

# SUPERVISION OF RESEARCH STUDENTS : RESPONDING TO STUDENT EXPECTATIONS

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## 1. INTRODUCTION

*This is just to let you know that Dr ---'s supervision of my Master's thesis has been superb. His guidance has greatly helped my progress, and he's been extraordinarily generous with his time. This generosity began before I had even enrolled, when he provided me with detailed commentary on the written work I submitted. All his comments on my work have been clear and incisive, isolating problems and clearly defining areas of weakness. I've been amazed (and grateful for) the level of detail in his comments, and the amount of time he's given to supervising me. The combination of encouragement and criticism in his comments worked perfectly ... yet I also had a great sense of being free to explore and include whatever material I pleased.*

[ extract from a letter written by an MA student in English ]

*My supervisor was away too much. He showed very little interest in my work. It was very difficult to get contact with him. Thesis drafts were not read properly - only 2 or 3 marks on 160 pages of text. I felt frustrated and directionless all the way through. For some students their supervision is so poor that they would be better off without it. Staff are too busy with their own affairs - the attitude is "sink or swim".*

[ extract from notes of interview with a PhD student in science ]

These quotations from research students represent extreme assessments, positive and negative, of the degree to which their expectations of their supervisors have been fulfilled. The experience of most students lies between these extremes. This paper is primarily intended to assist individual supervisors of research students to discern their students' expectations and to respond appropriately to these expectations. It is not intended to be prescriptive ; issues are canvassed and possible approaches are suggested, but it is assumed that readers will formulate their own responses within their departmental and institutional constraints.

The material in this paper is largely derived from my experience as inaugural Dean of the Graduate School at The Australian National University, Canberra (ANU), from 1990 to 1998. It is based mainly on comments made by individual PhD students in 150 confidential "exit interviews" conducted from 1994 to 1998 inclusive, and on matters raised in approximately 100 meetings requested throughout my term by graduate students from a variety of courses. Other activities involved in the role of Dean have also contributed, including regular meetings with the President and Council of the ANU graduate students' association, formal and informal meetings with students and staff from all of the University's Graduate Programs, 8 years as Chair of the University's Graduate Degrees Committee, and participation from 1991 to 1993 in a substantial study of PhD supervision at the ANU funded by the Australian government (ref.1).

My views are inevitably influenced by my own experience in supervising research students in nuclear physics from 1961 to 1991, mainly at the ANU. Nevertheless, my Graduate School activities have provided a comprehensive overview of the concerns and expectations of research students from a wide variety of disciplines. I have also profited greatly from reading the now extensive literature on supervision, some of which is listed under "further reading".

The structure of the paper is as follows: Section 2 describes some general approaches to the supervisory task, Section 3 discusses commonly expressed student expectations, Section 4 canvasses possible responses to these expectations, and, by way of epilogue,

Section 5 considers some of the privileges and responsibilities inherent in supervising research students.

The text includes numerous (anonymous) quotations from individual students. Although these reflect the ANU situation, I am sure that they represent the more or less universal experiences of research students.

## 2. APPROACHES TO SUPERVISION

Before examining specific student expectations, it is desirable to consider some general approaches that can be adopted to supervision. The way in which individual supervisors respond to student expectations will be strongly influenced by their overall philosophy of supervision. There is a wide variety of supervisory styles, but I have found it helpful to think in terms of 3 broad categories : strong, weak, and intermediate interactions, recognizing that there is in fact a continuum of styles spanning these groups.

### 2.1 Strong Interaction

This style is often found in scientific laboratories, particularly those whose work is centred around the use of a large, complex and expensive piece of equipment. Some experiments, for example, are run 24 hours a day for periods of, typically, 5 days. This, together with the complexity of data acquisition systems and data analysis, means that they must be performed by groups rather than individuals. These groups may include varying numbers of tenured faculty, non-tenured faculty, and research students. Apart from sharing in the running of an experiment, the group will meet regularly to plan the experiment, to consider the data analysis and interpretation, and to discuss publication. In such situations the supervisor and student effectively become collaborators, who interact with each other more or less continuously. An example of strong interaction is given by Cullen et al. (ref.1, p.51), who quote the following statement by an academic from a large-equipment-based discipline :

*We usually get students that arrive here and for the first twelve months we involve them in what we are already doing and that usually means they're doing work that I'm interested in. That might include several different topics. Over that year we try and spell out to them how each of these fields of research might develop and how I'd like to see them develop. At the end of that year they're usually in a position where they themselves do say, yes this is the field of interest that I [the student] want to pursue and it's those particular types of developments that have been spelt out that I [the student] am interested in pursuing.*

*From that point forth the student - he's never isolated or independent, the door's always open, he walks in as often as he likes - then really takes on the responsibility of pursuing that. So he's the leader of the team if you like from then on. Now we have weekly or fortnightly meetings, and we discuss how things are progressing, and how to do things differently. So where experience matters about techniques, he gets all the advice necessary. But in actually determining what should be done he is the group leader. And as he gets more experience he decides how to do it as well. I think that's what I've always tried to do with the students. The aim is to try and make them choose the subject. This guarantees their interest rather than imposing something on them ...*

## 2.2 Weak Interaction

This approach is the extreme application of the view that students must work independently. It is less common today than formerly. Typically, a student arranges an initial meeting with the supervisor, who outlines some possible thesis topics, and suggests that the student go away and read in the library for a few months. At the end of this time the topic is decided, the student works away with irregular and infrequent contact with the supervisor, and eventually writes a thesis. The draft of the thesis is read by the supervisor with a degree of thoroughness which can sometimes be quite superficial.

The experiences of students working under this kind of approach are illustrated by the comments of the science PhD student quoted in Chapter 1 above, and by the following :

*Personalised sink or swim (with optional lifeboat) - encourages the student to be self critical and self sufficient and to direct their own project.*

[ student description of supervisor's approach quoted on p.19 of ref.2]

*I saw my supervisor twice throughout my 5-year PhD.*

["Evelyn", as quoted by Cullen et al. (ref.1, p.67)]

*I rarely got to see my supervisor - 10 minutes every couple of months.*

[from record of interview with PhD student in science]

### 2.3 Intermediate Interaction

This supervisory style, or variations thereof, is probably the most common today. It may be illustrated by the case of a student who completed a BA in history, the final (honours) year of which consisted partly in preparing a short thesis. She became sufficiently interested in the subject of this project that upon completing the degree she arranged to undertake a PhD in the same department on a topic issuing from her honours dissertation, working under the supervision of her honours supervisor. At the outset they discussed possible supervisory arrangements, and agreed to meet on a weekly basis to discuss progress. The frequency of meetings was varied by mutual consent as the course progressed. From time to time the supervisor read and criticized pieces of her written work. After about 4 years she completed a thesis, the drafts of which were read carefully and criticized constructively by the supervisor.

### 3. SOME COMMON STUDENT EXPECTATIONS

This Section deals with expectations of their supervisors' performance as frequently expressed to me by research students.

### 3.1 Academic Competence and Enthusiasm

Perhaps the most important requirement of a supervisory arrangement is that it should provide for the student appropriate academic expertise. Usually a student would not be admitted to candidature unless the university can provide this expertise from among its academic staff. Often it will be sufficient that the supervisor be competent in the general area of the student's research even if not expert in the detailed area of the thesis topic.

Difficulties can arise when the supervisor is the university's only expert in the area of the thesis, and for some reason leaves the university during the student's course; in such cases some universities arrange for an external expert, eg from another university, to take over. If you are your university's only expert in the field of work proposed by a prospective student, it might be fair to warn the student of this potential problem.

Sometimes an external supervisor is appointed from the outset, eg when a student wishes to work in a non-university laboratory close to the university. When an external supervisor is appointed, it might be considered desirable to appoint a co-supervisor from within the university who, even if not expert in the thesis subject, will ensure that the university's formal requirements and ethos are observed; this procedure is followed at the ANU.

Some universities have adopted some form of supervisory-panel system; for instance, a panel of at least 3 people, at least one of whom has supervision responsibility, the remaining members being advisors able to provide support in particular aspects of the thesis topic. Even when a formal panel arrangement is not set up, it is reasonable for the student to expect that the supervisor will arrange introductions to other people, either

within or without the university, who can provide useful advice, whether academic or technical, or even pastoral.

When joint supervision arrangements have been established, problems have sometimes arisen because of ill-defined responsibility. It is therefore desirable that one person be designated as having final responsibility for the student's supervision.

### 3.2 Regular and Appropriate Contact

One of the most common complaints from research students concerns infrequent or erratic contact with supervisors, due to supervisors being too busy with administrative or teaching responsibilities, or having too many students, or being away from the university too often, or simply giving low priority to graduate students compared to their own research, eg

*Faculty tend to consider students something of an afterthought - students to be tolerated rather than given high priority.*

[from notes of interview with PhD student in the humanities]

*My supervisor was always away - and not much help when he was here!*

[from notes of interview with PhD student in social sciences].

R.W.Connell writes (ref.3):

*The commonest complaint of PhD students is that they never get to talk to their supervisors. The commonest complaint of supervisors is that their PhD students never come to talk to them. I think it is up to the supervisor to bridge the gap. The only way ... is to schedule regular meetings.*

Some universities have established formal requirements for regular meetings between supervisor and student, and for the establishment of adequate arrangements for supervision when the supervisor is away for an extended period.

It is often difficult to determine an appropriate balance between providing support and allowing the student to work independently. This can be a particular problem in “strong interaction” situations. Some students have suggested to me that supervision should not be so close that students do not have the freedom to make mistakes, since learning to recover from mistakes is an essential part of research training. Usually there will be a gradual movement from dependence to independence as the course progresses. Cryer (ref.4) has described this as a “weaning” process!

### 3.3 Guidance in Topic Selection

Students usually expect that supervisors will guide them in selecting a topic that is within the competence of the supervisor and the institution and is of sufficient intellectual depth, and furthermore that it should be possible to complete the project within the time scales prescribed by the university and the funding agency. The latter expectation has become increasingly pertinent given the increasing pressures from governments and funding agencies for reduced completion times, especially for the PhD degree. The situation where a PhD student in engineering “spent 18 months trying to think of a problem” would now be considered by most students to be unacceptable. If supervisors advocate or approve topics which they know will take more time than is available within funding or institutional constraints, students would expect to be advised of the anticipated completion time at the outset so that they can consider other options.

### 3.4 Guidance Concerning Institutional Requirements



Most students, especially those coming to a university from another institution, have little idea of how the university's machinery operates. Even though universities publicise their arrangements through handbooks and induction programs, many students still look to their supervisors for initial advice of formal requirements and possible pitfalls. Supervisors can save students a lot of time and expense by making sure that they are aware of matters such as requirements on thesis preparation; reporting and review requirements throughout their course; availability of resources for conference attendance and fieldwork; departmental policies on photocopying, computing access, fax and email; procedures for extension of course and suspension; availability of counselling and study skills support; and institutional policy on the ownership of intellectual property. Such advice is of course especially useful for international students.

### 3.5 Constructive and Timely Criticism

A major student complaint is that supervisors have been unduly slow in reading thesis drafts and other written material. For example, the following are extracts from notes of interview with PhD students in the social sciences and humanities:

*My supervisor still hadn't read the first draft of my thesis after 10 months.*

*My supervisor took 3 months to read my thesis draft, and the delay cost me a job.*

*...five chapters of my thesis still not read by my supervisor after 5 months - with prompt response I could have submitted my thesis long ago.*

Furthermore, the supervisor's response to written material is sometimes seen to be too superficial. For example, quoting again from PhD students in the social sciences and humanities:

*My supervisor took 6 months to respond to my draft, and there were no significant comments when it was eventually returned.*

*...thesis drafts were returned with hardly anything written on them.*

Students expect that supervisors will read their written work thoroughly and provide constructive criticism. This is an essential element in the student's intellectual development. However, it is important that the criticism should not become destructive.

*As a supervisor, you should be aware that conflict can arise as a consequence of the manner in which criticism is delivered. Criticism needs to be both constructive and delivered in a sensitive way. In our survey, several students felt that criticism from their supervisors was unhelpful and degrading. [ref.2, p.29]*

*A balance is not easy to strike, and at times like the writing of the first draft it can be acutely difficult. Sharp criticism can be very discouraging at a stage when many students feel more or less suicidal anyway. Yet to hold back any valid criticism is to do less than justice to the student. [R.W.Connell, ref.3]*

One PhD student in science commented in a letter:

*I feel it has often been difficult to learn from my supervisor due to his lack of patience and patronising behaviour. For example, he often wrote rude comments on my thesis chapters. He asked me to understand that this was because he got very frustrated with my poor expression at 2.00am in the morning, which was the only time he was able to*

*read my chapters. I told him I understood his frustration, but his rude comments were better off kept to himself.*

The thesis is usually the most substantial piece of writing yet undertaken by the student, and it provides an opportunity for supervisors to help students develop their skills in writing and in the marshalling of arguments. Students should be asked to submit written work in some form as early as possible in their course so that writing problems can be recognised and corrected; the later such problems are dealt with, the more painful the process becomes. In some cases it may be desirable to refer the student to professional assistance available on campus, eg a study-skills centre.

### 3.6 Resource Facilitation

Students expect that supervisors will ensure that adequate resources are provided for the agreed course of study. Indeed, many would consider that if supervisors are not able to do this they should not undertake to supervise the course concerned. Resources needed may include appropriate desk space, research equipment, computing facilities, library facilities, access to photocopying, fax and telephone, and funding for fieldwork and conference attendance. Many students would consider that participation in major conferences is an important avenue of job procurement :

*Attendance at two international conferences provided excellent top-level international contacts.*

[extract from record of interview with PhD student in science]

Some universities have now adopted policies specifying the minimum level of resources to be provided for their research students. For example, the recently adopted ANU policy states that

*students admitted to a full-time research course at the University are assured that the sponsoring area undertakes to provide the following minimum resources: sufficient*

*laboratory or office space, infrastructural equipment and facilities to complete the agreed program of research, these items to be available from the outset and throughout the course*

and goes on to state explicit minimum standards for accommodation, storage, computing support, stationery, postage, photocopying and fax, telephone, fieldwork and conference support (ref.5).

### 3.7 Fairness in Authorship of Publications

A not uncommon source of dissatisfaction among senior research students is that they have not been given due credit for their research accomplishments. Sometimes work has been plagiarized by supervisors, eg presented at conferences without attribution, or the student's name has been omitted from publications of work to which they had made a significant contribution, or supervisors have inserted their names on publications of work to which their contribution was insignificant. For example :

*He gets his name on all papers published in the group, even when he has made no contribution - other students are cheated off too.*

[extract from notes of interview with PhD student in science]

Some universities have adopted codes of conduct for research-student supervision which include requirements such as

*... that supervisors should advise and negotiate with the candidate at or near the outset of the course in respect of any publication or joint publication likely to arise during or on the basis of the research project, appropriate and adequate recognition of the candidate's and the supervisor's contribution to the publication [ref.6].*

It is of course true that each discipline, and even some institutions and laboratories, has its own conventions and mores concerning such matters as the order of authors' names in joint publications; these conventions should be explained to the student.

There has been increasing concern in some areas of the literature about the practice of "honorary authorship". The journal *Nature* now encourages authors of multi-authored papers to describe succinctly their own contributions to the work at the end of the paper (ref.7):

*We hope that, as the practice spreads, the dishonourable practice of "honorary authorship" - authorship by virtue only of seniority, for example - will diminish. More positively, we hope it will lead to a fuller appreciation of just who made what critical contributions.*

A correspondent in the same issue of *Nature* (p.406) wrote:

*No matter if the author is the first or the seventeenth, they will be able to show their part in the work, which might be helpful for their future careers, especially in the case of younger scientists. This system will be informative for readers and also for potential employers, who need to assess the work of scientists they might employ.*

### 3.8 Absence of Gender Bias and Sexual Harassment

Most institutions now have clear codes of behaviour concerning sexual harassment. Students will expect supervisors to observe these codes meticulously.

The following is an extract from a publication of a research-student association (ref.8):

*Issues to do with sexual harassment may be particularly difficult if they occur within the supervisor/student relationship. Working together in an intellectual pursuit, sharing the same academic interests and spending considerable time together in a one-to-one situation may easily result in a relationship developing which could have sexual overtones.*

There may be differences of opinion as to the acceptability and possible consequences of such a relationship. However, every supervisor should be aware that one consequence can be a perception of favouritism among other students of the same supervisor. For example:

*Problems arose within the group due to preferential treatment of a student having an affair with a senior person.*

[extract from record of interview with PhD student in science]

In addition, severe difficulties can occur if a supervisor-student relationship subsequently breaks down; the student is left in a particularly vulnerable position.

### 3.9 A Measure of Pastoral Care

Students will often expect supervisors to provide a measure of pastoral care, providing advice, sympathy and encouragement in areas outside the strict academic boundaries of the thesis project. The matter needs to be approached with care. For example, Cryer writes (ref.4):

*A common view among experienced supervisors is that supervisors should not involve themselves at all in students' personal problems. They argue that the unloading of personal problems onto supervisors can all too easily get out of hand; that supervisors who try to emulate professional counsellors are behaving irresponsibly and can do*

*more harm than good; and that supervisors are individuals with their own personal and professional needs, which cannot involve being all things to all people.*

On the other hand (ibid):

*It is second nature for supervisors to adopt a sympathetic and helpful stance towards students airing their personal problems. For supervisors holding this view, the dilemma is not whether to get involved, but when and how much.*

At the very least, the supervisor should know where to refer the student when serious personal problems begin to affect the student's work, eg the university's health service, counselling service, and student loan scheme. An excellent discussion of the "mentoring" aspect of supervision is given in ref.9; although specifically concerned with students in science and engineering, it is of general applicability.

#### 4. RESPONDING TO EXPECTATIONS

Having considered some of the most common student expectations, the question is: "How should I respond?"

I suggest that it is first necessary to decide the purpose of the supervision exercise. In the case of the PhD, a common statement of purpose would be something along the lines that the process should produce graduates who are capable of performing independent research of publishable quality. There will be a number of subsidiary agendas, eg the graduate, and the work done for the degree, should be of such quality as to maintain the reputation of the institution (and the supervisor!). For the Master degree, there may be a variety of legitimate objectives, eg the training of students in research methodology and techniques.

The perceived purpose of the exercise will largely determine your approach to supervision, eg where it sits within the spectrum of Chapter 2 above, and hence your response to student expectations, including the assessment of whether any particular expectation is reasonable and legitimate.

Other factors that will affect the manner of your response will include:

\* the student's personality, background, ability and aspirations, eg some supervisors consciously vary their approach from one student to another according to their perception of the student's initiative or diffidence:

*Relationships with each student are different, they vary just like in life and not everyone gets along.*

[comment by a supervisor quoted on p.37 of ref.2]

\* the nature of the research, eg the strong interaction approach will be common in scientific research centred around large and heavily used facilities, whereas the intermediate interaction will be more common in the humanities.

\*your own circumstances and workload, eg R.W.Connell writes (ref.3):

*There are limits to what a supervisor can do ... Supervisors also have rights, and competing obligations: other students, their own research, undergraduate courses, administration, and even a few shreds of life outside the department. These determine how quickly one can read drafts, and how much time can one give to devising bibliographies or reading new literature to keep up with the student. Supervisors have to draw lines to protect themselves as well as to give the student space to work independently.*



\* the stage of the student's course - the "intensity" of supervision will usually vary between the initial stages when students are finding their feet, the middle stages of data acquisition and analysis, and the final stages of thesis preparation.

In my experience it is essential that supervisor and student should clarify their mutual expectations at the outset of the course. Particular attention should be given to the frequency and nature of student/supervisor meetings, the supervisor's requirements of written material from the student, the supervisor's anticipated response time to written material, and policies for "putting names on papers". Some people believe that these mutual expectations should actually be put in writing. It is necessary from time to time throughout the course to review these expectations.

A necessary prerequisite in all of this is effective communication between supervisor and student. Following a survey of students and supervisors, the student authors of ref.2 wrote:

*The issue of good communication comes up over and over again. We think effective communication is the crux of good supervisor-student relationships.*

They list the elements of effective communication and negotiation as:

- *making an effort to articulate what you think*
- *listening, indicating that you have understood, and responding to what has been said by confirming or disagreeing*
- *discussing opposing points of view*
- *compromising on less important matters and persisting in arguing for issues considered essential*
- *reaching a compromise agreement that all parties accept.*

In brief, supervisor and student should be able to exchange views frankly without embarrassment or intimidation. To paraphrase the estate agent's views on the

importance of location, it could be said that the three essentials for effective supervision are: Communication, Communication, and Communication. And it is probably true that the onus for the establishment of effective communication rests very largely with the supervisor.

## 5. EPILOGUE

For many academics the subject of supervision is a sensitive one. For example, I once told a group of senior research-only staff that one of the main objectives of the ANU graduate school would be to improve the quality of research-student supervision. This met with a particularly frosty reception. After considerable discussion the meeting decided that it would be more appropriate to use the word “enhance” than “improve”. That is, it was OK to enhance the quality of supervision, but not to improve it!

To supervise research students is a great privilege. Students make a huge contribution to the academic research enterprise worldwide. They also provide a considerable effervescence to the academic environment of their host departments. The supervisory relationship often leads to lifelong friendships.

On the other hand, supervision is a great responsibility. In accepting you as a supervisor, students are entrusting a crucial stage of their development to your skill, judgement, diligence and care. For good or ill, the supervision experience will greatly affect the whole of their future lives. I have known students whose enthusiasm for research has been completely destroyed by an unfortunate experience. For example, one PhD student in the social sciences stated:

*My aspirations have been ruined and my enthusiasm shot to pieces.*

Thus, responding to student expectations is not a trivial matter. It could be said that unless you are prepared to take these expectations seriously, formulate a reasonable response, and establish good lines of communication, you probably should not get

involved. Agreeing to supervise a research student is a formidable responsibility, but one that has great potential rewards.

## 6. ACKNOWLEDGEMENTS

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## 7. REFERENCES

1. Cullen,D.J., Pearson,M., Saha, L.J., and Spear,R.H., (1994) *Establishing effective supervision*. Canberra : Australian Government Publishing Service. ISBN 0644 34901 8.
2. Christian,R., Davies,K., de Chazal,J., Krebs,E., and Melbourne,B., (1997) *PhD Supervision : A Guide for Students and Supervisors*. Canberra. The Australian National University, Graduate Program in Ecology, Evolution and Systematics. ISBN 0 7315 2785 2.
- 3.Connell, R.W.,(1985) *How to supervise a PhD*. Vestes No.2, p.38.
- 4.Cryer, Pat, (1997) *Handling common dilemmas in supervision*. Issues in Postgraduate Supervision, Teaching and Management, Guide no.2 London : Society for Research into Higher Education and The Times Higher Education Supplement. ISBN 0 946 376 026.

5. The Australian National University, Canberra (1998) *Policy on minimum allocation of resources for full-time research students*, ANU1573B/1998.
6. The Australian National University, Canberra (1999) *Draft Code of Practice for Supervision and Candidature of Doctoral Research Students*, ANU788B/1999.
7. Editorial, *Policy on papers' contributors* (1999) *Nature* 399, p.393.
8. *Antitheses*, Canberra (1996, Autumn).
9. National Academy of Sciences, National Academy of Engineering, Institute of Medicine (1997). *Adviser, Teacher, Role Model, Friend - On being a mentor to students in science and engineering*. Washington, D.C. : National Academy Press. ISBN 0-309-06363-9.

## 8. FURTHER READING

The following is a list of some publications that I have found useful. It is by no means exhaustive. It is classified into material written (a) mainly for supervisors, (b) mainly for students, and (c) for both supervisors and students.

### For supervisors

Connell, R.W. (1995). *How to supervise a PhD*. *Vestes* No.2, pp 38-41.

National Academy of Sciences, National Academy of Engineering, Institute of Medicine (1997). *Adviser, Teacher, Role Model, Friend : On being a mentor to students*

*in science and engineering*. Washington, D.C. : National Academy Press. ISBN 0-309-06363-9.

Okorochoa, E. (1997). *Supervising International Research Students*. Issues in Postgraduate Supervision, Teaching and Management, Guide No.1. London : Society for Research into Higher Education and The Times Higher Education Supplement. ISBN 0 946 37601 8.

Moses, I. (1985). *Supervising Postgraduates*. Campbelltown : Higher Education Research and Development Society of Australasia Incorporated. ISSN 0813-524X.

Cryer, P. (1997). *Handling Common Dilemmas in Supervision*. Issues in Postgraduate Supervision, Teaching and Management, Guide No.2. London : Society for Research into Higher Education and The Times Higher Education Supplement. ISBN 0 946 37602 6.

#### For students

Cryer, P. (1996). *The Research Student's Guide to Success*. Buckingham : Open University Press. ISBN 0 335 19611 X. Especially Chapter 8.

Craswell, G. (1996). *This Unfathomable Thing Called Supervision : Negotiating Better Working Relationships with Supervisors*. Canberra : The Australian National University. Graduate School Occasional Paper GS96/4.

#### For both supervisors and students

Science and Engineering Research Council (1989). *Research Student and Supervisor : an Approach to Good Supervisory Practice*. Swindon : Science and Engineering Research Council.

Christian, R., Davies, K., de Chazal, J., Krebs, E., and Melbourne, B. (1997). *PhD Supervision : A Guide for Students and Supervisors*. Canberra : The Australian National University, Graduate Program in Ecology, Evolution and Systematics. ISBN 0 7315 2785 2. Although produced by science students, this booklet is highly recommended for students and supervisors in all disciplines.

Cullen, D.J., Pearson, M., Saha, L.J., and Spear, R.H. (1994). *Establishing Effective Supervision*. Canberra : Australian Government Publishing Service. ISBN 0 644 34901 8.

Phillips, E. and Pugh, D. (1994). *How to get a PhD*. Buckingham : Open University Press. ISBN 0 335 19214 9. Especially chapters 8 and 11.