

This paper is based on a review of the contemporary literature on factors which influence students and lead them to complete their research degree programmes. The evidence demonstrates that there is a multiplicity of factors involved and that these interact in complex ways with substantial variation between disciplines. For example, factors which are important in some disciplines (e.g. being part of a situation with a critical mass of researchers in a science area) are unimportant in other disciplines. The factors identified through the review are of three broad types: (1) institutional/environmental; (2) individual supervisory arrangements; and (3) student cohorts and characteristics.



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Factors Associated with Completion of Research Higher Degrees

Introduction

The main purpose of the review was to provide some empirical evidence on which to develop a programme to support postgraduate research students and supervisors at the University of Technology, Sydney. A second purpose was to identify infrastructure changes needed to enhance the support and environments for postgraduate research students.

The review was undertaken by Kris Latona on behalf of a Working Party of the University Graduate School Board with the assistance of staff of the UTS Library. The brief was to compile a selective and pragmatic review focused on identifying areas where action would be feasible in terms of changes to policies, processes or resourcing strategies of the University in the support of postgraduate research students.

1. The Evidence from the Literature

1.1 Growth of critical interest in postgraduate education

A comparison of the number of Australian PhD candidates in 1990 with those in 1999 shows a nearly two-and-a-half-fold increase (Johnston, 1999). Expectation (and measurement) of quality performance in all areas of university teaching and learning has also grown. The literature on postgraduate education in the last decade has correspondingly expanded, reflecting growing critical interest in the experience and fate of the postgraduate student. The literature includes quantitative data, time-to-complete (TTC), attrition rates and student satisfaction for example, as well as qualitative data on innovatory practice.

It should be noted that TTC rates may be measured in the literature by (or along with) changes in other data such as increased enrolments, lower

attrition rates (including earlier, in preference to later attrition) and improved quality of the programmes.

1.2 The nature of the research degree

A debate in the literature centres on the character and aims of postgraduate education (Johnston, 1999). Basic to this discussion is whether the value of the PhD lies in its outcome (new knowledge) or its process (training in research). While the traditional British and American models of doctoral programmes may be examples of these differences, there may also be discipline differences in conceptualising higher degrees (Hockey, 1995).

1.3 The nature of supervision

Unsurprisingly there is also contention about the nature of supervision of postgraduate research students: 'the role of supervision remains profoundly ambiguous' (Green and Lee, 1995). One view is that supervision is (or should be) teaching. Connell (1985) describes it as 'the most advanced level of teaching... a genuinely complex teaching task', thereby raising the methodological and curriculum questions associated with all teaching and learning. Understanding supervision as pedagogy is shared by commentators, Green and Lee, who observe that this view encounters 'deep-seated prejudice in the modern university which systematically privileges research over teaching' (Green and Lee, 1999).

Knowles (1999) however, describes postgraduate supervision as 'critical conversations' and Taylor (1995) as 'mentorship [more than] instruction'. Others stress the dual nature of the task: 'Research postgraduate training is unique among academic responsibilities in providing a direct linkage between teaching and learning activities and research' (Zuber-Skerrit and Ryan, 1994).

1.4 Training and support for supervisors

The training of supervisors has been described as ad hoc with competence to supervise being assumed rather than known. (Dinham and Scott, 1999). The case for training is put by Orton (1999) '...if learning to think like a researcher requires the nurture of a supervisor with the skills of an educator, so does learning to think like a supervisor.' Some of the models of supervision (See 1.6) contain details of supervisor training.

1.5 Stance and mood of the student

Acker, Hill and Black (1994) believe that the success of the supervisory relationship depends as much on the student as on the supervisor and identified five coping strategies which students use. Parsloe (1993) found that students' moods (excitement, despair, boredom and confidence) had predictable stages as they moved through the degree.

1.6 Models of supervisory practice

Australian universities generally follow the British one-to-one supervisory model. Yeatman (1995) characterises this as master and apprentice and considers it inappropriate for contemporary mass education and international students. Johnston (1999) recommends the trial and evaluation of approaches which offer 'a broader support and resource base' for students.

Alternative models (or additions to existing ones) generally include some of these practices: more openness between all parties, the rights and obligations of both parties made explicit (for example, through contracts) induction and/or research skills training, research-in-progress seminars, conferences, supervision by academic panels, formalised peer groups, informal gatherings, student inclusion in departmental activities and sympathetic arrangements for office space and technical support.

Some of the models are:

- Conferences, workshops, peer meetings (for people with shared research interests, for example) which supplement one-on-one supervision (Conrad, Perry and Zuber-Skerrit, 1992).
- Australian National University's supervisory panels (Pearson, 1996).
- University of South Australia model, the elements of which are a code of supervisory practice, accredited staff training and needs-based staff development, structured research skills training for students, centralised management and faculty decision-making (Whittle, 1994).
- The Collaborative Cohort model, involving regular cohort meetings (face-to-face or by teleconference),

written progress reports and feedback. The role of the supervising academic is to coordinate and mentor the process (Burnett, 1999).

- Changes to identified key aspects of graduate education (admissions, curriculum, advising/mentoring, monitoring progress, financial support, institutional climate, practices and procedures) (Lipschutz, 1993).
- Innovative systems in postgraduate organisation and administration (Holdaway 1996). Yeatman (1995) for example, reports on the successful use of graduate logs.
- University of Western Australia model of supervision which 'broadens the traditional focus on subject-area expertise to include support for the student and capacity to balance creativity with criticism.' (Fraser and Mathews, 1999).

1.7 Quality issues

Data collection

Johnston (1999) points to problems associated with gathering feedback for quality improvement from postgraduate students such as the personal relationship existing between student and supervisor and students' fears of jeopardising these relationships by giving critical feedback.

Student evaluation as the basis for change

A longitudinal study aiming for quality improvement on the basis of student satisfaction ratings reported a shortening of time to complete in their doctorate programmes (Kehrhahn, 1999). Other commentators (Lipschutz, 1993 and Tinto, 1993) believe that views of the graduate students on their

postgraduate experience should form the basis of university reviews of postgraduate education.

Examining candidates

A review of examiners' reports of doctoral theses in several disciplines by Johnston (1997) found inconsistencies in the format of the reports and in how examiners interpreted the criteria. The wisdom of using the large amount of time which examination by doctoral thesis takes has also been called into question (Crittenden, 1997).

The transition into postgraduate research

A study by Johnston and Broda (1996) highlights the difficulties some students face when moving from undergraduate or postgraduate coursework programmes into postgraduate research programmes. They report experiencing few supporting structures, isolation, confusion over what resources they are entitled to and a change in their relationships with staff.

Quality of supervision

Aspland, Edwards and O'Leary (1999) report on a survey of supervisors and postgraduate students in Australian universities which shows that they were frequently at cross purposes, based on mistaken expectations and assumptions. Related to this may be Hockey's findings (Hockey, 1996) that there are three categories of motives for academics taking on supervisor duties. The first relates to furthering the discipline and the supervisor's attainment of knowledge within the discipline. The second motive is the benefits that accrue, either material or career

benefit through joint publication, for example. The third motive is self-esteem, to do with the recognition the supervisor's role carries. Each carries with it different (unvoiced) expectations of students.

Help to publish and disseminate research findings.

Dinham and Scott (1999) in a study of doctoral graduates in thirteen countries, found a lack of support for new graduates and recommended that universities formalise support structures for doctoral students to assist them with dissemination of their work.

1.8 Enthusiasm for change

It would be fair to say that the literature reveals consistent and enthusiastic support for changes to postgraduate education. Bowen and Rudenstine (1992) make a useful summation: 'The potential rewards [of reform] are very great. The low completion rates and long time-to-degree that often prevail...mean that even modest improvements would increase markedly the number of recipients of doctorates.'

2. Factors associated with improved completion rates

2.1 Disciplinary differences: Studying in the sciences

Overseas investigators in the US (Bowen and Rudenstein, 1992), Canada (Seagram, Gould and Pyke, 1998) and the UK (Wright and Cochrane, 2000) have found better completion rates in postgraduate students studying within science-based disciplines than in the social sciences, arts or humanities. This is in line with Australian data (NBEET, 1989) which shows that students in the social sciences, education and the humanities have longer completion times and higher attrition rates than those in the natural sciences.

While there are consistent differences in completion times between disciplinary areas, the reasons for these differences are not clear. Data based on 1983 cohort figures from the Australian Vice-Chancellors' Committee (cited in Moses, 1994) demonstrates that the most successful PhD students were 'traditional' students—young, male and in the natural sciences—who undertook more structured research degrees, often as part of a team, with less financial worry and more research training before they began. Conversely, the students who dropped out were mainly enrolled in disciplines with traditionally higher expectations of autonomy for individual researchers. Seagram et al. (1998) noted that a series of variables which co-varied with discipline—making an early start of the dissertation, maintaining the same

topic, frequent meetings with supervisors—seemed to explain differences in completion times.

The tendency for public policy to ignore these and other differences between disciplines has been criticised particularly in the UK. Delamont, Atkinson and Parry (1997), for example, critiqued the Harris Review of Postgraduate Education pointing to the lack of recognition of differences between academic cultures. They argued that the application of models and expectations based on the conventions and traditions of science disciplines were inimical to the social sciences and humanities. Delamont and her colleagues were especially critical of the lack of understanding of the differences in supervisory relations in the areas with a critical mass of researchers as opposed to the field of humanities where the work is more often based on a directed and intense relationship with one or two supervisors than with a group of people in a physically defined research setting (Delamont, Atkinson and Parry, 1997).

2.2 Student admission and enrolment characteristics

Entry qualifications

Wright and Cochrane's (2000) study of more than 3,500 postgraduates at the University of Birmingham found that science students entering with a first or upper second class degree were more likely than those with other entry characteristics to complete in four years. For arts and humanities students, the class of the first degree made no difference to four year completion but those with first or upper seconds were more

likely to complete within ten years. Moses (1994) found that, along with quality of the supervision, admission criteria were a key variable in time to complete. The implication she drew was that students gaining admission on the basis of their 'equivalency' of a good honours degree, should be given opportunities to enhance their skills in areas covered in traditional honours degree training.

Full and part time enrolment and financial support

The (American) National Center for Education Statistics (1996) found that the ability to attend full or part time was the largest predictor of time to complete. Funding was a related issue. Self-supporting students took the longest time to complete, whereas students on scholarships took the shortest. Seagram, Gould and Pyke (1998) found that shorter completion times at York University in Canada were associated with maintaining full-time enrolment and fewer years of teaching assistantship funding.

The University of Birmingham study (Wright and Cochrane, 2000) distinguished between mode of enrolment and source of funding. Research - council funded students were more likely than others to finish within four years or the part-time equivalent of eight years. There were no significant differences in four-year equivalent submission rates between full-time and part-time students, but only 22 per cent of full-timers submitted within three years, whereas 52 per cent of part-timers submitted within six years.

Dinham and Scott (1999) suggest that information technology and changing work patterns might mean

that the dichotomy between full and part-time attendance is no longer relevant, and that the concept of 'flexible' attendance is more useful.

2.3 Factors related to supervision

General claims about quality of supervision

Seagram, Gould and Pyke (1998) found that the quality of the supervisory/mentoring experience is the key factor in the successful and timely completion of postgraduate degrees. Dinham and Scott (1999) report that the quality of the supervision, which includes the personal qualities of the supervisor, is 'a key factor in completion and student satisfaction with doctoral programmes.' This conclusion is widely supported in the literature.

Feedback from the supervisor

Knowles (1999) identifies feedback as 'the main gauge by which both parties measure whether the supervision... is successful.' Feedback must be timely, thorough and critical and be given within a supportive personal relationship between supervisor and student. Seagram, Gould and Pyke (1998) report that delays in feedback affect time to complete. Knowles (1999) draws attention to the ethics of giving feedback and the waste of students' time if supervisors give insufficient critical feedback. The result can mean that substandard work and errors are left uncorrected and can compound. Aspland, Edwards and O'Leary (1999) propose practical strategies which ensure regular feedback, as well as guidelines and evaluative tools.

Meeting frequently with the supervisor

Woodward (1993) and Seagram, Gould and Pyke (1998) found that more frequent meetings with supervisors were strongly associated with successful completion.

Explicit protocols of supervision

Kehrhahn, Sheckley and Travers (1999) found that clarifying and correcting student expectations about the milestones and time frames were part of improved time to complete. Formalising supervisor/student interaction has been found to confer benefits (Whittle, 1999).

Relationship with between student and supervisor

Relationships of such 'length, complexity and intensity' as the supervisory one have attendant power issues (Johnston, 1999). Aguinis et al (1996) found that students fared better if the power was 'expert' rather than 'coercive'. 'Collegiality' was another factor associated with student success (Elton and Pope, 1989). Acker, Hill and Black (1994) speak of the 'managed' (or directive) and 'negotiated' approaches to supervision and note the prevalence of 'negotiated' relationships in their study.

A sense of belonging

Dorn, Papalewis and Brown (1995) found that belonging to a doctoral cohort which provided peer support and mentoring was a 'persistence enhancer'.

Getting started early and keeping the same topic and supervisor

Seagram, Gould and Pyke (1998) found that beginning the dissertation early in the programme and remaining with the original topic and supervisor were significant factors in a fast time to complete.

2.4 Student characteristics, perceptions and behaviours

Gender differences

Moses (1994) found that, other things being equal, women are as likely to complete their degrees but to take longer. Other researchers (Seagram, Gould and Pyke, 1998; Wright and Cochrane, 2000) could find no significant gender difference in time to complete. However, Seagram et al. found that male graduates are more satisfied with quality of supervision than females. Lussier (1995) reports that factors which most affected women's experience of the supervision are interpersonal while those impacting on men's experience are academic.

There are some explanations given for the differences in the postgraduate experience of men and women. Seagram, Gould and Pyke (1998) cite a range of authors who have identified a 'chilly climate' for women which may be associated with slower time to complete. Conrad (1994) found that supervisors spend as much as half as much time with female as with male students.

Schroeder and Mynatt (1999) analysed student/supervisor gender combinations and found

psychological advantages for males and disadvantages for females. Issues of power and sexuality which can characterise women's relationships with their supervisors, are raised in the literature (Conrad, 1994; Seagram, Gould and Pyke (1998). Lussier (1995), in summarising survey data, says 'women experienced almost every aspect of the doctoral programme differently', and concluded that gender must be taken into account in all postgraduate programme development.

Perceptions and psychological factors

Various inventories have been developed to identify and measure psychosocial factors related to dissertation completion in education and clinical psychology in the US doctoral system (Johnson, Green and Kleuver, 2000). Procrastination, which includes self-denigration, fear of failure, difficulty in making decisions, a need for structure; and perfectionism, which includes perceptions that the dissertation should be significant and the best in the field, were related to completion. The research suggested that these factors could be used to identify students at risk and develop interventions focused on dissertation completion.

2.5 A combination of factors

The combination of factors associated with high attrition rates in an Australian Vice-Chancellors' Committee study of the 1983 cohort of higher degree students (cited in Moses, 1994) were: studying in the social sciences, education or humanities disciplines; being older; studying part-time; not having a scholarship; changing universities and

commencing without research training. Moses herself (1994) found that admission criteria and quality of supervision were key variables.

Focusing on supervision alone, Seagram Gould and Pyke (1998) found a combination of variables which accounted for 30 per cent variance in time to complete. This combination was: collaborating with supervisors in writing research papers, not changing supervisors or topics, the number of times students met with their supervisors, and beginning the dissertation early in the programme. The last two were the most significant. Kehrhahn et al. (1999) found that improvements in the three areas of administrative, technical and emotional support led to a dramatic improvement in time to complete.

3. Summary

In summary, there is a body of literature exploring the factors which impinge on the experiences of students and influences whether or not they complete their research degrees. As might be expected there is no single variable that stands out as the key factors impacting on student success levels—the picture is one where factors combine and interact in a complex way.

There are three sets of influences on students and the rate at which they complete. These need to be taken into account in developing strategies for supporting students and their supervisors.

A. Institutional/ Environmental Factors

- (i) Differences between the disciplines in terms of their traditions and the way they conduct research need to be recognised. For example, the experience of science students is typically within a tightly knit community of researchers among whom the supervisor is but one (albeit important) source of guidance and support. At the other end of the scale, social sciences and humanities' students tend to work in a more intense relationship with their supervisors in the absence of highly integrated research cultures.
- (ii) Milestone protocols around candidature milestones are useful; for example guidelines to be used in assessment of candidature and statements of infrastructure support which can be expected at different stages.
- (iii) A sense of belonging to a group or institution is critical. In the case of science-based students this comes primarily through a research team or department. For humanities it is more often built on participation in institutional activities for research students; co-authorship of papers with supervisors; presenting work at seminars; being part of a cohort, e.g. in a professional doctorate.

B. Individual Supervisory Arrangements

- (i) Feedback from the supervisor is important but needs to be in a form that is appropriate at the time. For example, a student may require a broad brush response to an idea being developed in writing, and at another time more detailed advice on the structuring of an argument or the text as a whole.
- (ii) Meeting frequently is important to students although the phrase begs the question of what 'frequently' means. For some, it may mean several times per week, for others once a month or less. The key is not so much the temporal aspect as the sense of structure within and between the meetings to give a sense of purpose and building towards the completion of the work and the thesis.

- (iii) Supervision protocols which allow students and supervisors to negotiate their expectations of each other and establish ground rules for working together can contribute to productive working relationships.
- (iv) Positive relationships between student and supervisor are essential as general quality of the interaction and personal qualities of supervisors are key variables in completions.
- (v) Getting started early on the topic is a major contributor to success. Preparation of research proposals as a requirement before enrolment can curtail some of the uncertainty and help most students to move more rapidly.
- (vi) Keeping the same topic and supervisor. The evidence, not surprisingly, is that students are significantly slowed down by changes in arrangements or topics.

C. Student Cohorts and Characteristics

- (i) Entry qualifications make a substantial difference. Students who have not come through traditional academic paths such as Honours often need opportunities to develop their research knowledge and skills.
- (ii) Overseas studies suggest that students working full time on their degree and without major financial worries fare better than part-time or impoverished students. There is evidence from Australian universities, however, that part-time students in full-time employment complete in similar timeframes, and at the same rate, when adjustments are made to calculate full-time equivalence.
- (iii) There is no conclusive evidence that either males or females complete at higher rates.
- (iv) Discipline differences are clear in the rates of completions with science-based students more likely to complete than those in humanities. There is however evidence from some universities (including the University of Technology, Sydney) that humanities' and social sciences' students have rates equivalent to the rates of completion in other disciplines.

- (v) Psychological factors are to some extent outside the control of the institution, but supervisors may be able to move students through to completion if they can identify personality traits such as a tendency to procrastination.

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