Experiences of Doctoral Students in Mathematics in New Zealand

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Abstract

This study investigates factors affecting doctoral study in mathematics and mathematics education in New Zealand universities. In particular, it gives insight into the problems faced by students and provides comprehensive information for the mathematical community. A questionnaire to students gathered information including their financial support, initial motivation to pursue a doctorate, the level of satisfaction they were experiencing from their studies, their perceptions of the supervisory process, their experiences as research students, and their hopes for the future.

1 Introduction

There has been little formal research on the experiences of graduate students in mathematics in New Zealand (NZ). A survey of Mathematics and Statistics Departments in NZ Universities (Morton 1993) gathered information about graduate study opportunities and included numbers of staff and doctoral students along with information on gender and ethnicity. In 1997 this data was updated for just mathematics and the ethnicity component was omitted (Morton & Thornley 1997). For both these surveys the information was obtained from the relevant heads of departments.

The literature contains a number of studies of graduate students from a broad range of disciplines. In NZ some of the first studies have come from the students themselves. In 1994 the University of Canterbury Students' Association initiated a survey titled 'Third Degree' by distributing questionnaires to departments with the request to pass them on to appropriate students. The questions were related to departmental support, finances and supervision. This study identified several areas where women's experience of postgraduate study was less positive than that of their male counterparts. In order to investigate these concerns a study of women graduate students, 'Take Us Seriously', was undertaken in 1996. A report to the NZ Vice Chancellors Consultative Committee (Gavin, 1995) gives the results of a survey of graduate students at Auckland University where the questionnaires were distributed via Faculty Registrars.

Recently the newly formed New Zealand Academic Audit Unit (NZAAU) completed audits (Victoria, Otago 1996; Canterbury, Waikato, Massey 1997; Auckland, Lincoln 1998) of the seven universities and praised those universities who monitor the experience and progress of their research students. Delinquent universities are being encouraged to put central guidance, support and monitoring procedures in place and to secure meaningful input from research students about their progress and their experiences of supervision. A sample audit report comment was 'Although the university has a strong research emphasis and eminent research staff, it was apparent to the audit panel that attention to postgraduate students needs considerable improvement.'

A number of studies (Anderson & Swazey 1998; Barrett, Magin & Smith 1983; Cullen, Pearson, Saha & Spear, 1994; Donald, Saroyen & Denison 1995; Holdaway, Deblois & Winchester 1994; Pole, Sprokkereef, Lakin & Burgess 1997; Pole 1998; Seagram, Gould, & Pyke 1998) have sought the students' perspectives on their graduate experience. Typical reports include demographic information, reasons for undertaking a research degree, means of financial support, issues of supervision, projected completion times and plans for the future. Two comprehensive texts, one from Britain (Becher, Henkel & Kogan 1994) and the other from the USA (Bowen & Rudenstine 1992), present overviews on graduate education in their respective countries.

Shannon (1995) suggests that the view of research in a given field is intimately related to its role in a research degree. He says (page 12), 'Research in mathematics is inextricably linked with the solution of a problem or the application of a technique so that research methodology courses are meaningless. Research in the experimental sciences is usually a team process, so that estimating the contributions of individual members can be problematic. Research in the social sciences is often fashioned by paradigms with seemingly shifting boundaries.' He continues, 'research degree expectations are also shaped differently across disciplines from the apprentice model of the sciences through the collegial style of mathematics to the view in some of the social sciences of the PhD as a mid-career peak achieved after many years of isolated labour.'

In order to make comparisons between disciplines, Becher (1989) suggested forming clusters of disciplines which share epistemological and methodological concerns. The Australian study (Cullen et al, 1994) uses the five clusters: Hard /Applied (eg applied physics, art history); Hard/Pure (eg classics, mathematics); Soft/Applied (eg education, geography); Soft/Pure (eg english, sociology) plus Transitional (biological sciences). The present investigation includes mathematics (Hard/Pure cluster) and mathematics education (Soft/Applied cluster).

2 Background

At the time of this study there were six universities in NZ offering doctoral programmes in mathematics. In three of these (University of Auckland, Massey University and University of Waikato) mathematics and statistics were housed in separate departments while for the others (University of Canterbury, University of Otago and Victoria University) mathematics resided in a department or school which included statistics and possibly other disciplines. This study interprets mathematics in the narrow sense as excluding statistics although students in operations research and mathematics education are included when they are housed with mathematics groups. The survey did not attempt to include students studying mathematics within other disciplines such as engineering or management science, or studying mathematics education within an education department.

The usual background for a doctoral student in NZ is a good honours degree at either Bachelors or Masters level. Sometimes further coursework may be required at the time of provisional enrolment. The doctoral degree consists of a thesis containing original research which is examined by a panel, including an overseas expert in the field, and is then subject to an oral examination. Maximum length of study is six years, although the usual length for full-time students is three to four years. Many candidates will have little, or no, previous experience in mathematical research.

There has been rapid growth in the number of mathematics doctoral students over recent years. Moreover, mathematics education is now an area of doctoral study and these students are often associated with mathematics departments. A review of the mathematical sciences, Ministry of Research, Science and Technology (MoRST) Report 77 (1998), collected data from university departments. Tables A-25 and A-26 of this document provide the figures in Table 1 for PhD enrolments in mathematics (excluding statistics) in 1992 and 1997. The column titled 'Other' refers to other areas related to mathematics including mathematics education.

The MoRST report data shows enrolments have doubled over the six year period. The same document reports that forty-eight PhDs were awarded in the mathematical sciences (including statistics) over the period 1992-1997. In Table 2 these numbers are compared with the three previous six year periods using data from Education Statistics of New Zealand (ESoNZ) which includes doctorates in statistics. (Figures for 1991 were

Table 1: PhD enrolments in mathematics.

Year	Pure Maths	Applied Maths	Operations Research	Other	Total
1992	5	15	3	8	31
1997	14	24	5	20	63

not published. The last entry row, marked *, is also from MoRST Report 77 (1998), which did not include the gender breakdown.)

Table 2: Doctoral degrees awarded in the mathematical sciences.

Years	Source	Total	Women
1973 - 78	ESoNZ	21	2
1979 - 84	ESoNZ	22	2
1985 - 90	ESoNZ	21	4
*1992 - 97	MoRST	48	NA

The increase in enrolments has been most dramatic at the University of Auckland which currently has more than a third of the doctoral students in mathematics while three other universities (Massey, Otago, and Waikato) share half the doctoral students (Morton & Thornley, 1997). There are many reasons for this growth which signifies a certain maturing of mathematics in NZ. No longer do all the best students automatically go overseas for graduate study. The universities are placing a greater emphasis on graduate teaching and research, and are encouraging recruitment of overseas students. More funding is available for graduate students through scholarships, research grants, teaching assistant positions and research partnerships with industry. Mathematics departments are becoming aware of the benefits of a strong graduate student presence in their midst.

In contrast, the American Mathematical Society report (Fulton, 1996) on new mathematical sciences doctoral recipients in the USA states that overall there has been a 10% increase over the period 1992-96. Of the 1996 recipients, 22% were women.

3 The study: goals and method

The purpose of this study is to gain insight into the issues faced by graduate students in mathematics and the benefits they see in their work. The type of information sought from these students was their previous education, the financial support they're receiving, what motivated them to pursue a doctorate, how they negotiated their choice of topic and supervisor, the level of satisfaction they are experiencing from their studies, and their career expectations. Also of interest is the gender composition of the group and whether gender was a critical factor in their recruitment and subsequent experience as doctoral students. This survey doesn't take into account qualified students who chose not to pursue a doctorate or those who have dropped out.

A questionnaire, partially modelled on the one used by Barrett et al (1983), was developed. After an initial pilot it was slightly modified and mailed individually to all appropriate registered doctoral students along with a letter which explained the purpose of the study and assured them that their responses would be treated in confidence. The completed forms were returned to an administrative assistant who removed the cover sheet which identified the student and put code names on the completed questionnaires. Reminders were posted to those students who hadn't replied. From the sixty three questionnaires mailed there were thirty one replies, a 49% response rate. Some respondents did not answer all questions and these are indicated as no response (NR) where appropriate.

This response rate was comparable with other surveys where questionnaires were mailed directly to the doctoral students. In Australia Barrett et al (1983) had a 60% response rate from 698 students, while Cullen et al (1994) achieved a 37% return from 983 students. Anderson & Swazey (1998) had an impressive 72% response rate from 2000 doctoral students in research universities throughout the USA. In the earlier NZ surveys the questionnaires were sent to the departments for distribution rather than to individual students. The response rates for the Canterbury surveys were 39% from a population of 1350 (Canterbury, 1994), and 49% from a population of 655 women (Canterbury, 1996). The Auckland survey response was only 26% from a population of 1260 (Gavin, 1995).

The current sample of mathematics doctoral students may be compared with known characteristics of the total population in the choice of subject area and in gender. Table 3 records how students classified their thesis topics. The responses classified as 'other' include six students in mathematics education. The population figures are from Morton & Thornley (1997) where the total population was higher (sixty eight compared with sixty three at the time of this study). This discrepancy may be due to changes in enrolment status, or the inclusion of some statistics students in the earlier returns from combined departments. It is noted that the sample is underweight in the applied mathematics area and overweight in the mathematics education area.

The thirty-one responses were from thirteen women and eighteen men so that almost

Table 3: Research profile of population and sample (number of women in brackets).

	Applied & Comp Maths	Operations Research	Pure Maths	Other	Total
Total Population	35(9)	4(2)	18(4)	11(8)	68(23)
Sample	13(4)	2(1)	9(2)	7(6)	31(13)

42% of the sample are women. This compares with 34% women in the total population of mathematics doctoral students.

4 Findings from the survey

A synthesis of the information from the completed questionnaires is now presented. In some instances the students were asked to rate given statements relevant to the component under consideration, at other times to compose their own responses. Selected illustrative comments from the students are incorporated in the text. Where appropriate parallels are drawn with relevant findings from the literature. Because of the small absolute size of the sample no attempt is made to apply statistical significance tests to the data.

4.1 Student characteristics

Some of the background characteristics of the sample are displayed in Table 4. One striking feature is that almost two thirds of the respondents are over thirty years of age. This is probably characteristic of the total population of this study. (There is a similar proportion of students aged over thirty in the Auckland segment of the population, namely fifteen out of twenty four students. Auckland is not significantly over represented in the sample or among the older students.) Two of the reasons for this age imbalance may be that it's easier for younger students to go overseas for further study and the need for mathematics education students to have professional experience before beginning a doctorate.

In her study of factors affecting students' decision making about pursuing tertiary mathematics courses, Forgasz (1996) reports that the sample of first year undergraduate students interviewed showed noticeable gender differences in the type of school attended (co-educational, single sex, state, church, etc.). She suggests that this invites further investigation. For the current sample of doctoral students, Table 4 indicates that the

Table 4: Background of respondents

		Female	Male	Total
Age				
	≤ 30	2 (15%)	9 (50%)	11
	> 30	11(85%)	9 (50%)	20
Schooling				
	single sex	7(58%)	8 (44%)	15
	co-ed	5 (42%)	10 (56%)	15
	NR			1
First degree				
	NZ	9 (69%)	12 (67%)	21
	overseas	4 (31%)	6 (33%)	10

type of secondary schooling has little significance in relation to gender. More than half the students had done their undergraduate study at the same university as their graduate work, and only four with NZ undergraduate degrees had changed universities for graduate study.

Just over two thirds of the sample are currently fulltime students, though some mentioned that their status had changed during the course of their doctoral study for health or financial reasons. Dates of registration in the doctoral degree programme ranged from 1992 to 1997 with nine (29%) in the period 1992-94, fifteen (48%) in the period 1995-1996, and seven (23%) in 1997. Eighteen (58%) of the students expected to finish in three years full-time (or six years part-time) and eight (26%) in four years. Of the others, three suggested between two and two and a half years and two gave no response. Parry & Hayden (1994) and Becher et al (1994) found that students consistently underestimate the time required to write up their theses.

4.2 Financial support

When asked for factors which are most influential in preventing capable students from completing graduate programs in a reasonable time, both Bowen & Rudenstine (1992) and Holdaway et al (1994) cited lack of financial support more frequently than any other factor. Nearly two thirds of the current sample held scholarships, but only two of these were funded by organisations outside the universities. Five (16%) of the students were in fulltime employment, three were on leave from their jobs and sixteen (52%) in part-time employment (fifteen of these in the universities). Ten (32%) described themselves as unemployed although three of these said they sometimes have part-time jobs and ticked both categories. The students' main sources of financial support are summarised in Table 5. The fact that only four (13%) manage on a scholarship alone seems to indicate that the current level of scholarship funding is not sufficient for full support.

Table 5: Main sources of financial support.

Earnings from jobs	10
Scholarship and family	9
Scholarship only	4
Savings or private income	4
Family support only	3
Student allowance	1

Replies to the financial support section of the questionnaire indicated that some degree of financial hardship is a reality for more than half of these students, and in some cases for their families. Two respondents claimed considerable hardship while sixteen (52%) said they suffered financial hardship to some extent. The difficulties they experience include adjusting to a drop in income, finding suitable accommodation at affordable rentals, high childcare costs, pressure on partners to work to provide for the family, additional debt, and the decision to delay starting a family.

The decision to work part-time to provide income comes with a time cost. Students reported that this ranged from three to twenty five hours per week during the semester, with most doing eight to ten hours per week. A few also worked outside the semester. The respondents were fairly evenly divided in their assessment of whether this work affected their progress in graduate study. Several commented that teaching took more time than expected, and highlighted the tension between teaching and research, but they valued the teaching experience.

> *To some extent this did interfere with my progress during weeks of 'heavy demand' but overall it was not too bad and I enjoyed the opportunity of lecturing, even if the preparation time was more than I had forseen.*
> (Student A, fifth year.)

4.3 The decision to pursue a doctorate

The most common motives given for pursuing a doctorate revolved around the students' interest in and enjoyment of the subject leading to a desire to learn more and to improve their career prospects. Barrett et al (1983) and Anderson & Swazey (1998) report similar responses, although Becher et al (1994) note that most mature students enroll for doctoral studies for their own personal development. This is not supported by the present study. Many of the mature students said they wanted to make their contribution to a particular topic of study, or they were preparing for a change of career.

For clarification the participants were asked to rate the importance of a number of factors which may have influenced their initial decision to enrol in a doctorate. All agreed that an interest in pursuing research in mathematics was an important factor, and most expected that engaging in advanced research would provide personal satisfaction. Two thirds of the group ascribed significance to: success in undergraduate study, encouragement from lecturers to continue into research, the perceived usefulness of the resulting skills and knowledge. Fewer than half of the respondents considered the following factors important: the encouragement of peers, the presence of role models among the staff and graduate students, the opportunity for a change in career.

A third of the group regarded limited employment opportunities after undergraduate study as an important influence on their decision, and one specifically said the temporary contract nature of tutor positions and the uncertainty of their continuing from year to year was a factor. One respondent was inspired by the great mathematicians both present and past.

The students were also asked what they hoped to do after graduation. A third of the group (ten) are hoping to obtain academic positions, and a further nine said they will seek a research/consulting position with industry or business or a post-doctoral position. Others were unsure or had no particular plans though some expressed a desire to use the results of their research constructively. There is clearly some concern about the availability of university positions, particularly in pure mathematics.

4.4 Supervision

The sample indicates that the population of doctoral students is not homogeneous, students enter into their study with diverse backgrounds, expectations and motivation. Naturally changes occur as they become more experienced and more confident in their research. Pole et al (1997) describe a typical scenario for student progress through the various stages of a doctorate. Initially students expect a high degree of involvement from their supervisors, but then move through a more detached phase when they take increasing responsibility for their own work, before returning to greater involvement with their supervisors during the preparation and checking of successive drafts of the theses. Responses to this section of the questionnaire may reflect the current phase in the student/supervisor relationship.

Ten (32%) of the students have only one supervisor, while seventeen (55%) have a second supervisor and four (13%) have three supervisors. Twelve (39%) of the respondents have a supervisor outside the mathematics department. Only four of the thirteen female students have a female supervisor, whereas two male students have a female supervisor. The lack of female supervisors is not surprising as females constitute less than 10% of the academic staff in NZ mathematics departments. Cullen et al (1994) state that students receiving regular guidance from more than one supervisor indicated higher levels of satisfaction with overall supervision. Pole (1998, p270) highlights the complexities of joint supervision and cautions 'Our evidence suggests that joint supervision does not automatically ensure a safety net, but if used cautiously may be an effective way of cushioning a fall.'. In the present study the number of their supervisors does not appear to be related to student satisfaction.

All but three of the students said they had some choice as to whom they would work with. Before commencing their research nineteen of the thirty-one students had a discussion with their supervisory team about what each expected from the others. Twenty-two (66%) of the students met with their supervisors on a regular basis. Eighteen of these met weekly or more frequently while the others met fortnightly or monthly. The remaining nine met 'when there is something to talk about'. One supervisor rarely approached the student or asked how things were going. Two of the students had undergone a major change in their supervision.

The consensus of the literature is that supervision is the key to successful graduate program completion. Table 6 presents a summary of student responses to a series of statements on supervision. A higher proportion of students in the Soft/Applied cluster expressed dissatisfaction with aspects of their supervision, particularly with the advice on writing the thesis up. This may reflect the different nature of the thesis in the Soft/Applied areas, and the lack of experienced supervisors with doctorates in mathematics education at the time of this study. Another factor is the preponderance of mature students. Leder, Forgasz & Landvogt (1998) point out that 'Supervisors in faculties such as education, which attracts many mature-age students often with well-acknowledged expertise in their own field, face the additional challenge of balancing the needs of research novices with the expectations of those who are competent profesionals in their own right.'

Although the majority of the students appear satisfied there are still sufficient students expressing some degree of dissatisfaction for this to be a matter of concern. Graham (1998) cautions that students who are unhappy with their supervision are often reluctant to give honest feedback unless they are assured their opinions will remain anonymous. Even so, she claims that questionnaire responses to a confidential survey on supervision may seem more favourable than they actually are, particularly if there are a small number of respondents.

Table 6: Student satisfaction with supervision (number from Soft/Applied cluster in brackets).

	Satisfied	Some dissatisfaction	Dissatisfied	No Response
Availability of supervisor	27(7)	3(0)	1(0)	0(0)
Guidance in topic selection	21(3)	6(2)	3(1)	1(1)
Assistance/encouragement	20(3)	9(2)	0(0)	2(1)
Advice on writing up	17(4)	7(2)	1(1)	6(0)

The students were also invited to write their own comments on any particular aspects of their supervision. About a third of these were very favourable indicating an excellent student/supervisor relationship. Specific concerns are indicated in a sample of the negative comments.

> *Haven't felt encouraged by supervisors really. I feel I am just another project and their main interest is in the research publications rather than the research.*
> (Student B, second year.)

> *It was necessary to talk to other doctoral students to find out where necessary help was available in the university e.g. the availability of grants for research, the importance of ethics requirements, the role of conferences and the part I may play in them.*
> (Student C, fourth year.)

> *My supervisor is very 'hands off' unless I approach him. He also suggested a topic of research in which there is little literature. Finally, my former research experience is minimal. All of these factors combine to lead to a lot of wasted time. I feel that my inexperience required closer supervision and more importantly a research topic with more background literature.*
> (Student D, fifth year.)

4.5 The doctoral thesis

The research areas, classified by the respondents, are given in Table 3. Three of the students said there had been a major change in their research area during their doctoral study, but they didn't offer further comment. The data on the choice of topic differs for the two types of subject clusters under consideration. In the Hard/Pure cluster (pure, applied or computational mathematics and operations research) four (17%) of the respondents said the choice of topic was entirely their own decision, while a further eight (26%) had chosen a topic themselves but modified it in consultation with their supervisors. Ten (41%) said the topic was suggested by their supervisors and for the remaining two the topic was a natural progression from their masters theses. In the Soft/Applied cluster six (86%) had chosen the topic themselves and only one had a topic which was suggested by the supervisor. The differences here are not surprising, given the professional experience and maturity of the students in the latter cluster.

The majority of the students were finding that their topics were manageable (in the sense that the thesis could be completed in about three years full-time research) but nine others (27%) said the research would take longer than three years, and two said their topics had been changed or substantially modified to make them manageable. Only one was finding the topic unmanageable and was intending to modify it substantially but was unsure of the direction at that stage. One was still looking for a topic. Nevertheless five of the respondents (including four from the Soft/Applied cluster) did express some dissatisfaction with the choice of research topic and a further two students (from the Hard/Pure cluster) were completely dissatisfied with their topics but made no further comment.

Fewer than half the students in each cluster were satisfied with their progress. Becher et al (1994) comment on the large number of students who are confused and uncertain about the level which constitutes an acceptable standard of work. In the current study this featured among the aspects of graduate work causing the students the most worry.

> *Self doubts - am I good enough?*
> (Student E, second year.)

> *Not progressing as well as anticipated. The work seems so much more overpowering than my masterate thesis was.*
> (Student F, second year.)

Aspects of graduate study which gave the students the most satisfaction were simply doing research, the mathematics itself, presenting the results, completing a paper and the interaction with colleagues.

> *Networking. Meeting people in similar areas. Encouragement from others, particularly at times when the 'going seems tough'.*
> (Student F, second year.)

> *Working out how to run programs connected with my work. Discovering new ways of doing things. Discovering new research with supervisor.*
> (Student G, fourth year.)

Other student comments indicated a variety of circumstances which interrupted or delayed their research - a part-time job, having to learn new skills in computing or a new area of mathematics, health and personal problems.

> *Getting enough time.... Worried my wife and kids are missing out because I am under pressure with study.*
> (Student G, fourth year.)
>
> *Poor physical health aligned with a limited financial support system has made it hard to focus only on the research/writing up.*
> (Student H, sixth year.)

4.6 The research environment

Students' responses to specific queries concerning their level of satisfaction with four aspects of their research environment are summarised in Table 7. Each query received a positive response from more than half the students, but the numbers expressing some dissatisfaction warrant departments paying further attention to these matters.

Table 7: Student satisfaction with the research enviroment.

	Satisfied	Some dissatisfaction	Dissatisfied	No Response
Contact with other research students	17	11	2	1
Research equipment/facilities	23	8	0	0
Technical assistance from support staff	16	15	0	0
Literature access and search facilities	19	10	1	1

The main reason mentioned for dissatisfaction regarding contact with other research students was isolation from others in their particular research area. Perhaps this is somewhat inevitable given the small number of doctoral students in mathematics departments throughout NZ. Mathematics education students were particularly aware of this. Parry & Hayden (1994) emphasise the value of contact with other students and point out that students working in isolated specialisms express the greatest need for contact with other research students. A student in this study comments:

> *Contact with other students (e.g. in Education, Psychology, Medical Sciences) has had to be made on my own initiatives. This has been useful but*

energy consuming because I have been more in need of making contact than they have.
(Student H, sixth year.)

The difficulties in access to literature seemed to arise from journals being stored off campus, limited library holdings in some areas and hassles with interloans (often from overseas). A direct question about computing skills revealed that nineteen of the thirty-one respondents were having to develop new computing skills. Of these only seven said that adequate training and assistance was provided for this.

I have had to teach myself a new programming language and some mathematical and statistical packages. While assistance is available for specific queries there is no training or teaching available. I received most assistance from other research students and books.
(Student A, fifth year.)

The practice of research students helping one another with computing is advocated in Parry & Hayden (1994). In mathematics this is particularly applicable in the learning of Tex. For some of the more specialised software a supervisor may not have the relevant experience to assist and may consider investigating the use of the software to be part of the student's project.

An invitation to comment on other aspects of graduate study brought pleas for better computers, comments on teaching responsibilities, raised the issue of financial problems when the scholarship runs out, and affirmed the contributions of a positive and supportive Head of Department and of fellow students.

5 Conclusion

The information gathered in this survey presents an opportunity to examine patterns of experience common to the respondents. These suggest that the graduate experience could be improved for many students by simply paying attention to the everyday experiences of their lives. This includes monitoring the level of funding for scholarships; providing comprehensive information in the beginning phase of the doctorate on the study/research process, the research facilities and departmental procedures; and fostering ways of counter-acting isolation from other graduate students or from scholars in their field.

It is crucial to have procedures which are able to identify and respond to difficulties with supervision. Donald et al (1995) emphasise that, since the process of supervision is complex and occurs within a disciplinary context, much of the effort involved in enhancing the quality of graduate student supervision must be made at the departmental level. However, this doesn't preclude the need for a comprehensive definition of graduate student supervision across an institution to ensure that, whenever possible, there is a common ground for graduate student supervison, policy and practice. Graham (preprint, p 14) articulates multiple challenges 'The challenge is to develop methods which make accurate assessments of the student/supervisor relationship, and gain useful information about the ways in which the supervision relationship can be improved, without destroying or disrupting the relationship. Sustaining these strategies that depend on personal contact by skilled professionals is yet another challenge.'

In her literature review, concerning the elements which contribute to the successful completion of a graduate degree, Leder (1995) suggests that female higher degree students are more likely than their male counterparts to feel overlooked, neglected and unsupported by staff - particularly in more informal settings. Anderson & Swazey (1998), University of Canterbury (1996) and Seagram et al (1998) document similar 'chilly climate' feelings by some of the graduate women. Careful reading of the completed questionnaires for this current survey didn't indicate any problems which were clearly gender related, though specific questions addressing this point were not asked.

A number of respondents mentioned how much they relied on the encouragement and support from their fellow students. A strong student network both within and across disciplines doesn't just happen by chance. Graduate schools should foster a university wide community by ensuring that opportunites occur for students to meet, both socially and for scholarly purposes. Swazey and Anderson (1996) suggest that all faculty members, both collectively and individually, have a responsibility for improving the experiences of their graduate students.

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