7 INITIATING THE FORMAL SUPERVISORY PROCESS

7.1 Introduction

It is difficult to determine statistically what proportion of postgraduate research programs fail as a result of the supervisor and what proportion fail as a result of the student. Generally, neither supervisors nor students are eager to accept blame for an unsuccessful program. Of course there are also other extraneous, non-academic factors that may contribute to the unsuccessful termination of a project, including:

- Personal bereavement
- Illness
- Relocation
- Initiation of a start-up company
- Research student being head-hunted for a lucrative job prior to completion.

Notwithstanding non-academic factors, in an unsuccessful project, where things have gone awry, the student is likely to blame the supervisor and the supervisor is likely to blame the student. Suffice to say that, because it is the supervisor's responsibility to make a postgraduate research program work then, if it doesn't, the supervisor generally has to accept responsibility for the failure.

There are naturally a few instances where a research student needs to wear responsibility for the failure of a postgraduate program. These include

cases where the research student:

- Has been lazy and/or unproductive, despite the best efforts of the supervisor
- Does not, in practice, have the intellect, academic skills or capacity for independent thought and work required to complete a program.

These sorts of occurrences tend to be the exception, however. In general, as long as a student has successfully completed undergraduate studies at a high level, and is genuinely contributing work effort to the process, it is the supervisor's responsibility to make sure that that student reaches the required standard.

The place where a supervisor's failings are most likely to manifest themselves are in the early stages of the research program. In the initial phase, a supervisor's role is far more onerous than just issuing instructions and requirements, on the assumption that the student is able to carry them out. The supervisor has a responsibility to initiate the program by:

- Trying to understand the student's approach to learning
- Identifying student strengths and limitations
- Taking the time to develop a suitable supervisory approach which will build on student strengths and specifically address any limitations.

This must be a *closed-loop* process. In the early stages of the research program this process may require the supervisor to:

- Set time-limited tasks for the student in order to provide a vehicle for capability assessment
- Assess the capacity of the student to deliver results in the time-constrained period
- Vary the time-frame for the next task and assessment, based upon the student's performance on the current task.

This initial activity is clearly also an iterative process, and can be a particularly time-consuming one for the supervisor. However, it is at this point where the supervisor can either set the foundations for a successful program, by putting in the initial hard work, or just let things slide – and accept that, at some point down the track, the program may ultimately become irretrievable because of compounding failures that have not been addressed in time.

The corollary of the above discussions is that it is imperative for the supervisor to inject maximum effort at the start of the program. This

doesn't mean that the supervisor needs to become a *nanny* to the student – perhaps, it may mean the exact opposite and require the supervisor to challenge the student and allow him/her to fail and learn from relevant exercises.

With these points in mind, exactly when is the start of a postgraduate research program?

Although this may appear to be a question with a relatively obvious answer, in practice, it is sometimes difficult to identify a specific starting point for a postgraduate research program. The actual starting point for some programs may be a casual conversation held with a final-year undergraduate student after a lecture – and months before the actual postgraduate candidature process commences. For other students, the starting point for research may take place after the formal submission and acceptance of a candidature form.

Herein, we are specifically concerned with what takes place after the formal acceptance of candidature, and when a research student is formally recognized as a postgraduate student entity within the university.

As a general rule, if a relationship between a supervisor and student starts badly, then it is unlikely to improve during the course of the research program, so the supervisor is responsible for ensuring that it does not start badly. There are two broad aspects to initiating the research program:

- Administrative/managerial – ensuring that correct university processes will be followed during the program
- Academic – formally initiating a systematic program of investigation in the field of interest.

Academics and researchers often underestimate the importance of the administrative/bureaucratic side of research supervision. The reality is that the administrative/bureaucratic processes pertaining to research supervision can be as complex as the research being undertaken. It would therefore be both naive and arrogant for a supervisor to just brush these issues aside as irrelevant bureaucratic trivia, simply because their innate complexities do not fall into the supervisor's chosen field of research interest.

Supervisors need to develop sufficient maturity to understand that, while they may have an underlying passion for knowledge and learning in a specific area, the reality is that they work in a large, complex environment which has:

- National/regional legal operating frameworks
- Institutional operating/procedural frameworks, based upon external legal requirements and internal structural requirements

- Potential health and safety threats that may impinge upon the research student
- Financial and business constraints
- Complex academic structures for governance and oversight of research activities
- Complex internal and external reporting requirements (e.g., for research outputs).

These cannot simply be ignored, and dealing with them professionally is an integral part of the supervision process.

In this chapter we look at some of these issues as well as the more fundamental ones of the research program itself.

7.2 General Induction for Research Students

Universities can be very large organizations, and most large organizations do not simply allow individuals to come aboard without some form of induction. Postgraduate research students may not technically be staff of the university but their role is such that they are more akin to staff than to students. Research students have much greater levels of access to university resources than undergraduates, and far less direct supervision when in a laboratory.

A university/faculty/department/center/group may therefore deem it to be appropriate for every research student to be formally inducted into the complexities of the university environment.

Some universities regularly run induction programs specifically tailored for postgraduate students, wherein new cohorts can interact with one another, and with more experienced postgraduates – or academic staff. There are numerous issues that need to be covered through induction. These may include:

- General university rules and procedures pertaining to postgraduate studies
- Rules and regulations pertaining to scholarships
- Rules and regulations pertaining to ethics
- Discussions on postgraduate assessment processes within the university
- Issues relating to acceptable conduct within the university – specifically in relation to areas such as discrimination, harassment, bullying, etc.
- Workshops on oral presentations, preparation of research papers, dissertations, etc.

A research supervisor needs to be aware of the specific induction training that is available at university, faculty or departmental level. If there are any gaps, then the supervisor has an obligation to ensure that they are filled appropriately.

7.3 Occupational Health/Safety

A supervisor has a moral obligation and, in many jurisdictions, a formal legal obligation to ensure that individuals operating under his/her management do so in a safe manner, and without subjecting themselves – or other co-workers – to short or long-term health risks.

Each research group, center, department, institute, faculty and university has its own unique set of operating conditions, and clearly it is not possible to have a generic set of rules covering every eventuality. However, each supervisor should be in a position to undertake a professional examination of his/her environment to determine what specific approaches need to be adopted in order to ensure the safety of the research student. It is a serious error of judgment to assume that a research student will naturally be able to determine these for himself/herself.

A supervisor needs to understand that a research student, in his/her enthusiasm to complete a task, may take risks which – from a student perspective – appear reasonable but which, to a more mature professional, are clearly dangerous. A supervisor also has the responsibility of interpreting departmental/faculty and university regulations in regard to health and safety, and seeing how they impinge upon his/her area of operation. Consider Example 7.1.

Example 7.1

A university has an electronics engineering department, which has established operating procedures and rules for working with electronic (i.e., low power) equipment. A supervisor comes into the department and decides to conduct a postgraduate research program in high-power electronics. Prior to commencing the postgraduate program, the supervisor may need to:

- *Liaise with departmental staff in order to establish formal (documented) operating procedures for the high-power equipment experimentation*
- *Establish safety rules which are additional to any existing departmental rules (e.g., forbidding students from working in a high power laboratory without the presence of another student or staff member)*
- *Put in place additional training regimes specific to the equipment (e.g., provide CPR training to all staff and students working in the high-power electronics laboratory).*

Academics can sometimes dismiss this sort of attention to safety detail as annoying bureaucracy but the reality is that it can be a critical element of the safety of any research program.

Universities are likely to already have template guides for the development of procedures relating to health and safety. If not, then a supervisor may need to develop his/her own as they specifically pertain to the local environment.

The stakes as they pertain to health and safety of research students are extraordinarily high. A failure can manifest itself in death or serious, permanent injuries, and the research supervisor is likely to bear responsibility for these in a moral and/or legal sense. In some jurisdictions, a failure to provide a safe working environment can lead to criminal sanctions, over and above any punitive measures imposed by the university itself.

From a moral and legal perspective, therefore, there is no element in a research program more important than the basic health and safety of those working in the research environment. Supervisors have a responsibility to ensure that their students understand and accept this.

7.4 Initial Meeting with the Research Student

7.4.1 General

Once a supervisor is confident that he/she is on top of the administrative/bureaucratic aspects of a candidate's supervision, there needs to be an initial meeting between the candidate and the supervisor to formally commence the academic/research aspects of the process.

The nature of the first meeting ultimately depends upon the relationship that a supervisor has with a student. Some supervisors may have known their research students for years, during their undergraduate degree programs. Some may have already supervised the research students for undergraduate thesis projects. For many supervisors, however, the initial meeting with the student will be the first time that the two will discuss the project in a formal and clearly defined way as part of a structured research program.

The supervisor should allow a significant amount of time for the first meeting. Ideally, it should be open-ended and stretch for as long as is required for both parties to leave the meeting, comfortable with the arrangements that have been agreed. Depending on the specific nature of the research program, and the capabilities of the student, the initial meeting could conceivably extend to several hours duration.

Some supervisors make the mistake of using their initial meeting with a research student to *lay down the law* and assert their authority. Needless to say, this not only reflects a lack of understanding of the practical, authoritative scope of a supervisor, but can also provide a fast-track to alienating the student and setting up the basis for a combative relationship.

A supervisor can't assume or demand respect from a research student – even if the supervisor is an eminent authority in his/her field. A research student is likely to be a highly intelligent person in his/her own right, and the fact that they have not yet had the opportunity to develop eminence is no excuse for a condescending attitude on the part of the supervisor. The research student's respect is something that needs to be earned – and earning it is a long-term process.

7.4.2 Understanding the Research Student's Perspective

The initial meeting between the supervisor and student should provide an opportunity for the supervisor to find out as much as possible about the student, in order to develop an optimal research learning approach. There is little value in discussing the academic aspects of a research project until the supervisor gets a solid understanding of the student's background, vis a vis:

- General cultural issues
- Schooling and university studies
- Learning preferences during undergraduate study
- Specific subjects that the student found of interest
- School or university teaching/lecturing staff that inspired the student
- School or university teaching/lecturing staff that the student didn't like
- Social activities/sports interests/hobbies
- Family commitments and dependencies
- Lifestyle issues – is a research student living at home, or has he/she moved away for the first time?
- International student issues – how is the student settling in (coping) with the change of country and culture?
- Extra-curricular business, employment or volunteering interests.

Once a supervisor has established the student's background, there needs to be some discussion as to the student's future directions. A cardinal mistake in determining this is to ask the cliché question,

"Where would you like to see your career in five years time?"

This is only going to corner the student into providing a cliché answer that might please the supervisor,

"I'd like to become a professional researcher and ultimately a tenured academic."

A better approach is for the supervisor to start by explaining the advantages and disadvantages of an academic career – and then talk about other potential options including:

- Business
- Industry
- Government R&D
- Start-up companies.

The discussion should also include the sorts of preparatory work that the student will need to undertake (in addition to his/her basic research) in order to achieve these sorts of objectives. This should provide ample opportunities for the research student to interject and contribute – and for the supervisor to genuinely determine the relative levels of enthusiasm that the student has for each option.

All these discussions need to be meandering in their approach in order for the supervisor to gently prompt the student to express his/her genuine preferences and explore options, rather than just have the student enunciate answers that he/she believes are required responses.

A supervisor needs to be a good listener during this phase of the meeting – listening for spontaneous bursts of enthusiasm, disdain or revulsion whenever various topics are broached. These bursts are the ones which contain the genuine, unfiltered information that the supervisor will need in order to re-orient his/her own thinking about how to approach the project. The old adage that humans are equipped with two ears and one mouth, which should be utilized in those proportions, is particularly relevant here.

7.4.3 Negotiating a Mutually Acceptable Supervisory Approach

A supervisor's role is not simply to provide the pathway of least resistance for a student to achieve his/her ends but, more importantly, to develop a considered program of learning that will challenge a research student and enable him/her to grow professionally. This may require the supervisor to take students outside of their comfort zones, extend themselves, and to do things that they might not otherwise do of their own volition.

For these reasons, a supervisor needs to have some understanding of the sorts of approaches that a student is comfortable with, but these should not limit considerations on the learning program. For example, some research students may be:

- Introverted and uncomfortable with interacting with other people
- Poor/nervous public speakers
- Intently focused upon the theoretical technicalities of their

research to the exclusion of practical or commercial realities
- Poor at writing and have limited skills in the English language
- Self-serving career-climbers who will overstate achievements; take shortcuts, or misrepresent information in a positive light in order to get ahead
- Obsessive publishers who want to turn every minor experiment into a research paper.

These are the sorts of issues that require the mature judgment of a professional and they should not be taken lightly. If, for example, a student is highly introverted, a research supervisor needs to consider:

- Is the student likely to benefit from being forced into a situation where he/she needs to interact with others on a regular basis?
- Is it reasonable to coerce a timid student into a position where he/she has to interact and thereby cause them considerable psychological stress?
- Is the introverted student likely to become extraverted as a result of any artificial activities/environments created by the supervisor?

In other words, a supervisor needs to make a subjective decision as to whether he/she can act as a positive agent of change on the part of the research student. And, at the same time, it is important that the supervisor does not attempt to take on the role of an amateur psychologist – if there are concerns, then the student should be referred for professional guidance elsewhere.

Nevertheless, as a result of extensive discussions with the research student, a supervisor needs to notionally determine a set of strengths and limitations, and then work out how (or if) the limitations can be reduced or turned into strengths.

In addition to the basic strengths and limitations of character that a student may have, a supervisor also needs to consider the academic capacity of the research student – and not simply in the context of academic grades from undergraduate programs. Consider examples 7.2 and 7.3, which occur commonly in supervision.

The key point arising from these examples, and numerous other possible scenarios, is that the supervisor should not let things slide. A supervisor needs to be on top of the process at all times. Specifically:

- Identify student capabilities
- Identify a strategy for managing according to capabilities

- Ensure that actual mechanisms are in place to manage the student (either visibly or subtly).

Example 7.2 – Dealing with a Rote-Learner

Situation:

This is the case of a student who has achieved high academic grades at undergraduate level but who originates from a country where undergraduate learning is highly rote-based and procedural. It is naive for a supervisor to believe that if the student is, "thrown in at the deep end", that that student will magically be capable of high levels of independent research.

Possible Supervisory Approach:

Such a student needs to be transitioned by the supervisor from the rote learning environment to independent research. The transitioning process may take months – and it will require considerable effort on the part of the supervisor. The supervisor may initially need to set very short-term objectives/milestones for the student (e.g., weekly) and then see how he/she handles these. If a student is unable to work to weekly milestones, then the timeframe needs to be shortened to daily objectives – or even half-daily objectives – until positive outcomes result and the timeframes can be progressively lengthened to something meaningful in a research context.

Considerations:

A student is not a failure, or incapable of performing good research, simply because he/she has been hamstrung by an inadequate learning process at undergraduate level. A research supervisor has the capacity to resolve this problem.

Example 7.3 – Dealing With a Strong-Willed High Achiever

Situation:

A high-caliber student, with no significant research experience, wants unfettered freedom to do the postgraduate research as he/she please and to largely act independently of the supervisor.

Possible Supervisory Approach:

If a research student is extremely capable, and there is sufficient latitude in the description of the research program, a supervisor may elect to give that student some headway in decision-making. Rather than scheduling formal meetings on a short-schedule, the supervisor may instead elect to simply visit the research student on a weekly basis for informal chats in order to provide a less visible form of oversight.

Considerations:

A highly capable research student may still have severe limitations in terms of research process and rigor. An enthusiastic student may meander in a broad range of unproductive directions, using up valuable time in the postgraduate program. A supervisor still needs to be a supervisor – and create more subtle means of ensuring rigor and direction.

7.4.4 Establishment of Formal and Informal Meeting Mechanisms

It is neither professional nor efficient for a supervisor to assume that he/she can simply work with a research student in an unstructured, friendly, collegial (mentor-like) manner. This is only one part of a supervisor's role. The supervisor has a responsibility to deliver outcomes for both the student and the institution, and some of these outcomes are dependent upon the establishment of a formal research learning structure. One of the elements of a learning structure in postgraduate research is a series of formally scheduled meetings at which:

- Progress is discussed in an open and frank manner
- The supervisor and student exchange ideas/knowledge
- Problems/impediments to the research program are discussed (e.g., resource problems, lack of access to laboratory staff, etc.)
- Student limitations are assessed and measures enacted to attempt to address these
- Realistic goals/targets are established to be discussed at the next meeting.

The frequency, duration and timing of the meetings is a matter for the supervisor to determine, based upon:

- The student's ability to deliver on agreed outcomes
- The student's capacity to work independently
- The specific needs a student and supervisor have in relation to the research program (e.g., need to share updated datasets with other researchers in the group).

Clearly it is important that meetings do not become a time wasting exercise – where the supervisor and student merely go through the motions in order to check a box saying that they have had a meeting. If a supervisor observes that a meeting has been unproductive, then he/she has a responsibility to determine the root cause and ensure that it is addressed before the next meeting.

In the initiation phase of the research program, the research supervisor needs to work on the assumption that a student will require detailed guidance and support – particularly in relation to any initial administrative or resource access issues – so meetings need to be more frequent. As the student finds his/her legs, and becomes less dependent upon the supervisor, the length of time between formal meetings can be increased.

Each supervisor should be able to prepare a template – even if only as a

mental picture – as to the nature, duration and time-lapse between meetings. Table 7.1 provides a sample.

Needless to say, the sorts of meetings described in Table 7.1 only constitute the formal meeting requirements. A supervisor will also need to meet informally with the research student on a more regular basis to ensure that the research student is:

- Comfortable with his/her activities and daily progress
- Working satisfactorily in his/her environment and with colleagues
- Generally well from a physical/mental point of view and not requiring additional support for personal issues.

Meeting	***Duration***	***Subjects***	***Time-lapse to next meeting***
1	3 Hours	• Description of the institution, research group, etc. • Understanding student's background • Detailed discussion of research project • Discussion of initial tasks to be completed • Discussion of access to resources/staff (e.g., IT, laboratories, technical staff) • Introduction to other group members	1 Day
2	1 Hour	• Follow up meeting to ensure that resources have been provided and that student has settled in • Allocation of specific tasks to be completed by next meeting (e.g., literature review topics)	1 Week
3	2 Hours	• Review of work completed by student relative to previously set requirements • Discussion of issues/shortcomings • Allocation of new tasks	1 Week
4	2 Hours	• Review of work completed by student relative to previously set requirements • Discussion of issues/shortcomings • Allocation of new tasks	2 Weeks
5	2 Hours	• Review of work completed by student relative to previously set requirements • Discussion of issues/shortcomings • Allocation of new tasks	1 Month
6	2 Hours	• Review of work completed by student relative to previously set requirements • Discussion of issues/shortcomings • Allocation of new tasks	1 Month
:	:	:	:

Table 7.1 – Sample Template for Meetings Between Supervisor and Research Student

7.4.5 Providing Constructive Feedback to Research Students

A particularly important aspect of postgraduate research supervision is the provision of ongoing, constructive feedback to research students in terms of:

- Specific, technical aspects of the work being undertaken
- General research directions
- Strengths and limitations of the work
- Possible new directions to be explored.

None of these items should come as a surprise, even to a novice supervisor, but it is necessary to devote some effort to looking at the manner in which this sort of advice needs to be provided. Specifically, feedback advice needs to be:

- Timely
- Relevant to the research student's needs and capabilities
- Constructive.

Of all the complaints leveled at research supervisors, however, one of the most common relates to a failure to provide timely feedback.

The first priority of all academic and research staff in a university is in servicing the professional needs and welfare of students under their care. All other academic activities, regardless of their seeming importance, need to be rearranged accordingly around student priorities. Those academic and research staff that are unable to prioritize their commitments to ensure that students are at the top of their list, should consider whether they have made an appropriate career choice by working in academia and, more importantly, whether they are suited to the task of postgraduate research supervision.

It is unacceptable for research supervisors to rationalize a lack of timely feedback as being the result of other commitments or workload. Excuses for lack of timely feedback are neither of relevance nor interest to a student, who is fully entitled to receive professional advice on an ongoing basis, and in timeframes that minimize delays to the postgraduate research program.

Universities are funded to provide research supervision, and supervisors need to ensure that they are performing that task as intended – rather than using their positions of authority over a student as a means of reprioritizing their work towards other activities that may have short-term career benefits.

Allocating time to research students is, however, insufficient of itself to

provide a good feedback mechanism. Key to this is understanding that criticizing a research student doesn't make them smarter or more capable – it just demoralizes them, makes them insecure in their own thought processes and less open with the supervisor.

The feedback which supervisors need to provide therefore has to be in line with the capabilities of the research student to put it to use. For example, telling a research student that a series of experiments has been poorly structured and ill-conceived may be of little value if a research student does not grasp the concepts of experimental design as they pertain to his/her particular field of research. Telling a research student that an analysis of results is flawed is unhelpful unless the student has a sound grasp of statistics. To this end, a supervisor needs to:

- Maintain ongoing vigilance of the research student's activities
- Endeavor to assess where the research student's strengths and limitations lie
- Look towards providing support on a pro-active basis for areas that appear to be weak – for example, having the student sit in on a relevant statistics course if that is determined to be an area of weakness.

More than this, it is important that the supervisor provides useful (i.e., constructive) feedback when the need arises during meetings with the student. It can be tempting for novice supervisors to provide feedback in the context of pointing out what the student has done incorrectly. Rarely is this sort of feedback useful in its own right, and if its only purpose is to provide the supervisor with an air of superiority, then it is completely counterproductive.

A research supervisor should have a good grasp of whether a research student has performed an allocated task well or not. This is something which the supervisor needs to process internally, rather than to vocalize to the student. The end objective is not to tell a student what he/she has done incorrectly but, having assessed the problem, to explain to the student what needs to be done in order to get things back on track.

When a research student has performed a task poorly or incorrectly, then time and resources have been lost and it is important, in the context of feedback, to enunciate the consequences of those losses and what can be done to remediate them. For example:

> *"...This is where we are now, and here is where we should be. In order to get back on track, you will need to provide me with a plan on how you intend to get these new experiments completed by this date. The cost of the ones you have already performed will need to come out of the budget, and so you will need to*

provide a revised budget in order to bring the costings back into line."

It is important not to dwell on errors but to focus on the remediation strategy. The old adage that nobody wants to listen to problems is particularly relevant here – the focus needs to be upon solutions, not regurgitating history or looking at punitive measures. Nevertheless, universities and their research groups are time and resource constrained environments, so any remediation strategy should self-evidently reveal to the student the latent penalties or sanctions that are incurred as a result of any errors/shortcomings that have arisen.

In exposing the time and resource constraints that rein in the project as a result of the student's performance, it is also important not to inadvertently leave the student with the impression that one is incentivizing a *corner-cutting* approach to research – in other words, letting the student think that second-rate research methods are a sensible solution to the problem.

In the matter of avoiding blame allocation, it may also be useful, particularly when things have gone awry, for the supervisor to use the collective pronoun, *we*, rather than *you*. This avoids victimizing the student, and demonstrates that the supervisor and student are working with one another, rather than against one another.

Apart from demoralizing a student, negative (i.e., unconstructive) feedback is also an unproductive pathway from a management perspective. If the student feels that he/she is going to be victimized or humiliated by the supervisor each time he/she makes a mistake or error of judgment, then the student is going to become reluctant to bring any dubious issues to the supervisor for discussion – in the end, the dubious issues may compound into serious and/or irreversible problems that may doom the research program to failure.

A good supervisor should welcome any attempts by a research student to bring problems to the table so that they can be discussed without blame or rancor, and with a view to genuinely achieving a better outcome for the research program.