually be set up by the Graduate School (or equivalent office) in your institution. This induction event is not always mandatory, but it would be wise not to miss it, in our experience. However, in some institutions research degree studies (particularly at the doctoral level), can start at any time of the year rather than only at one or two set annual entry points, so your induction may actually be a few weeks to a few months after you have started. In these cases, you might well find some pre-recorded basic introductory material available in the Graduate School webpages or the PGR students VLE (Virtual Learning

Environment), which you should review. Regardless of when it happens, the induction offers an introduction to your place of study, to fellow students, to staff/colleagues who will be working with you on your journey through your degree, and to a range of essential information for your studies. In other words, it provides your initial group of contacts, in the widest sense, in your chosen university/institution. It also tends to give you some helpful starter information about what to expect in your institution, both in the early stages of your studies and then into the further years. It covers processes, forms, policies, and a range of other useful information, and often will include an opportunity to meet students who are further on in their own studies, in order that you can hear from them and ask questions about what research-student life will really be like.

In addition to this induction, it is likely that your supervisor(s) will arrange more localised induction and/or introductions to colleagues and other students who will be working with you over the next few years in your general discipline (and probably departmental) area. Once again, the initial

contacts that this facilitates are important, and will help set you off on your journey in a good way.

As you become familiar with your new surroundings and get to know both the institution and your departmental context a bit more, it is also worthwhile finding out whether there are any departmental seminars and meetings available on a routine basis, or even seminar series in cognate discipline areas. Once again, early engagement with these opportunities to connect with your fellow researchers is a very good way to get to know colleagues and potential future collaborators. It will also help establish a network of additional assistance and support. In short, while not volunteering to become too heavily involved from the word 'go', do find out what opportunities are available to engage with the broader research active staff community in your institution. We are sure that you will be made to feel very welcome.

There will then likely be an opportunity made available (and once again, this could be mandatory in some institutions) to sign up to attend a student conference that may take place

at some stage in your first year (and possibly in subsequent years). This will be a further opportunity to find your feet and perhaps to have the chance to begin to share something about your own research interests with your fellow students. If something like this is available in your institution, then it is well worth attending.

Tools and resources for managing the journey through a research degree

In most institutions, once you become a registered student you will be given a student email address, a student ID number, and a student identification card. These will give you access to a dedicated PGR student area of the VLE, where contact and communication can be made with respect to issues of student progression and other important notices and opportunities. This will also give you access to library resources and IT services, as well as a range of student support and study aids.

The student journey for a PGR student is quite often closely managed and monitored, at an institutional level, by a key

academic committee. In the case of the University of the Highlands and Islands, this is known as the Research Degrees Committee. This body will normally comprise of experienced academic and professional services staff from a range of different disciplinary areas and research-related backgrounds. Their job is to ensure that all matters related to PGR students' needs and smooth progression – including degree approvals, re-approvals, and quality assurance – are maintained in good and appropriate order. Quite often, PGR students are directly represented on a body such as this, as well as having representation in the institution's Students Union/Representative Council (albeit these can often have a fairly heavy focus on undergraduate provisions and only relatively modest provisions for PGRs).

Quality Assurance and the student experience

Quality Assurance is an important factor in respect of the student experience of their degree studies, at any level of study, no matter whether it is a taught course or research-based. Therefore, there will also be some engagement with the student body through internal quality assurance and

assessment means, and also engagement with relevant external QA processes. In Scotland, standards are assured and maintained by the Quality Assurance Agency for Scotland (QAA (Scotland)). Parallel bodies exist and operate in the other nations that comprise the broader UK. In addition, there are a number of UK-wide quality assurance exercises that are available for institutions to engage with, such as the Postgraduate Research (Student) Experience Survey (PRES – run by the Higher Education Authority). These help an institution understand the student experience of their provisions at the research degree level, and thereafter to make improvements as and when required – most often in discussion and partnership with the student representatives and the PGR student body.

Basic provisions for study (practical things, like workspace etc.)

If there is one thing that universities are good at, it is understanding what it takes to try to provide a good and effective environment for students to be able to undertake their research degree studies. At the doctoral level, there

are certain basic provisions that ought to be available to you, and if they are not available then you should ask why not? These facilities include the provision of a suitable desk/work space and/or laboratory space and equipment for you to be able to engage in your research studies effectively. This includes, for example, access to library resources (often electronic-based but also physical), and access to buildings and other relevant facilities. In the case of library and building access, these will often be arranged on the same basis as for a member of academic staff rather than as an undergraduate student. In addition, you will be given access to computer infrastructure and data storage provisions that are suitable for research degree studies, but do bear in mind that you are responsible for complying with the university's and Government's legal provisions with respect to the safe storage and appropriate use of (and access to) research data.

Not infrequently, research degree students (typically at the doctoral level and sometimes at the research Master's level) are invited to a range of staff-based events, which will include the aforementioned research seminars and internal

conferences and workshops, but could also include staff meetings, webinars, some training events, etc. In sum, while doctoral level students will occupy a slightly curious position of not quite being a student and not quite being an academic member of staff, you are likely to find that the academic staff will view and treat you more like the latter than the former. In other words, you are likely to be considered from the start as being a valued and valuable part of the academic team, albeit as a junior researcher, not least because of the recognition of your peers that you will be undertaking research that will be at the cutting edge of the discipline area. It is no wonder, when looking at things through this lens, that research degree students are so highly prized in academia!

Beyond the basic provisions that should be available to all doctoral level research students, it is worth exploring with your supervisor exactly what sorts of things your RTSG may be used to provide for you (if you are lucky enough to have such a provision within your funding). In other words, if you hold a studentship or scholarship, you may have access to a number of additional benefits with respect to equipment,

training, and travel support etc. But all students should have access to at least a minimum level and standard of such provisions. You are not likely to get an office all to yourself, and you might have to share a desk or work on a hot-desk basis, perhaps in an open-plan, research degree student study area, but the provisions made for you need to be adequate and appropriate for your studies. Therefore, if there is something not being provided but which you need in order to undertake your research successfully, simply ask. It is highly likely that your Director of Studies and/or Graduate School contact, will do whatever they can to sort something out with/for you.

Training and development

There is regular training available for both students and supervisory staff, which is quite often arranged or provided by the Graduate School. In the case of students, this begins with the initial induction as already covered, but soon thereafter it extends into a range of generic research skills options and then provision for training in specific and specialist research-related needs that you may have. While

your training and development needs will normally be discussed and agreed with your Director of Studies in an ongoing way, there is also likely to be a more formal assessment of your requirements in these areas at the start of each new year of your studies.

In addition, your institution will also provide a range of training for your supervisors, to make sure that they are kept up to date with the latest information about supervisory issues and techniques, and are thereby equipped to provide the best supervisory experience for you that they can. Often, this training for supervisors is mandatory for a supervisor every few years (even for very experienced supervisory staff). This follows on from some initial mandatory training for new supervisors, which can also be accompanied by opportunities for peer-to-peer mentoring on an ongoing basis (both as a mentee and a mentor). These training and development approaches are taken in order to ensure that you will receive broadly consistent and high quality supervision during your time as a student, no matter where you are located and no matter what is the subject of your research degree studies.

Quite often, the Graduate School office will provide a list of training opportunities that are available to you, as a student, to sign-up to attend. These are posted on the website and the VLE, and also communicated through email and other alerts. In addition, most universities are now partnered with others in a range of collaborations, and this frequently means that training opportunities are also available at other institutions, on a national or regional basis. The trick nowadays, perhaps, is to get the correct balance between undertaking the training that is necessary and helpful for you to progress through your PhD successfully, and possibly avoid undertaking a bit too much training in areas that are interesting but perhaps not directly relevant to completing your studies. Such opportunities, though perhaps tempting, can act as a slight distraction from your main priority, which is to secure your research degree. This is where the guidance and support of your supervisors (and particularly your DoS) is especially valuable. You should do what you can to grab hold of the many and various opportunities that will be available to you, but you cannot afford to become too distracted from achieving your ultimate goal.

It is likely that if you are being supported in your studies through a funded studentship, there will be some financial provision made within this for training, development and support needs on an annual basis. This will help cover the costs of some forms of training and/or attendance at conferences and such like. However, all students, whether externally funded via studentships or not, will have access to training opportunities as part of the fee they pay for engaging with the degree. Sometimes, this may extend to the provision of partial financial assistance with the cost of travel to conferences. The funds can be modest, but a modest contribution can often mark the difference between being able to attend or not.

In addition, there are usually some discretionary funds available to help students who may find themselves in temporary financial difficulty, and there is likely to be some form of student hardship support that can be applied for, if required. Again, the Graduate School should be able to advise.

Student progress monitoring

Most institutions will ask research students and their supervisors to work within a Progress Monitoring Framework (or a similar scheme, known by another name in your institution). This sets out a broad framework for conducting research degree studies, and it is divided into broad periods of time within which a variety of elements of your degree studies need to be undertaken and completed. Your progress can then be reviewed and assessed against those markers through regular reports that have to be prepared and submitted for review to the Graduate School, for consideration by the university's (or faculty's/school's) overseeing body for research degrees. These reports offer a formal opportunity for students and their supervisors to make periodic assessments of progress. These reports are used to confirm (with hindsight) what has been achieved in the previous few months (usually 6 or 12 months) since the last report, and then look ahead to the next period of time, in order to articulate a plan for development of the research. Some institutions require only a formal report every 12 months, while others combine a less formal 6 months report

with a formal and more comprehensive annual report. There are various models and approaches taken to this across UK Higher Education, but some form of formal reporting is usually mandatory.

Frequently in the Science, Health, and Engineering areas, students will produce and present a GANTT chart of expected work tasks against a timetable of progress, whereas reports in Arts, Humanities and Social Sciences areas are often more descriptive and text-based. You should use whatever approach is required or expected by your institution and/or discipline area, and your DoS, as well as officers in the Graduate School Office, will work with you to ensure that this is done timeously and correctly.

These reports and opportunities for progress monitoring, should not be viewed with any sense of fear, but they should be treated seriously and diligently. Within the reports, you will be able to address a range of successes, challenges, future opportunities, training needs, and other relevant factors affecting your progression. It is also likely that some of these reports will be required in order for the university to

approve your progression from, say, a probationary period in your first year of study into a fully-fledged PhD student status. Major transition points can also involve the need for you to make a presentation to a slightly wider team of experts than your supervisors alone. This may lead to the production of a report that can help you and your supervisors engage in further fine-tuning of your studies, and thereby give you even greater chance of achieving your research goals in a timely way. It should be noted therefore, that as daunting as this may sound, and while not underplaying the importance of these provisions, they are all tailored to help you progress successfully through your research degree.

Progress monitoring can be helpful to the supervisory arrangement too, in terms of providing a formal occasion, routinely, whereby both student and supervisor can reflect on their own approaches and expectations, and make any adjustments that may be necessary. In most cases, though, this form of engagement and adjustment is simply part of an ongoing activity, which runs throughout the normal course of the research degree. However, if there

are issues that emerge that might need some additional help and support, then the routine monitoring reports can also provide an opportunity to bring these to light and take appropriate actions to help resolve the matter.

Dealing with difficult issues and situations

While on the matter of student progress, it is worth spending a little time looking at how we might deal with the difficult personal issues and circumstances that can sometimes emerge during the course of a student's time pursuing their degree. To begin with, it is probably worth stating that it is seldom a good thing to let small niggles in a relationship (even if between a supervisor and a student) fester and become deeper bruises or wounds. After all, the PhD is a process that involves the engagement and interaction of human beings, and things do not always work out ideally with all relationships. Therefore, rather than waiting for the opportunity of a formal report in order to air any differences of opinion that may occasionally arise, it is strongly encouraged that these non-academic matters are dealt with through a different means than the formal academic

progress reporting process. These should be addressed in a discrete, timely, and yet direct way.

It is perhaps worth making an extra point here, which goes beyond straightforward academic performance and progression monitoring issues. It is occasionally the case that a modest difference of academic opinion or disagreement can take place between a student and a member of the supervisory team. This is normal, and it simply reflects the fact that everyone involved in the research degree process is passionate about what they are doing, and academics are not famed for holding back their views. When handled well, these occasional differences of opinion can actually be a good and healthy thing, both for the student and the supervisor, not least if it leads to the further refining and strengthening of a position on a research matter.

However, at a personal level, it can also sometimes be the case that you, as a student, may find yourself having to deal with a somewhat discrete and personal matter that you would not wish to discuss or share with your DoS or any

other member of the supervisory team. In these sorts of situations, it is quite likely to be the case that your university will have allocated you to an experienced academic who is not a member of your core supervisory team and is therefore independent of it. Indeed, this individual might be working within a completely different academic field. However, their main purpose is not to provide specialist academic guidance for your degree studies, but instead to act as a confidant in the provision of academic-related, and sometimes more personal advice and support, if that should be required. In the University of the Highlands and Islands these individuals are known as Third Party Advisors (TPA). However, beyond these highly useful people, your institution will also have other professional services and pastoral support arrangements in place, which you will be able to access for help and support if you should require it. Quite often, in the University of the Highlands and Islands, TPAs are able to provide a bit of help and support that simply gives an extra boost of confidence that a student may require from time to time, in order to get over a stumbling block of one sort or another.

In our experience, this has often helped to avoid the relatively small issues that can sometimes occur from becoming major challenges and unnecessary impediments to progress. The conversations held between the student and the TPA are confidential, but the TPA can be asked to raise points of concern or issues in a sensitive way with university officers or supervisors, with the permission of the student. However, their main aim is to listen and provide an impartial ear, and thereby to ‘hear’ the students' concerns and help to provide additional non-specific academic or process-related advice.

Likewise, officers in the Graduate School office (or its equivalent) are also available to help with these matters, and to help address any factual questions relating to student activities or to point students in the direction of some more specialist help and advice that may be required. There will also be a formal and informal complaints procedure available if necessary, in the unusual event that a situation takes a more serious turn for the worse and needs to be dealt with in that way. Once again, the Graduate School or Student Support Services Team (or

equivalent) will be there to help advise you on this, if it should be needed, which it rarely is, thankfully.

Sometimes, a change in membership of the supervisory team can be needed, either because a member of staff leaves to take up a position elsewhere, or for some other reason. The Graduate School Office, the DoS and other supervisors will work with you to help you during this time in order to help achieve the minimum disruption possible to your studies while a replacement/successor is identified (in discussion and agreement with you) and put in place.

Ultimately, if required, there are also processes in place within your institution to help students terminate their studies early, if required, and to do so in the most positive and constructive way possible. Indeed, there are many things that can happen during the course of a research degree, and especially one that is the length of a doctorate, and occasionally these can mean that a student is not able to complete their studies at all, and they have to withdraw. There are also occasions where a temporary suspension of studies is all that is required in order to address a particular

issue and then for the student to be able to pick up their studies again, once the issue has been resolved. These sorts of situations can exist where, for example, a student suffers a health condition that requires an operation that will necessitate a period of recuperation and non-engagement with the PhD, but it can be for a range of reasons.

In sum, the provisions for PhD studies are ordered, but also relatively flexible. It is understood that life continues to take place while you are on the journey, and the institution will be well aware of the sorts of things that can happen, so will do everything possible to help you in any such difficult and challenging personal times that you may face.

Mental good health and wellbeing, and Special Education Needs

It is always important to ensure that students' needs are met in respect of their academic requirements, but it is also understood in present day Higher Education that it is equally important to ensure that there are proper provisions made to help students deal with the emotional and

psychological aspects of long-term engagement with intensive research degree studies. For this reason, any institution that you attend is likely to have a number of resources available for you to access in order to help keep yourself in a state of good mental health. At a minimum, these will include access to a student counselling service as well as to other professional health-related services.

However, if it should be the case that you require a more direct and a deeper level of support that needs to be provided via the NHS, then you need to know that the fact that you are engaged in research degree studies is unlikely to give you a fast-track route into therapeutic care and support. While this is unfortunate, and there are actions underway across the sector to try to ensure that the special requirements of research degree students are taken into account and addressed as quickly as possible, you do need to bear this current situation in mind. Unfortunately, it has to be said that engagement with doctoral studies is not likely to be an entirely stress-free time. This being said, stress that can be caused by the need to work hard and to regular deadlines, as well as the need to trouble-shoot all manner

of issues that come about when undertaking research, can help develop useful resilience, fortitude, patience, creativity and flexibility, which are not unimportant personal (or research) attributes.

Institutions will also endeavour to help students stay connected with each other, and thereby to form mutually supportive groups, which often span a range of discipline areas rather than being restricted to only one, or even only to single cognate areas. It is up to you to decide how much, or how little, you wish to engage with these opportunities. As a PhD/research degree student, you are expected to take responsibility for your own time and activities, and so there are very few things that are mandatory. However, you will be strongly encouraged to keep yourself connected through the provisions that are made available for you to engage with, and thereby avoid falling into the trap of being too isolated and solely focussed on your own niche area of research activity and interest. In other words, it is important to keep things in balance, and to enjoy an appropriate and healthy social life too.

When it comes to Special Education Needs, it has to be said that provisions in UK institutions are greatly improved on what they have been in the past. There is also, however, the practical issue to be acknowledged, that research degree students are working at the highest level of academic endeavour in very specialist fields of study. This may mean that the generic provisions that are available for cohorts of undergraduate students are not always going to be able to meet your own specific academic support needs as fully as might be preferred at the doctoral level. An example might be with respect to very highly specialised assistance with scientific writing that is required for a PhD. Nevertheless, institutions are good at dealing with a growing range of special educational needs, and they will seek to tailor their support in order to meet your own needs as far as they can.

Regrettably, for one reason or another, a number of students do not declare having special educational requirements at the point of application, and so can be part way through their studies before making such a declaration. At a minimum, this creates a delay in providing effective

support to help meet those needs, which is regrettable. Clearly, it is up to an individual to decide if and when to declare that they have a special education need, but we would suggest that it is likely to be most helpful to consider making supervisors and the Graduate School aware of this as early in the process as possible, (even as early as the initial application stage). The answers given by a student with any special needs will not be used to the disadvantage of that student but will instead allow the institution to engage with them in planning for their support and thereby allow the institution to put a good number of special provisions in place so that the student can be properly and effectively supported, right from the word ‘go’.

Careers support and placements

Many research degree students do not go on to pursue a formal academic career in a Higher Education Institution. Institutions are aware of this, and so their provisions for careers advice and guidance, and also opportunities for research students to spend some time on a relevant placement, are becoming increasingly common, especially

at the doctoral level. Details about such opportunities may not be available at the time of your registration to study for your degree, not least because these often emerge suddenly, as one-off situations rather than being annual vacancies, and thereby these are beyond an individual university's control. However, information and advice about these opportunities will be circulated to students by the Graduate School office and/or their supervisors when they do arise. It is then up to the student, in discussion and agreement with their supervisors, to decide whether to apply and what to apply for. It is worth bearing in mind, though, that doctoral-level placements are often competitive and highly prized, but they are not always valuable for all PhD students, not least because they extend the time it then takes a student to complete their degree.

An important part of your time spent in your doctoral studies will be in building ties, connections and networks. Your supervisors and other members of the professional services will help support you in accessing these networks, but it is up to you to develop and thereafter maintain these. In doing so, this can be one of the best ways available to secure the

job of your dreams following the successful completion of your research degree. Indeed, engaging in research leading to the co-authoring of academic papers is not an unimportant way of being introduced to the future marketplace, not least for those aspiring to a future career in academic-related positions.

Further Reading

This book has been written more as a ‘road map’ of the supervision experiences, to guide the process and suggest ideas. It was not intended to provide a comprehensive, fully referenced account of supervision. For those readers who now would like to investigate the subject in more depth, the following three publications are recommended, although of course there will be other relevant literature, and new resources become available regularly.

For the supervisor:

Delamont, S., Atkinson, P. and Parry, O. (2004). *Supervising the doctorate: A guided to success*. Open University Press. ISBN 0-335-21263-8

For the student being supervised:

Phillips, E. M. and Pugh, D. S. (1994). How to get a PhD: A handbook for students and their supervisors. Open University Press. ISBN 0-335-19214-9.

For the educationalist wishing to delve more deeply into the background research and analysis of research supervision as an academic:

An excellent resource of the systematic analysis is this annotated bibliography.

Taylor, S. (Ed.) (2019). *The Research Supervisor's Bibliography*. Third Edition. The UK Council for Graduate Education. https://supervision.ukcge.ac.uk/cms/wp-content/uploads/2019/09/Research-Supervisors-Bibliography-Third-Edition-Taylor-UKCGE-Research-Supervisors-Network-Resource.pdf