Regenerating the Academic Workforce

The careers, intentions and motivations of higher degree research students in Australia

Findings of the National Research Student Survey (NRSS)

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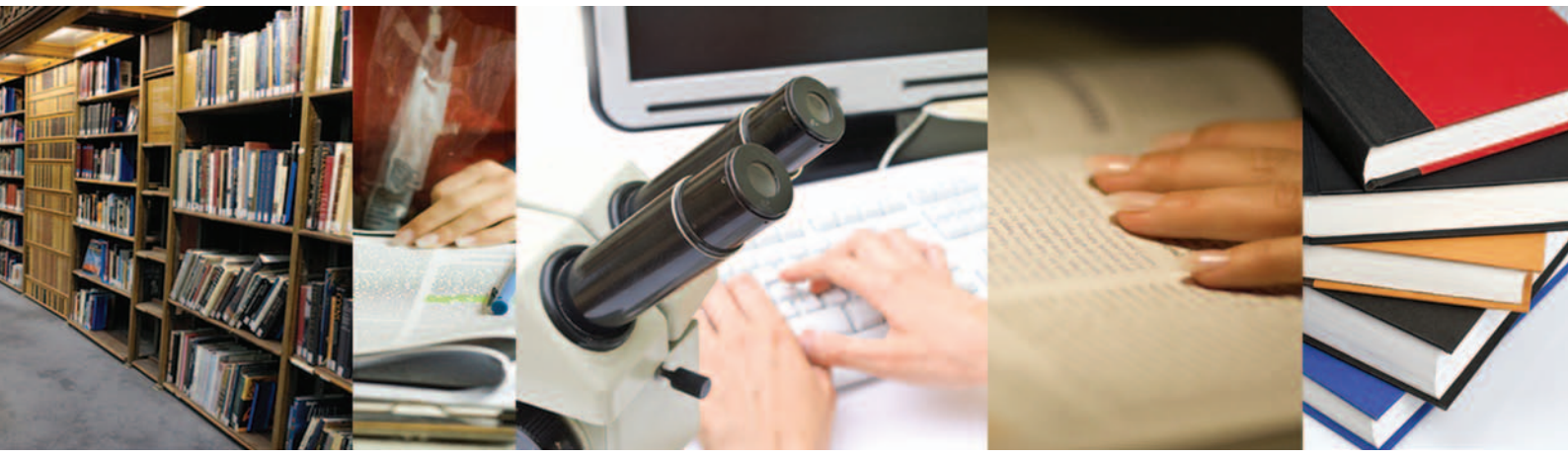

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As noted in the method section of this report (Appendix A), the success of this project would not have been possible without the dedication and professionalism of university staff from the 38 participating institutions in the NRSS. The authors thank these people for ensuring that students across Australia had an opportunity to participate. The final thank you goes to the almost 12,000 research students in Australia who took the time to complete the survey. Your responses are what have made this report possible and we wish you well in the future – whatever you do and wherever you go.

Executive summary

This report is the culmination of a project carried out for the Australian Government Department of Education, Employment and Workplace Relations (DEEWR) by the Australian Council for Educational Research (ACER) in collaboration with the Centre for the Study of Higher Education (CSHE). The main findings of this report are based on the outcomes from the National Research Student Survey (NRSS) conducted in June 2010 across 38 of the 39 universities in Australia. In total 11,710 Higher Degree by Research students (those enrolled in PhD and masters by research degrees, also referred to simply as 'research students' in this report) responded to the NRSS, providing a 25.5 per cent response rate across the country. These response numbers represent the largest collection of survey responses from research students ever undertaken in Australia.

The report primarily explores the career intentions and motivations of these students. It provides particular emphasis on the interests of Higher Degree by Research (HDR) students (referred to in this report as 'research students') in following an academic career on completion of their degree and the support they have received in terms of preparation for university teaching during their candidature. In the context of growing student enrolments and the large numbers of predicted retirements associated with an ageing academic workforce there is a need to examine the career intentions of research students. This report explores the extent to which the current cohort of research students may be a source of replenishment for the academic profession in the context of an ageing academic workforce.

It is important to remember that the traditional notion of an academic being someone who has made a linear transition from school to university, to a HDR and on to academia is outdated. Research students come to the HDR from a diverse variety of professional backgrounds and have equally diverse aspirations for their careers after gaining their qualification. Some research students may already be working in universities in an academic capacity. Many intend to use their research degree as a springboard to a career outside of the university sector. Others undertake a research degree out of interest in the subject matter and simply for the pleasure of studying at an advanced level. Nevertheless, those research students who aspire to an academic career do represent an important source of future academics.

The findings of this report raise a number of crucial issues relating to the research degree in Australian universities, the career aspirations of research students and potential issues for the future of the academic workforce over the coming decade. Key findings are set out below.

Career aspirations and motivations

Research students believe Australian universities are appealing places to work

In comparison with other career possibilities, an academic career is viewed by research students (regardless of their future career plans) as favourable on a number of key factors such as development of new knowledge, interest and challenge, and job satisfaction.

However, there are two important areas where an academic career is not perceived to compare well with other careers, these are the availability of positions and salary.

The majority of research students are interested in pursuing an academic career

The vast majority (83 per cent) have at some time seriously considered an academic career and more than half (54.1 per cent) of all students intend to pursue such work in the medium- to long-term. This interest in an academic career is higher than expected given current rates of transition from the HDR into academia. This finding suggests that there is potential within this group for ensuring the future sustainability of the academic workforce.

Of those research students interested in an academic career in the medium- to long-term, more than two-thirds indicated they plan to pursue a position that involves a balance of both teaching and research.

The most positive influence on research students' perceptions of an academic career come from their own supervisor, with more than half of students indicating that the observations of their supervisor made them more interested in pursuing an academic career. This is an encouraging finding as previous studies canvassed in the literature review indicate that observations of supervisors detracted from the appeal of an academic career. Another positive influence on interest in academia among research students comes from gaining experience working as university tutors or lecturers during their degree. This suggests that the more experience these students have with the academic environment the more their desire for the work increases.

However, there are impediments to pursuing academic work in Australia

The picture above is not entirely positive for the university sector. This is primarily because there is a notable shortfall between students' goals regarding academic work following graduation and their perceptions of whether such goals are realistic. Among research students who aspire to enter an academic career upon graduation, nearly 30 per cent indicate that they consider finding an academic job unrealistic.

The most prominent reasons given by research students for this assessment relate to both a perceived lack of availability of academic positions and also to lower salaries in comparison with other employment sectors.

Research students also have strong intentions to work overseas - around 40 per cent of all these students expect to work outside of Australia in the medium- to long-term. Of the range of career options canvassed with students, those who aspire to an academic career are the most likely to expect that their medium- to long-term career will take place outside of Australia. This suggests that despite the large group of research students hoping to pursue an academic career a significant proportion intend to undertake the work overseas. However, domestic students with academic career plans are less likely to want to work overseas than the average student with about one-third (32 per cent) of domestic students expecting to be working overseas in the medium- to long-term. Despite this, it is important to note that allowing migration flows of academics into and out of Australia brings global ties into our workforce and is important for the cross-pollination of knowledge in this high-skilled occupation.

Research students with non-academic career plans intend to pursue work that is relevant to their research degree

Among the cohort of research students in Australia who intend to follow a career outside the university sector, the majority intend to pursue work that is closely related to their research degree, indicating that the knowledge and skills gained through an HDR are seen by many as transferable to non-academic forms of work. However, other findings from the NRSS show that further work to make the HDR qualifications relevant outside the academic sphere is desirable.

Experiences of the research degree

Students enter the HDR from a wide variety of backgrounds

Among research students, 45.6 per cent were in full-time work and 9.6 per cent in part-time work as their main activity in the year prior to commencing their studies. About one-quarter (24.0 per cent) entered their degree straight from an undergraduate course and a further 16.2 per cent made the transition from other postgraduate studies. These pathways differ greatly across the fields of study, with many science students making the transition straight from undergraduate studies (43.3 per cent), while architecture and education students were the most likely to have entered their research degree from full-time work (64.8 and 63.9 per cent, respectively). Importantly, the majority of those in full-time work before they began their degree were in jobs directly related to their studies.

Most research students feel well supported in their studies

Nearly half (49.8 per cent) of all research students strongly agree with the statement: 'My main supervisor has been very supportive during my studies', and 28 per cent indicated general agreement. There were also relatively large proportions of students indicating that the overall support they received from their institution, and the support they received from university administrative staff, had been satisfactory during their degree. For universities and their academics, this is a positive finding because it confirms that in general, research students are satisfied with the support offered by their institution.

However, some fields of education showed low levels of engagement

While students' satisfaction with support structures was relatively high across all fields of education, there were differences across fields in terms of the engagement with other students and university life. Students from the sciences report high levels of engagement with their fellow students. At the other end of the spectrum, education and creative arts students record quite low scores on this scale. It is important to pay attention to this because the NRSS findings also show that the fields in which students are most disengaged from other students and university life in general are also the fields most likely to have students contemplating withdrawal.

The majority of research students have worked at university during their degree

Findings from the NRSS show that 57 per cent of all research students have been employed at a university at some period during their candidature.

Among those students currently employed at a university, the vast majority are on casual or temporary contracts (70 per cent) or contracts of 12 months or less (9 per cent). In addition, 60 per cent of those who are employed at a university work for fewer than 10 hours per week. On average, almost three quarters of those employed at a university work as tutors or lecturers, while about 20 per cent are engaged in research-related work. Six per cent of research students appear to already be employed as full-time academics within Australian universities.

About one-quarter of all research students currently work outside the university sector. For these students, 41 per cent indicated their work was 'closely related' and a further 41 per cent that their work was 'somewhat related' to their research degree. These students are employed in a range of sectors and industries and are more likely than those employed within universities to be working on a full-time basis.

Overall, research students tend to see the HDR as preparing them well for academic research activities, but not very well for university teaching and non-academic careers

In general, research students indicated that their degree will be effective in preparing them for academic research and publication, but not particularly effective in preparing them for the task of university teaching and coordinating teaching or for careers outside the academic sphere. This is an important finding in the context of this study, as it suggests that those research students who intend to go on to an academic career do not feel their degree prepares them for teaching roles within universities. Being aware of this perceived deficiency in the skills of new staff coming through this path and providing resources to assist with this preparation, will allow universities to smooth students' transition into an academic career.

Training for university teaching

There is a general lack of awareness among research students of the existence of courses providing training for university teaching

More than half (54 per cent) of all research students who have medium- to long-term ambitions to enter the academic workforce are unsure of whether their institution offers any training to support the development of teaching skills for university.

Few research students report having participated in training for university teaching during their research degree

Only 14 per cent of all research students report having participated in teaching training during their research degree. Among those with academic career ambitions, the figure is slightly higher at 16 per cent.

Findings from a supplementary survey to the NRSS – an Institutional Survey of university leaders in graduate education – suggest that institutions tend to over-estimate the proportion of research students undertaking teaching training.

Research students who are aware of training but have not participated in it tended to indicate lack of time as being the most notable impediment to their involvement, with many also expecting that they might be involved in such training at a later date. Indeed, under current arrangements the Australian HDR is notably shorter in duration than that of many other countries and further crowding it with teacher training may diminish the time students have to complete the degree. Under these arrangements it appears that courses of shorter duration are more attractive to research students as they provide training that fits within their time-constraints. A key issue, however, is whether shorter courses are the most appropriate and effective form of providing training in university teaching. Any change in arrangements for the HDR qualification may allow research students to undertake a wider range of forms of teacher training.

The training that was undertaken provided a range of skills to students

Those who undertook training for university teaching felt that the training provided good preparation for teaching methods for small groups in particular. There was also a strong indication that students valued the opportunity to meet other students just starting out teaching and to learn from experienced academics.

Training was seen to be less effective in providing preparation and skills for course planning and administration.

Despite low participation in training, when research students undertake teaching work, the majority feel adequately prepared

Research students with experience in university teaching were asked to reflect on how well prepared they felt for the first lecture, tutorial or demonstration that they gave at university. Half indicated that they had felt well prepared for this work and a further 42 per cent indicated they were moderately prepared. Only 8 per cent suggested they were unprepared to begin teaching at university. It should be noted, however, that this is a self-assessment of their preparation for teaching and not an objective assessment of their effectiveness as teachers.

In addition there were high levels of satisfaction among research students with the teaching work they had undertaken.This is important, because bad experiences in teaching would no doubt detract from interest in future work as academics.

University teaching qualifications are not necessarily a high priority for universities when hiring recent HDR graduates as academic staff

Findings from the Institutional Survey of university leaders in graduate education indicate that when institutions are employing new staff they do not place much value on recent graduates having undertaken training in university teaching. This suggests that any decisions among research students not to engage in training for university teaching may be based on their recognition that it is not a highly valued commodity in gaining work at a university at the present time.

Institutional respondents indicated that instead of making it a requirement of entry to the academic profession, they offer such training once a new graduate has been appointed to an academic position. All Australian universities now offer a Graduate Certificate in University Teaching (or equivalent), which provides some degree of professional development to early career academic staff.

Policy implications

The NRSS provides a rich source of information about the motivations, experiences and interests of research students in Australia. The findings highlighted here provide an entrée into the complexities of the HDR qualifications and the substantial issues faced by students when considering future careers and occupational pathways. These outcomes provide important insight for universities and policy-makers, particularly in relation to the sustainability and future of the academic workforce in Australia. At the institution level, the formulation and implementation of strategic workforce plans may be informed by the findings in this report.

The NRSS collection enables a more nuanced understanding of the supply-side of the equation when it comes to examining future academic workforce numbers.

Despite a lack of detailed data on demand for academics, three issues make it unmistakeably clear that growth in this workforce is inevitable: the growth trend recorded in recent years; the current policies of expansion for higher education in Australia; and the demographic imbalance of an ageing academic workforce. The NRSS provides an indication of the potential supply that could meet this demand. It shows that there is a high level of interest in an academic career amongst research students suggesting that there is potential within this group to ensure the future sustainability of the academic workforce.

A critical factor in ensuring this supply remains at high levels to respond to these issues is the extent to which the academic profession is seen as an attractive proposition.

The attractors and detractors of academic work identified through responses to the NRSS can be helpful in creating policy (both at the national- and the institutional-level) to ensure that sufficient numbers of qualified individuals are drawn to, and are adequately prepared for, this kind of work. Factors such as greater emphasis on highlighting the availability of positions, improving remuneration benefits and improving job security, while continuing to ensure flexible work conditions, will all help to sustain and improve the attractiveness of the academic career

Another policy issue raised through the NRSS is the question of whether the research degree (especially the PhD) as it is currently conceived in Australia is actually adequate in preparing students for embarking on the types of careers they wish to pursue.

While the NRSS was not designed to specifically address this issue, there are some interesting findings that provide an indication of whether the HDR is effective in preparing students for their chosen careers. The findings of the NRSS certainly show that these qualifications are effective in preparing students specifically for research work within universities and research agencies; but only a small proportion of students have a research-only career in mind for the future. As such, further thinking about the extent of support provided to students during their degree to prepare them for work outside the university sector and/or for the academic tasks of teaching, research and administration is needed. In particular, the low participation and awareness of teacher training is an issue for those planning to pursue academic careers. Ensuring a balance between the alignment of the research degree with the realistic career ambitions of students is important whilst also recognising that some specific career-related training is perhaps best undertaken after the foundation of the HDR is set. Achieving this balance of skill development is critical for nurturing the successful career pathways of research students in Australia.

1 Introduction

1.1 Overview

This report is submitted to the Australian Government Department of Education, Employment and Workplace Relations (DEEWR) by the Australian Council for Educational Research (ACER) and the Centre for the Study of Higher Education (CSHE). It has been prepared for the DEEWR tendered project PRN 24815 for research into the career pathways and teacher training of higher degree by research (HDR) students.

The report primarily explores the career intentions and motivations of Higher Degree by Research students (referred to in the report as 'research students') in Australia. It places particular emphasis on the interests of these students in following an academic career on completion of their degree and the support they have received in terms of preparation for university teaching during their candidature. In the context of growing student numbers and large numbers of predicted retirements associated with an ageing academic workforce there is a need to examine the career intentions of research students. Essentially, the report explores the extent to which the current cohort of research students may be a source of replenishment for the academic profession in the context of an ageing academic workforce.

However, the traditional idea of an academic being someone who has made a linear transition from school to university, to an HDR and on to academia is outdated. Research students come to the HDR from a diverse variety of professional backgrounds and have equally diverse aspirations for their careers after the HDR. Some research students may already be working in universities in an academic capacity. Many intend to use the HDR for a career outside of the university sector. Others undertake an HDR out of interest in the subject matter, and simply for the pleasure of studying at an advanced level. Nevertheless, those research students who aspire to an academic career, but do not already have experience in university teaching, do represent an important source of replenishment for the future of the profession.

The main findings of this report are based on the outcomes from the National Research Student Survey (NRSS) conducted in June 2010 across all universities in Australia, with the exception of one. In addition to this, the findings of an Institutional Survey relating to research student training for university teaching, also administered during June 2010, are examined in this report.

1.2 Context

1.2.1 Introduction

At a time when a notable shortage of academics in Australia is looming (Coates, Dobson, Edwards, et al., 2009; Edwards, 2010; Edwards, Radloff, & Coates, 2009; Edwards & Smith, 2010; Hugo, 2008; Hugo & Morriss, 2010) and substantial expansion of the system is at the forefront of higher education policy (Australian Government, 2009a, 2009b), the need to understand the career intentions of research students and potentially facilitate more attractive pathways into the academic profession is of acute importance.

The primary pathway to an academic career has traditionally been through the research higher degree, and in particular the PhD. Understanding the career intentions of these students is of particular importance given their potential to become the next generation of the academic workforce. If interest in an academic career among current research students is low, this has serious implications for the expansion of the higher education system that is needed in the coming years. DEEWR is currently undertaking an additional project to examine the supply and demand of academics into the future. The career intentions findings from the NRSS will help to inform the estimation of future supply in this project.

Teaching which is informed by active research has long been seen as a hallmark of university teaching, and growing awareness of the parallel impact of teaching upon research underlies the development of Teaching-Research Nexus (TRN) activities within institutions (Baldwin, 2005; Krause, Arkoudis, & Green, 2007). However, high level research skills developed within the research programs in universities do not automatically confer a similar degree of teaching skill among academic staff. In recognition of this, universities have introduced a wide range of professional development resources for staff; both informal, such as peer review of teaching (Harris, Farrell, Bell, Devlin, & James, 2008), and formal, for example through training in teaching practice such as the Graduate Certificates in University Teaching offered by most institutions. The provision of adequate training to instil confidence and build skills in teaching is of particular relevance to attracting and motivating research students to consider an academic career pathway.

However, despite the importance of teaching skills and the need to understand research students' career motivations, there has been little policy-focused research conducted in Australia into these issues. The gaps in Australia's knowledge of these areas have been identified in recent reviews and studies of national importance such as the *Review of the National Innovation System* (Cutler, 2008), the *Review of Higher Education* (Bradley, Noonan, Nugent, & Scales, 2008), and the *Inquiry into Research Training and Research Workforce issues in Australian Universities* undertaken by the House of Representatives Standing Committee on Industry, Science and Innovation (2008). Therefore, this study is important in that it helps to identify the extent to which those who are currently pursuing qualifications that can lead to an academic career have an interest in the profession. It also provides evidence on the teaching preparation undertaken by these potential academics. This new evidence can be coupled with other research relating to the forecast demand for academics in order to examine the link between intentions of research students and the requirements of the system in the future.

1.2.2 The research setting

With the backdrop of the Cutler and Bradley reviews, Australian higher education is now embarking in a new direction, focused on improving access, boosting skills and equipping Australia with the knowledge and expertise to further develop world-class research and a highly educated workforce. Both reviews emphasised the important role of research qualifications in achieving these aims.

Ongoing work for the Federal Department of Innovation, Industry, Science and Research (DIISR) has begun the process of shedding more light on the population with higher research degrees in general (Edwards, et al., 2009). This research has shown the high employment rates and permeation of this group of people throughout a range of sectors and industries in Australia. Importantly, it has also shown the employed HDR population not only has a noticeably older age profile than the general professional workforce, it has forecast that the future demand for these qualifications will grow faster than that for other qualifications over the coming decade (Edwards, 2010; Edwards, et al., 2009). Of key importance in this finding is the role of universities and more specifically the academic profession in facilitating this growth.

The future career directions taken by the current research students are of interest in this regard. This is because universities will need new stocks of academic staff to train the following generations and to facilitate growth in the sector as a whole. If interest in an academic career among current research students is inadequate, this has serious implications for the expansion that is needed in the coming years. As such, understanding not only research students' career intentions, but also the factors that are influencing these choices is very important. If feedback from current research students suggests that there may be problems in staffing the academic workforce in the future, then examining the factors impacting on students' intentions in order to facilitate changes in practice to improve interest in this area of employment could help rectify potential future shortages.

Closely linked with this is the crucial importance of facilitating the development of teaching skills for university academics. This is an area that is often not considered among research students due to the overwhelming focus of research in the qualification in which they are enrolled. However, this does not mean this issue is ignored. Most Australian universities provide professional development and support for sessional teaching staff (many of whom are research students). However, the extent of such support varies by institution and the participation levels of students in this training have not been formally recorded until now. As such, the findings in this report provide a valuable new contribution to knowledge in this area.

1.3 Focus of this study

This report focuses on the following areas and key research questions:

- *Motivations and career pathways*
  - What is the proportion of current research students who intend to pursue a long-term academic career?
  - What are the motivating and discouraging factors for an academic career and the relative importance of these factors?
  - Where motivating factors are identified, how do students rate their institutions on these factors?
  - When do research students develop their long-term career motivations?
- *What teacher training is on offer?*
  - How much teacher training is required as part of current HDR qualifications?
  - How much supplementary teacher training is on offer for current research students?
  - What is the level of encouragement and support for teacher training and opportunities for work as teachers for research students? (ie. Are incentives provided)

- *How much training is undertaken?*
  - How much teacher training is undertaken by current research students?
  - How much work as teachers have these students previously and currently engaged in?
  - Are there factors that impinge on research students' ability to undertake teacher training?
- *Student perceptions of teacher training*
  - Where currently teaching, how well prepared do students feel for their current teaching roles?
  - Do students feel they receive adequate teacher training for a potential career in academia?
  - How much weight is given to teacher training in academic recruitment?

1.4 Outline of this report

This report begins with a literature review examining previous studies following the career intentions and motivations of research students. It also explores research and practice relating to the training of research students for university teaching. This literature review helps to provide further context for examining the outcomes of this research project.

Chapter Three explores the characteristics of the NRSS respondents, providing a context for the analyses to follow. Chapters, Four, Five and Six provide the main analysis of this report. These analyses start with a chapter examining the career intentions, aspirations and motivations of research students (Chapter Four), followed by an exploration of the experiences of students during their research degree (Chapter Five). Chapter Six examines the extent to which research students are involved in training for university teaching and also highlights the main findings in this regard from a smaller survey of university leaders.

Chapter Seven acts as both a discussion chapter and a conclusion to the report. It takes a number of key findings raised through the analysis of the NRSS responses and examines in more detail the policy implications of these outcomes.

The Appendices of this report also provide important information – of note is Appendix A which offers a detailed account of the methods employed in the project and Appendix D which details the respondent characteristics and provides information about the weighting of responses.

2 Background literature

2.1 Introduction

The need to understand the career intentions of research students and potentially facilitate more attractive pathways into the academic profession is becoming increasingly urgent. Growth in student numbers is currently high on the policy agenda (Australian Government, 2009b) but at the same time Australia is confronted with issues of an ageing academic workforce and large numbers of impending retirements (Hugo, 2008; Hugo & Morriss, 2010). As discussed in the introduction to this report, these issues have been noted in recent reviews and studies of national importance such as the Review of the National Innovation System (Cutler, 2008), the Review of Higher Education (Bradley, et al., 2008), and the Inquiry into Research Training and Research Workforce issues in Australian Universities undertaken by the House of Representatives Standing Committee on Industry, Science and Innovation (2008). As these reviews recognise, a lack of interest in an academic career among current research students would have serious implications for the expansion of the higher education sector and the planned increases in student numbers expected in the coming years.

The Cutler and Bradley reviews moved Australian higher education in a new direction, focused on improving access, boosting skills and equipping Australia with the knowledge and expertise to further develop world-class research and a highly educated workforce. The reviews both emphasised the important role of the postgraduate research qualification in achieving these aims.

Ongoing work for the Federal Department of Innovation, Industry, Science and Research's Research Workforce Strategy is helping to better understand this population in general and implement strategies for sustainability and renewal. Research by Edwards et al. (2009) has highlighted the positive employment outcomes and labour force participation of this group across a range of sectors and industries in Australia. Importantly, from the perspective of regeneration of the workforce, this research has also shown that the age profile of this group is noticeably older than that of the professional workforce in general. In addition, modelling of future demand for research qualifications suggests that employment for people with these high level qualifications is likely to grow at a faster rate than for people with undergraduate, other tertiary and lower level qualifications over the coming decade (Edwards, 2010; Edwards, et al., 2009). The role of the university in the training of people with these qualifications is therefore of crucial importance to the likelihood of achieving this future growth.

This chapter provides a review of the current data on the changing academic profession, followed by a review of the literature about the interests of research students in an academic career, the realities of life as an early career academic, and the extent and adequacy of training for these realities undertaken within research higher degrees, including training for academic teaching duties. The literature reviewed in this document is drawn from a large number of studies, primarily undertaken in Australia, the US and the UK over the past fifteen years.

Our analysis of DEEWR and other data on changes to the academic profession over the past twenty years is in line with other studies (Coates, Dobson, Edwards, et al., 2009; Hugo, 2008; Hugo & Morriss, 2010) in finding a profession which is comprised of members comparatively older than the wider workforce, and in which work has become increasingly casualised and characterised by limited term contracts. Student to staff ratios have increased, and many academics find that there is less time available to them for research. It is a mobile workforce, with attractive employment opportunities overseas facilitating cross-border flows.

The findings of prior research of the career motivations research students and early career academics outlined here paint a relatively negative picture of their attitudes towards the academic profession. Studies of Australian, UK and US postgraduate students suggest that students are influenced by their observations of academic staff in making decisions about following an academic career path. These studies show that these observations have largely negative effects, leading students to imagine the academic life to be one of heavy workload, a constant search for research funding and little time for an outside life. Studies have also found that the sense of isolation that many students experience during their HDR studies, particularly those in the humanities and social sciences, can put them off pursuing an academic career. It is of some concern that the available literature has so little to say about positive attitudes toward an academic career. However, where positive attitudes exist, they tend to be focused on the autonomy and independence of academic work and the flexibility of work-time allocations. It is perhaps unsurprising that participants use attitudinal surveys and interviews to air grievances and fears, and caution must be taken when interpreting stated intentions as predictive of future behaviour. The authors of this report note that the majority of the available literature originates in the UK and USA, and that the differing education systems in these countries mean that the findings may not be entirely compatible with the Australian system.

2.2 Patterns of academic work and research education outcomes

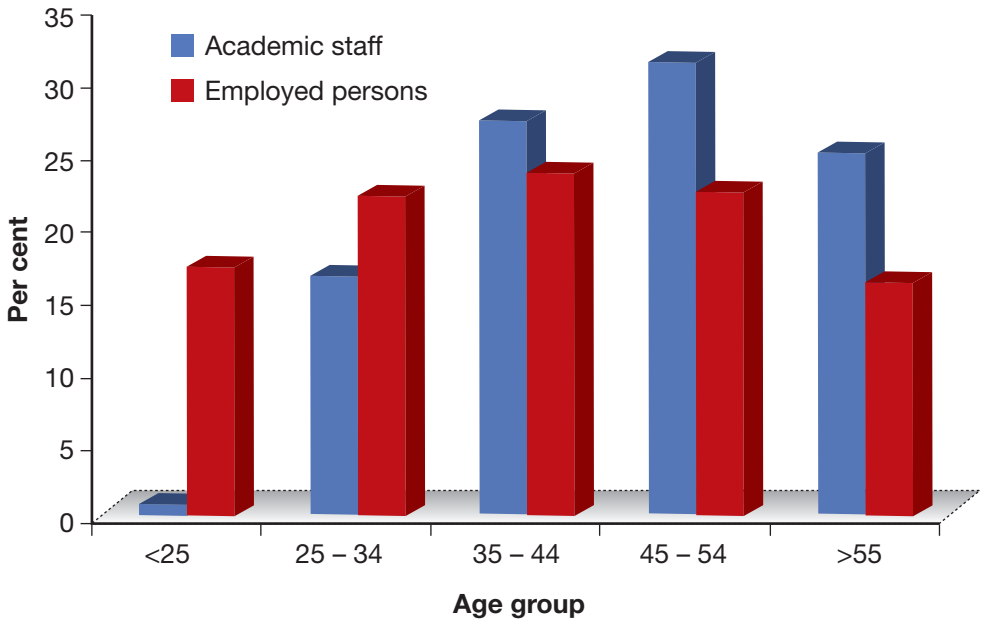
The nature of academic work has changed greatly over the past thirty years. The shift from elite, to mass and now towards universal higher education has created changes in the demographic characteristics of students, while fluctuations in funding to higher education institutions have increased student-to-staff ratios and impacted on the proportions of time academic staff must devote to teaching, research and administrative duties. In addition, there has been a failure to replace departing staff over the past decade-and-a-half, resulting in fewer long term career opportunities for young academics. This failure is partly due to a lack of indexation of funding for staffing and partly due to a lack of planning or policy at the institutional level. This in turn has created an academic workforce with a much higher average age than that of the national workforce. The ageing of the academic workforce is not unique to Australia, however, with many other countries also facing this problem. The casualisation of the workforce has made academic employment less stable and in many instances casual academic work is effectively seasonal, with substantial gaps in paid work between semesters. Globalisation and an increasingly mobile academic workforce mean career possibilities are not limited to Australia. All these changes affect the attractiveness of an academic career in Australia for the research students from whom a substantial proportion of the academic workforce is traditionally drawn.

Changes in the nature of academic work are outlined below, preparatory to investigating the career motivations of research students.

2.2.1 Ageing of the academic work force

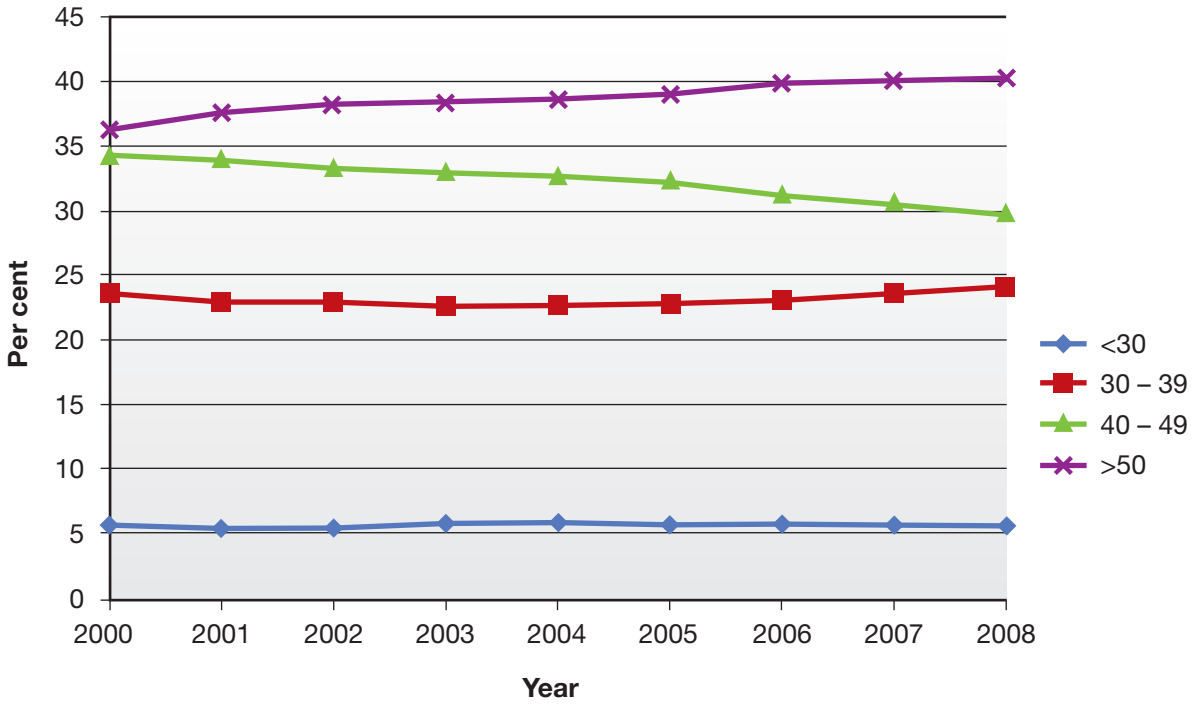
An ageing academic workforce is a problem faced by many nations, including Austria, Belgium, France, Germany, Iceland, Norway, Sweden, the Czech Republic and the Netherlands (Huisman, de Weert, & Bartelse, 2002; OECD, 2008). The ageing of the academic workforce in Australia in particular has also been well documented (Coates, Dobson, Edwards, et al., 2009; Edwards, 2010; Edwards, et al., 2009; Edwards & Smith, 2010; Hughes & Rubenstein, 2006; Hugo, 2005a, 2005b, 2005c, 2008; Hugo & Morriss, 2010). Fast-paced expansion of the higher education sector in the 1970s necessitated an accompanying sharp increase in academic staff numbers, which continued, with some variation, through the 1980s. Since the tightening of funding to higher education in the mid 1990s, however, staff numbers have only increased comparatively modestly. These factors have resulted in an academic workforce age profile that is skewed toward the older end of the spectrum, particularly when compared to the age-profile of the overall workforce (Figure 1, below). Further, because younger staff are not entering the academy at a rate of replenishment, the percentage contribution of workers over 50 years of age is increasing.

While staffing levels have picked up somewhat in the early 2000s, a missing generation of academics – Generation X – has left a risky hole in the age profile of the workforce as the Baby Boomers move toward retirement. This phenomenon is evident in the data presented in Figure 2 (below), which shows the shift of the 40-50 year old age group into the 50+ range over the 2000-2008 period, while the percentage contribution of the younger age groups remain stable.



Source: DEEWR selected statistics 2008; Australian Bureau of Statistics Cat: 6359.0.

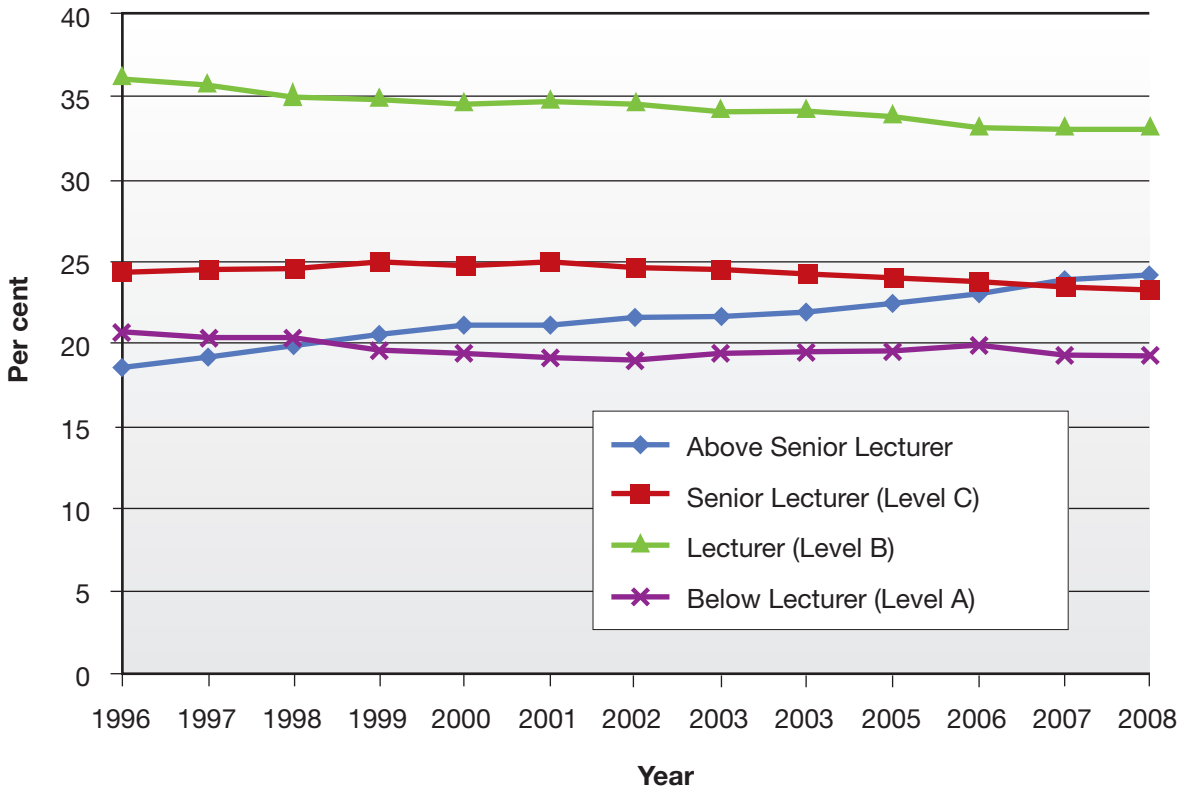
Figure 1: Percentage of academic staff in each age group; percentage of employed persons in each age group, 2008.



Source: DEEWR selected statistics.

Figure 2: Percentage of academic staff by age group, 2000-2008

The concentration of older age groups in the academic workforce evident in Figure 1 has also led to imbalances in the strata of professional classifications within the sector. As noted by the OECD (2008) older workers are more likely to hold senior positions and this has budgetary implications for universities. In Australia, the classifications above Senior Lecturer (above Level C) are the only classification group to have increased their percentage share within the workforce over the period from 1996, moving from having the smallest percentage share of the four classification levels, to the second highest over that period (Figure 3, below). Shifts in the composition of the academic workforce toward the more senior of the classifications also has implications for institutional budgets, as wages at the most senior levels are around twice those of a Level A staff member, reducing the financial base on which to employ more junior staff. Given the academic workforce is also ageing in other countries it is likely that this imbalance in professional classifications would be apparent in other countries as well (OECD, 2008).



Source: DEEWR selected statistics.

Figure 3: Percentage of academic staff by classification, 1996-2008

The ageing of the academic workforce is occurring at different rates across different disciplines, meaning that the viability of an academic career, as research students might see it, will also vary by discipline. Paradoxically, it is just those areas in which the average age of staff is the highest, and which are most in need of replenishment, that are likely to appear the most out of reach to aspiring academics, as they contain the fewest 'early career role models.' Hugo (2008) provides data on the organisational areas with the highest proportion of staff over 50 years of age, presented in Table 1. A number of these areas are of key policy importance; in particular, education, information technology, nursing and the mathematical sciences. As a point of context, across all academic disciplines, 46 per cent of academic staff are aged above 50 years in the dataset used by Hugo (2008).

Table 1: Australian academic staff: academic organisational units with high proportions aged 50 years or more,

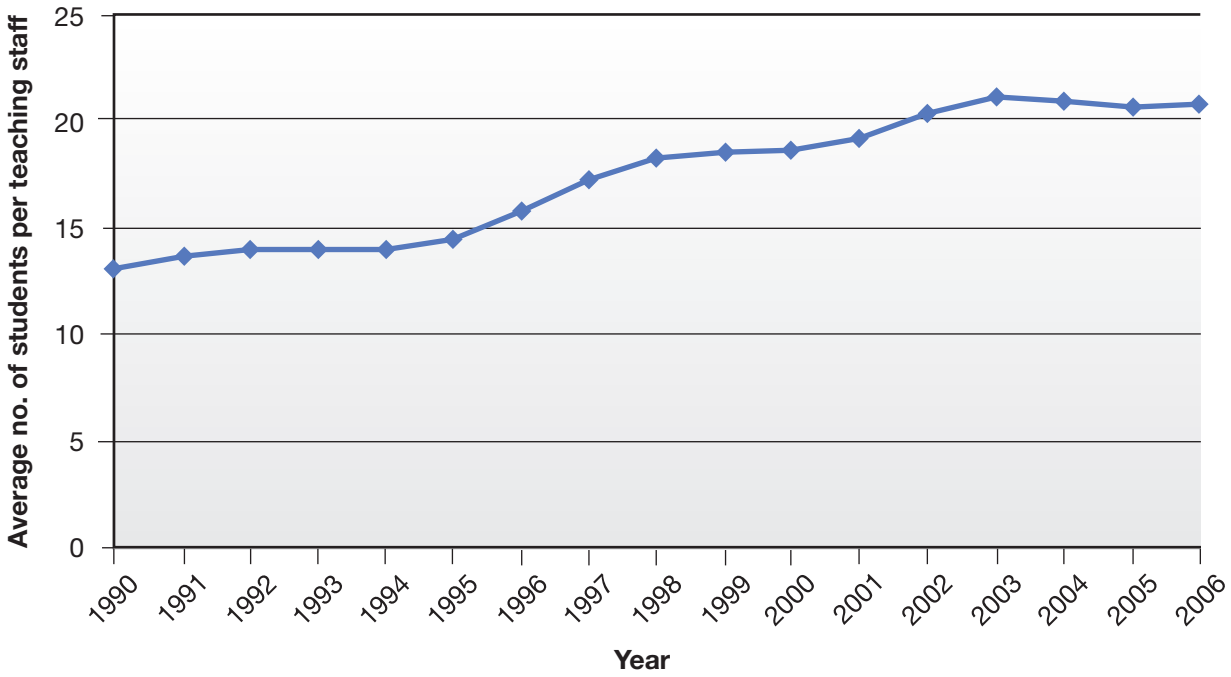
Academic organisational unit	Number of staff	Percentage aged 50+
Teacher Education	696	62.8
Education—General	1,126	60.4
Agriculture	85	60.0
Curriculum and Education Studies	181	58.6
Human Welfare Studies	196	57.6
Visual Arts	213	56.8
Information Systems	176	53.9
Studies in Human Society	733	53.2
Mathematical Sciences	444	52.7
Nursing	789	51.3
Information Technology	925	50.0

Note: only academic units with more than 60 members are included in this table

Source: Hugo 2008: 20

2.2.2 Increase in student/staff ratio

The diminution in the rate of employment of new academic staff has occurred in a context of increasing student participation in higher education. Universities Australia calculates that student to teacher ratios increased from 12.9 students per teaching staff member in 1990 to 20.5 in 2006 (illustrated in Figure 4, below). Of course, student to staff ratios will vary widely at the institution, discipline and class level, and high ratios will impact differently upon different subject areas. However, strong anecdotal evidence of rising class sizes from across the sector may make an academic teaching career less attractive to research students. Further, these students may already have experienced large class sizes as casual teachers within their departments, which in itself may be off-putting.



Source: Universities Australia: 2006, Student to Teacher Ratio for Academic Staff with Teaching function.

Figure 4: University student-staff ratio, 1990-2006

2.2.3 Changes to teaching, research & administration balance

Fewer resources and an increase in student to staff ratios has contributed to an increase in the amount of administration activities undertaken by academic staff, meaning that for many academics less time is available for research. These changes have been documented by McInnis (2000) and more recently by Coates *et al.* (2009). A survey of academic work currently being undertaken by the CSHE for DEEWR will provide a further opportunity to investigate this issue.

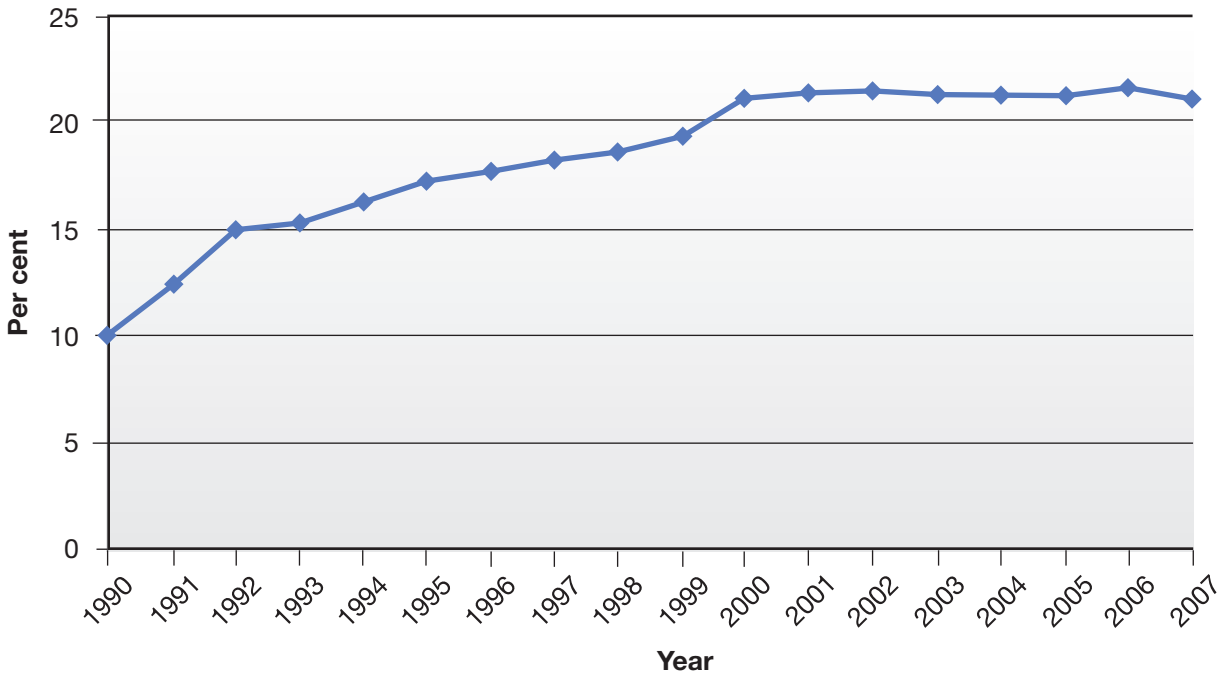
In his 1999 survey of the academic workforce, McInnis found a strong preference for research work over teaching in early career academics (66 per cent) compared to late career academics (36 per cent). Only 18 per cent of early career academics expressed a strong preference for teaching over research (McInnis, 2000). McInnis also found that, overall, academics would prefer to decrease the time they spend teaching, and increase the time they spend on research. The preference for research over teaching was even more strongly expressed in Coates *et al.*'s 2007 survey of academic staff (2009). In that survey, only 7 per cent of academic staff expressed a clear preference for teaching. These findings are relevant to the way in which research students, who are primarily researchers, may think about an academic career. Those with a very strong interest in research may observe the teaching load of staff in their department and consider a non-academic research career to be a more attractive option (further discussion relating to the way students' observations of academic staff shape their career goals is found below).

Interestingly, research in the USA finds that many graduate students have 'very strong interests in and commitments to teaching' (Bieber & Worley, 2006), perhaps due to the fact that working as a teaching assistant is commonly a formal element of the PhD in the US. Research in the UK, where the PhD has more in common with the Australian model, finds that most students are interested in research-led academic careers, 'with a bit of teaching' seen as inevitable (Mills, Jepson, Coxon, Hawkins, & Spencer, 2006). If it is true that the greater likelihood of teaching duties forming a required part of doctoral candidature in the US is tied to the stronger interest in university teaching among US doctoral students, this may suggest the utility of a similar approach in Australia. However, the Australian and US PhDs are very differently structured in other respects, including coursework components and size of dissertations. Any consideration of allowing teaching experience to comprise part of the Australian PhD or other research qualification would necessitate a reconsideration of the timeframe and dissertation size for these degrees.

2.2.4 Casualisation, the move to limited term employment and the rise in part-time work

As has been well documented (Edwards & Smith, 2008b; Huisman, et al., 2002) the composition of contract type held by the academic workforce has changed substantially over the past two decades, with a large increase in the amount of teaching undertaken by casual staff. Most of this increase occurred during the 1990s, and by the end of that decade, the proportion of teaching staff (defined here as both teaching only as well as teaching and research staff, calculated FTE) who were employed on a casual basis more than doubled, from 10 per cent to just over 21 per cent of the academic workforce (Figure 5, below). Casual contracts are more common in some disciplines than others, with 30 per cent of academic staff in the Creative Arts, Architecture and Education holding casual contracts, compared to 13 per cent in Agriculture and 19 per cent in Society and Culture in 2008 (DEEWR selected statistics).

While there are obvious organizational benefits to a more casualised workforce, especially in relation to flexibility, there are core reasons why this kind of work is less attractive to many academics: a 2004 study found that only 28 per cent of casual academics agreed that casual work was their first choice mode of employment (Junor, 2004). Further, because many casual teaching staff are only employed during semester, they are without an income from this source of employment for large portions of the year. Given that casual staff tend to be concentrated at the lower classifications (DEEWR statistics show that 71 per cent of casual staff are employed at the Level A classification and 24 per cent at Level B) and to be generally much younger than the overall academic workforce, this shift to more tenuous forms of employment may make an academic career less attractive for many research students.



Source: Universities Australia: FTE for Full-time, Fractional Full-time and Actual Casual Staff by Work Function and Gender, 1990 – 2001; DEEWR selected statistics, various years.

Figure 5: Proportion of FTE teaching only and teaching and research academic staff who are casual, 1990-2007

The increasing casualisation of the academic workforce has occurred against a background increase in the number of students entering university (particularly international students), which Coates et al. (2009) contend has added to the burden on tenured staff as they must manage the army of casual and sessional staff on top of their other duties. These changes impact on the desirability of an academic career for newcomers: casualisation means that those entering on casual contracts face a far less certain professional future than previous generations of academics, while those lucky enough to obtain tenure are likely to experience high administrative workloads. Coates et al. conclude that this tension indicates that 'academic work is now being perceived as being less likely to lead to a real career than in the past' (Coates, Dobson, Edwards, *et al.*, 2009, p. 53).

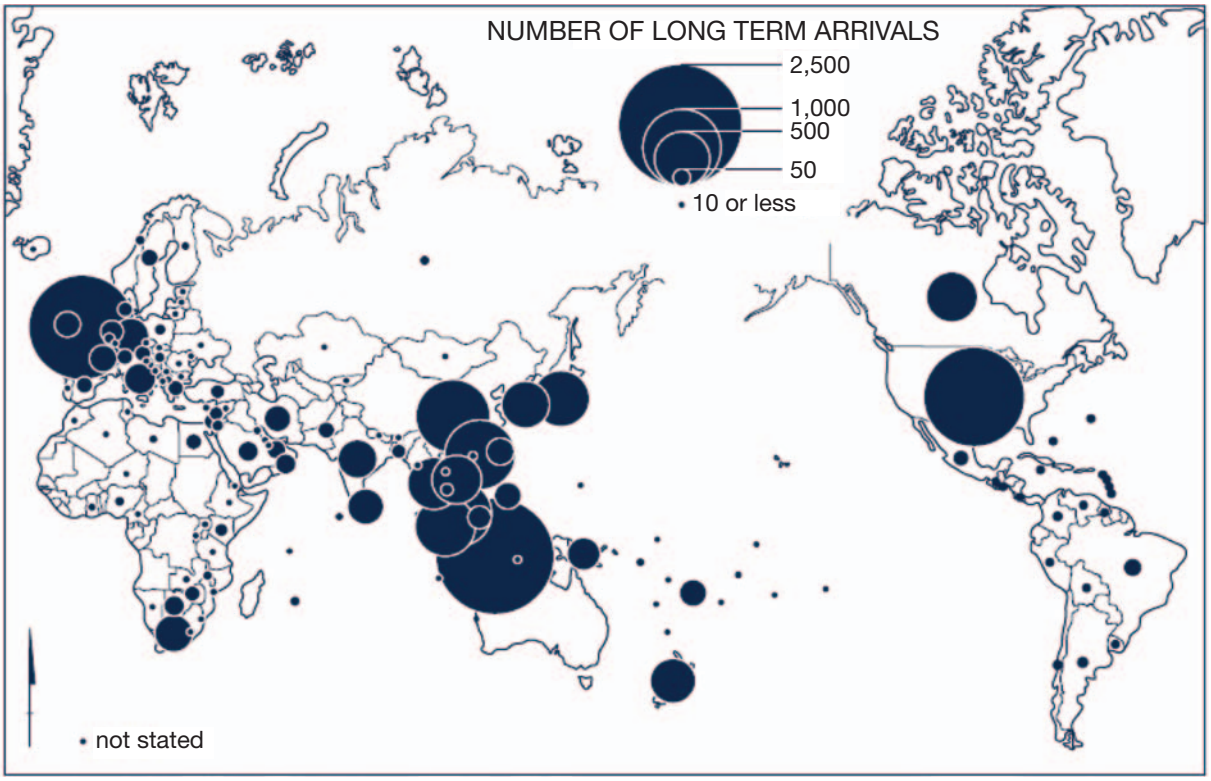
In addition to the proliferation of casual positions in the Australian academic workforce, there is also a trend toward limited term contracts rather than the traditional tenured positions. Where once aspiring academics may have expected an ongoing position in a university, they are now far more likely to experience a career comprised of a series of limited term contracts. Of course, this is the case in the non-academic workforce as well, but it symbolizes an important shift in the idea of the 'academic life.' Post-doctoral academics might well find themselves spending years on a 'post doctoral treadmill' (Edwards, *et al.*, 2009), moving from one short-term contract to another without being able to transition into a full academic position (Dawson, 2007). Studies of the casualisation of the academic workforce in the US also find that non-tenured academic staff can feel 'expendable' as they undertake a series of short-term contracts (Anibas, Hanson-Brenner, & Zorn, 2009).

It is, however, difficult to quantify the shift in trends from tenured to limited positions. DEEWR data (also tabulated in Coates et al. 2009) show a rise in the proportion of limited tenure staff from 26.9 percent of non-casual academic positions in 1989, to a peak of 33.9 per cent in 1998 before dipping back to 20.0 per cent in 2004 and rising slightly thereafter. However, the 1998 reversal in trend is mirrored by a similar reversal in trend for tenured staff data, a curious phenomenon suggesting a shift in definitions used in the data (DEEWR has been unable to clarify this apparent anomaly).

DEEWR data also show an increase in the percentage of non-casual academic positions which are non full-time (fractional full-time, or FFT). FFT positions comprised 2.7 per cent of the tenured workforce in 1989, and 6.2 per cent in 2007. For non-tenured positions, there was a rise from 14.4 per cent of positions being fractional in 1989 to 24.4 per cent in 2007 (Coates, Dobson, Edwards, et al., 2009, p. 9). While in some cases the shift to fractional positions may mean greater flexibility in the work force, particularly for those with parental responsibilities, it is unclear what proportion of fractional staff would prefer to work full-time, and whether the shift toward fractional positions might represent a tightening of budgets limiting career opportunities for newcomers (in the US, the term 'freeway faculty' is used to refer to part-time academics who commute from one university to another as institutions seek to cut costs (Hamilton, 2005)).

2.2.5 Globalisation and workforce mobility

The final significant change to the academic profession discussed here is the impact of globalisation on the academic workforce. The academic workforce is an extremely mobile one, with Coates et al. (2009) finding that 30.8 per cent of academics had 'taken concrete steps' to find an academic position in another country, compared to an international average of 20.5 per cent across the countries taking part in the Changing Academic Profession (CAP) survey, placing Australia second only to Italy in this regard. However, Australia also benefits from academics coming here from other countries: indeed, Hugo (2008) cites 2006 ABS census data showing that 40.5 per cent of Australian academic staff were born overseas, compared to 25.7 per cent of the total workforce. Hugo also presents DIAC data on long-term and permanent migration of academics in and out of Australia. Figure 6, below, shows the destinations of academic staff leaving Australia over the 1993/94 to 2005/06 period. The most popular destinations during that time were the UK, US and South East Asia.



Source: Hugo 2008: 35; using Department of Immigration and Citizenship unpublished data.

Figure 6: Permanent departures of academics, Australia, by destination, 1993/94 to 2005/06

Overall, Australia has experienced a net increase in academic staff through migration in recent decades. However, in 2005/06 alone Australia lost 1071 academics to long-term migration and 411 to permanent migration off the back of a five to six year trend (Hugo, 2008). These staff represent a possible source of replenishment for the ageing Australian academic workforce, whether through attracting those who have left Australia to return, or stemming the tide of departures through increasing the attractiveness of remaining.

The extent to which opportunities to find academic employment at overseas institutions impact upon postgraduate students' career decisions is presently unclear. This area is investigated in the survey analysis in this report.

2.3 Patterns in PhD destinations and employment outcomes

The number of domestic completions in the doctorate qualification has grown rapidly in Australia, from 2,326 in 1996 to 4,405 in 2007, a growth of 89 per cent. Over the same period, there was a decrease in the number of domestic completions in masters by research from 1,494 to 1,101 – a decline of 26 per cent (DEEWR selected statistics 2008). Growth in international student doctorate completions was greater than those for domestics (127 per cent over this time), although the differences here between international and domestic growth is nowhere near as substantial as that found in some of the undergraduate qualifications. In masters by research completions, international student numbers were stagnant over the 1996 to 2007 period (Edwards, et al., 2009).

Almost one-quarter of all doctorate completions are in the field of Natural and Physical Sciences, with a further 23.4 per cent in Society and Culture, 13.8 per cent in Health and 11.8 per cent in Engineering (DEEWR selected statistics 2008). In total, Australia had 5,276 graduates from advanced research degree programmes in 2006 (OECD, 2009), comparable with other OECD nations such as Germany, the UK and Ireland when population size is taken into account (Edwards, et al., 2009). In terms of employment outcomes, the doctorate population living in Australia have high rates of workforce participation and high rates of employment, with 88.9 per cent of 30 to 64 year olds with an HDR qualification employed in 2006 (ABS, 2006). Of this group, 25.9 per cent are employed as university and vocational education teachers, while 18.0 per cent work as Natural and Physical Science Professionals.

Table 2 provides the figures for the most common occupations undertaken by those with an HDR qualification in Australia and provides some perspective of the relative concentration of doctorate degrees among employees in each of these occupations. The final column in this table shows that for the University and Vocational Education Teachers occupation, 25.6 per cent of all employees have a doctorate qualification – by far the largest concentration of any of the occupations listed here. Among those identified in the Census as Natural and Physical Science Professionals, 18.8 per cent were qualified with a doctorate. The figure for the 'Professionals, not further defined' group was also high at 17.4 per cent.

Table 2: Most common occupations among the doctorate population, Australia 2006

Occupation type (ASCO)	Number employed	Share of employed Doctorate population (%)	Proportion of all employees in occ. who have a doctorate (%)
University and Vocational Education Teachers	16,305	25.9	25.6
Natural and Physical Science Professionals	11,335	18.0	18.8
Miscellaneous Specialist Managers	3,983	6.3	3.8
Professionals, not further defined	3,656	5.8	17.4
Medical Practitioners	2,475	3.9	19.4
Miscellaneous Business and Information Professionals	2,408	3.8	1.6
Social Welfare Professionals	2,258	3.6	2.6
Building and Engineering Professionals	2,142	3.4	1.9
Miscellaneous Social Professionals	1,639	2.6	2.5
Computing Professionals	1,604	2.6	1.3
General Managers and Administrators	1,587	2.5	1.8
Miscellaneous Health Professionals	1,360	2.2	1.8
School Teachers	1,331	2.1	0.5
Miscellaneous Business and Administration Associate Professionals	1,022	1.6	0.3
Artists and Related Professionals	795	1.3	0.7
Miscellaneous Education Professionals	791	1.3	1.8
All other occupations	8,177	13.0	0.1
Total	62,868	100.0	0.8

Source: ABS Census of Population and Housing, 2006, customised data set

Table 2 also shows that a relatively small proportion (25.9 per cent) of the total employed doctorate population are employed in the University and Vocational Education Teachers occupation group. Data on transition rates into the higher education sector show that in 2008, around 28 per cent of PhD students and 8 per cent of Masters by Research students were employed in the higher education sector in the four months after they graduated (GCA, 2009). As noted above, there are high employment rates and a strong permeation of doctoral-qualified people throughout a range of sectors and industries in Australia. This is an encouraging trend in the context of the knowledge economy, but is also a reminder of the diverse career paths open to those with HDR qualifications and the fact that universities face strong competition for talent from non-university employers. Despite this, a better understanding of the reasons behind these trends is needed. The survey phase of this project sheds light on the factors motivating research students' choice of other professions.

2.4 Choosing an academic career: Aspiration and identity in graduate students and early-career academics

Finkelstein (1984) describes the choice to follow an academic career as being comprised of two decisions: the choice of discipline, which is generally made as an undergraduate, and then the choice of an academic career versus all other possible careers one could choose with the disciplinary credentials achieved (cited in Lindholm, 2004). The first decision is one that will have been influenced by any number of factors, ranging from personal and family interests to experiences at school, as well as by experiences during the undergraduate degree itself. The second decision is, perhaps, somewhat easier to unravel, as it is more likely to spring from mature reflection and likely to occur during the HDR experience. Recent research into the career motivations of graduate students and early-career academic staff is discussed here.

2.4.1 Picturing an academic career

While only 54 per cent of academics in Australian universities held a PhD in 1977 this had grown to 61 per cent in 2009 (DEEWR, 2009b). Although this is the norm in most disciplines there are some exceptions, particularly Law, where professional experience, rather than a PhD, is more likely to precede an academic career (Harman, 2006). For most disciplines, then, it is likely that the intent to establish an academic career will be formed during the graduate student period. Aspiring to an academic career involves imagining one's self in the roles of an academic, and what that role might be. Austin (2002, 2008) describes this process as a socialisation process that takes place within the graduate study period, introducing the graduate student to three roles simultaneously: the life of the graduate student, the life of an academic, and the norms and values of their particular field.

A small number of studies undertaken in recent years have investigated the extent to which research students aspire to an academic career. In 2005, a survey of 5,400 doctoral students in Australian universities found that 39 per cent of students had plans to work within a university on completion of their research degree (Pearson, Cumming, Evans, Mcacauley, & Ryland, 2008). This was the most common response among doctoral students, followed by responses stating 'not sure' (23 per cent of respondents). A survey of doctoral students at two Group of Eight universities carried out in 2000 (Harman, 2002, 2006) found that 34.2 per cent of respondents ideally wanted to move on to an academic appointment after completion of their studies, while 32.4 per cent ideally hoped to find a postdoctoral position: a higher rate of intent to pursue work in the university sector than was the case in the Pearson et al. study five years later. This difference may have as much to do with the different target populations of these two studies as it has to do with any decline in interest in an academic career between 2000 and 2005. However, when students in the Harman study were asked what they realistically expected after completion of their studies, the largest gap between ideal and realistic career goals was for those who had held an academic appointment as their ideal (Harman, 2002, 2006). This suggests that the paucity of opportunities available to take up an academic career is affecting the aspirations of students.

The decision to enter academia has been shown by a large number of studies to be heavily dependent on student observations of the academic staff around them. For example, in follow-up interviews to his study on postgraduate students' career plans, Harman found that while many students had planned an academic career when they first began their postgraduate studies, on observing the work of academic staff around them (e.g. the extent of their supervisor's workload), as well as the necessity to continually attract outside research funding, they had reconsidered their choice of career (Harman, 2002, 2006).

While the US, like Australia, has a 'greying' academic workforce and expects increases in student load will necessitate increased future employment of new academic staff, the academic environment is quite different from Australia's, particularly in terms of the source and level of funding for higher education, the regulatory framework in which universities operate (largely state-based) and the pedagogical norms of the PhD (incorporating larger amounts of course work, and far more likely to include a teaching role as a formal requirement). As with Australia, a number of US studies have found that graduate students learned most about faculty life by watching academics. Bieber and Worley's 2006 study of US doctoral students at three public research universities confirmed that observing staff was the primary way in which doctoral students formed an impression of what it may be like to have an academic career (Bieber & Worley, 2006). Linholm's 2004 study found that academics remembered the influence of the faculty advisor (somewhat similar to a supervisor in the Australian sense) as being the biggest influence on their decision to follow an academic career. Austin (2002) found a common theme in her interviews with graduate students was the concern that, after observing faculty, it seemed impossible for academics to 'have a life' on top of their many work commitments (Austin, 2002). Another US study by McAlpine and Amundsen (2009) also found that interaction with academics tarnishes students' image of an academic career.

International literature suggests a range of other negative perceptions of an academic career commonly held by students, including: that they will be relegated to short-term contracts with great uncertainty about whether they will be reappointed (Huisman, et al., 2002; Richlin & Essington, 2004); the intense competition for research funding (Monastersky, 2007); the fear that they will be exploited (Mills, et al., 2006) and the failure of staff to accept the impact of students' family responsibilities (Sweitzer, 2009), which June (2009) has found can mean up to 100 hours of total work per week when family duties, study, paid work and other responsibilities of adult life are taken into account. Mason, Goulden and Frasch (2009) have found that a particular deterrent for female students in the US is that they perceive the majority of female academics as being childless and conclude that an academic career would require them to sacrifice having children.

The experience of undertaking a research higher degree can in itself be off-putting, with Gardner (2008) finding that graduate study leaves many 'feeling isolated and frequently distraught', particularly in disciplines in which 'inherently isolating research' is common, such as the social sciences. Austin highlights the 'mixed messages' and 'lack of systematic and developmental' organisation in most doctoral candidatures that result in lower retention and less interest in academic careers following completion (Austin, 2008, p. 1). Portno (2009) suggests that students may assume that any lack of support they receive as graduate students is a reflection of the realities of academic life. While having role models and mentors can help to overcome some of these issues and encourage students to pursue an academic career, Fried and MacCleave (2009) find that it is rare for female students in male dominated areas to find any role models of the same gender.

On the other hand, there are attributes of an academic career that particularly attract postgraduate students. These are generally found to be the autonomous and independent nature of academic work, as well as flexibility of hours and the general nature of the university work environment (see Austin, 2002; Lindholm, 2004). Yet these positive perceptions of an academic career are in worryingly short supply in the national and international literature. As discussed in subsequent chapters, the survey designed for this particular project seeks to identify both attractors and de-motivators of an academic career.

2.4.2 Preparation for an academic career

When students do decide to follow an academic career path, how adequately does the research degree prepare them for the tasks that they will be expected to undertake? The academic profession requires a number of skills beyond teaching and research, which are unlikely to be included in the research degree experience, and for which early-career staff may be under-prepared. These include: service on university committees with a wide variety of remits; outreach activities; providing pastoral care for students; making and maintaining connections with business and government; various public roles such as contributing to public debates in the popular media; large amounts of administration; course and subject design; oversight and duty of care to employees under their direction, such as sessional staff; writing for a variety of audiences beyond the thesis examiner (for example, journal articles, popular or opinion pieces, reports to government and departmental or faculty reports); and perhaps most importantly, the writing of detailed and lengthy grant and funding applications. In her US-based research, Austin found that postgraduate students generally had a very poor understanding of the actual nature of academic life despite being such keen observers (Austin, 2002, 2008). She notes 'graduate education provides limited explicit attention to helping students understand the nature of academic careers…Opportunities to discuss and ask questions about academic work and careers are not necessarily an explicit part of the socialization experience' (Austin, 2008, p. 2). While there is limited knowledge from the Australian perspective, there is little reason to think Australian students would be better prepared in this regard than their American counterparts.

While the academic profession requires a wide and varied skill set, the focus of both initial employment and promotion criteria is very much on the applicants' research track record. Those wishing to be employed or promoted must demonstrate an ability to attract research funding, and have a strong record of publications in peer-reviewed journals (in the humanities and social sciences, monographs are also a common requirement). Establishing such a track record can be difficult for those trying to obtain a foothold in the academy. Laudel and Glaser argue that Australian universities often do not feel responsible for the period in which individuals move from the supervised research of the research student to the independent research of the early career academic, or, as they put it, during the 'transition from dependent to independent research' (Laudel & Glaser, 2008, p. 402). In science disciplines this transition is commonly undertaken during a post-doctoral position, while in the social sciences and humanities it is more usual for new academics to work as a Research Assistant or Research Fellow. Mills et al. (2006) argue that postdoctoral and fellowship positions often take new academics away from their primary research interests, making establishing a publication record in one's area of specialisation difficult.

Post-doctoral and fellowship positions can also make it difficult for new academics to establish the skills necessary for a future career with both teaching and research responsibilities, as post-doctoral positions generally involve research only, meaning that individuals' teaching skills are not improved (Horta, 2009). Edwards and Smith (2008b, 2010) among others, highlight the problem of the 'postdoc treadmill' in this regard, where early-to-mid career academics move from one postdoctoral position to the next, without gaining a foothold in a department or experiencing any teaching. As a result, the longer a person is on this treadmill, the less likely it seems that they will be able to find a full academic appointment. Glanz (1998) suggests that a lack of early career teacher training may cause some new staff to move out of university work entirely, although the introduction of Graduate Certificates of University Teaching (or similar) put in place across Australian universities in the mid 2000s has made training in teaching and learning for new academics much more accessible since Glanz's 1998 paper. Further, the focus on establishing a research track record is not a realistic preparation for the actual duties of most academic staff. For example, McInnis (2000) found that academics in Australia spend 50 per cent of their working week on activities related to teaching, even though prospects for promotion generally depend heavily on an individual's publication record.

Top institutions in the US are similarly placed to Australia in this regard. Fukami finds that in US research-intensive universities, there is a 'general disregard for teaching', demonstrated by the fact that a period of 'teaching release' is seen as the 'most prized reward' for academics (Fukami, 2007, p. 359). Such a culture means that early-career academics are under great pressure to focus on their research, often leading them to view their teaching responsibilities as a distraction (Janke & Colbeck, 2008; Solem & Foote, 2004).

2.4.3 Teacher training and professional development

Australian studies undertaken in the late 1990s found that early-career academics felt that there was a lack of support for their teaching from their departments, and that they found teaching to be a particularly difficult aspect of their work (Asmar, 1999). In his 1999 survey of Australian academics, McInnis (2000) found that approximately one-third reported receiving training in teaching from their universities, more commonly at modern institutions than sandstone ones, and that the quality of such training was variable. Since that time, Australian universities have introduced a wide range of professional development resources for staff; both informal, such as peer review of teaching (Harris, et al., 2008), and formal, as established through formal training in teaching practice such as the Graduate Certificates in Higher Education or similar training offered by all Australian universities.

Teacher training is not mandatory within the research degrees at any Australian institution. Although some universities now make it mandatory for new academics before they begin teaching (Smigiel, 2008). The most common way for graduate students to gain teaching skills is through work as tutors and demonstrators. Yet Austin makes an observation of the American doctoral experience that is equally true of the Australian one: 'while doctoral students usually undertake both teaching and research during their degrees, these roles are structured more to serve institutional or faculty needs than to ensure a high quality learning experience' (Austin, 2002, p. 95). Many Australian institutions are addressing such concerns by introducing short training courses for new tutors and demonstrators (who may or may not be research students), as well as Graduate Certificates in University Teaching (or similar) which give participants a formal qualification on completion. Other institutions have implemented internship programs for doctoral students that provide information and explanation about all facets of an academic career, including teaching (Smigiel, 2008). The extent of such practices is described in the institutional survey phase of this project.

A significant issue for Australian postgraduates interested in gaining teaching experience is the tight time-frame of the PhD. Since the introduction of the Research Training Scheme in 1999 the time-frame for a full-time PhD has been reduced from five years to four. The Australian Postgraduate Award scholarship stipend provides a living allowance for highly ranked research students for two years for masters programs and three years for PhDs (with a possible six-month extension). Meanwhile, anecdotal evidence suggests that the average length of a PhD dissertation in most study areas has increased from around 60,000 words in the 1980s to 100,000 words today. Students are also increasingly required to take generic skills courses within their studies; for example in qualitative or quantitative methods, or in writing skills workshops. If students are considering an academic career, they should also be establishing a publication record by publishing outside of their thesis during candidature. In addition, many research students are expected to present papers at conferences and seminars. While undertaking sessional tutoring work or lecturing is a valuable way of gaining teaching experience, such duties make a significant dent in the time available to fulfil the core requirements of the degree which is, after all, research. A recent UK study found that students are sometimes discouraged from taking on teaching by supervisors who argue that it 'takes time away from research' (Knottenbelt, Hounsell, & Kreber, 2009, p. 30).

The experience of research students who do undertake teaching work during their studies is poorly understood in the Australian context. This is of concern particularly in light of the relatively recent increase in focus on teaching and learning in Australian higher education, including the widespread introduction of Graduate Certificates in University Teaching and the ongoing development of an Indicator Framework for Higher Education Funding by the federal education department (DEEWR, 2009a). The extent to which research students are being offered an option to undertake teacher training and the extent to which they are actually engaging in these sort of activities has consequences for universities in increasing their capabilities in relation to teaching qualifications in the future. The present study provides a timely opportunity to better understand the stresses, constraints and benefits presented by undertaking teaching duties while studying.

However, there is much research from the US on this issue, which, again, paints a rather bleak picture. One study finds that tutors repeat poor teaching methods passed down to them by similarly untrained academic staff (Shannon, Twale, & Moore, 1998); another that tutors are often treated poorly by the departments in which they teach, but persevere in the hope that their experience will help them to gain academic jobs in the future (Papp, 2002). Janke and Colbeck contend that much of the available teacher training shows students how to reproduce lessons in a mechanistic way rather than educating them in principles and concepts of effective teaching that would enable them to learn 'creative and flexible approaches to problem solving' (2008, p. 62). Further US research suggests student teachers are rarely able to take on responsible roles that would prepare them to coordinate subjects in the future (Golde & Dore, 2001). Solem and Foote (2004, p. 907) also find that many early-career academics in the US have had little or no teaching preparation during their graduate studies and are without 'even a cursory knowledge of pedagogy and learning theory' (see also Hardre, 2005). With this background they find their heavy teaching loads to be onerous, have difficulties understanding the expectations of them (Olson, 1993) and receive little support or guidance in managing their workloads from senior staff (Anibas, et al., 2009). Moreover, if they wish to improve their teaching techniques, new academics often find they do not have the time to undertake the necessary training (Solem & Foote, 2004). Janke and Colbeck (2008, p. 113) suggest that 'unstructured or ineffective mentoring' often means that graduate students are not well prepared for their teaching roles (see also Austin, 2002). Indeed, a study of over 4000 graduate students in the US found that while the majority would spend much of their future careers teaching, their training included little on specific aspects of teaching, from pedagogy, to assessment, to mentoring (Golde & Dore, 2001). Nerad (2004) finds that this is one of the major criticisms of graduate education made by US graduate students, with many expressing a strong desire for their programmes to give them better teaching skills.

Such negative reports about teacher training from early-career academics in the US jar with other studies, such as Lindholm's, that find a ' "passion for teaching" is often a key motivator in deciding to pursue an academic career' (2004, p. 617). Solem and Foote (2004) report that those early-career academics who have gained experience in teaching as graduate students have much more positive attitudes towards their teaching than those who have not. In the US, work as a teaching assistant (TA), is often a formal part of the PhD student's training. Indeed, some colleges provide graduates with a teaching transcript as well as their academic transcript upon completing their doctoral studies (for example, through the McGraw Centre at Princeton University). It is plausible that the lack of uniformity of teaching requirements within graduate degrees across the United States' (for the most part) locally regulated higher education sector explains the variation in findings about satisfaction with teaching duties in early-career academic staff in the US.

Again, there is some disjuncture between the reports of research based on surveys and interviews, and what happens at the institutional level. For example, the Preparing Future Faculty (PFF) programme in the USA has funded 43 universities to prepare doctoral students for teaching as well as research and service (Council of Graduate Schools, 2010). European countries, including the Netherlands, Sweden and the UK have created teaching training programmes for academics (Huisman, et al., 2002). In the UK, the Higher Education Funding Council for England (HEFCE) has established 74 Centres for Excellence in Teaching and Learning at English universities, investing £315 million over the five years from 2005/06 to 2009/10 (HEFCE, 2010). This disjuncture between a lack of support for teaching reported by students, and widespread evidence of the availability of such support may be due to a number of factors: students may be aware of such support but consider it inadequate; they may have such support available but be unaware of it; or they may be at an institution that does not offer teaching support.

An important aim of the present study is to discover how much teaching support (whether formal training or client-based programs) is available at Australian universities, to what degree Australian students are aware of the teaching support available to them, and to what extent students undertake the training available to them.

2.5 Conclusion

The primary aim of this literature review has been to assist in the formation of the NRSS survey instrument that forms the basis of this project. The literature review raises a number of key issues for consideration. These fall under the broad headings of: the effect of the local professional setting on students' aspirations and perceptions; perceptions of academic work; the formation of plans for work after graduation; the effect of the research student experience on career intentions; students' prior experience of tutoring, lecturing and demonstrating; and, the availability of teaching support and professional development in Australian universities. These issues are addressed throughout the analysis and discussion of the research findings from this report.

3 NRSS Respondent Characteristics

3.1 Introduction

This chapter examines the basic characteristics of the response sample from the NRSS. A total of 11,710 valid responses to the NRSS were received in the three weeks of the survey administration. This response yield represents 25.5 per cent of the target population for the survey (Appendix A provides further details relating to response rates and the methods followed in this project). These responses have been weighted to reduce instances of sample bias and these weighted figures have been used in the majority of analyses in this report, although in the tables in this chapter, both the non-weighted and the weighted figures are displayed. More information relating to the weighted figures and a detailed comparison with the raw and the target population figures is provided in Appendix D.

3.2 Respondent characteristics

Analysis of the respondent characteristics in comparison with the characteristics of the target population shows that the secured response sample provides a close representation of the target population (detailed further in Appendix D). The section below examines the respondent characteristics, detailing response frequencies and distribution as well as weighted proportions.

The demographic characteristics of the NRSS sample displayed in Table 3 show that more females than males responded to the survey, although following weighting, this imbalance was rectified (see Appendix D for more discussion). Nearly half of the respondents are aged between 25 and 34, although a reasonable number of more mature-aged students are present in the sample. The majority of respondents speak English as their main language, and most are citizens of Australia. A small group of research students identified as being of Aboriginal or Torres Strait Islander descent. The sample included respondents from all Australian states and territories.

Table 3: Demographic characteristics, NRSS respondents

Characteristic		NRSS Responses		NRSS weighted	
		Count	*Per cent*	*Count*	*Per cent*
Sex	Male	4,224	42.0%	22,681	48.3%
	Female	5,830	58.0%	24,260	51.7%
Age	Less than 20	17	0.2%	71	0.2%
	20-24	1,187	11.8%	5,567	12.0%
	25-29	2,827	28.2%	13,299	28.4%
	30-34	1,757	17.4%	8,331	17.8%
	35-39	1,231	12.3%	5,852	12.5%
	40-44	839	8.4%	3,802	8.1%
	45-49	752	7.5%	3,486	7.4%
	50-59	1,045	10.4%	4,632	9.9%
	60-69	303	3.0%	1,453	3.1%
	70 and above	65	0.6%	322	0.7%
Indigenous status	Not Aboriginal or Torres Strait Islander	9,957	99.4%	46,508	99.5%
	Aboriginal or Torres Strait Islander	63	0.6%	231	0.5%
Main language spoken at home	English	7,192	80.1%	33,206	82.3%
	Language other than English	1,789	19.9%	7,120	17.7%
Main country of citizenship	Australia	6,704	67.0%	30,797	65.9%
	New Zealand	210	2.1%	1,046	2.2%
	Elsewhere	3,090	30.9%	14,864	31.8%
State of current residence	New South Wales	3,405	35.7%	13,788	30.9%
	Victoria	2,289	24.0%	13,281	29.8%
	Queensland	1,485	15.6%	8,111	18.2%
	South Australia	981	10.3%	3,311	7.4%
	Western Australia	937	9.8%	4,346	9.7%
	Tasmania	219	2.3%	977	2.2%
	Northern Territory	55	0.6%	197	0.4%
	Australian Capital Territory	167	1.8%	595	1.3%
Total		11,710	100.0%	53,480	100.0%

Table 4 provides an overview of some of the key characteristics of respondent backgrounds. These characteristics can be used as a proxy for socioeconomic status and provide insight into the potential influences of parents and places of origin on respondents. A notable proportion of respondents had a parent who had a university-level qualification. In addition, nearly one-quarter of this population have a member of their immediate family who has worked in a university as an academic; an interesting finding in itself. The majority of students grew up in a capital city and few were raised in areas of low socioeconomic status (SES).[1]

Table 4: Background characteristics, NRSS respondents

Variable		NRSS Responses		NRSS weighted	
		Count	*Per cent*	*Count*	*Per cent*
Father's highest level of education	No school or primary school	616	6.1%	2,972	6.3%
	Some secondary school	1,823	18.2%	8,336	17.8%
	Completed secondary school	1,448	14.4%	6,751	14.4%
	Vocational certificate or diploma	1,670	16.6%	7,635	16.3%
	Undergraduate university degree or diploma	2,453	24.4%	11,541	24.6%
	Postgraduate university degree or diploma	1,787	17.8%	8,522	18.2%
	Not sure	168	1.7%	782	1.7%
	Not applicable	74	0.7%	324	0.7%
Mother's highest level of education	No school or primary school	742	7.4%	3,574	7.6%
	Some secondary school	2,033	20.3%	9,375	20.0%
	Completed secondary school	1,962	19.6%	9,329	19.9%
	Vocational certificate or diploma	1,751	17.5%	8,037	17.2%
	Undergraduate university degree or diploma	2,234	22.3%	10,334	22.1%
	Postgraduate university degree or diploma	1,112	11.1%	5,198	11.1%
	Not sure	134	1.3%	677	1.4%
	Not applicable	61	0.6%	271	0.6%
Immediate family member has worked as an academic	No	7,644	76.2%	35,623	76.1%
	Yes	2,381	23.8%	11,200	23.9%
Type of area where grew up	Isolated or remote area	131	1.3%	593	1.3%
	Rural or country area	1,580	15.8%	7,281	15.6%
	Regional or provincial town	2,696	26.9%	12,546	26.8%
	Capital city	5,140	51.3%	24,089	51.5%
	Overseas	473	4.7%	2,285	4.9%
SES of area where grew up (using postcodes ranked according to the educational and occupational characteristics of residents based on ABS Socioeconomic Indexes for Areas)	Lowest quartile	882	15.1%	3,970	14.7%
	Middle 50 per cent	2,374	40.7%	10,997	40.7%
	Highest quartile	2,101	36.0%	9,766	36.1%
	Grew up overseas	473	8.1%	2,285	8.5%
Main activity in year before beginning research degree	Undergraduate university study (excluding honours)	366	3.4%	1,799	3.6%
	Honours at university	2,179	20.3%	10,130	20.4%
	Postgraduate university study	1,780	16.6%	8,075	16.2%
	Vocational education and training (VET)	41	0.4%	199	0.4%
	Full-time employment	4,887	45.5%	22,667	45.6%
	Part-time or casual employment	1,051	9.8%	4,785	9.6%
	Looking for work	100	0.9%	475	1.0%
	Caring for family	167	1.6%	718	1.4%
	Travelling	129	1.2%	591	1.2%
	Other	49	0.5%	271	0.5%
Total		11,710	100.0%	53,480	100.0%

[1] SES has been derived from the postcode of where students lived at the end of their primary school years. The ABS Socioeconomic Indexes for Areas (SEIFA) Index of Education and Occupation has been used in this calculation.

The activities of research students before commencing their current qualification indicate a diversity of experiences and pathways into the HDR qualification. Almost half (45 per cent) were in full-time work before they began their research degree. A further 10 per cent indicated their 'main activity' was part-time or casual work. About one-quarter of respondents were in undergraduate study and 17 per cent in postgraduate study in the year before commencing their research degree.

In Table 5, some of the key characteristics relating to the enrolment status of respondents are detailed. The vast majority of respondents were enrolled in a doctorate by research degree. Nearly three-quarters were enrolled full-time. About one-quarter of respondents indicated they were international students and two-thirds of all respondents were on some kind of scholarship for their studies. Respondents came from a range of fields of education, with Society and Culture, Health and the sciences being the most common. The weighting of the sample has resulted in a slight adjustment in a couple of these fields to account for sample bias. Further detail of this is presented in Appendix D.

Almost one-quarter of respondents indicated they were in the early part of their candidature, while about one-third were either nearing the end, about to submit, or awaiting examination of their thesis. This good spread across the time-span of the candidature has allowed for an interesting analysis of many of the responses in the NRSS.

A substantial share of respondents (43 per cent) spend most of their study time in a shared office at an assigned desk at their university, while more than 30 per cent indicated they primarily undertake their study for their research degree at home. Other students have different arrangements with on-campus office space or undertake their studies at work or a research institute outside the university.

Table 5: Education characteristics, NRSS respondents

Variable		NRSS Responses		NRSS weighted	
		Count	*Per cent*	*Count*	*Per cent*
Qualification	Doctorate by research (PhD)	8,710	86.5%	40,133	85.4%
	Masters by research	1,282	12.7%	6,529	13.9%
	Professional doctorate (mainly coursework)	76	0.8%	358	0.8%
Broad field of education	Natural and physical sciences	1,719	17.1%	8,787	18.7%
	Information technology	448	4.5%	1,855	4.0%
	Engineering and related technologies	1,038	10.3%	5,792	12.3%
	Architecture and building	125	1.2%	677	1.4%
	Agriculture, environmental and related studies	566	5.6%	2,159	4.6%
	Health	1,997	19.9%	7,492	16.0%
	Education	920	9.2%	3,581	7.6%
	Management and commerce	600	6.0%	3,238	6.9%
	Society and culture	2,011	20.0%	10,342	22.1%
	Creative arts	605	6.0%	2,963	6.3%
	Food, hospitality and personal services	17	0.2%	17	0.0%
Enrolment type	Part-time	2,557	25.4%	11,781	25.1%
	Full-time	7,492	74.6%	35,138	74.9%
Student type	Domestic	7,564	75.5%	34,877	74.5%
	International	2,460	24.5%	11,959	25.5%
Scholarship student?	No	3,345	33.3%	15,456	32.9%
	Yes	6,699	66.7%	31,465	67.1%
Current timeframe of candidature	Just starting	2,377	23.7%	11,113	23.7%
	Part way through	2,218	22.1%	10,527	22.4%
	About half way through	2,014	20.1%	9,125	19.5%
	Nearing the finish	2,463	24.5%	11,525	24.6%
	About to submit my thesis	664	6.6%	3,133	6.7%
	Submitted thesis and awaiting examination	270	2.7%	1,297	2.8%
	Candidature lapsed	34	0.3%	174	0.4%
Main study location	At my university in a private office provided to me as a research student	1,084	10.8%	5,200	11.1%
	At a computer or desk assigned to me in a shared office at my university	4,326	43.1%	20,663	44.1%
	In a shared computer lab / office / library at my university in which no computer or desk is assigned to me	450	4.5%	2,029	4.3%
	At my university in an office which I use for paid university work	321	3.2%	1,348	2.9%
	At home	3,116	31.0%	14,298	30.5%
	At work outside the university	534	5.3%	2,423	5.2%
	External research institute	144	1.4%	626	1.3%
	Elsewhere	70	0.7%	318	0.7%
Total		11,710	100.0%	53,480	100.0%

In order to reduce sample bias and provide the most accurate full population analysis possible (ACER, 2007; Coates & Edwards, 2009), the results for the remaining analyses in this report are based on the weighted NRSS sample rather than the raw response numbers. The tables above and the details in Appendix D provide a reference point for these weighted responses, the survey response numbers and the target population.

The following three chapters give a detailed overview of the findings of the NRSS: the career aspirations and motivations of students (Chapter 4), experiences of the research degree (Chapter 5) and training for university teaching (Chapter 6). A succinct analysis of important themes and key issues arising from these findings is provided in the Discussion section concluding the main body of the report.

4 Career Aspirations and Motivations

4.1 Introduction

One of the core aims of this study is to examine the career intentions of current research students, with a particular focus on the extent to which they have an interest in pursuing an academic career on completion of their degree. A number of items were developed in the NRSS to examine the future career intentions of research students in Australia. In addition to questions asking directly about intentions, the instrument included questions designed to probe the motivations underlying these intentions by uncovering which aspects of an academic career are particularly attractive or unattractive to research students.

The analysis in this section begins by looking at the career aspirations of research students, both broadly and at sub-group level. A more focused examination of the expectations follows, including the motivations and opinions of those who are interested in pursuing an academic career. For those with no interest in academia, further exploration of the types of work students aspire to is carried out. The opinions of this group in relation to work in the academic profession are also examined in order to gauge what makes other career options more attractive than an academic one.

From a workforce planning perspective, the key findings in this chapter are:

- More than half of all research students in Australia aspire to follow an academic career in the medium- to long-term;
- The majority of research students see that an ideal academic position would involve a balance of teaching and research responsibilities;
- There is a notable gap between students' 'ideal' and 'realistic' expectations of gaining an academic position following graduation;
- There is an important group of research students, representing 18 per cent of respondents, who would ideally like to move into an academic career on completion of the HDR, but do not think that this is a realistic option;
- This gap varies by fields of education with creative arts, education, agriculture, health and society and culture having the largest gap between ideal and realistic intentions;
- The results suggest that those students who feel they will miss out on their ideal of academia make a pragmatic decision to pursue careers in either research work outside a university or non-research professional jobs despite these not being their ideal choice;
- Participants with academic career plans indicate that the most positive influences on their decision to follow this pathway have come from observing their supervisors and undertaking paid teaching or research work.;
- Around 40 per cent of all research students expect to be working outside of Australia in the medium- to long-term. Of the range of career options canvassed with students, those who aspire to an academic career are the most likely to expect that their medium- to long-term career will take place outside of Australia;
- In comparison with other career possibilities, an academic career is viewed by research students (regardless of their future career plans) as favourable on a number of key factors such as development of new knowledge, interest and challenge, and job satisfaction;
- Opinions about the availability of academic positions were strikingly negative, regardless of whether or not participants were considering an academic career; and
- Among those who intend to follow a career outside the university sector, the majority intend to pursue work that is closely related to their research degree.

4.2 Career intentions

The vast majority of students surveyed, 83 per cent, indicated that they had seriously considered an academic career at some point. This is an interesting and important finding, because it shows that the pool of potential academics is large. However, the reality of whether this 'serious' consideration actually translates into something concrete in the career plans of these students is another matter.

Participants were asked about their career intentions based on three considerations – what they would ideally like to do in the year after completing their degree, what they realistically expect they will do in the year following completion and what career they plan to pursue in the medium- to long-term.[2] The extent to which students indicated a desire to follow an academic career pathway, in any of these three scenarios was substantially lower than the 83 per cent indicating they had seriously considered an academic career more generally. A total of 62.8 per cent indicated that they ideally wanted to follow an academic pathway in the year following completion of their degree, and 54.1 per cent saw this as a medium- to long-term prospect (Figure 7).

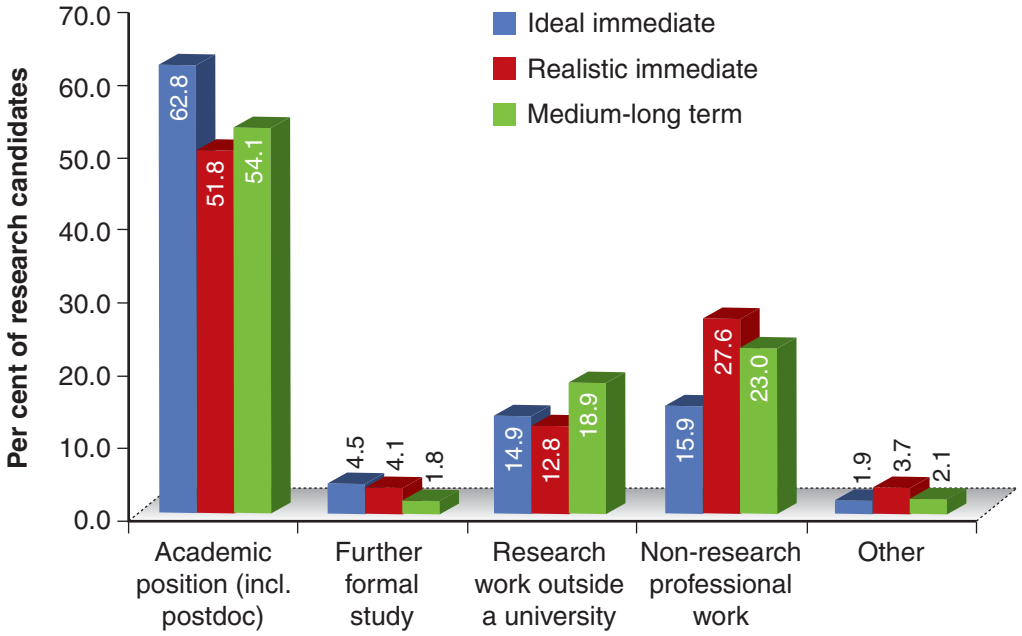


Figure 7: Career aspirations of research students

4.2.1 Short term intentions

Figure 7 displays the response distribution of research students for a range of career options based on ideal, realistic and medium- to long-term expectations. Comparing the ideal with the realistic responses provides an interesting insight into attitudes towards career prospects. While 62.8 per cent of students indicate they would ideally like to move straight into an academic job after completing their research degree, only 51.8 per cent believe this to be a realistic goal. The findings show that when it comes to realistic expectations for initial work after a research degree, about 10 per cent of respondents believe an academic appointment to be desirable but unrealistic.

Reflecting students' perceptions that academic jobs are not an option immediately after graduation, more students expect to end up in a non-research professional jobs than those who would ideally want to work in those jobs. This suggests that non-research professional jobs are seen as the most realistic alternative to the ideal of academic work.

An intention to enter further formal study is harboured in the immediate term by a small but notable percentage of research students – most of these are masters by research students, presumably planning on enrolling in a PhD following submission of their masters thesis, or converting to PhD status.

4.2.2 Medium- to long-term intentions

While respondents' immediate expectations regarding work are of importance, and the 'ideal versus real' scenarios offer an insight into the tension between desire and expectation, the medium- to long-term career ambitions of research students are perhaps of most relevance and importance to practical planning for the future academic workforce in Australia.

[2] Medium- to long-term is defined for respondents as five to seven years after completion of research degree.

The distribution of career plans is represented in the third (green) bar in Figure 7. They show that more than half (54.1 per cent) of all current research students have plans to establish a career in the academic sphere in the five to seven years following the submission of their thesis. This is by far the most commonly chosen career pathway of students. A further 23 per cent plan to pursue non-research work in a professional occupation, while 18.9 per cent intend on following a research career, but outside the university sector.

Comparing the ideal career plans of students to their medium- to long-term plans shows that nearly one-quarter (23 per cent) of those students who ideally would like to enter an academic career do not see themselves as being in this occupation in the medium- to long-term. Most of those students who expect to miss out on their ideal of an academic career instead aim to pursue either research work outside a university or non-research professional jobs. This suggests that some students are making a pragmatic decision to pursue careers outside of academia despite these careers not being their ideal choice.

While the proportion of students expecting to pursue an academic career in the medium- to long-term is smaller than those who would ideally plan to enter such an occupation immediately after completing their degree, it is still a relatively large proportion. This broad result is in keeping with the findings based on a couple of Group of Eight institutions by Harman in 2000 (2002, 2006), but is higher than that identified in the small national study by Pearson et al. in 2005 (2008).

Interestingly, when these analyses are conducted according to student's stage of candidature (i.e. 'just beginning', 'about to submit thesis', etc.) there are no notable patterns of difference apparent from the overall trend noted here. This is an important finding as it conflicts with other, mostly US, studies discussed in the literature review that indicate that the HDR experience tends to deter students from pursuing an academic career. Clearly, for the students surveyed, disincentives to an academic career lie *outside* of the HDR experience.

Overall, the findings discussed above indicate that there is strong interest amongst research students in pursuing an academic career. This strong interest provides an opportunity to foster a robust and vibrant academic workforce into the future in Australia.

Examining the medium- to long-term career aspirations of students in more detail, Figure 8 provides a breakdown of intended career paths for PhD and masters by research students. For those interested in pursuing an academic career, the flow chart provides further detail relating to the type of academic position aspired to. The outcomes show different patterns in pathways intended for students undertaking these two qualifications. As can be seen, PhD students are more likely than masters by research students to have some intention to enter the academic workforce. The most popular of these basic pathways among the masters by research students was a non-research professional career.

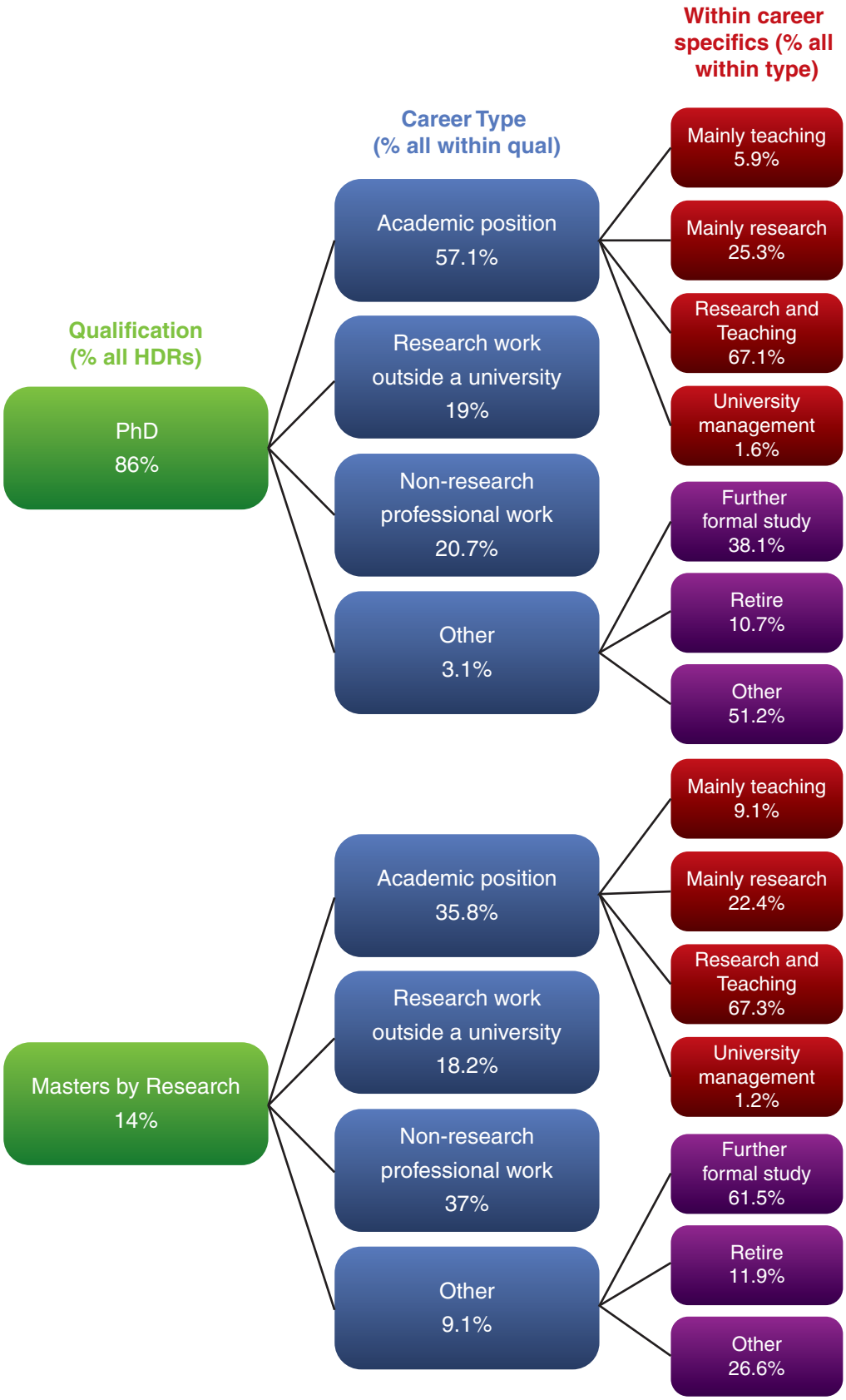


Figure 8: Medium- to long-term career intentions for research students

The unweighted distribution of these academic aspirants is shown in Figure 9. Importantly, the largest numbers of those with academic career plans are in the younger age brackets, with nearly 60 per cent of the total currently being aged under 35 years. About 11 per cent, or 2,800 of these students are aged over 50 and would therefore have a shorter potential period within the workforce if they pursued this plan. In terms of the future generation of academics in Australia (i.e. from 2020 onwards), realistically the bulk will come from those in the younger age brackets.

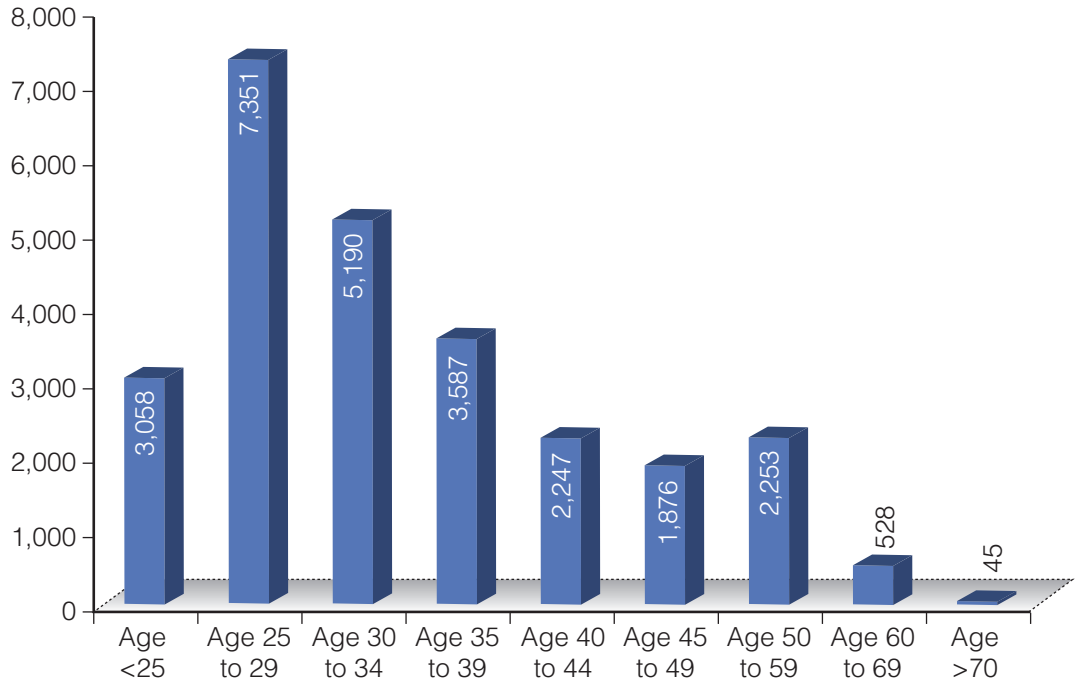


Figure 9: Estimated number of current research students who plan to enter academic workforce in medium- to long-term, by age

4.2.3 Work destinations – Australia and overseas

While the initial findings show that Australia has a healthily sized proportion of research students intending to pursue an academic career many of these students anticipate they will end up overseas following graduation. Table 6 illustrates the extent to which research students expect to remain in Australia after completion of their research degree. While the NRSS provides information on the intentions of research students to move overseas it does not measure actual movements and did not investigate whether students wish to move overseas on a temporary or permanent basis. Looking broadly at respondents' immediate 'ideal' and immediate 'realistic' expectations, it is interesting to see that while three quarters of research students expect realistically that they will be located in Australia in the year immediately following the completion of their degree only 64.9 per cent think that being located in Australia would be ideal. This equates to about 23 per cent of those who expect to remain in Australia would prefer to be elsewhere.

In the context of the medium- to long-term plans, 60 per cent of research students expect to remain in Australia. Those with plans to be in an academic position are the least likely of the cohorts examined here to expect that they will remain in Australia (56.8 per cent). However, the intentions to stay in Australia are also quite low for those planning to enter research work outside of a university (57.7 per cent). This trend is also present in the more immediate term categories.

Table 6: Region of work anticipated by type of work

	Australia	Overseas	Total
Ideal immediate			
Academic position (incl postdoc)	63.4	36.6	100.0
Further formal study	69.6	30.4	100.0
Research work outside a university	63.4	36.6	100.0
Non-research professional work	71.6	28.4	100.0
Other	56.1	43.9	100.0
Total	64.9	35.1	100.0
Realistic immediate			
Academic position (incl postdoc)	69.3	30.7	100.0
Further formal study	83.7	16.3	100.0
Research work outside a university	77.4	22.6	100.0
Non-research professional work	82.9	17.1	100.0
Other	84.7	15.3	100.0
Total	75.2	24.8	100.0
Medium-long term			
Academic position (incl postdoc)	56.8	43.2	100.0
Further formal study	57.7	42.3	100.0
Research work outside a university	57.7	42.3	100.0
Non-research professional work	67.9	32.1	100.0
Other	78.4	21.6	100.0
Total	60.0	40.0	100.0

This desire to work overseas both in the immediate and medium- to long-term perhaps reflects the global nature of the academic and research workforces. As noted in Chapter 2, Australia is currently a net importer of academics with more academics coming to work here than we are losing to other countries (Hugo, 2008). Australia benefits from these inflows of highly educated immigrants as they bring knowledge and global ties into our workforce. These flows in and out of Australia are also important for the diffusion of knowledge. While the propensity of Australia research students to work overseas does reduce the size of the potential academic and research workforce within Australia, the Australian workforce and economy benefit from the knowledge sharing undertaken by these workers. Greater flows between countries are also likely to increase the collaboration between academics and universities.

Given this survey asked students to consider where they will be working in five to seven years, it is not clear from this data whether these research students are part of a long term 'brain drain' from Australia. However, it is apparent that the intention to work overseas is relatively similar for both the students who intend to pursue an academic career and those who intend to pursue research work outside of a university. This suggests that the desire to work overseas is not necessarily limited to those pursuing academic careers and may reflect working conditions and attractiveness of research careers more broadly.

While at the aggregate level Australia is a net importer of academics, there is little or no evidence to ascertain which graduates Australia is losing to these overseas markets and which academics are migrating here. For example, some fields of education may be losing a disproportionate number of academics who are not being replaced by immigration. Therefore, it is possible that there are gaps in the workforce where more academics are being lost than gained and these aggregate figures are hiding this information. Hugo (2008) shows that the origins of immigrating academics has changed over the past ten years with Asia now accounting for 45.5 per cent of total permanent arrivals and more traditional sources (New Zealand, the United Kingdom, the United States and Other Europe) becoming less significant. The flows of migration by field of education, however, are unclear and this leads to the question of whether some fields are losing more academics than they are gaining. Whether disproportionate losses in some fields of education are a problem will be dependent on the demand for the academics in the fields. Without this information, however, it is not possible to determine whether there are gaps in the academic workforce that are not being filled by equivalent inflows of migrants.

The NRSS responses enable us to examine the intentions of students to pursue academic work overseas in the medium- to long-term and thus provide an indication of at least one dimension of the issue outlined in the discussion above. As shown in Figure 10, there is some variation between the fields of education among those planning to pursue an academic career in relation to the location they would like to be based. Students from the health field were the least likely to be intending to pursue academic work overseas (34.3 per cent of aspiring academics thought they would be working outside Australia in five to seven years). Those studying in the fields of management and commerce, engineering, and information technology were the most likely to indicate intention to pursue academic work overseas.

This analysis provides some insight into this important issue, but as the discussion above suggests, the 'brain-drain versus brain-gain' issue is one which requires further investigation and insight in order to build a more comprehensive picture of the academic workforce flow in Australia and beyond.

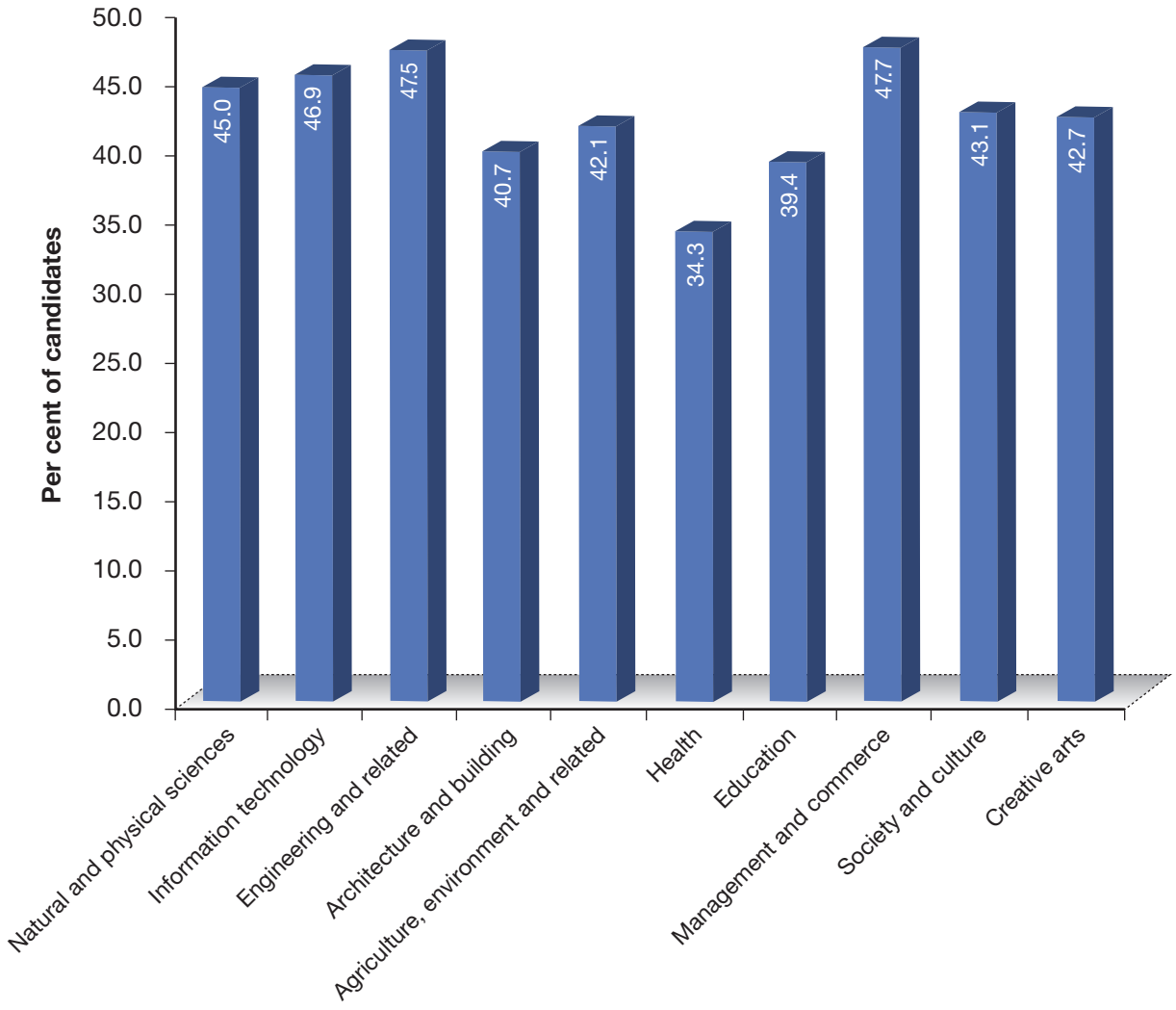


Figure 10: HDR Students with medium- to long-term ambition for academic work who intend to pursue this work overseas, by field

Examining students' reasons for wanting to work overseas allows us to see what might attract them back to Australia in the event that they move overseas. The most prominent reason students give for going overseas is the perception of greater job opportunities and career advancement overseas (40 per cent see this as the most important reason for their choice to go overseas). Other reasons include the existence of 'academic connections' (25 per cent) and lifestyle reasons (18 per cent). It is interesting to note that 'higher salary' was not chosen by many as the most prominent reason for moving overseas.

Some of these reasons indicate that students believe that spending an amount of time overseas will help them progress in their career. This may reflect a lack of prospects in Australia. On the other hand, it may also indicate that spending part of an academic or research career overseas will assist in these students' career progression through broadening their experience and networks. It may be that students intend to spend part of their career overseas in order to gain experience and connections before returning to Australia. Given the relatively short term nature of the intentions recorded by the NRSS it is not clear whether these students intend to stay overseas in the long term or whether it will be possible to attract them back to Australia later down the track.

4.2.4 International students and future work destinations

The responses of international students in terms of remaining in Australia for work in the immediate and medium- to long-term are displayed in Figure 11. As shown in Table 5, the NRSS represents a large collection of data from the international research student cohort, with 2,460 of international students completing the survey. The outcomes from the NRSS show that ideally, most international students are interested in remaining in Australia to work in the year immediately after graduation (Figure 11). Importantly, this aspiration is most strongly felt by international students who plan to follow an academic career.

When it comes to realistic expectations, fewer of these students think they will remain in Australia (Figure 11). However, across this cohort about 45 per cent still believe they will work in Australia in the year following graduation.

In terms of the medium- to long-term, the proportion of international research students intending to remain in Australia to work reduces, with just under one-third (31.5 per cent) retaining these plans (Figure 11). Among the three main types of work examined here, the difference here is relatively small.

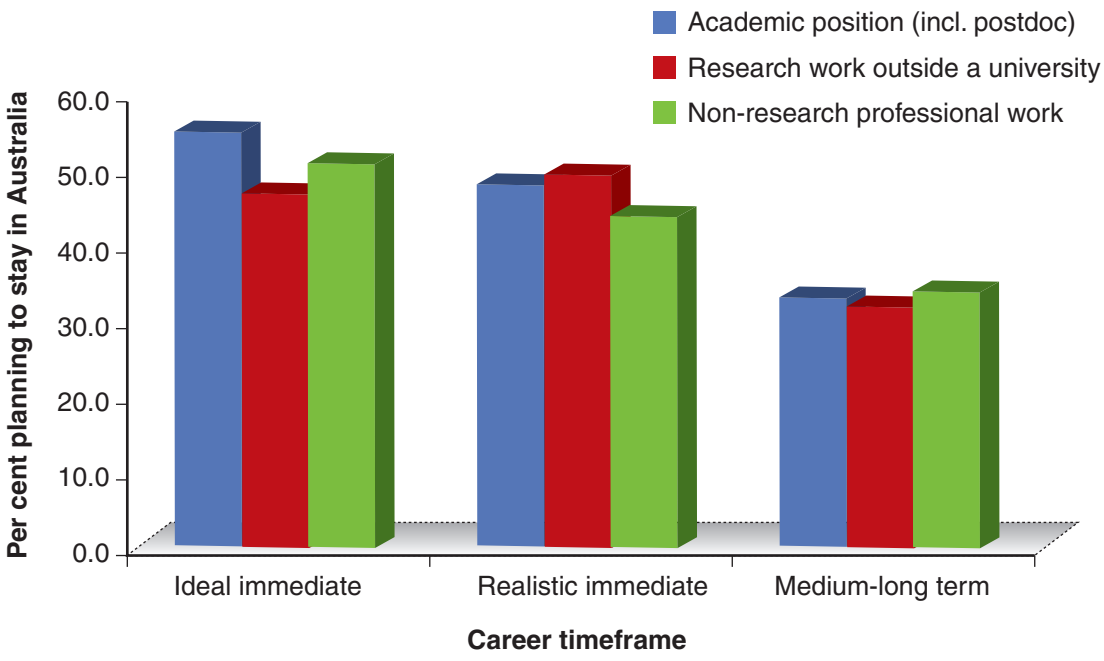


Figure 11: Proportion of international research students expecting to work in Australia, by intended work type and timeframe

In general, these findings reflect other studies of the international research student cohort undertaken in recent times such as the International Postgraduate Research Scholarships (IPRS) Program Evaluation (DIISR, 2010a) and the Graduate Destinations Survey (GDS) as analysed by Edwards et al. (2009). The IPRS evaluation, which involved a survey of about 450 international students who hold research scholarships, found that about two-thirds of these students intended to remain in Australia in the immediate-term following graduation, while about 40 per cent intended to remain working in Australia in the longer term. Data relating to actual movement of international students (Edwards, Radloff & Coates, 2009) shows that in the period immediately following graduation, about half of all international PhD students and about three-quarters of masters by research students remain working in Australia.

However, when compared with the responses of domestic students, as is to be expected the differences in desire to remain in Australia for work among students who intend to pursue an academic career are notable. Figure 12 shows that domestic students with aspirations to follow an academic career are much more likely than their international student counterparts to expect they will be working within Australia either immediately following graduation or in the medium- to long-term. Interestingly though, for international students, the proportion who would ideally like to work in Australia (53.9 per cent) is higher than the proportion who realistically expect to do so (46 per cent), while the result is the opposite among the domestic cohort.

Overall, these findings relating to international student plans for future work are promising because they show that there is interest in pursuing research in Australia and there is a relatively solid cohort of this group who intend to stay. As with the domestic cohort, when it comes to ensuring these students do pursue research careers (especially in academia) within Australia, a key task is to ensure these jobs are attractive.

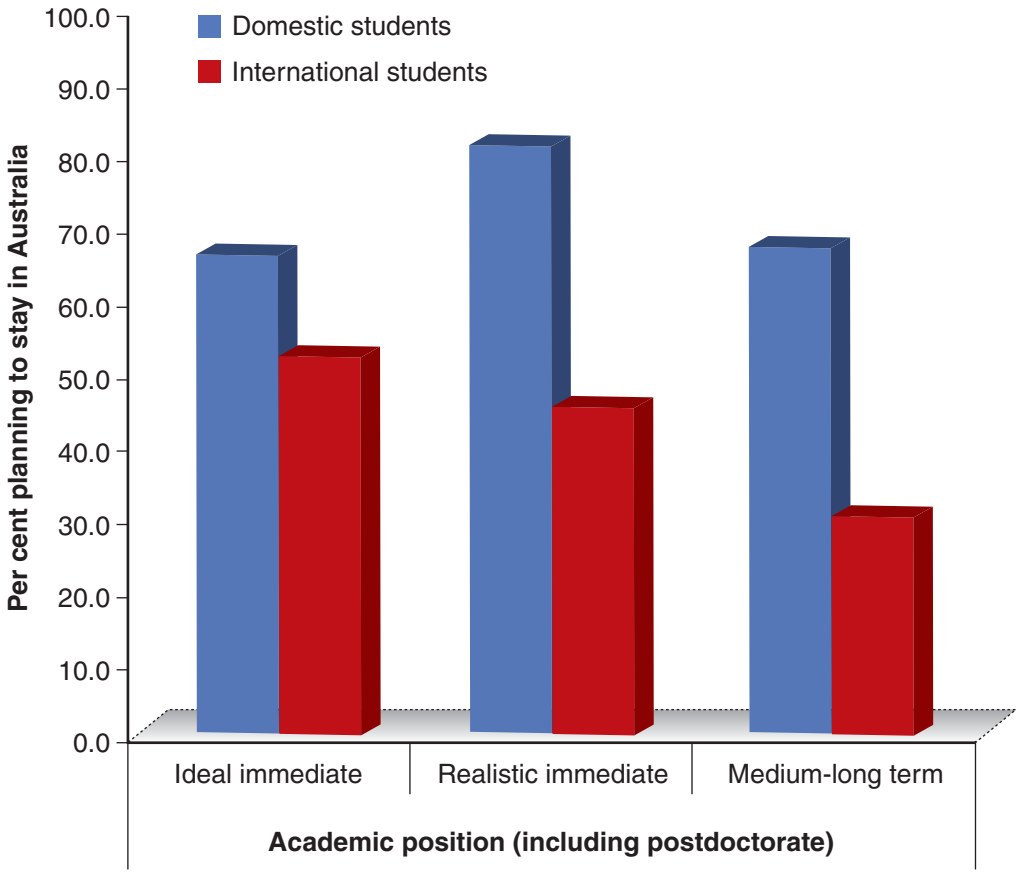


Figure 12: Proportion of research students that are expecting to work in Australia by student type and timeframe – students who indicated intention for Academic work only

4.2.5 Differences between 'ideal' and 'realistic' career ambitions

Career intentions in relation to following an academic career vary among students depending on the field in which they are studying. Figure 13 examines the expectations of work immediately after completion of degree for each broad field of education, showing the proportion of students who would ideally like to enter an academic position upon graduation and who realistically think that it is likely. Overall, students from the management and commerce field appear the most interested in an academic career, although in seven of the ten broad fields shown here, more than 60 per cent of students indicated a preference for an academic career.

The most interesting finding illustrated by Figure 13 lies in the difference between ideal and realistic expectations among the fields of study. There are notable variations in the gap between the ideal and the perceived reality of an academic career. The size of this gap shows the extent to which students believe aspirations to an academic career to be unrealistic, and therein the fields of study where career stress is highest.[3]

Particularly large gaps between respondents' ideal of an academic career and their realistic expectations are apparent in health and education: areas of key policy importance. This suggests that while students in these areas have a desire to enter academia, a large proportion of them believe this is not a realistic outcome immediately after graduation. Similarly in society and culture (the largest field), entry into academic work on completion of the research degree was indicated as an ideal by 68 per cent of students, but perceived to be realistic by only 51 per cent, a sizeable gap of 17 percentage points. However, in the second largest field, natural and physical sciences, the gap between ambition and reality is much smaller, with 63 per cent indicating an academic position would be ideal and 57 per cent thinking it is realistic – a six percentage point difference.

Thus while a larger proportion of society and culture students appear to be genuinely more interested in an academic career than science students, the science students are notably more likely to feel that entering such a career immediately after graduation will actually happen. The greatest gap between ideal and expectation was among creative arts students, of whom 59 per cent indicate a preference for immediately entering academic work, while only 34 per cent see this as being realistic – a 24 percentage point difference.

[3] Statistical testing on this analysis has shown that all of the differences noted here are statistically significant except for those in the architecture and building field, for which the margin of error is large enough to suggest caution in interpretation.

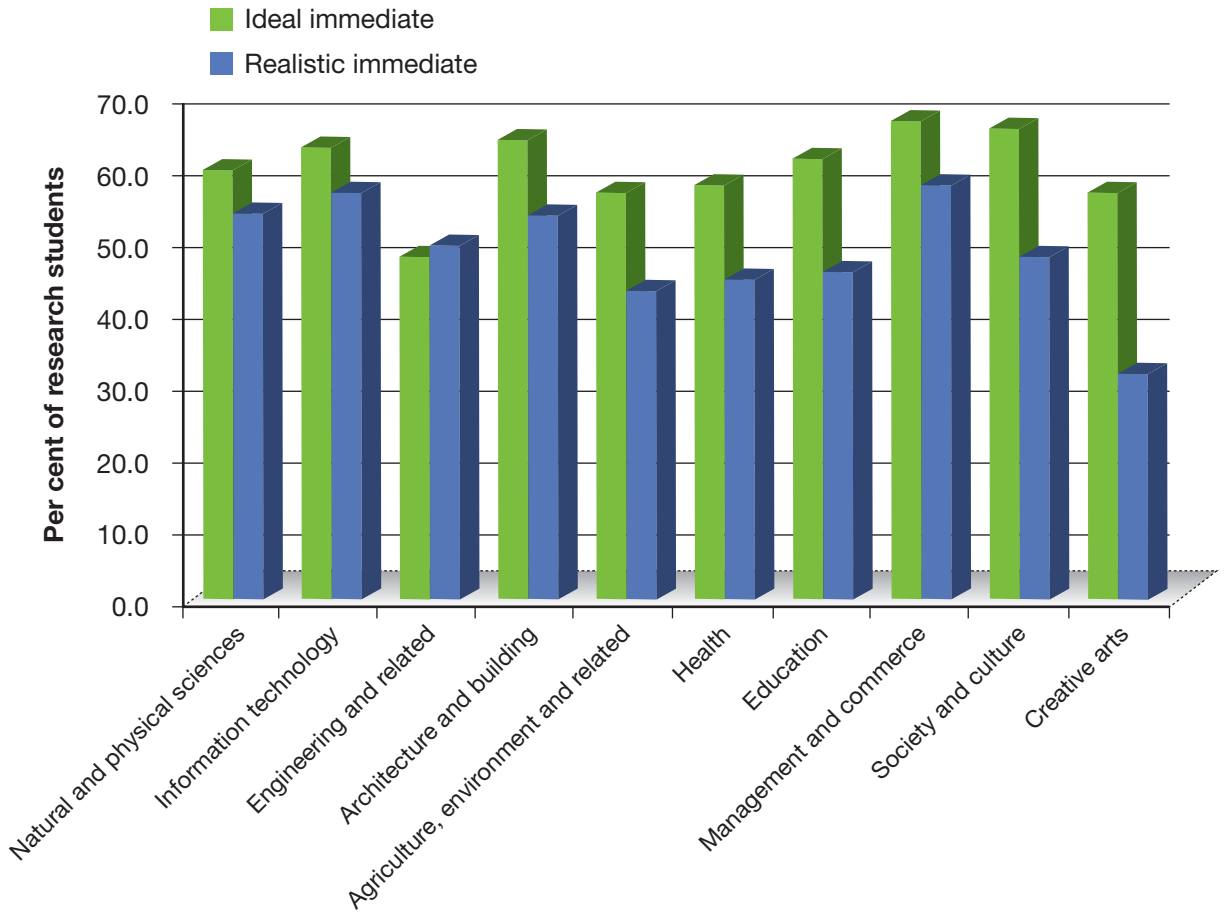


Figure 13: Proportion of research students who indicated intention towards Academic work by field of education

Taking this analysis further, to examine only the responses of students who ideally would like to enter the academic workforce once they have completed their degree, Figure 14 shows that across the disciplines a relatively high proportion of those with their mind set on immediately entering an academic career also realistically believe that they will end up in such a position in the year following graduation. Management and commerce students are most positive in this regard, with 80.2 per cent of the academic aspirants indicating that their aspiration is realistic. About three-quarters of those studying in the fields of science, information technology, engineering and architecture also think that aiming for an academic career is both ideal and realistic.

However, across the whole cohort, 29.2 per cent of those who indicate that an academic career is their ideal pathway following graduation do not tend to think this is a realistic goal. Of most concern are among the fields in which the proportions in Figure 14 are lowest. Among creative arts students who would like to be an academic immediately after graduation, almost half (48.6 per cent) believe this is unlikely and have an alternative 'realistic' goal. The findings for education, agriculture, health, and society and culture students are also significantly lower than for other fields, with about one-third of all academic career aspirants not believing this to be a realistic proposition.

In this regard, education, agriculture, and society and culture are of particular concern because these three fields currently have some of the oldest academic workforces currently (see Table 1). If students who ideally want to enter the academe in these fields are not confident they will realistically find a position and instead pursue work outside the university, then an ample opportunity to rejuvenate the workforce in these areas is potentially being missed.

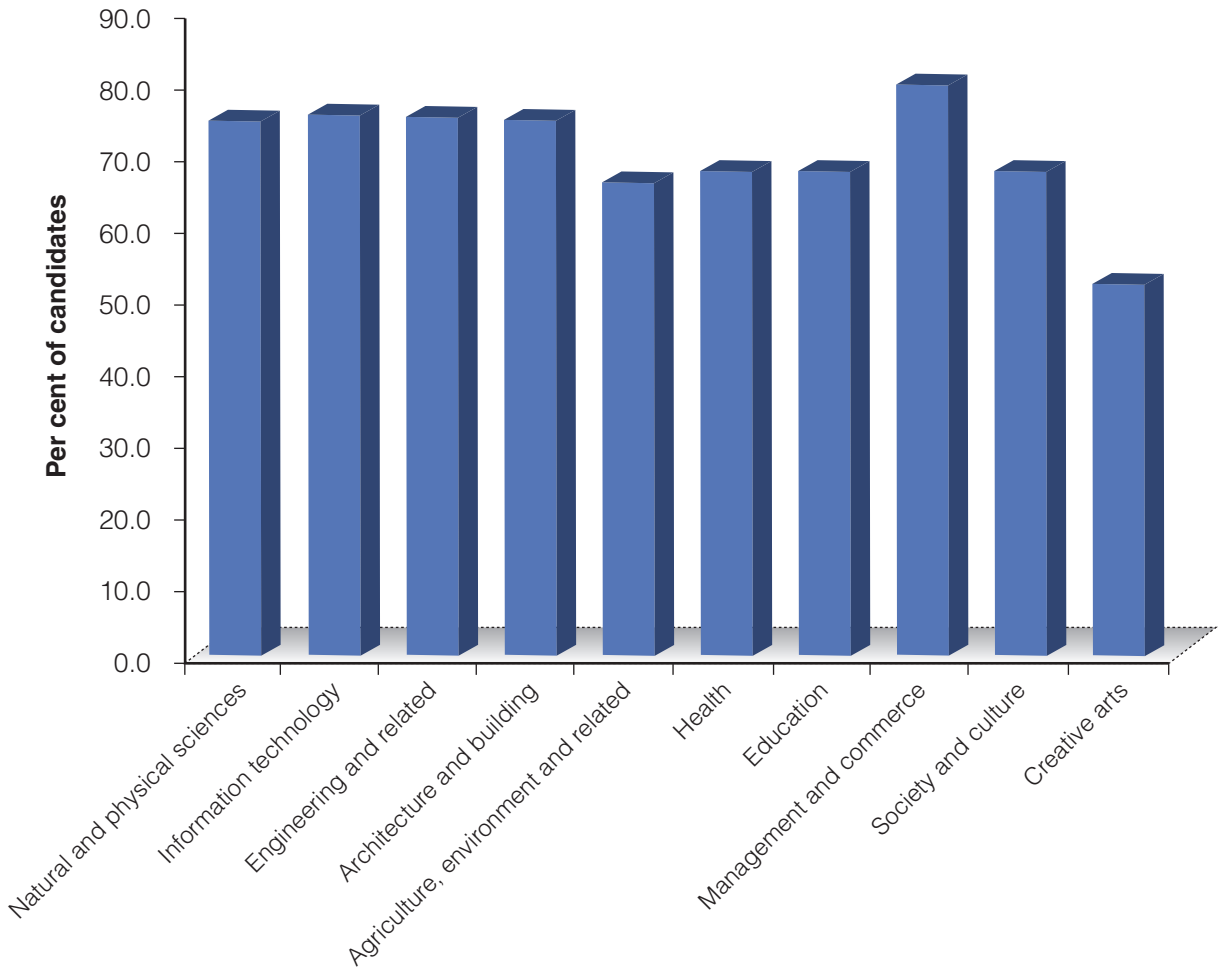


Figure 14: Research students who would ideally like to enter academic career on graduation: proportion who consider this goal to be realistic, by field of education

4.2.6 Further detail on medium- to long-term career intentions

While the short term career intentions of students are obviously important, it is the medium- to long-term plans of students that are of particular relevance to planning for the future academic workforce. When the medium- to long-term plans of research students are examined by field of education, some interesting differences (and similarities) are discernable. These are illustrated in Table 7. Importantly, for all fields the most common career option indicated is an academic position. However, there is a notable difference in the proportion of students with intentions to pursue an academic career, with agriculture students being least likely to be planning such a career (44.9 per cent), and management and commerce students (63.0 per cent) the keenest on an academic career. While the preference for academic work is relatively low for agriculture students, they are the most likely to have a career ambition to engage in research work outside the university sector (31.1 per cent). A notable proportion of engineering (27.6 per cent) and science (24.7 per cent) students also express a desire for research work outside a university.

Students intending to pursue non-research professional work are most commonly found in fields that incorporate specific professions, such as health and education. In addition, students from the creative arts indicated a strong intent to undertake this kind of work. However, given the difference noted above between ideal and realistic expectations of creative arts students they may be indicating a preference for non-research professional work as they believe an academic position is not achievable.

Table 7: Medium- to long-term career ambition of research students by field of education (sorted by highest proportion with academic ambition) (%)

Field of education	Type of career					Total
	Academic position (includes post-doc)	*Further formal study*	*Research work outside a university*	*Non-research professional work*	*Other*	
Management and commerce	63.0	0.9	12.2	23.1	0.8	100.0
Information technology	60.8	0.9	17.9	18.2	2.3	100.0
Architecture and building	59.8	0.4	8.9	25.8	5.0	100.0
Society and culture	59.5	1.9	14.6	20.3	3.7	100.0
Education	59.4	1.9	9.6	26.9	2.2	100.0
Natural and physical sciences	54.4	1.9	24.7	17.1	1.9	100.0
Health	50.2	2.2	19.1	27.3	1.1	100.0
Creative arts	46.6	3.1	10.6	36.4	3.4	100.0
Engineering and related	44.9	1.2	27.6	25.3	1.0	100.0
Agriculture, environment and related	43.1	1.1	31.1	23.2	1.5	100.0
Total	54.1	1.8	18.9	23.0	2.1	100.0

The instrument also asked participants when they formed their career intentions. Three key careers considered by research students over the medium- to long-terms are displayed in Figure 15 with the colour bands representing the proportion of students who formulated their decision at certain periods of their life. For those intending to pursue an academic career, about one-third (31.3 per cent) had come to this decision recently, during their postgraduate studies. A further third (36.8 per cent) decided to embark on such a career during their undergraduate years. This means that among academic career aspirants, nearly 70 per cent formulated this ambition during their university studies, a finding in keeping with other studies discussed in the literature review. This, and the finding that the HDR in Australia does not detract from students' academic aspirations, shows that Australian universities are, overall perceived to be attractive places to work.

The pattern of decision timing for those intending on pursuing a research career outside the university sector was similar to those wanting to enter academia. However, those intending to pursue non-research professional work seem to have followed a slightly different decision-making process, with a larger proportion having developed this ambition during schooling or during time in the workforce, although more than half of this group had formulated their intention while enrolled at university.

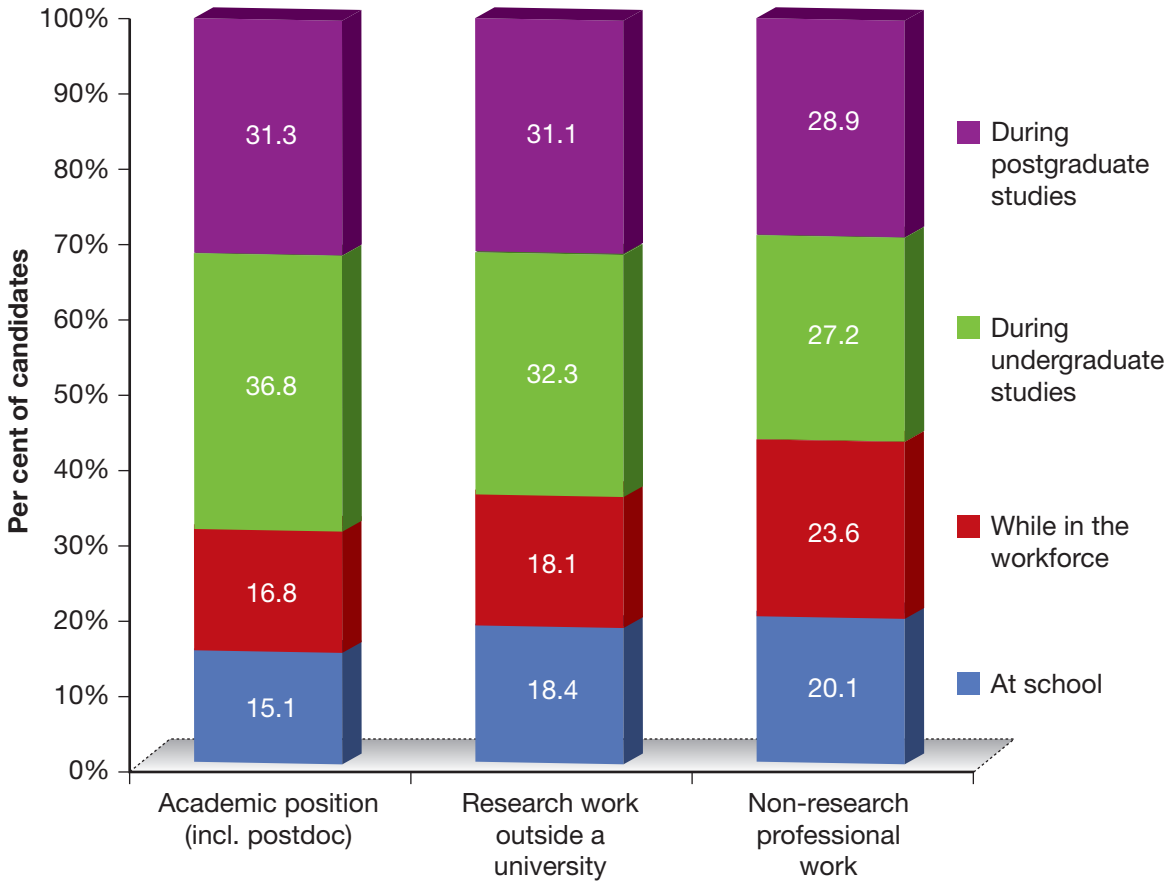


Figure 15: Period in which medium- to long-term career plans were formed, by career choice

4.3 Factors influencing choice of an academic career

This section focuses on the responses of those students who have indicated that they plan to pursue an academic career in the medium- to long-term, examining particular facets of the academic career that make the profession more or less appealing. The intent here is to identify the 'motivators' for an academic career. The responses of research students who do not intend to pursue an academic career, and their attitudes towards academia, are examined in the next section.

Just over two-thirds of research students with an academic career goal indicated that they would like a balance of teaching and research in an academic job (Figure 16). This is in contrast to earlier studies (e.g. McInnis, 2000) which suggested that early career academics are less interested in teaching than in research. One-quarter of respondents indicated that they would like to focus mainly on research, while only 6 per cent want teaching as the main part of their work. A small proportion intend to pursue a position in university management and administration.

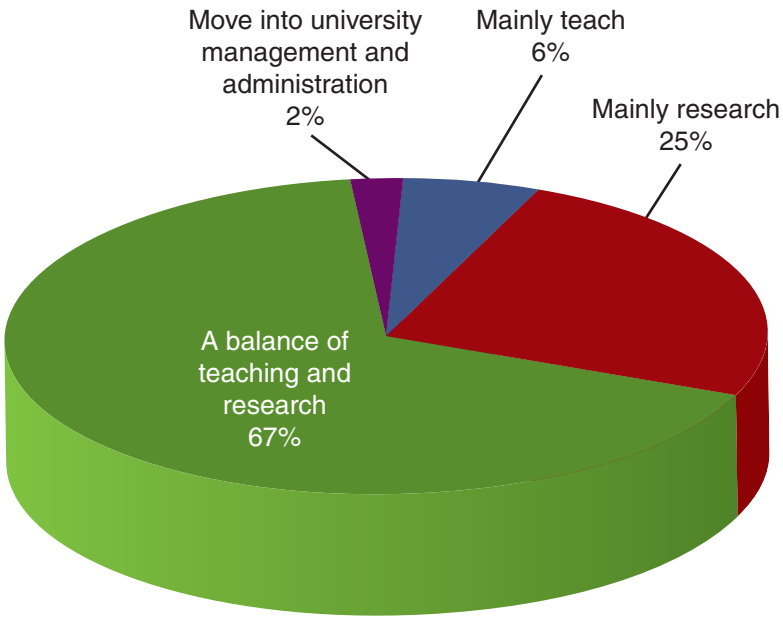


Figure 16: Ideal type of academic job for research students planning to pursue academic work in medium- to long-term (per cent of students)

While a balance of teaching and research is seen as the ideal by most aspiring academics, when asked what aspects of an academic career are most attractive, it is the opportunity to undertake research that is seen as the most appealing by respondents. Figure 17 illustrates students' responses to questions relating to the attractiveness of certain aspects of the academic profession. The figure displays the proportion of students who see each factor as 'very' attractive. At nearly 60 per cent, research is clearly the most attractive of the factors canvassed. Teaching is a relatively distant second with 37 per cent finding this a key attractor to the profession (a further 34 per cent indicated that teaching is 'quite' attractive). Other kinds of interaction with students, such as postgraduate supervision and mentoring are seen as generally attractive, though to a lesser extent.

While the findings show that the ability to undertake research is a clear motivator for these students there also appears to be strong interest in the teaching aspect of an academic career. Clearly the opportunity to participate in both teaching and research is important in these students' choice to pursue an academic career. Achieving an appropriate balance between research and teaching work in academic positions is clearly a factor that is likely to impact on the attractiveness of an academic career for these students.

Factors that have the least bearing on students' attraction to academic work included a range of factors that could be considered as 'beyond the university', such as social status and developing a public profile. Community engagement also rated poorly, although it is plausible that research students are not much exposed to this aspect of universities' mission while studying. Few students view administrative duties as contributing substantially to the attractiveness of an academic career.

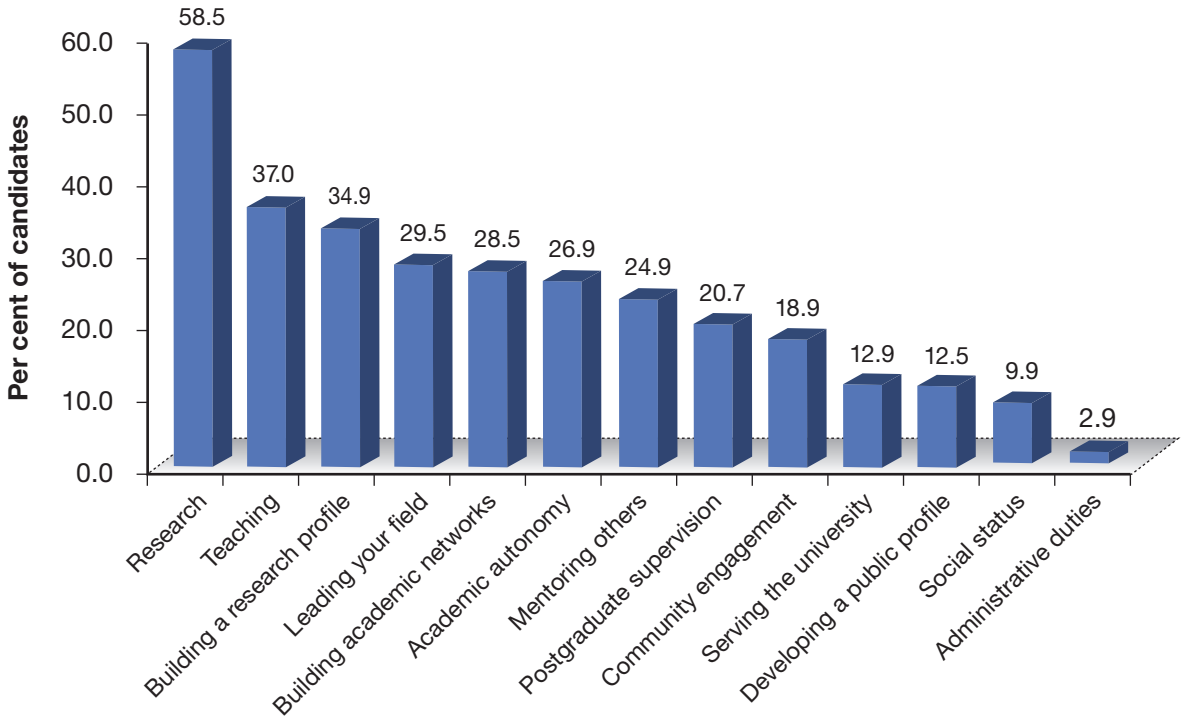


Figure 17: Proportion of students indicating that selected factors are 'very much' an attractive factor to an academic career – students planning to pursue academic work in medium- to long-term

A number of items relating to the levels of attractiveness of academic work have been combined to create a series of scales. These scales have been constructed following principles adopted in previous analyses of higher education data undertaken by ACER such as the Course Experience Questionnaire (GCA & ACER, 2009), the Australasian Survey of Student Engagement (ACER, 2007) and the Graduate Pathways Survey (Coates & Edwards, 2009). Scale scores for each of the scales range from -100 to 100, with the uppermost score being the most positive. The scales used here have been psychometrically validated by ACER using factor and reliability analyses. A key benefit of a scale score is that it is able to account for the responses to a number of items in one calculation. Scales also reduce exposure to artificial compression of variation in data that can occur when reporting limited response categories of multiple response scale items.

Three scales were used to analyse the attractiveness of an academic career in the NRSS: Working with Students, Research Profile and Wider Engagement. The Working with Students scale is based on responses to items relating to teaching, mentoring and postgraduate supervision. The Research Profile scale uses the research, building a research profile, 'leading your field' and building a public profile items. The Wider Engagement scale incorporates the 'serving the university', community engagement, social status and building academic networks items.

Figure 18 displays the mean scale scores for research students who plan to enter an academic career in the medium- to long-term by broad field of education. This analysis provides an indication of the notable variation across fields of education when it comes to assessing factors relating to this work that are attractive to students. Statistical testing of these results suggests that differences of five points can be considered to be statistically significant.

In the Working with Students scale, science students have the lowest mean scale score, while those in architecture, creative arts, education, and management and commerce have substantially higher scores, suggesting that teaching and student interaction is more attractive to students in these fields. Providing opportunities to work with students will obviously be important in attracting and retaining the students coming from these fields.

Overall, the Research Profile scale scores are higher for all fields than the scores for the Working with Students scale reflecting the preference for the research aspects of an academic career. Again, architecture students have the highest score in this regard, followed by engineering and management and commerce. Science students recorded the lowest scale score for the Research Profile scale.

Interestingly, there are two fields (Education and Creative Arts) where it appears that opportunities to work with students are more attractive than the opportunity to research. These fields had high scores on the Working with Students scale but lower scores on the Research Profile scale. This suggests that in these fields opportunities to work with students are particularly valued. The fields of Management and Commerce and Society and Culture also had relatively similar scores for the Working with Students scale as the Research Profile scale, again suggesting that a balance of work is particularly important in these fields.

The variation in the Wider Engagement scale is the most substantial of the three scales, with science students recording a very low score, while management and commerce, engineering and education students clearly view these aspects of a university academic career as being more attractive.

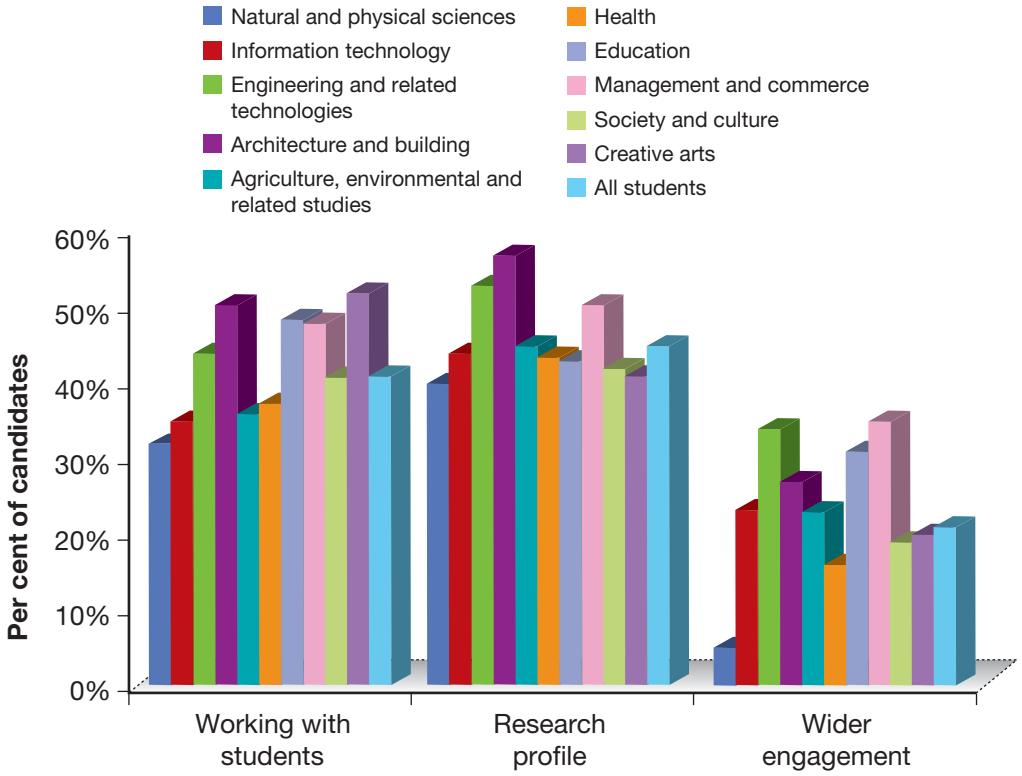


Figure 18: Academic career attractiveness scales by broad field of education for students planning to pursue academic work in medium- to long-term

The attractiveness of academic work is likely to be influenced greatly by experiences, conversations and work undertaken in universities over the course of a student's candidature. The influences of specific people and experiences on the interest in academic work of research students who plan to pursue such a career in the medium- to long-term are detailed in Figure 19. Students were questioned about the impact each of the nine factors listed here had on their plan to enter academic work. On a five-point Likert scale, students indicated the extent to which each factor had made them more, or less interested in an academic career. Only students with a response to each of these items are included in this analysis and those for whom the item was not applicable have not been included.

Figure 19 shows that the most positive impact for research students on their interest in academic work came from their own supervisor. More than half (54 per cent) of students indicate that observations of their supervisor have 'made me more interested' in pursuing an academic career. This is a positive finding because other research canvassed in the literature review indicates that observing the work of the supervisor detracts from the appeal of an academic career. It also suggests that the work life of an academic, as witnessed by research students, is relatively attractive.

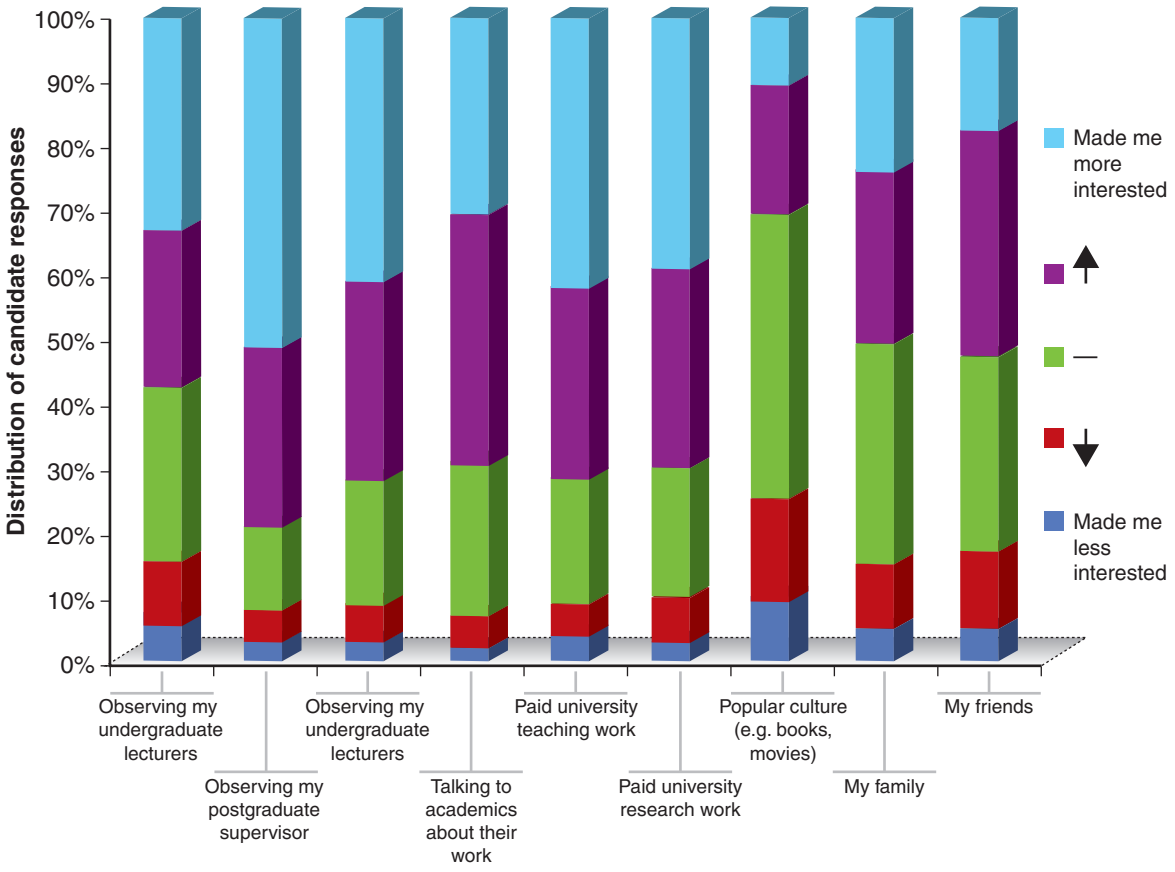


Figure 19: Influence of selected factors on interest in an academic career for students planning to pursue academic work in medium- to long-term

Focusing on the extent to which supervisors have made students more interested in pursuing academic work in the medium- to long-term, Figure 20 shows the proportion of students in this category by field of education. These results reveal that across the fields the differences in perceptions among students are not substantial. At the extremes, the low mark is 46.8 per cent for information technology, while at the upper limit, 62.9 per cent of creative arts students indicated that observing their supervisor made them more interested in pursuing academic work. However, what Figure 20 really illustrates is that regardless of field, research students intending to pursue an academic career are clearly influenced in a positive way by their supervisors.

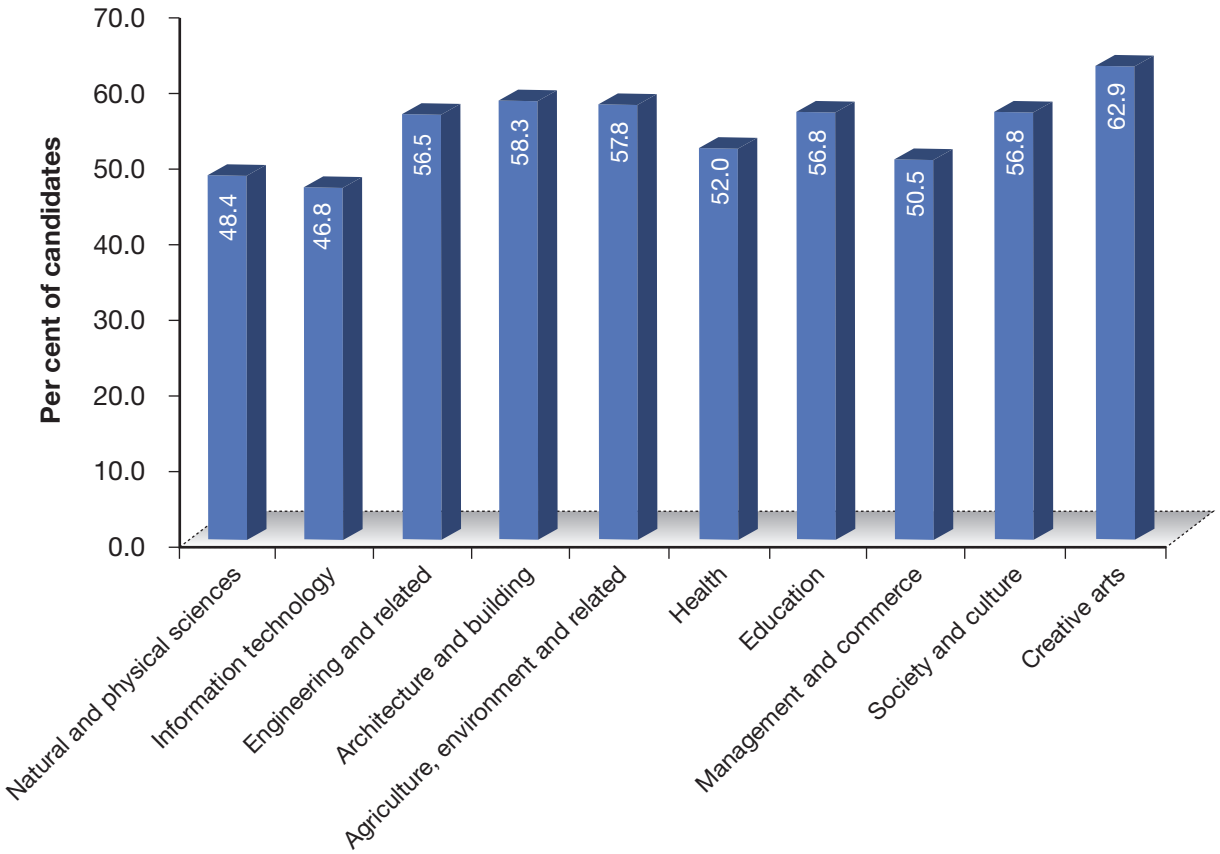


Figure 20: Observing my postgraduate supervisor 'made me more interested' in an academic career by field of education – students planning to pursue academic work in medium- to long-term

Returning to Figure 19, also of note is the relatively large positive influence of engaging in teaching or research work while at university. Forty-five and 41 per cent of students respectively report that the teaching and research work they have undertaken at university has made them more interested in an academic career. Importantly for these two factors in particular, very few students indicate that paid teaching or research experience at university has made them less interested in an academic career. The 'overall university environment' and observations of lecturers while an undergraduate also had a positive influence on students desire to pursue an academic career.

These findings show that students' observations of academic work and experience with teaching and research work tend to increase their desire to pursue academic work. This suggests that the more experience these students have with the academic environment the more likely they may be to show interest in pursuing an academic career. This emphasises that Australian universities are attractive places to work, and the academic profession is seen by many students as a rewarding one.

4.4 Comparing academic careers with other career options

All participants in the NRSS were asked to assess the relative difference between an academic career and other career options on a number of specific job-related factors. In total 15 factors were considered and rated by students in this regard. In general, and unsurprisingly, participants planning to pursue an academic career in the medium- to long-term rated an academic career more favourably, than did those intending to follow a career outside of the university sector.

Table 8 summarises these comparisons for both those with a medium- to long-term plan to enter the academic sphere and for those with other plans. While the proportion of 'others' (the non-academic aspirants) who rate an academic career as better or substantially better than other career options is smaller than for the academic aspirants, there is a clear trend in these responses suggesting that all students believe there are a range of factors that are particularly attractive about an academic career.

Table 8: Comparing an academic career to other career options, by selected occupational factors and intended career (%)

Comparison factor	Academic work is better or substantially better		Academic work is worse or substantially worse	
	Aspiring academics	*Others*	*Aspiring academics*	*Others*
Development of new knowledge	85.2	72.5	4.0	6.2
Interest/challenge	79.6	50.7	4.6	17.4
Job satisfaction	71.1	35.6	4.5	20.2
Flexibility	69.3	54.0	8.3	16.4
Contribution to community	68.2	46.2	4.7	15.6
Autonomy	64.3	43.6	7.2	19.3
Work/life balance	63.0	48.6	14.8	23.2
Travel opportunity	60.8	52.3	10.8	17.5
Collegiality (networks with peers)	59.9	50.0	6.1	10.7
Prestige	59.7	49.4	8.0	12.4
Prospects for career advancement	48.3	32.4	16.8	28.3
Job security	45.0	40.1	22.4	27.4
Workload	34.2	27.3	27.3	33.3
Salary	27.8	24.0	45.0	48.9
Availability of positions	23.6	18.9	50.2	52.0

The areas where the majority of students thought an academic career is better or substantially better than other career options are the development of new knowledge, interest and challenge, flexibility, and collegiality. Importantly, the first two of these areas (development of new knowledge and interest and challenge) are also seen as very important elements overall among academic aspirants when it comes to choosing a future career. As discussed later in this chapter (see Figure 28), 'interest and challenge' and 'development of new knowledge' are the first and fourth most highly rated factors (of 14 listed) indicated by these students in terms of influence on career choice. Therefore, the fact that these elements are not only seen as more attractive in academic work than in other career options *and* that these are specific factors that are overall seen as important in choice of career suggests that it will be particularly important for universities to ensure that they maintain these aspects of an academic career if they are to attract and retain research students.

Similarly, a concurrent study undertaken by the CSHE in 2010 based on a survey of academic staff (see Appendix G for details) found that a deep commitment to scholarship drew people to academic work and lay at the core of their professional values. Academics reported that the opportunity for intellectually stimulating work, a genuine passion for their field of study and the opportunity to contribute to new knowledge were the aspects of academic work they most prized (Bexley, James & Arkoudis, 2010).

Returning to the outcomes in Table 8, the two areas in which an academic career appears notably worse than other career opportunities were in relation to salary and to the availability of positions. These two factors are perhaps the most important of the factors listed here when it comes to making pragmatic decisions about career options. Therefore, while they are the only two strongly negative factors of 15 explored, they are both notable and potentially very influential factors.

Importantly, opinions about the availability of academic careers were strikingly negative, regardless of whether participants were considering an academic career or not. One in two participants rated the availability of academic jobs as either 'substantially worse' or worse than other career options. A further item within the NRSS adds weight to this finding: when asked about their agreement with the statement 'I think it will be pretty easy to get an academic job', well over half of respondents (61.6 per cent) indicated they either disagreed or strongly disagreed with the proposition (Figure 21). Again, this pattern of response did not differ substantially among students by career plans.

These findings are important, as they suggest that the key disincentive to an academic career lies in the lack of availability of positions. This is interesting in the context of an ageing academic workforce as it appears that the gaps in the academic workforce are not yet apparent to these research students. As noted above, participants were largely positive about their perceptions of academic work, and the majority were interested in an academic position. It may be that perceptions of a lack of availability of jobs cause students to believe an academic career to be unrealistic. This may also be the reason why some students are intending to pursue other careers in the medium to long term despite academia being their ideal career choice. It may be that students are switching from their preference of an academic career to the more pragmatic choice of other research and non-research careers due to a perception that there are more job opportunities in these other areas.

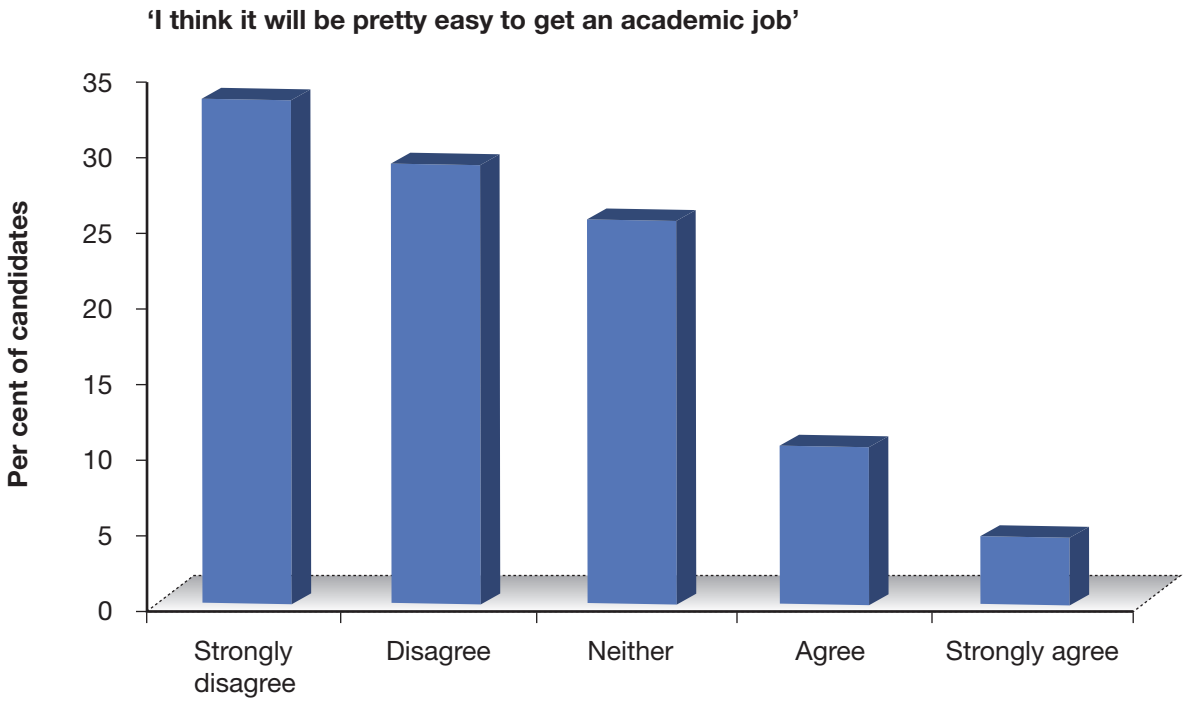


Figure 21: Research student responses to the statement: 'I think it will be pretty easy to get an academic job'

Examining these responses in relation to individual fields of education also provides an interesting insight into the nuances within the research student cohort. Figure 22 shows that management and commerce students are the least pessimistic about the availability of academic work; followed by those studying in the engineering and architecture fields. Large proportions of creative arts, and society and culture students indicated they saw the availability of academic work very unlikely, while the other large field of science also had a large proportion of responses in this regard.

These results also relate somewhat with the analysis of student responses relating to 'ideal' and 'realistic' career plans following graduation. Figure 14, earlier, showed that management and commerce students who ideally hoped to gain academic work were the most optimistic that this would realistically eventuate. It seems that these students' impression relating to the availability of positions has influenced their opinion about the extent to which pursuing an academic career might be a realistic option. On the other hand, Figure 13 showed that the gap between ideal and realistic goals of students from society and culture, and creative arts were the largest, no doubt influenced by their impressions of job availability.

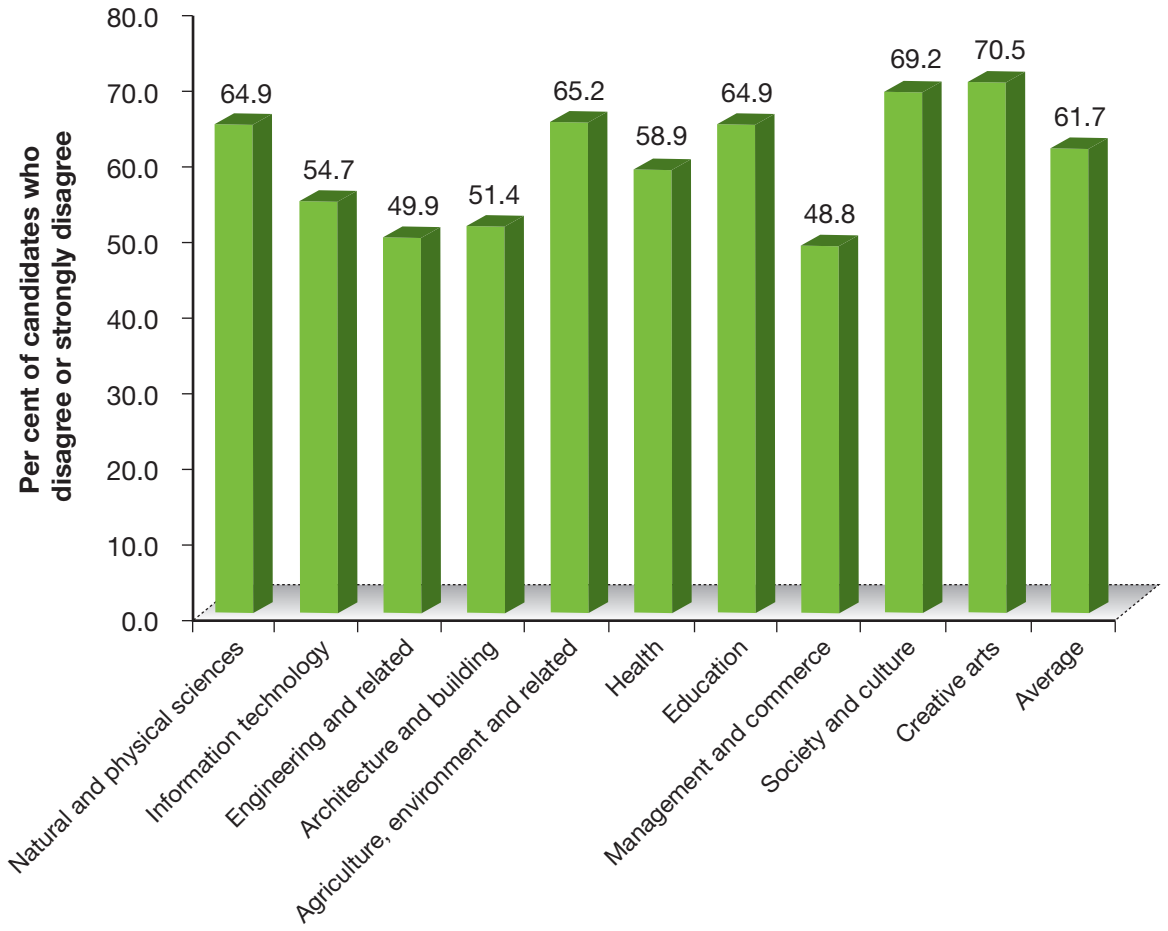


Figure 22: Research students indicating they 'strongly disagree' or 'disagree' with the statement: 'I think it will be pretty easy to get an academic job', by field of education (%)

The factors noted above have been further analysed by the creation of two scales to compare different dimensions of work. A Job Fulfilment scale and a Working Conditions scale have been constructed based on a number of items. The Job Fulfilment scale is designed to measure some of the elements related to the general enjoyment and satisfaction of an occupation and is based on items relating to interest/challenge, autonomy, prestige, job satisfaction, collegiality, contribution to community and development of new knowledge. The Working Conditions scale focuses on the more 'nuts and bolts' elements of a job, incorporating items such as availability of positions, salary, work/life balance, job security, prospects for advancement, workload and flexibility. Scale scores have been derived as per the methods described for Figure 18 earlier. Like the earlier chart, the scale scores run from -100 to 100. To assist in interpreting the details in Figure 23, the closer a score is to 100, the more strongly students have indicated that they think academic work is more attractive than other work they could pursue following graduation. Scores close to zero indicate students believe there is little difference between academic and other work, and a negative score indicates students think a non-academic job is more attractive.

In general, students were more likely to think that academic work rated higher than other career options on the job fulfilment scale than the working conditions scale. This suggests that an academic career compares well to other careers in terms of job fulfilment but less so in terms of working conditions. Figure 23 also looks at these scale scores in terms of the fields of education. Some variation across the fields is noticeable in the Job Fulfilment scale, in particular the low score of health students. However, the more interesting differences between the fields are found on the Working Conditions scale, where science and health students in particular tend to see little difference between academic work and other work in terms of conditions, while management and commerce, architecture, engineering and information technology students have significantly higher scores on this scale. This suggests that in these particular fields the working conditions of an academic career are seen to be better than other career options

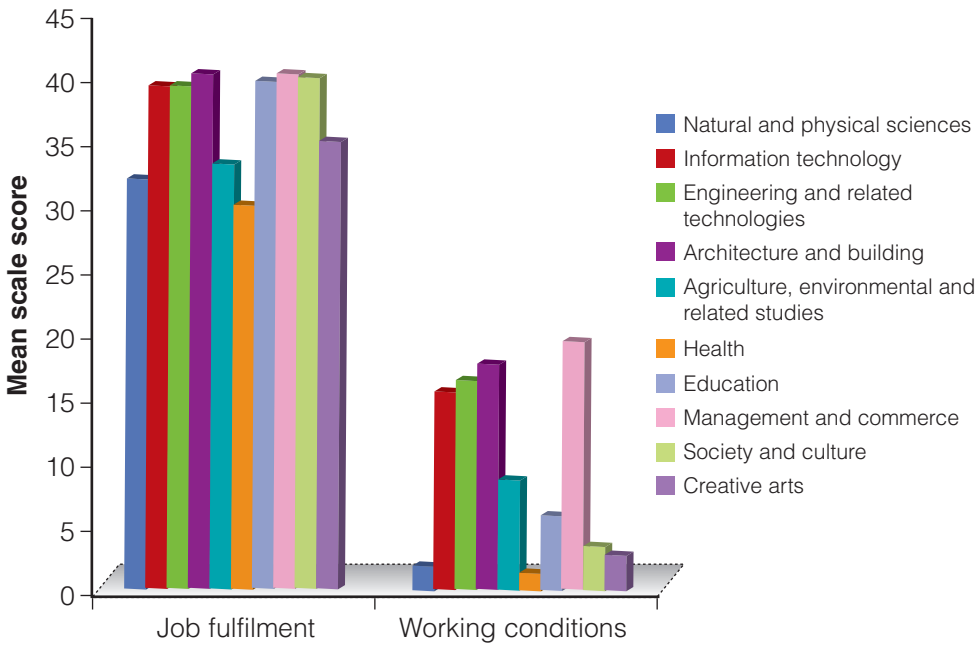


Figure 23: Mean scale scores for comparison of academic work with other types of work, by field of education

4.5 Non-academic career intentions

While the primary focus of this report is on the transition from the HDR to an academic career path, many students undertaking an HDR are doing so with very different goals in mind. Again, it is important to note that just as there are many paths to an academic career, there are many and varied paths leading from an HDR. Figure 7, with which this chapter opens, shows that 18.9 per cent of those surveyed for this project have medium- to long-term plans to pursue a career in research-related work outside a university and 23 per cent intend to follow a non-research work pathway in a professional occupation. The intentions of these particular research students are the focus of this section.

Figure 24, below, shows that the majority of students planning a non-university career expect this career to still be closely related to their current research degree. This is an important finding as it suggests that the skills gained by these students through their HDR will be used in the workforce. Of those interested in following a research career outside a university, 63 per cent expect their career to be related to their current research, while 53 per cent pursuing a non-research career also have this expectation. In all, 98 per cent of the research career outside a university group indicate that they intend to follow a career that is at least somewhat related to their research degree. The comparable figure for the non-research professional group is 93 per cent. These findings, show that despite these students intending to pursue a career outside of the university, the overwhelming majority will be taking the skills and knowledge acquired during their research degree and applying them in the workforce, whether that work be research-focused or not.

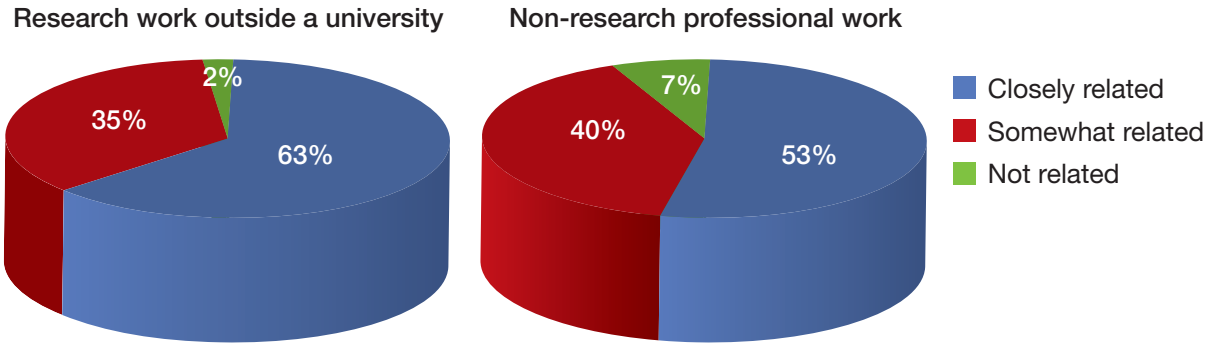


Figure 24: Extent to which planned career outside university is related to current research degree, by type of work (%)

Students intending to pursue a career outside of a university have a desire to work in a range of sectors and industries. In Figure 25 the employment sectors of interest to respondents are shown. While the most popular sector among those interested in research work outside a university is the government sector (33.7 per cent), for those planning to pursue non-research professional work, the private sector is the choice of the largest number of students (41 per cent).

Figure 26 shows the proportion of respondents intending to pursue a research or non-research career by employment area. The breadth of this list highlights the diversity of industries that research students from Australian universities intend to enter. As can be seen, by far the most popular industry among those wanting to enter into research work outside university is scientific and technical services. When examined by field of education, this category is highly popular among respondents from the fields of science, engineering and agriculture. It is also a common choice for information technology and health students. The healthcare and education industries are also popular among those intending to pursue research careers outside a university.

For those interested in non-research professional work, healthcare, education and public administration are the most commonly indicated industries for future careers. In the case of the first two of these categories, there are again substantial numbers of students from the relevant fields health and education) planning on entering these sectors.

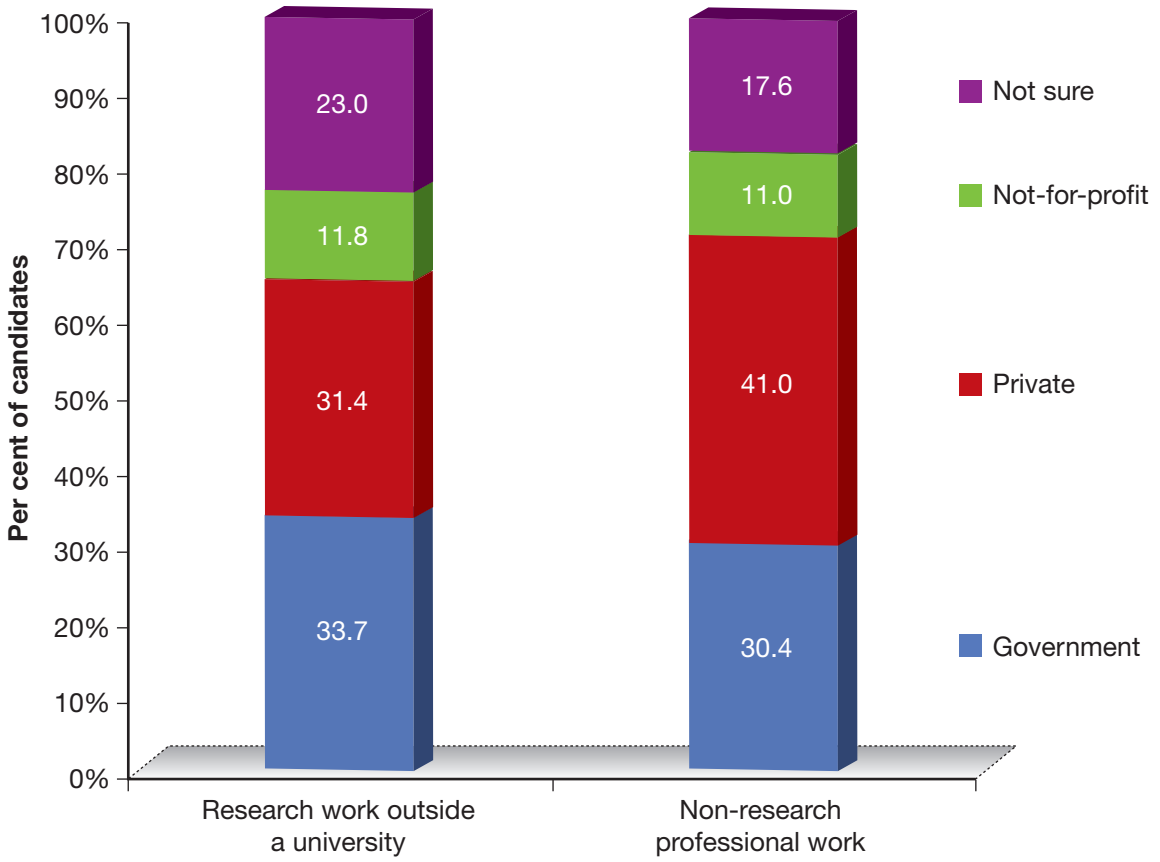


Figure 25: Intended sector for medium- to long-term career plans, by type of work

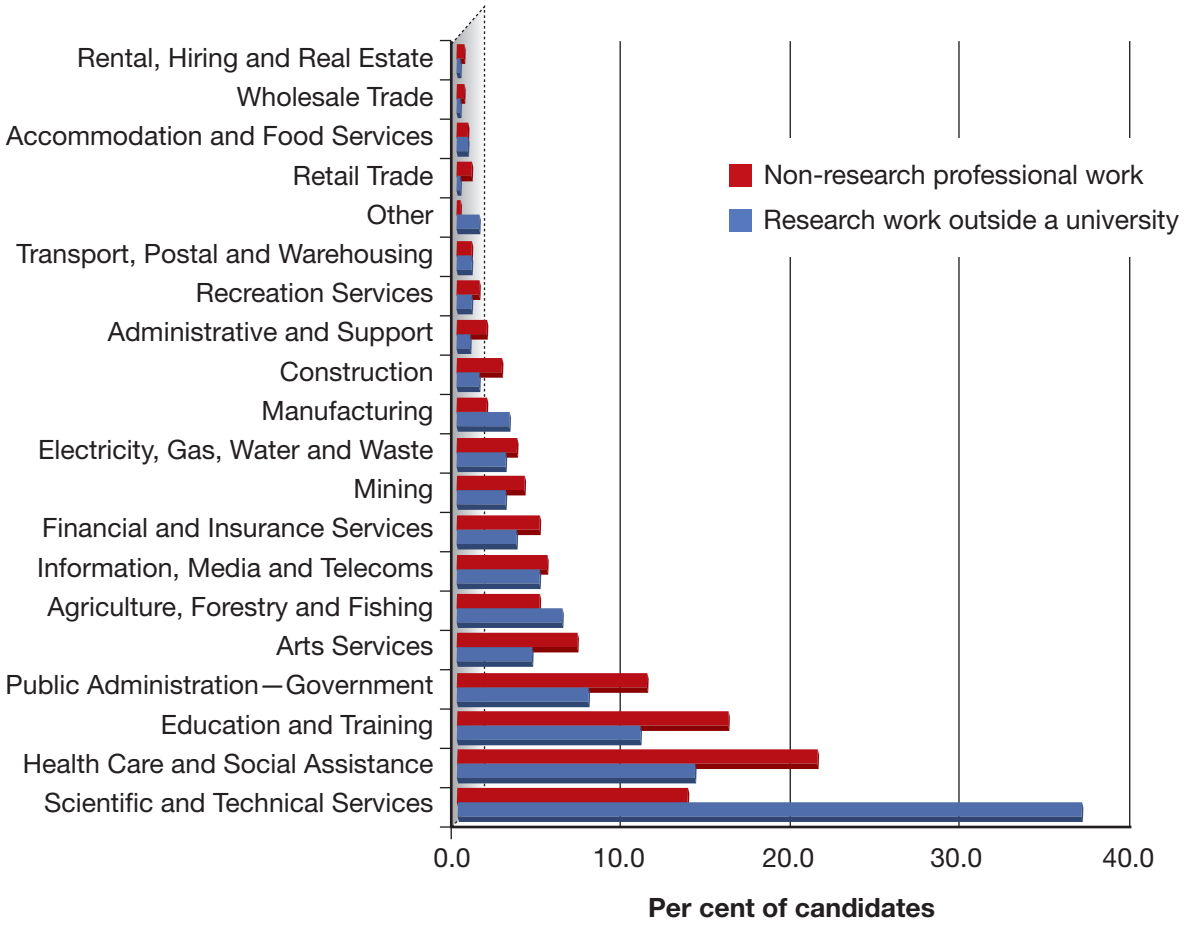


Figure 26: Intended industry for medium- to long-term career plans, by work type

Earlier, this chapter focused on those who indicated a medium- to long-term career intention of becoming an academic. Interestingly, a substantial proportion of those who do not intend to pursue an academic career have still considered the idea. As illustrated in Figure 27, 71.3 per cent of those intending to pursue research work outside a university and 66.7 per cent of those planning a non-research professional career have at some point considered an academic career. This shows that the majority of research students do think about the prospects of life as an academic when contemplating their future. While many may choose not to pursue this pathway, this finding raises the possibility of attracting such students by understanding the factors that motivate their choices is important.

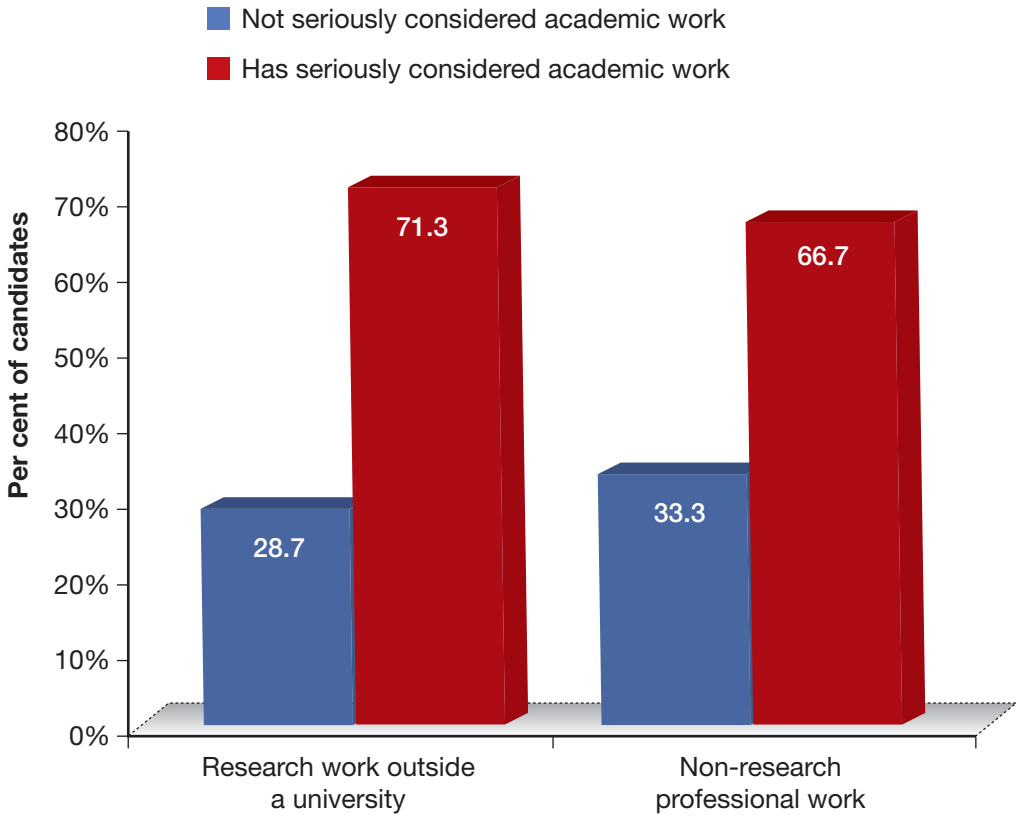


Figure 27: Extent to which an academic role has been seriously considered by research students, by type of work planned for medium- to long-term career

The motivating factors of those with a medium- to long-term plan to follow a career outside a university are shown in Figure 28, with the proportion of participants who believe each factor to be 'very important' displayed in bars. As can be seen, having interest in and challenge from work is viewed as very important by nearly two-thirds of this group. Job satisfaction and work/life balance are also seen as very important by more than half of these students. Lower down the list of importance are elements such as prestige, travel opportunities and workload. Prospects for career advancement and salary are seen as very important by about one in four of these students.

The findings from this particular analysis indicate that there are many factors that are very important to research students who wish to pursue a career away from the university setting, but that chief among these is finding work that provides stimulation and satisfaction.

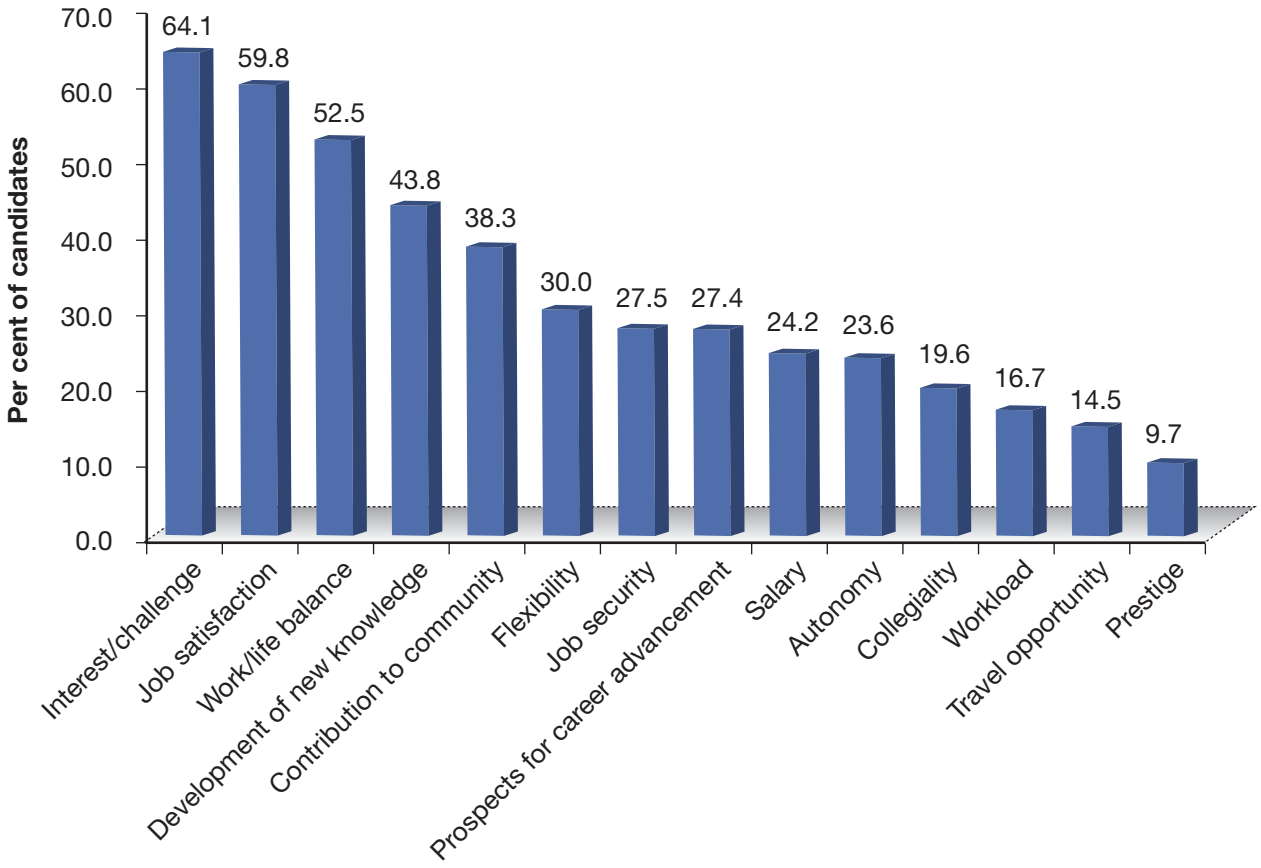


Figure 28: Proportion of respondents selecting specified job-related factors as 'very important' - students planning to pursue work outside a university in medium- to long-term

In Figure 29, the responses of students who have medium- to long-term ambitions to enter the academic workforce have been added to the outcomes displayed in Figure 28. The comparison of responses from these two groups of students reveals generally similar patterns. However, students interested in pursuing academic work tend to attach slightly higher levels of importance to all but one of these factors: salary. This is the only factor that those interested in following an academic career are less likely to see as 'very important' when compared to those with plans for a non-university career. This is interesting as students generally rated an academic career as worse or substantially worse than other careers in terms of salary (Table 8). Given the higher importance students not pursuing an academic career place on salary, it may be that perceptions about salary conditions are influencing these students' decision not to undertake an academic career.

The largest difference between the two groups is in terms of development of new knowledge, which is seen as notably more important by those interested in an academic career.

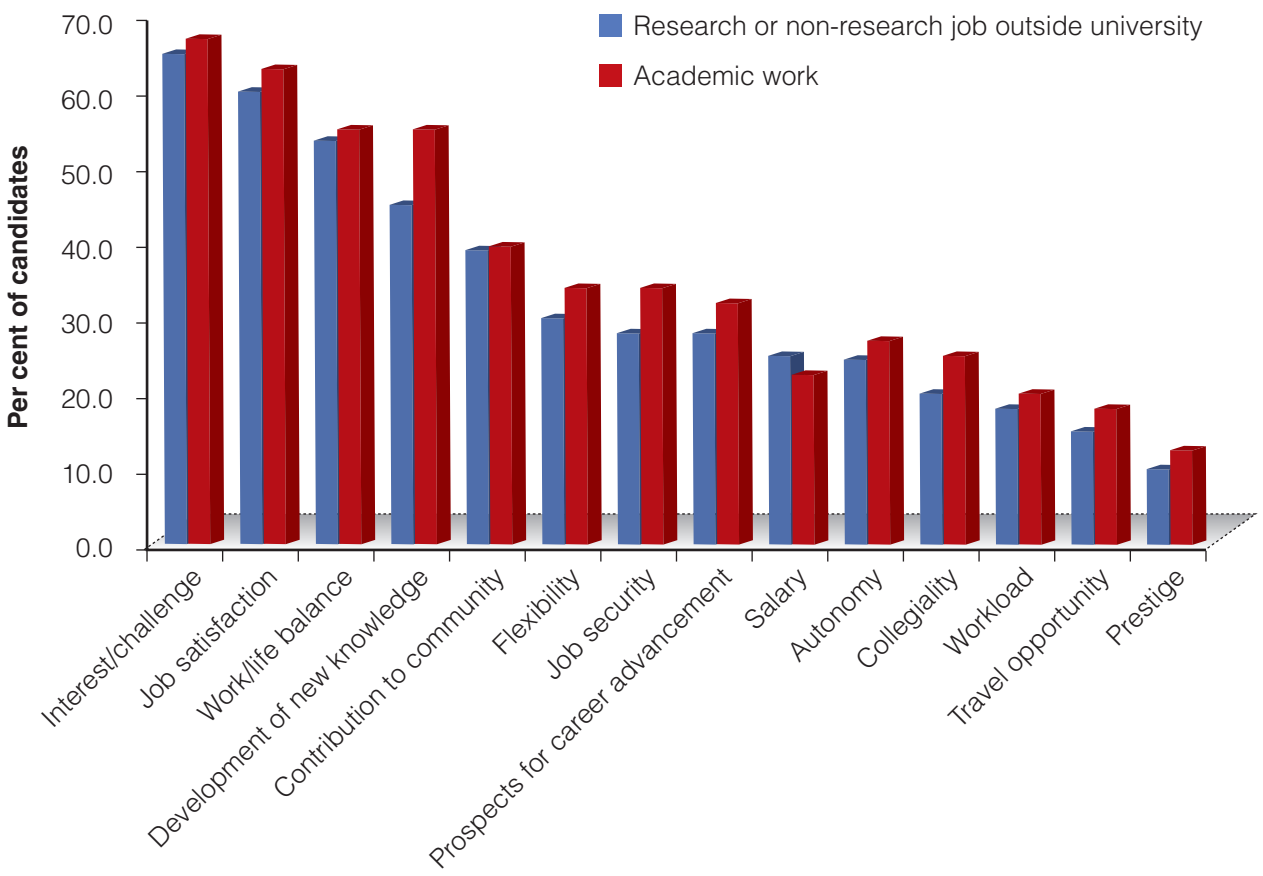


Figure 29: Proportion of respondents selecting specified job-related factors as 'very important', by type of work planned for the medium- to long-term

4.6 Conclusion

The findings from the NRSS in relation to the career plans and motivations of Australia research students are particularly revealing and help build an important understanding of perceptions of future work among this important group of students.

The analyses above have shown that the vast majority (83 per cent) of these students have at some time seriously considered an academic career. While a smaller proportion actually intend to pursue such work in the medium- to long-term, the fact that more than half (54.1 per cent) of all students have this intention shows that there is potential within this group for ensuring the future sustainability of the academic workforce.

It is also encouraging that participants with academic career plans indicate that the most positive influences on their decision to follow this pathway have come from observing their supervisors and undertaking paid teaching or research work. This suggests that the work life of an academic, as witnessed by research students, is relatively attractive.

However, the picture is not entirely positive for the university sector. Firstly, there is a notable shortfall between students' ideal goals of academic work following graduation and their perceptions of whether this goal is realistic, with nearly 30 per cent of participants indicating that they do not consider an academic job realistically achievable despite it being an occupation they would ideally pursue. The results suggest that those students who feel they will miss out on their ideal of academia make a pragmatic decision to pursue careers in either research work outside a university or non-research professional jobs despite these not being their ideal choice.

Some fields of education show particularly large gaps between those who would ideally like to enter academia and those who think it is realistic. The fields of education that are of particular concern are creative arts, education, agriculture, health and society and culture.

This difference between ideal and realistic outcomes for those wanting to pursue an academic career appears to be influenced by perceptions about the availability of jobs in academia. Opinions about the availability of academic careers were strikingly negative, regardless of whether participants were considering an academic career or not. Salary was also an important area where an academic career is perceived to compare less well with other career options.

In terms of key attractors, an academic career is viewed by research students (regardless of their future career plans) as favourable on a number of key factors such as development of new knowledge, interest and challenge, and job satisfaction. Further, the majority of research students see that an ideal academic position would involve a balance of teaching and research responsibilities. It will be important for universities to provide opportunities for an appropriate balance of research and teaching activities if research students are to continue to be attracted into an academic career.

While there is strong interest in an academic career, it is also important to note that more than 40 per cent of those with medium- to long-term plans to pursue an academic career, including a third of domestic students with these plans, believe that they will take up this work overseas rather than in Australia. Australia currently benefits from large flows of migrants into Australia (Hugo, 2008) and this desire to work overseas amongst research students perhaps reflects the global nature of the academic and research workforces. It is also important to note that this desire to work overseas is not only limited to those wishing to pursue an academic career but is also strong among those wishing to pursue research careers outside of universities. A propensity to work overseas amongst research students does reduce the size of the potential academic and research workforce within Australia. However, Australia can still benefit from migration flows if steps are taken to ensure that those who leave Australia are being replaced with migrants who meet the skills and workforce needs of Australia and Australian academics are attracted back from overseas posts.

Among the cohort of research students in Australia who intend to follow a career outside the university sector, the majority intend to pursue work that is closely related to their research degree, indicating that the knowledge and skills gained through an HDR are seen by many as transferable to non-academic forms of work.

The following chapter examines the experiences of research students during their research degree. It looks at the kind of paid work these students are involved in, their engagement with others at university and their satisfaction with their degree. This analysis compliments the work from the chapter above by providing further insight into the experience of being a research student and influences on career choices.

5 Experiences of the Research Degree

5.1 Introduction

As shown in the previous chapter, most of those surveyed who hoped to pursue a career as an academic made this decision during their university studies. This chapter explores the effect of undertaking an HDR on students' aspirations and career plans. It begins by briefly examining students' experiences prior to commencing their research higher degree and then their experiences during their HDR studies, including the types of work that these students undertake during their studies and the extent to which this work may influence the future career decisions of these students.

Elements of the HDR experience that impact on students' interest in an academic career include interactions with their supervisor, which, as shown in the previous chapter have a largely positive effect; and the experience of working in the university as a tutor or researcher. Again, the effects of these experiences seem to be positive.

Key findings relating to the experiences of research students include:

- Students enter the HDR through a range of experiences with 45.6 per cent of students having been in full-time and 9.6 per cent in part-time employment in the year prior to their studies;
- Students tend to feel well supported in their studies by their institutions and were also very positive about the support they receive from their supervisors;
- One-quarter of all students report feeling lonely and isolated in their studies;
- The fields which had the highest proportions of students who felt isolated during their studies were also those with the highest levels of students who had considered withdrawing from their course. These fields were education, creative arts, information technology and society and culture;
- On balance, it appears that supervisors provide more support and encouragement for research activities as opposed to teaching activities;
- Almost 60 per cent of research students are employed while undertaking their research degree and a third were employed at a university at the time of the survey;
- Almost three quarters of those employed at university work as tutors or lecturers while 20 percent are engaged in research-related work; and
- For those students employed outside the university sector during their degree, 41 per cent indicated their work was 'closely related' and a further 41 per cent that their work was 'somewhat related' to their research degree.

5.2 Experiences of university and satisfaction with studies

As detailed in Table 4 earlier, the majority of research students do not come into a research degree straight from undergraduate studies, but rather from the workforce. The results in Table 4 indicate a diversity of prior experience among research students. In total, 45.6 per cent of students worked full-time in the year prior to commencing their degree and a further 9.6 indicate that part-time or casual work was their 'main' activity. Only about one-quarter (24 per cent) of students came straight from undergraduate study, while a further 16.2 per cent were studying a postgraduate qualification before commencing their degree. As would be expected, these figures do vary across the fields of education, with science research students much more likely to have made the transition straight from undergraduate study (43.3 per cent) than others. In terms of other key differences in transition by field of education, those in the fields of architecture (64.8 per cent) and education (63.9 per cent) are more likely to have been working full-time prior to commencing their research degree than those studying in other fields.

Across all those whose main activity was work in the year prior to commencing their degree, a substantial proportion were employed in a job that was directly related to their research degree. Among those previously working full-time, 57.8 per cent were in work that was directly related to their subsequent study. A further 29.1 per cent had a job that was 'somewhat related' to their research degree. For students primarily in part-time or casual work 42.5 per cent of jobs were directly and 33.1 per cent 'somewhat' relevant to the topic of their research degree.

In the survey participants were asked to evaluate their level of agreement with a number of statements relating to their experience during candidature. These responses are displayed in Figure 30 and Figure 31. Some of the themes explored here are also subject to scrutiny in the annual Postgraduate Research Experience Questionnaire (ACER & CGA, 2010), which examines the satisfaction levels of graduates from research degrees. The findings in the NRSS differentiate from the PREQ in that the survey items are differently pitched and the population for the NRSS is enrolled students rather than just successful graduates. Among these experience-related items, the finding which stands out in terms of highest level of agreement is that relating to support from supervisors. Nearly half (49.8 per cent) of all research students strongly agree with the statement: 'My main supervisor has been very supportive during my studies', and 28 per cent indicate general agreement. There were also relatively large proportions of students indicating that the overall support they receive from their institution, and the support they receive from university administrative staff, has been satisfactory during their degree. For universities and their academics, this is a pleasing finding because it confirms that in general, research students are satisfied with the support offered by their institution.

One note of concern, however, is the feelings of belonging that these students experience. While students are relatively happy with the support structures being offered by the institution, only 42.9 per cent of students agree or strongly agree with the statement 'I feel like I really belong in my department/centre'. This suggests that despite the good support these students receive there is a large group of research students who lack a sense of belonging within their department.

The collegiality found between students, and the network, both social and intellectual, formed during the HDR are an important element of the HDR experience. The survey asked participants about these relationships, and again, responses were relatively positive. Almost two-thirds of students indicated that other research students are friendly and supportive and 44.5 per cent indicated at least some engagement with other students on a social level. However, of concern is the finding that almost one-quarter of research students agree or strongly agree with the statement 'I feel very lonely and isolated in my studies'.

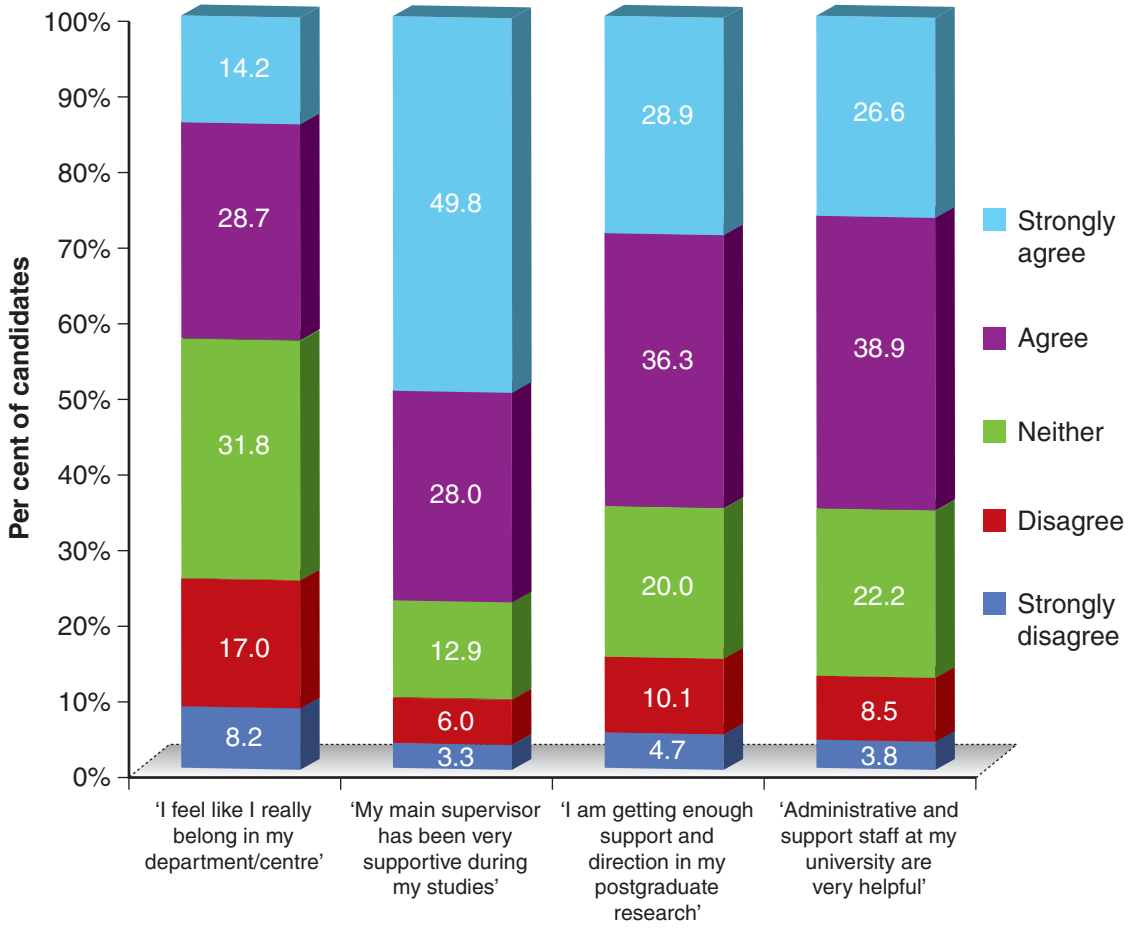


Figure 30: Student experiences of their institution – level of agreement with selected statements

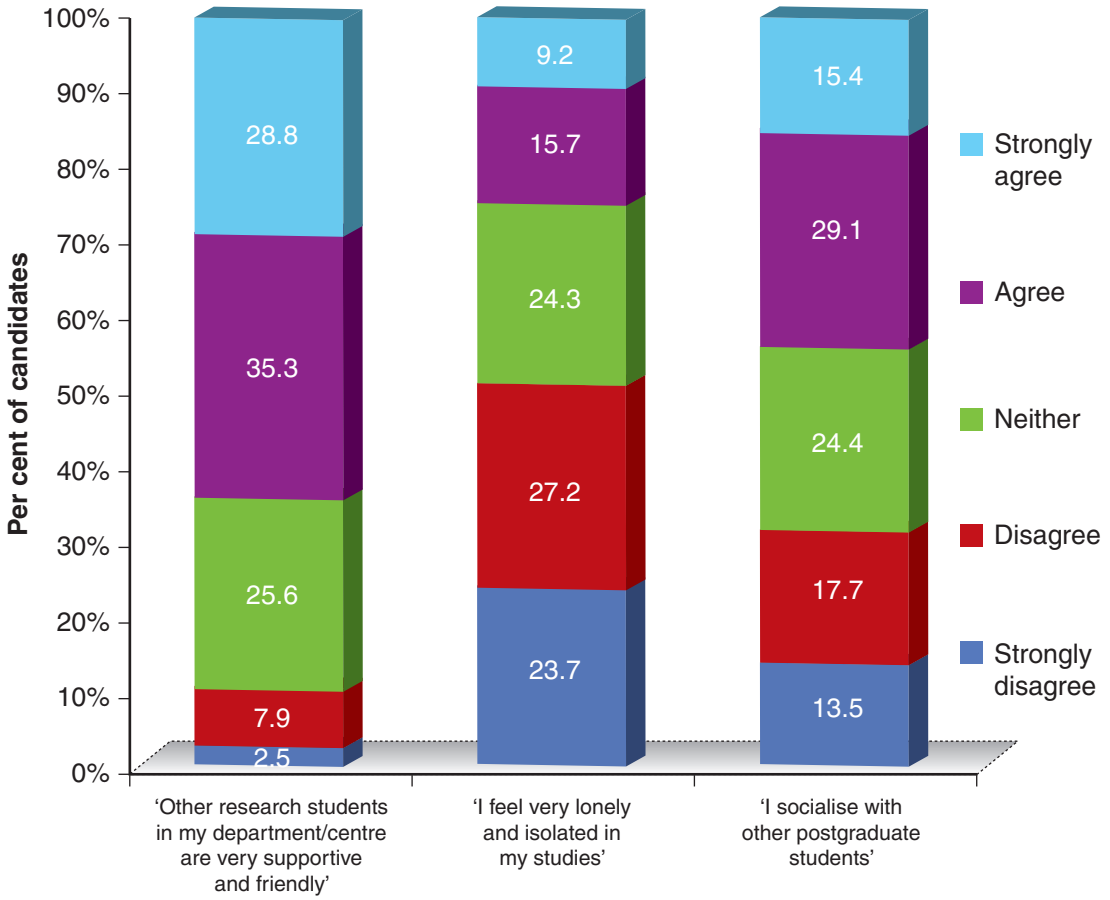


Figure 31: Student interaction with fellow students – level of agreement with selected statements

Responses to a number of statements in relation to support from staff and interactions with peers have been incorporated into two scales to assist with further analysis of the student experience. One student experience scale 'Support and supervision from university' is based on the item responses in Figure 30, a second scale 'Engagement with students and university life' is based on those reported in Figure 28. As with the discussion of scales in the previous chapter, these scales sit on a metric of -100 to 100, with 100 being the most positive.

Figure 32 displays the mean scale scores for these student experience scales by field of education. As the blue columns for university support and supervision show, there are no major differences between the fields in relation to these issues; on this measure, differences of five points or more can be considered significant and all fields fall within this range on the scale. This suggests that satisfaction with support and supervision among research students is relatively consistent across all fields of education.

However, on the engagement with students and university life scale, the variation between fields is notable, with large and statistically significant variations between fields. Students from the sciences have the largest mean scores on average for this scale suggesting that they are well connected and engaged with their fellow students. This is perhaps an effect of ubiquity of lab-based work in the sciences, which throws students together in ways less common in other disciplines. At the other end of the spectrum, education and creative arts students record relatively low scores on this scale. It is important to identify these low scores because they indicate the fields of education where students have less engagement with their peers and with university life in general. As shown in the analyses below, these low engagement scores appear to be related to students' intentions to withdraw from their degree.

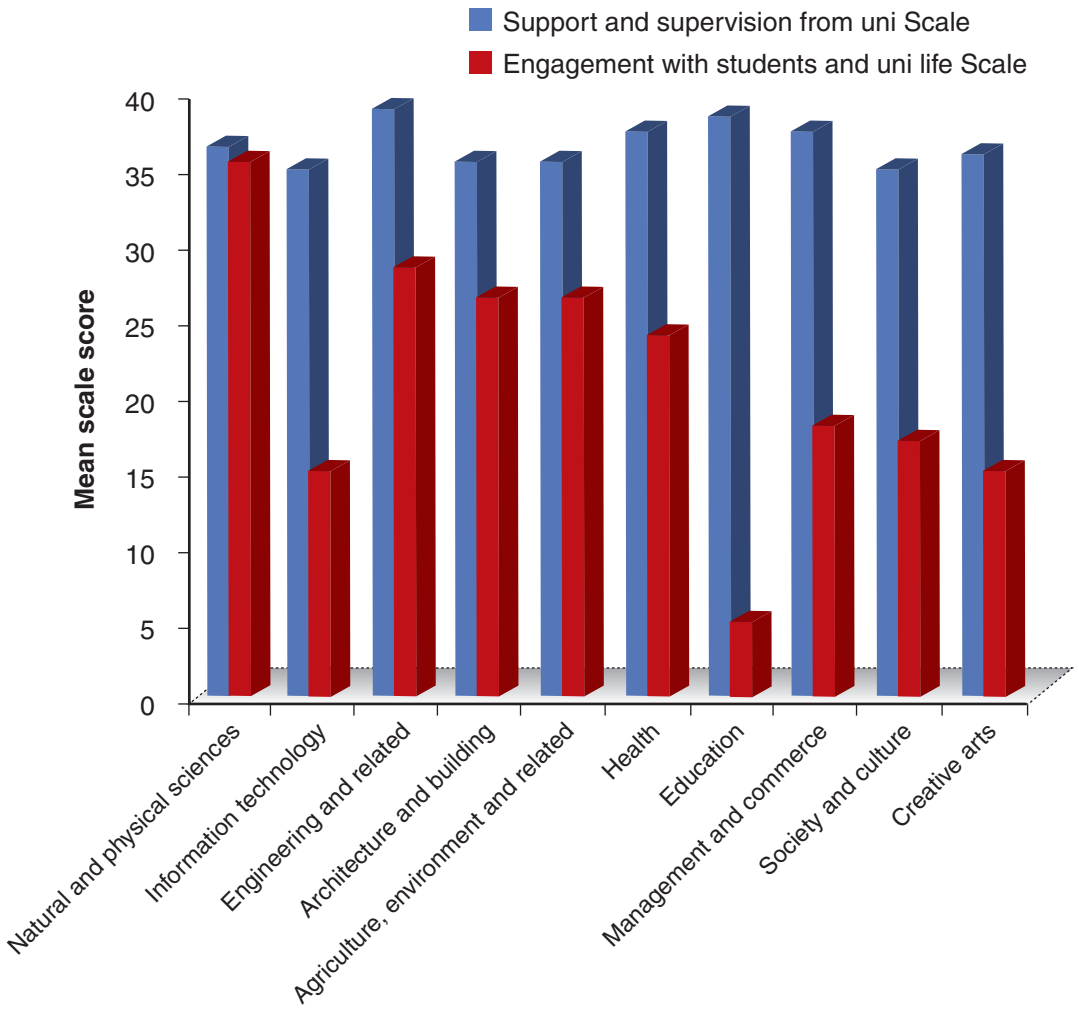


Figure 32: Mean scale scores for elements of student experience by broad field of education

Respondents were also asked to indicate the extent to which their thoughts of entering the academic workforce had changed during their research degree. In response to the statement 'I am now more interested in pursuing an academic career than I was when I began my research degree', students were more likely to indicate that they agreed than disagreed, with 46.2 per cent either agreeing or strongly agreeing with this statement while 25.6 per cent disagreed or strongly disagreed. This indicates that the HDR generally affirms students' interest in an academic career.

Of core importance to universities, governments and students themselves is that those who begin the task of a research degree are able to follow it through to completion. Overall, 12.4 per cent of students indicate that they have seriously considered withdrawing from their course over the past year, while 17.5 per cent have seriously considered taking a leave of absence. The variations in these responses by field of education are displayed in Figure 33. Students in the fields of education (16.5 per cent) and information technology (15.3 per cent) are most likely to have contemplated withdrawal compared to students from other disciplines, while those in engineering are by far the least likely (9.0 per cent). These variations in withdrawal intentions between fields are in line with variations in the 'engagement' scale above. These findings show that the fields in which students are most disengaged from other students and university life in general are also the fields most likely to have students contemplating withdrawal.

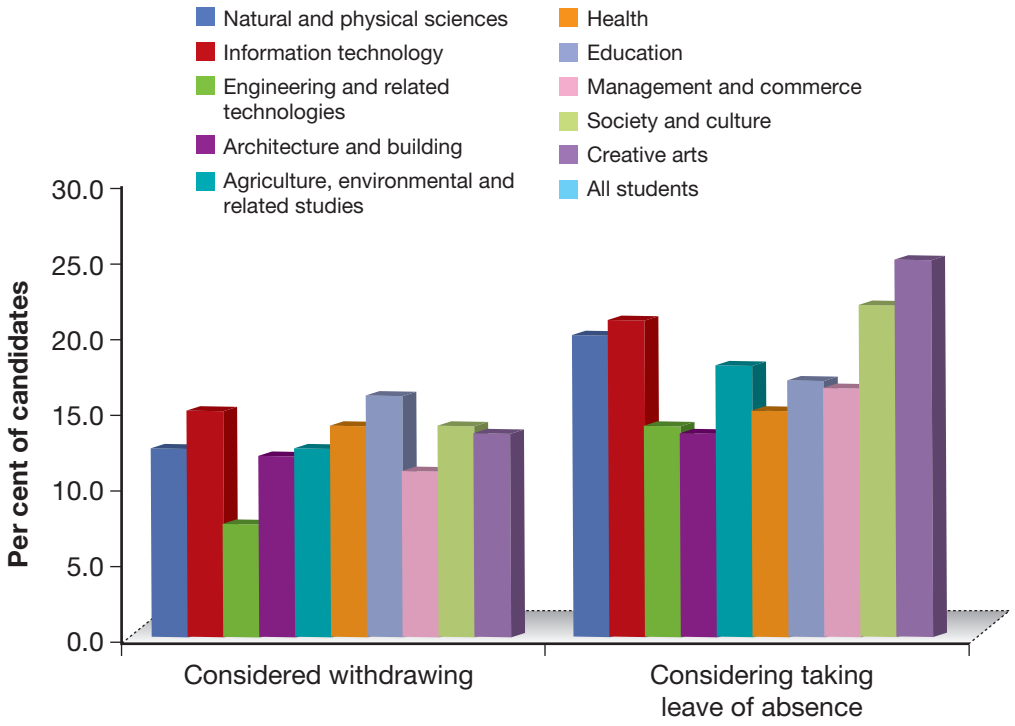


Figure 33: Research students considering withdrawal or taking a leave of absence, by field of education

Of those considering taking a leave of absence, over one-quarter of creative arts students and more than one in five of those studying society and culture (22.3 per cent) indicate that they have recently contemplated this option. The figures for architecture (14.0 per cent) and engineering (14.3 per cent) students are much lower. Again the pattern of leave of absence intentions by field of education follows the scores on the 'engagement' scale with those fields less engaged being more likely to indicate they have considered a leave of absence.

These findings help to highlight the relative vulnerability that research students experience during their research studies. They show that for all the intentions that a research student might have about a future career, if they do not have the support or feel they have the motivation to complete their research degree, many of the pathways they envision for themselves may not be achievable. The fields of particular concern are those with low engagement – education, creative arts, information technology and society and culture. The findings on engagement in the society and culture field are particularly concerning given the large proportion of research students who are enrolled in this field. There may be other confounding factors that are leading to students considering withdrawal.

Initial analysis of the influence of other factors suggests that students who primarily undertake their degree at home and students who work full-time hours are more likely than average to have considered withdrawing from their course. Amongst these broad groups, the most likely to be considering withdrawal are those working full-time at a university other than the one in which they are enrolled. While these analyses provide some interesting insight, further exploration of these withdrawal intentions, looking within fields and other characteristics of students is necessary to shed further light on this subject and more comprehensively utilise the data available in the NRSS.

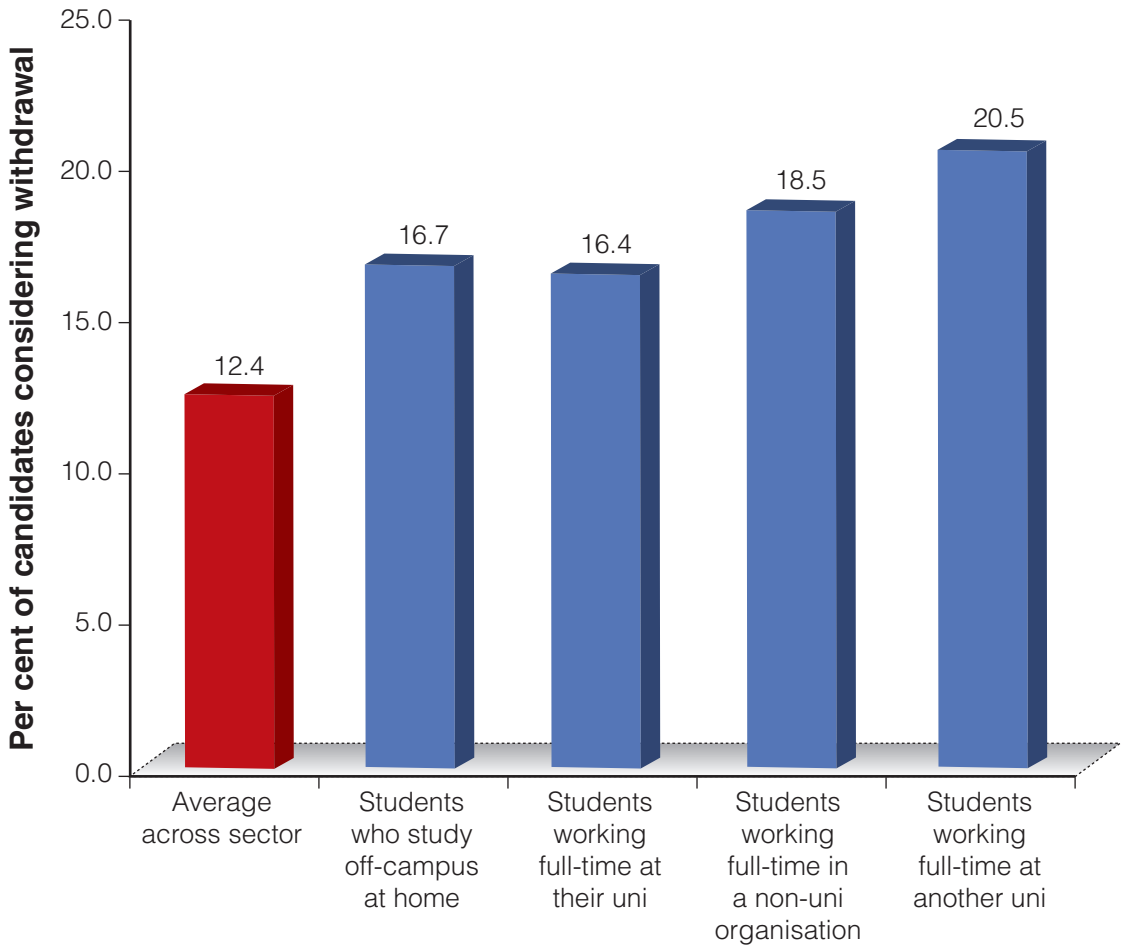


Figure 34: Research students considering withdrawal, by selected groups of students (%)

Of course there is an important difference between considering withdrawing and actually doing so, although considering withdrawing is a plausible proxy for satisfaction with the HDR experience. These results suggest it is particularly important for universities to monitor the engagement and retention of students in these particular fields.

A decision to change supervisors or move to a different university is another important indicator of students' satisfaction with their HDR experience. Figure 35 shows that while 7.9 per cent of students have seriously considered moving to another university in the past year only 0.7 per cent actually have done so. Figure 35 also shows that almost 9 per cent of research students have seriously considered changing supervisors in the past year and 4.8 per cent have actually made such a change. Therefore, a relatively small proportion of research students change supervisor (around 1 in 20), especially in consideration of the fact that some of this change may have been the result of supervisors moving university or retiring during a students' candidature.

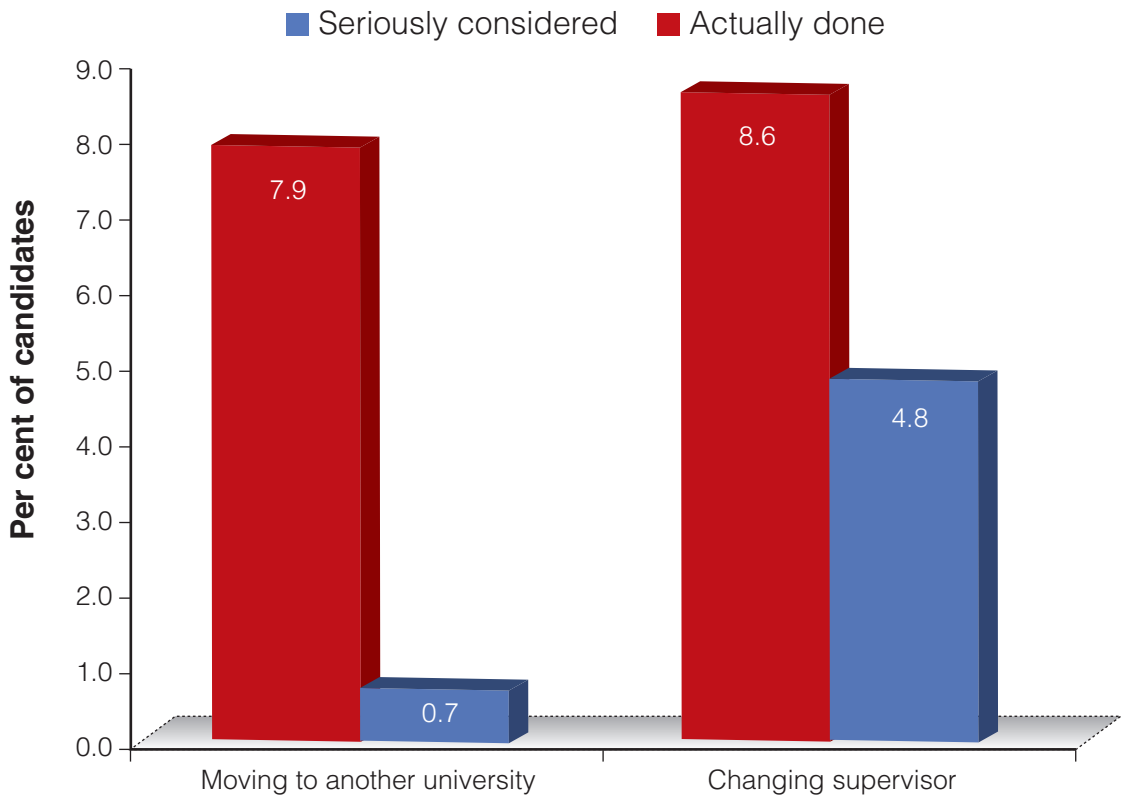


Figure 35: Research students' intentions and actions relating to changing universities and supervisors

As discussed in the previous chapter and in the earlier sections of this chapter, supervisors play a very important role in shaping the career motivations and research experience of research students. The results from the NRSS suggest that for the vast majority of students, their relationship and contact with their supervisor is seen as positive and beneficial. In Figure 36 the extent to which supervisors encourage their students to do specific academic-related extracurricular tasks is explored. As is illustrated here, four of every five students are encouraged by their supervisors to inform the academic world about their research via publication in journals and attendance at conferences.

Almost 40 per cent of research students are encouraged by their supervisor to take on undergraduate teaching responsibilities. Interestingly, students from the field of education are the least likely of all fields to have been encouraged by their supervisor to take part in undergraduate teaching, with only 23.6 per cent indicating they have been encouraged to do so. However, this may reflect that encouragement is not required in this field as there is an *expectation* that teaching will be undertaken by students studying in the field of education. At the other end of the spectrum, close to half of all science students (49.4 per cent) have been encouraged to undertake teaching or demonstrating duties. These differences may stem from a variety of aspects of disciplinary culture, and may also be an effect of the differing constraints imposed by the variety of research types undertaken across the disciplines, and their relative demands on time.

On balance, it appears that supervisors provide more support and encouragement for research activities than they do for teaching activities. This is perhaps unsurprising given that students are undertaking a research degree. However, it does suggest that those students intending to pursue an academic career are being encouraged to focus on the development of their research rather than teaching skills. It is also worth noting that almost half of all students indicated they were encouraged by their supervisor to prioritise their research above other academic activities.

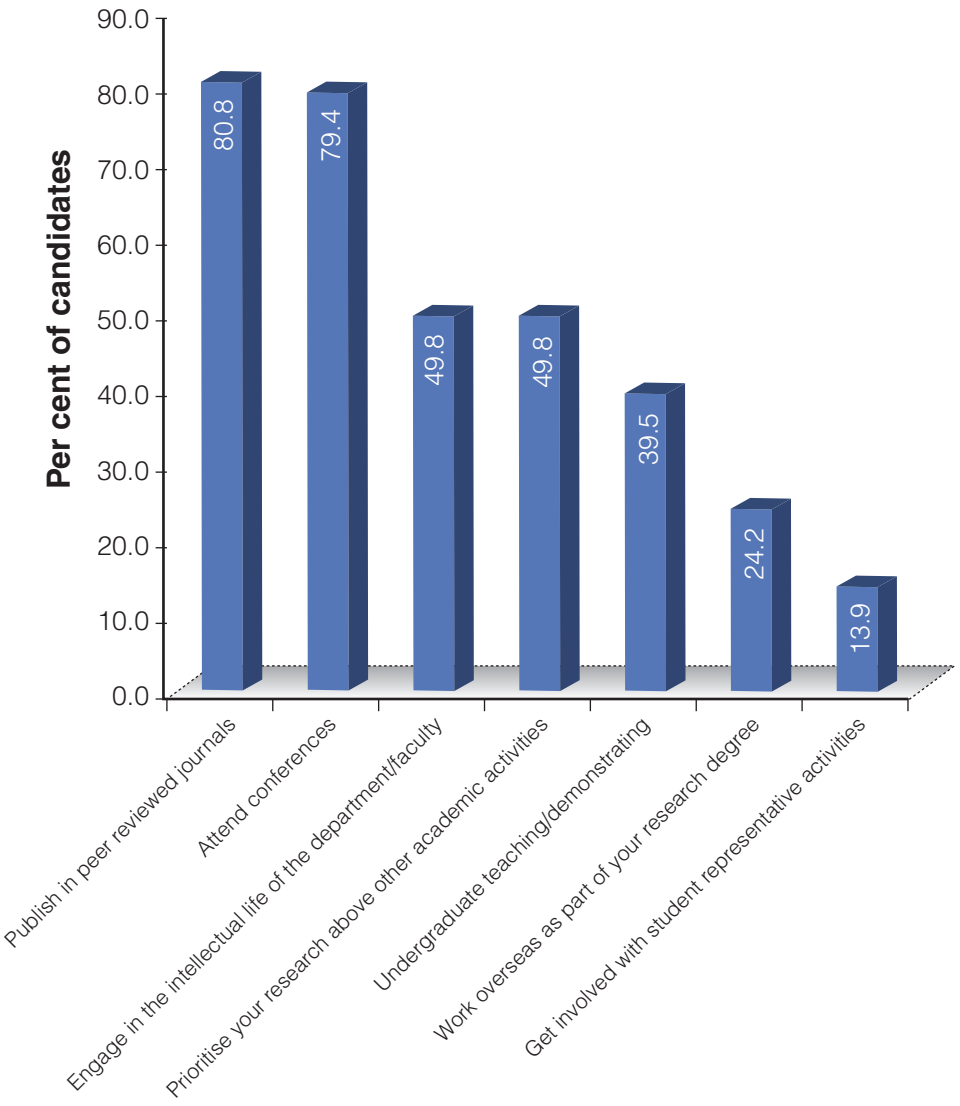


Figure 36: Proportion of research students 'encouraged' by their supervisors to undertake selected activities

Direct encouragement to pursue an academic career is also provided by supervisors to many of their postgraduate research students. The NRSS responses also suggest that this factor plays an influential role in plans to follow an academic career. As Figure 37 shows, students who have plans to pursue academic work were twice as likely as others to strongly agree that they have been encouraged to consider an academic career during their research degree. Given that the earlier evidence from the NRSS has shown that the influence of supervisors on student's thoughts relating to an academic career are seen as highly important to making decisions about such a pathway, the outcome shown in Figure 37 is perhaps not unexpected, but nonetheless important.

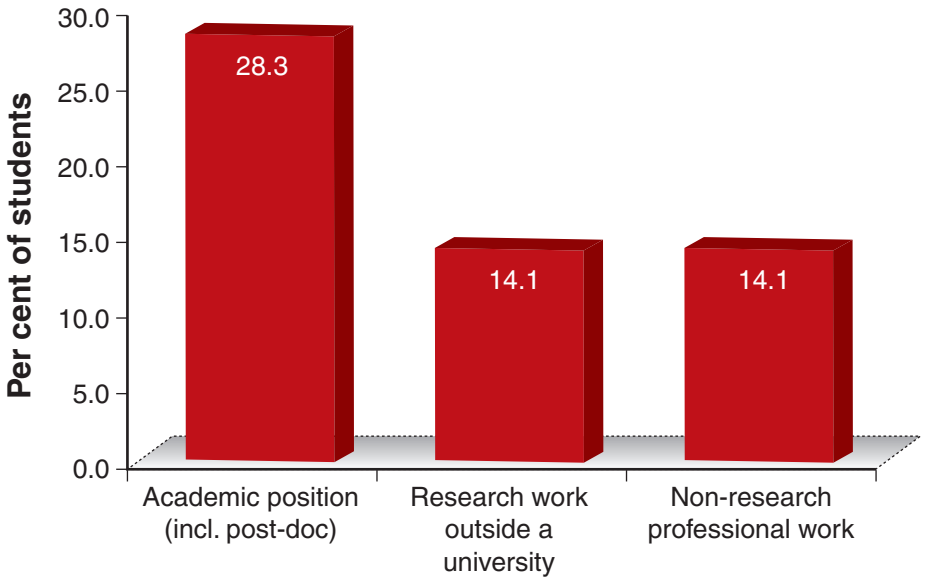


Figure 37: Proportion of research students who 'strongly agree' with the statement 'Staff encouraged me to consider an academic career when I was a postgraduate', by career plan for medium- to long-term

As Figure 36 shows, there are many duties and experiences competing for students' time, beyond their core task of conducting their research. As well as this, the HDR provides an opportunity for students to develop the skills they will need in future employment. Figure 38 shows the degree to which students feel that their experiences within the HDR have prepared them for a variety of work roles. Most of the activities illustrated in this figure relate to elements of the academic career, although the final two items relate to work outside academia. In general, students feel that their degree will be effective in preparing them for academic research and publication, but not particularly effective in preparing them for the task of university teaching and coordinating teaching or for careers outside the academic sphere. This is an extremely important finding in the context of this study, as it suggests that those research students who intend to go on to an academic career feel their research degree will not prepare them for teaching roles within universities. It is important for universities to be aware of this perceived deficiency in skills of early career staff, so as to implement policies that provide resources to assist with this preparation (be this during the research degree or in the initial period following the recruitment of new academics).

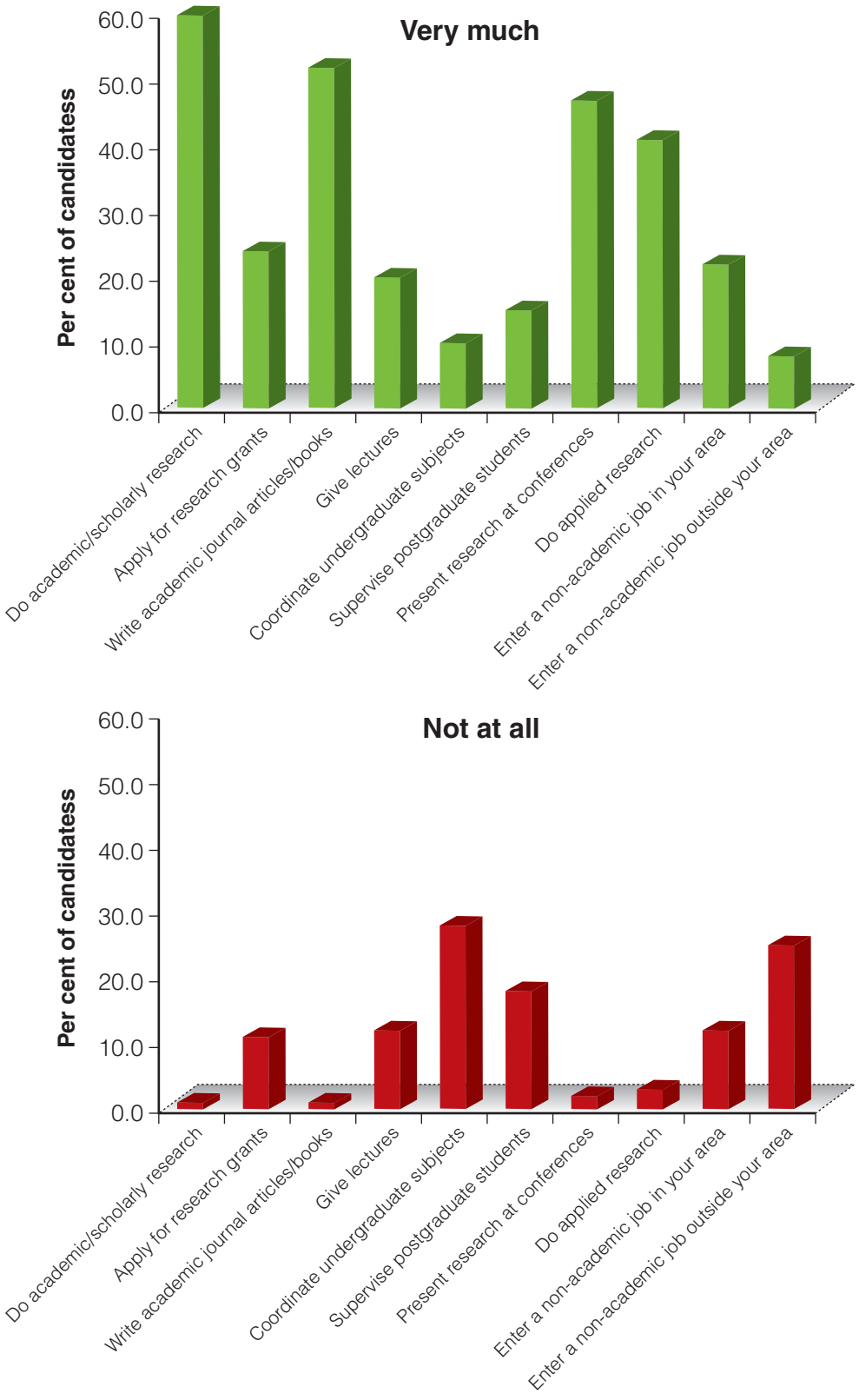


Figure 38: Extent to which research degree prepares students for work – proportion of students indicating high (top) and low (bottom) levels of preparation

5.3 Working during the research degree

The majority of research students are employed in paid work while undertaking their degree, with 58.9 per cent indicating they are currently employed. The most common place for research students to be employed is within the university in which they are completing their degree. Thirty-one per cent of all research students are working within their own university and 6.1 per cent work at a different university. Just over one-quarter (25.8 per cent) have a job outside the university sector (Figure 39).[4]

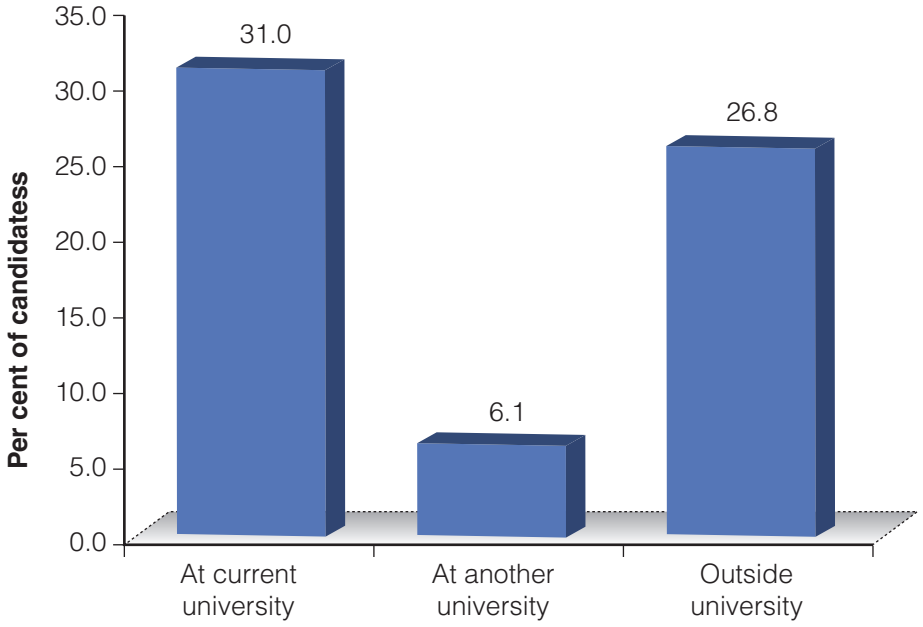


Figure 39: Place of employment for research students

5.3.1 Students working at universities

While slightly more than one-third of research students were currently employed in a university at the time of responding to the NRSS, a much larger proportion, 57.2 per cent of all participants, indicated having been employed by a university at some point during their research degree. This finding shows that a substantial proportion of the research student population undertakes employment within the university environment at some stage during their degree.

Of those currently employed by a university, 70 per cent are working on a temporary or casual basis and a further 9 per cent have a fixed-term contract of one year or less (Figure 40). Fourteen per cent of all those working at a university indicate they are on a permanent or open-ended contract – a larger proportion than might have been expected. However, those on these kinds of contracts tend to be older students, with few aged under 35 having the good fortune of such a position.

[4] About four per cent of students work in more than one of these locations in multiple jobs and are therefore represented more than once in the columns of Figure 39.

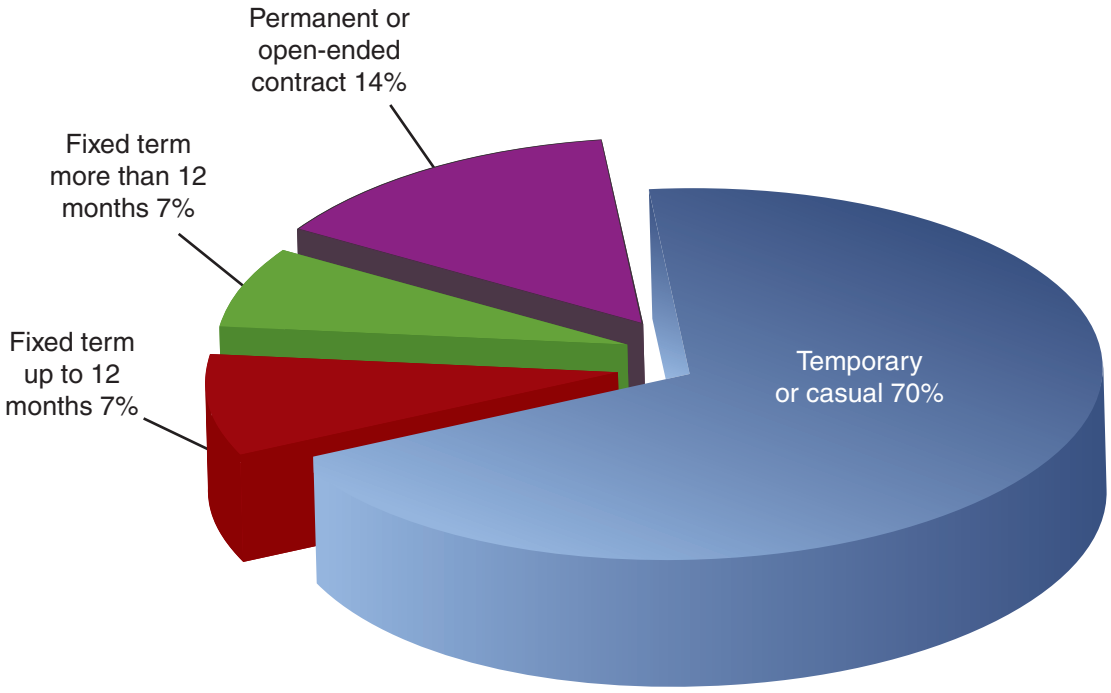


Figure 40: Contract terms for research students employed at a university

In line with the fact such a large proportion of students enrolled by universities are working on temporary or casual contracts, a substantial concentration of those working in the university sector are employed for fewer than 10 hours per week (60 per cent). About 17 per cent of all those working in universities indicated they work approximate full-time hours (35+ hours per week), while 23 per cent work between 10 and 34 hours per week.

This is an important finding, because it emphasises that there are many research students working in universities in full-time or close to full-time academic positions already. Of the whole cohort of research students, about 6 per cent are employed in university academic positions for 35 hours or more per week. This shows the non-uniformity of the HDR and for that matter the academic career.

For those working at universities during their candidature, there are differences in the amount of hours employed for students enrolled full-time and part-time (Figure 41). Unsurprisingly, those who are enrolled in a part-time capacity are more likely to be working longer hours at university. It is also of interest to note the small but important group of students that work at a university full-time (35 or more hours per week) and are enrolled in full-time study. The NRSS figures show that this group is less than five per cent of all those who are employed within universities.

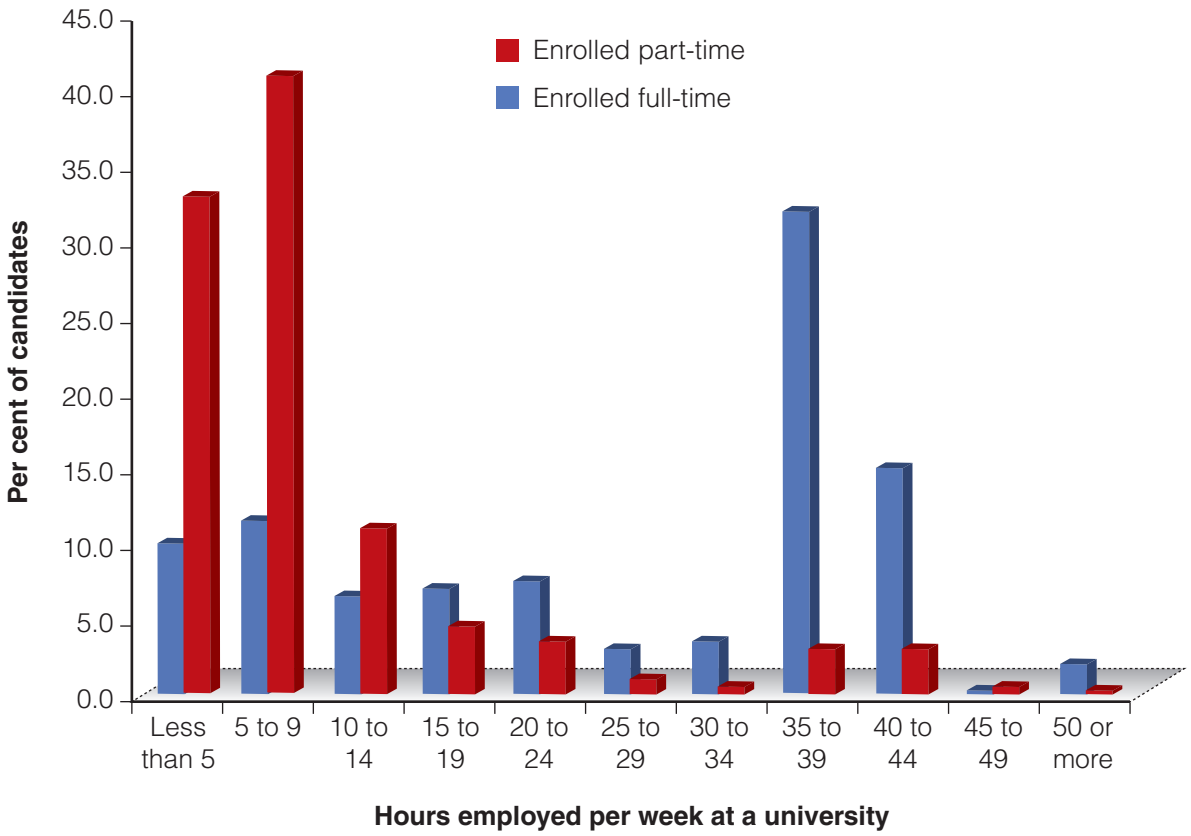


Figure 41: Hours employed per week, by enrolment status - research students working at a university

Research students are employed by universities in various positions. The general tasks and the proportion of research students employed in each category are displayed in Figure 42. The figure shows two different distributions; one fore students who are employed by the university at which they are enrolled and the other for students employed by a university other than the one they are enrolled. While a much larger number of students are employed at their university of study (as shown in Figure 39), the variation in findings here makes it useful to display the figures for those working outside their place of study as well. For each of these two groups, more than 70 per cent of those students employed by the university are undertaking teaching responsibilities – either as lecturers or tutosr/demonstrators. However, while those working at the university they study at were more likely to be tutoring (54.9 per cent) than lecturing (16 per cent), the outcome was almost the opposite for students working and studying at separate universities.

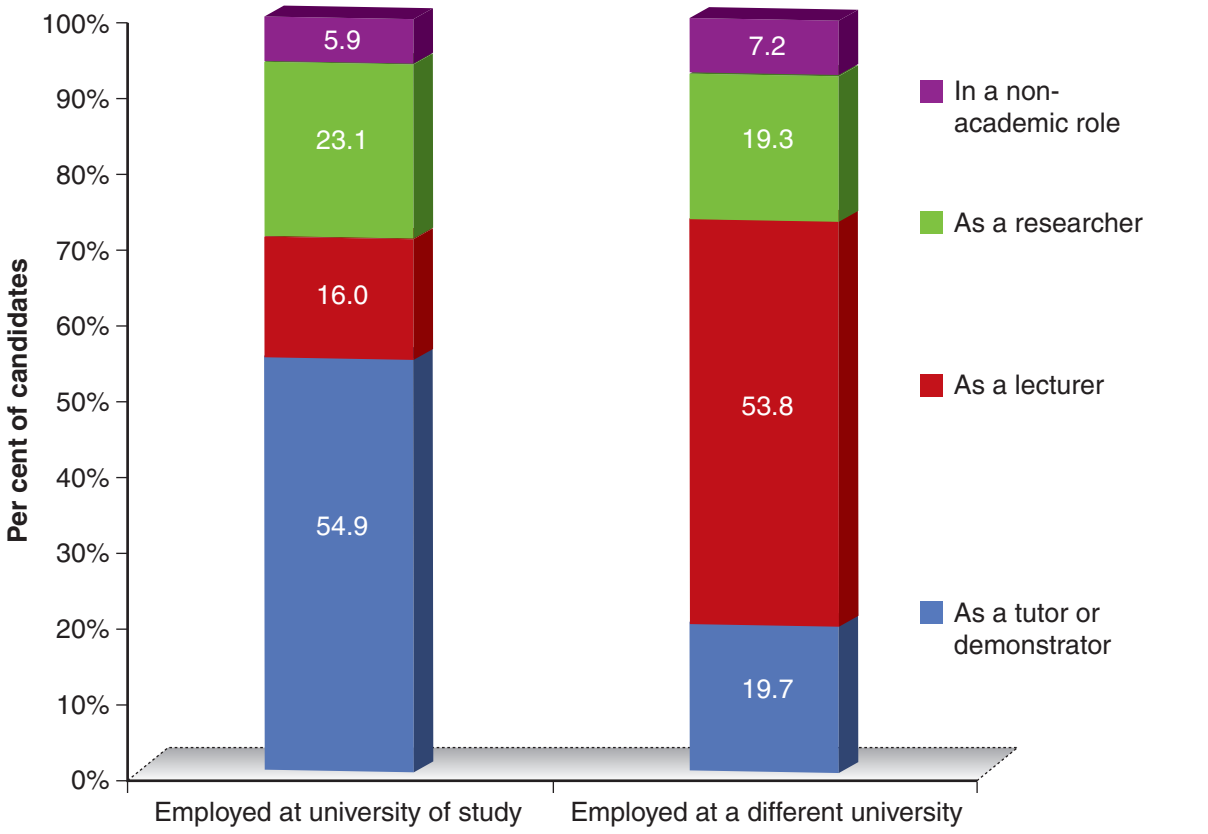


Figure 42: Type of employment at university by location of work, research students working in the university sector

These findings show that a significant proportion of research students who are working at universities are participating in paid teaching work during their studies. Across the whole cohort, 45.1 per cent of students indicate that they have been involved in some teaching or demonstrating work at some stage during their research degree. Comparing this to the findings in Figure 38, it suggests that even although students felt the HDR was not preparing them for teaching they are still gaining experience in these activities through their paid employment. This is important as even although students are being encouraged by their supervisors to focus more on research activities during their HDR (Figure 36), students are still ensuring that they gain experience in the other aspects of academic work.

Motivation to engage in paid work at universities comes from a range of factors, from the pragmatic to the idealistic. In Figure 43 a range of factors influencing the choice of this work is shown, displaying the percentage of students who indicate the factor was 'very important' in their decision to take the work. Those involved in teaching work and those in research work are shown in separate charts. For both groups, the basic need for an income is the key factor of importance (about 60 per cent of each group indicated that this reason is important). However, those who take on university work also see it as important as a basis for a future academic career, with 43 per cent of those in teaching work and 48 per cent of those in research employment indicating that the desire to improve skills in these areas in preparation for a future academic career is a very important motivation to undertaking this work. Similar proportions of students also report that the fact that they have a passion for this kind of work is a very important motivating factor.

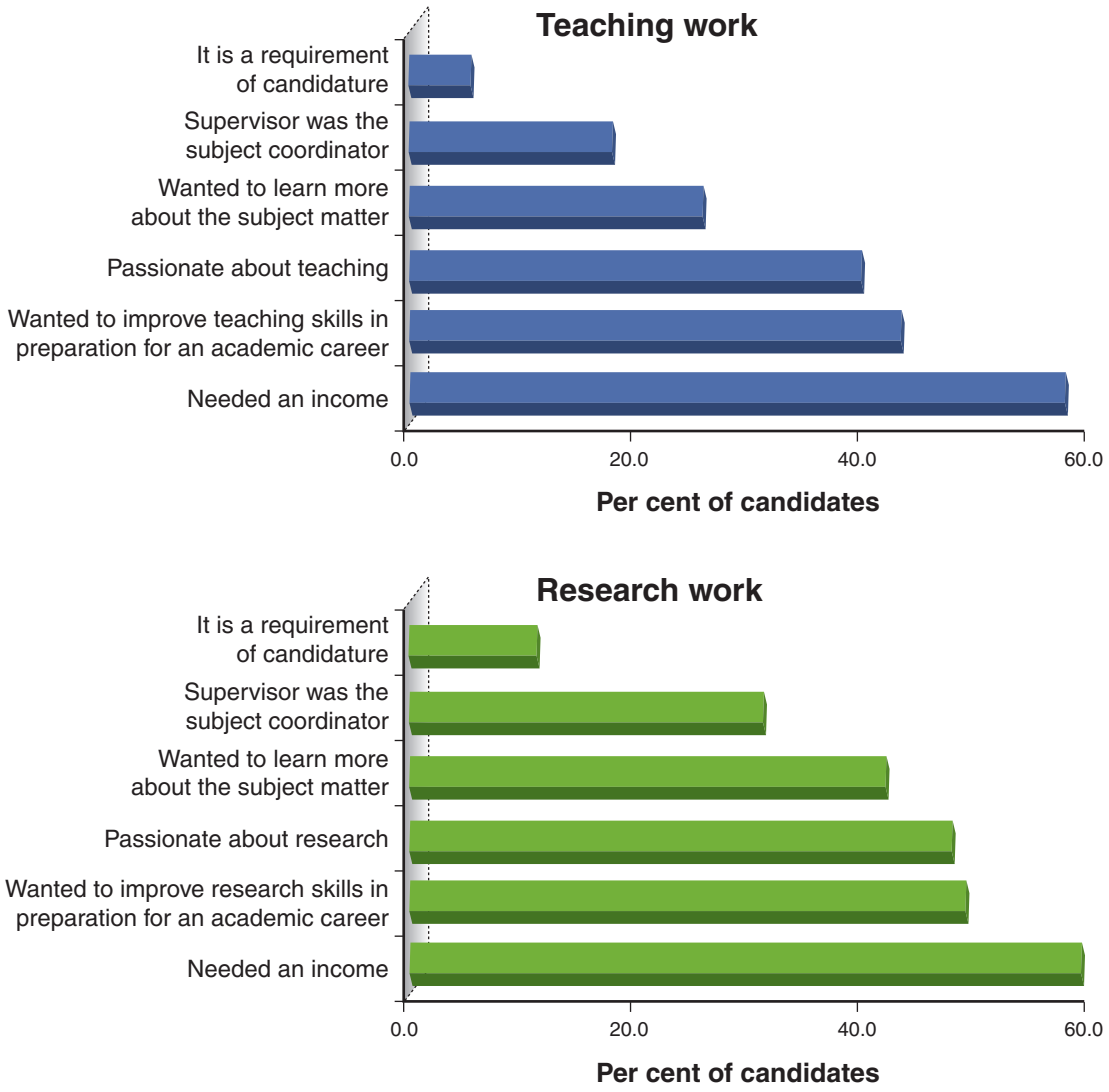


Figure 43: Proportion of working research students for whom the selected factors were 'very important' in the decision to take on this work, by type of university employment

5.3.3 Students working outside the university sector

As shown in Figure 39, just over one-quarter of research students surveyed are employed in work outside of the university sector. The work of these students is spread between the private sector (49.6 per cent), the government sector (36.4 per cent) and the not-for-profit sector (14.1 per cent). The jobs which these students are employed in are more likely than not to be related to their research degree, with 41 per cent having jobs that are 'closely related' and a further 41 per cent a job that is 'somewhat related' to their study (Figure 44).

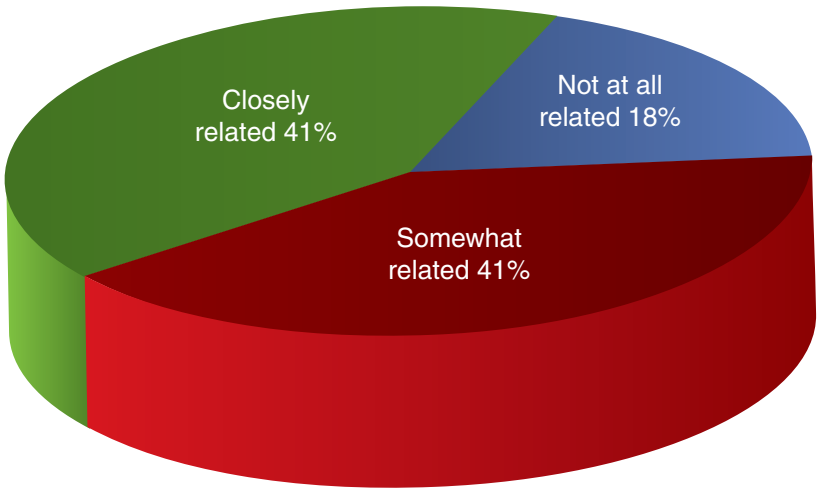


Figure 44: Extent to which job is related to research degree, students employed outside the university sector

The number of hours per week that these students work does seem to differ from those employed within universities. Thirty per cent of this cohort indicate that they work between 35 and 44 hours per week (approximately full-time), while a further 30 per cent work between 5 and 14 hours each week. Far fewer of these students work only a few hours per week when compared with those working at university. Figure 45 illustrates this point, showing the much larger proportions of the university-based workers spending up to 10 hours per week in such jobs, while jobs outside the university sector tend to have longer working hours.

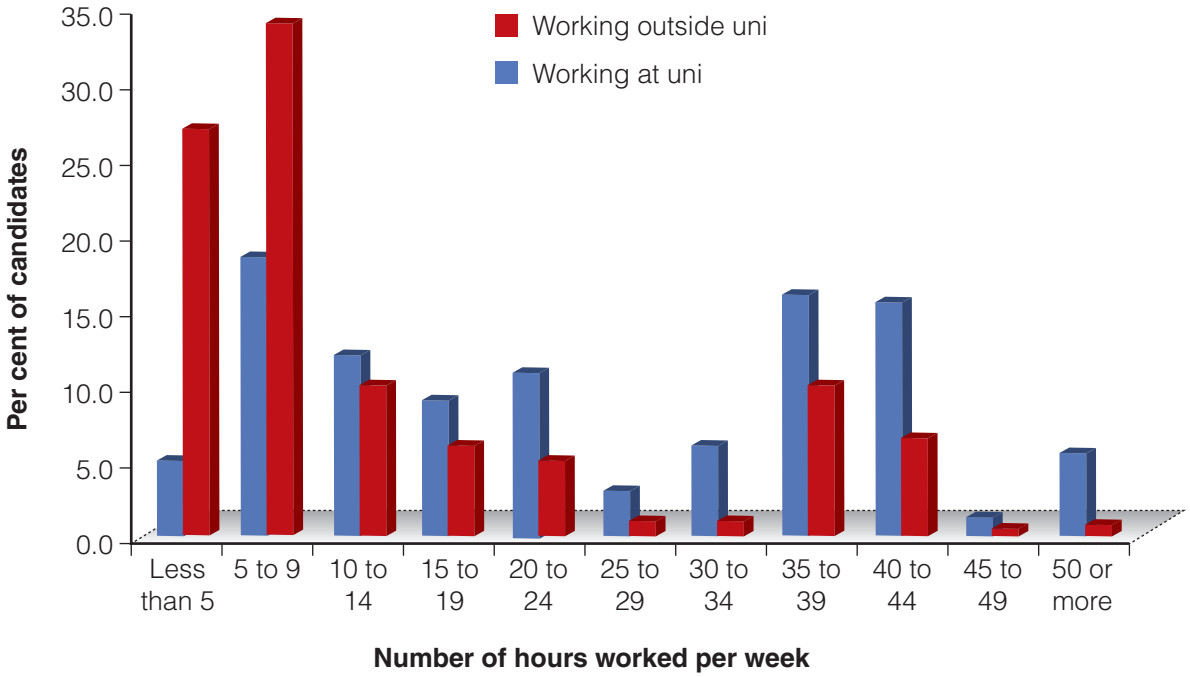


Figure 45: Hours employed per week by location of work

5.4 Conclusion

This chapter has examined the experiences of research students during their degree both in terms of their study and relationship with their institution and in the paid work they undertake outside the specific task of completing a thesis.

The backgrounds of students entering HDRs in Australia are varied, but the results from the NRSS show that many enter into research degrees following time in the labour force, with 45.6 per cent having been in full-time and 9.6 per cent in part-time work as their main activity in the year prior to commencing their studies. About one-quarter (24 per cent) entered their HDR straight from an undergraduate course and a further 16.2 per cent made the transition from other postgraduate studies. These pathways differ greatly across the fields of study, with many science research students making the transition straight from undergraduate studies (43.3 per cent) while architecture and education students were the most likely to have entered their research degree from full-time work (64.8 and 63.9 per cent respectively). Importantly, the majority of those in full-time work before they began their degree were in jobs directly related to their studies.

In general, students tend to feel well supported in their studies by their institutions and are also very positive about the support they receive from their supervisors. However, nearly one-quarter of all students report feeling lonely and isolated in their studies, suggesting that there are additional support mechanisms that could be offered to students. Students in some fields on average record lower levels of engagement with students and university life than others; in particular, education and information technology students appear to experience the highest levels of isolation. The fields that have the highest proportions of students who feel isolated during their studies were also those with the highest levels of students who have considered withdrawing from their course – education, creative arts, information technology and society and culture. However, overall only a small proportion of students have seriously considered withdrawing from their studies over the past year (12.4 per cent).

On balance, it appears that supervisors provide more support and encouragement for research activities than they do for teaching activities. This is perhaps unsurprising given that students are undertaking a research degree. However, it does suggest that those students intending to pursue an academic career are being encouraged to focus on the development of their research rather than teaching skills.

Almost 60 per cent of research students are employed while undertaking their research degree. About one-quarter of all students work outside the university sector while more than one-third are in paid work at a university. These figures record current levels of employment, however the NRSS also shows that 57 per cent of all research students have been employed at a university at some period during their candidature, with 45.1 per cent undertaking some form of teaching or demonstrating work. This suggests that a large proportion of research students experience academic work during their studies.

Among those students currently employed at a university, the vast majority are on casual or temporary contracts (70 per cent) or contracts of 12 months or less (9 per cent). In addition, of this group 60 per cent are employed by a university for fewer than 10 hours per week. On average, almost three-quarters of those employed at university work as tutors or lecturers, while about 20 per cent are engaged in research-related work. These findings suggest that even though students feel the HDR was not preparing them for teaching, they are still gaining experience in these activities through their paid employment. This is important as even though students are being encouraged by their supervisors to focus more on research activities during their HDR, many students are still gaining experience in the other aspects of academic work.

Motivation to engage in paid work at universities comes from a range of factors, from the pragmatic to the idealistic. For the most part the basic need for an income was the key factor of importance. However, those who take on university work also see it as important as a basis for a future academic career, with 43 per cent of those in teaching work and 48 per cent of those in research employment indicating that the desire to improve skills in these areas in preparation for a future academic career is a very important motivation to undertaking this work.

For those students employed outside the university sector during their degree, 41 per cent indicate their work was ‘closely related’ and a further 41 per cent that their work was ‘somewhat related’ to their research degree. These students are employed in a range of sectors and industries and are more likely than those employed within universities to be working full-time hours.

6 Training for University Teaching

6.1 Introduction

As its name suggests, the higher degree by research is a qualification based primarily on research conducted by the student (usually in the form of a thesis), although an HDR may comprise up to one-third advanced coursework (as funded under the Research Training Scheme)[5]. Training for other purposes is therefore somewhat peripheral to the requirements of the degree itself, although many skills are developed at the generic level as a product of the research experience. The results from the NRSS show that about 40 per cent of research students surveyed have medium- to long-term plans to enter an academic career that involves both research *and* teaching. It is important to gauge the extent of training for university teaching present within the HDR, and the extent to which research students are prepared for university teaching roles should they follow an academic career path. These questions are especially relevant in the context of the current policy focus on assessing various aspects of university quality, and the development of a new indicators framework by DEEWR and the Australian Government which emphasises the importance of professional development programs in university teaching.

There is little extant research on the extent to which students are involved in training for university teaching during the already arduous and time-limited HDR. This chapter provides analysis of the training experiences of students as well as on overview of the findings of the Institutional Survey relating to the provision of such training from the perspective of university leaders. It begins with a brief overview of the Institutional Survey.

Recognising that not all students intend to undertake teaching work and, therefore, do not require training in teaching, the next part of the chapter focuses on those who intend to pursue an academic career. The responses of students with an ambition to become an academic are examined for issues relating to training for university teaching including the extent of their knowledge of the training available at their institution and, for those who have undertaken training, the perceived importance and effectiveness of it for future career aspirations in the academic sphere. The final part of the chapter examines the characteristics of all those research students who have participated in training, comparing this group to the norm across the whole population in order to identify specific defining factors relating to training participants.

Findings of particular importance to institutions in this analysis is that:

- More than half (54 per cent) of research students who have medium- to long-term ambitions to enter the academic workforce do not know whether their university offers training for university teaching;
- Given this lack of awareness of training it is unsurprising that fewer than one in five research students actually participate in training for university teaching during their degree;
- Participation in training is higher among students involved in teaching work but the rate of participation is still low with only one-quarter of students who have undertaken teaching work (and have ambitions to become academics) participating in training for university teaching during their degree;
- Institutions appear to somewhat overestimate the take-up rate of participation in training for university teaching by research students, for example, half of all institutional respondents thought that the take-up rate of training was somewhere between 25 per cent to 75 per cent;
- Despite the small proportion of students undertaking training, most students who were engaged in teaching work felt prepared and satisfied in the teaching work they undertook;
- The main reason given by students for not having taken part in training was lack of time (38 per cent);
- Those who undertook training felt that the training provided good preparation for teaching methods for small groups and they valued the contact with other students just starting out teaching and with experienced academics;
- Training was seen to be less effective in providing preparation and skills for course planning; and,
- Responses to the Institutional Survey indicated that research skills were valued more highly than teaching skills by institutional leaders when recruiting new research graduates as academic staff.

[5] http://www.innovation.gov.au/Section/Research/Documents/RTSAnnexuretoDetermination2010.pdf

6.2 About the Institutional Survey

The Institutional Survey (IS) was conducted as a supplement to the National Research Student Survey (NRSS) and aimed at uncovering information about the extent to which professional development opportunities in teaching practices are available to sessional teachers and research students at Australian universities. The IS targeted two key personnel at each university – the appropriate Pro- or Deputy Vice Chancellor (for example DVC Academic, PVC Teaching and Learning) as well as the Head of Graduate Studies or equivalent. The findings from the IS are used here in conjunction with the NRSS responses in order to triangulate conceptions of the availability, breadth and quality of teacher training opportunities in Australian universities. The survey also asked participants to comment on the attributes desirable in new, junior academic staff at the institution. The IS asked only brief generalised questions, in view of the time likely to be available to staff taking part. In total 24 responses to this survey were received, resulting in information from personnel at between half and two-thirds of all Australian universities. Further detail relating to this survey is provided in the method discussion in Appendix A.

6.3 The involvement of HDRs in training for teaching

6.3.1 Prior training in teaching

While this chapter focuses primarily on the extent to which students undertake training for university teaching during their research degree, it is important to acknowledge the fact that some research students had already completed teacher training courses or qualifications prior to commencing the HDR. In total, more than one-third of students (35.3 per cent) had been involved in some kind of training relating to teaching before beginning their research degree. However, in general the training completed tended to be related to school rather than university teaching. Only a small proportion (4 per cent) of students had previously been involved in a specific university teaching qualification such as a Graduate Certificate in Higher Education. Of those with teaching qualifications, students were most likely to have a school teaching qualification such as a diploma of education, while a small proportion had a VET training qualification. About 16 per cent of students have done some kind of short course in teaching, but the extent to which this was higher education-based teaching is unclear.

In general, the findings here show that a notable proportion of research students had some experience in teaching training prior to beginning their research degree and therefore some familiarity with the skills that teaching involves.

6.3.2 Participation of academic aspirants in training for university teaching during the HDR

The key factors likely to result in research students being involved in training for university teaching during their degree include: an interest in pursuing an academic career, awareness of the existence of such courses and time to take part in the training. As discussed in Chapter 4, 54.1 per cent of all research students have plans to pursue an academic career in the medium- to long-term. Of these students, the majority expect that their academic work will comprise roles in both teaching and research (see Figure 15 in Chapter 4). Given that those students not wishing to pursue academic work are unlikely to be seriously interested or engaged in training for university teaching, it is students with medium- to long-term ambitions for academic work which are the focus of the analysis in this first part of the chapter.

Given that the group of research students focused on here have aspirations and interests in an academic career, it could be expected that the extent to which students are familiar with, and involved in training for university teaching is relatively large. However, the findings from the NRSS indicate that knowledge of the availability of such courses in not common and participation is relatively low.

Awareness of the existence of university teaching courses appears to be a significant issue. More than half of all research students with an ambition for an academic career do not know whether their institution offers training for university teaching to research students (54 per cent, see Figure 46). Slightly more than 30 per cent of this group of students indicate that they know that this kind of training is being offered and about 14 per cent believe that such training is not offered by their university. Interestingly, when examined by institution, there were no discernable patterns in this regard – in other words, students from some institutions think there is no training offered, while others from the same institution indicated that there is. Overall, it seems that there is some confusion among research students as to the extent of opportunities for training in university teaching that are available to them.

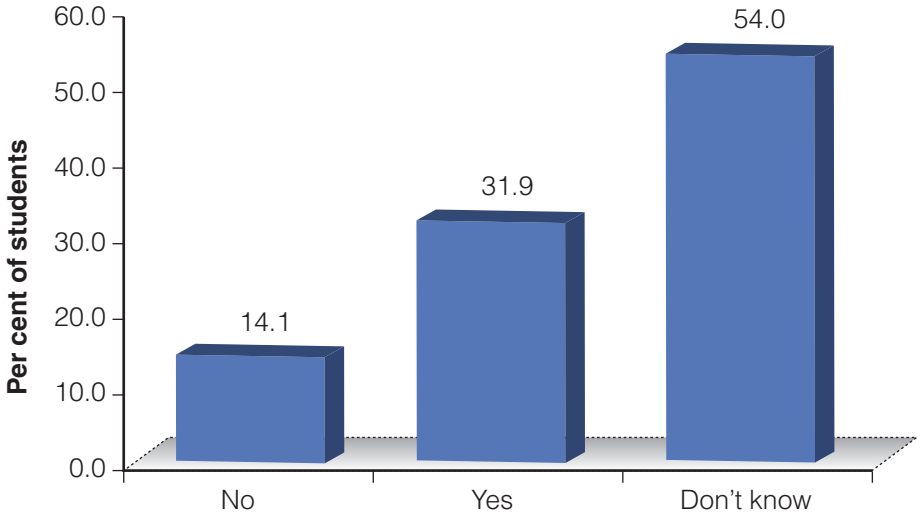


Figure 46: Research student responses to question: 'Does your university offer training for university teaching to research students?' – Students with plans for academic career in medium- to long-term only

Contrary to the views of students, the Institutional Survey shows that the availability of training in university teaching is widespread. Twenty of the 24 respondents to the IS indicated that their institution offers training in university teaching to research students who are undertaking tutoring, demonstrating or lecturing work. Of those offering such training, most have a variety of organisational units responsible for delivery. Fourteen of the 20 respondents' institutions offering training do so through a special academic development unit or similar, while 10 offer training through individual faculties, departments or schools. Delivery of training tended to be undertaken by a mixture of academic staff (18 institutions) and specialist training staff (10 institutions).

Around half of the institutional respondents report that their university offers a Graduate Certificate, Diploma or similar award in university teaching practices to research students. This finding may somewhat misrepresent the availability of such programs, because all Australian universities offer these kinds of courses. However, university conditions on the HDR often preclude concurrent enrolment in another award course, and it is likely that participants responding to the IS were commenting on the availability of such programs to research students, not their availability in general.

The lack of general awareness among students with academic career ambitions regarding training for university teaching at their institution is no doubt influential on the fact that a relatively small proportion of this cohort has actually taken part in such activities during their research degree. Overall, only 16 per cent of this group of research students have been involved in training for university teaching while enrolled in their current degree. However, the extent to which these students have been involved in such activities is related to the length of time they have been a research student. As shown in Figure 47, among students nearing the end of their candidature, more than one in five students have taken part in training.

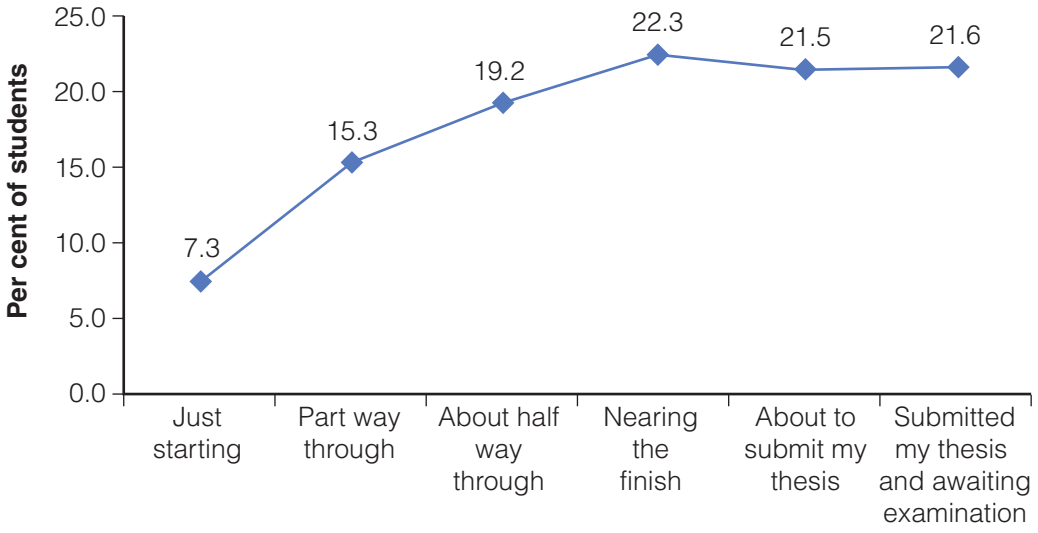


Figure 47: Proportion of research students who have participated in training for university teaching during research degree, by period of candidature– Students with plans for academic career in medium- to long-term only

Institutions appear to somewhat overestimate the take-up rate of participation in teacher training by research students. Eight of the 16 institutional respondents who answered the question on take-up rate in the Institutional Survey thought that between 25 and 75 per cent of students undertook such training, with two estimating less than 25 per cent and six not sure. This finding suggests that there is a mismatch between institutions' perceptions of the take up rate of training and the actual participation by research students.

The NRSS responses revealed that there are other variables that affect the take-up of training for university teaching. When examined by field of education, students with academic career ambitions from society and culture, management and commerce, and engineering were more likely than others (especially those from agriculture, education and health) to have participated in this kind of training during their research degree (Figure 48).

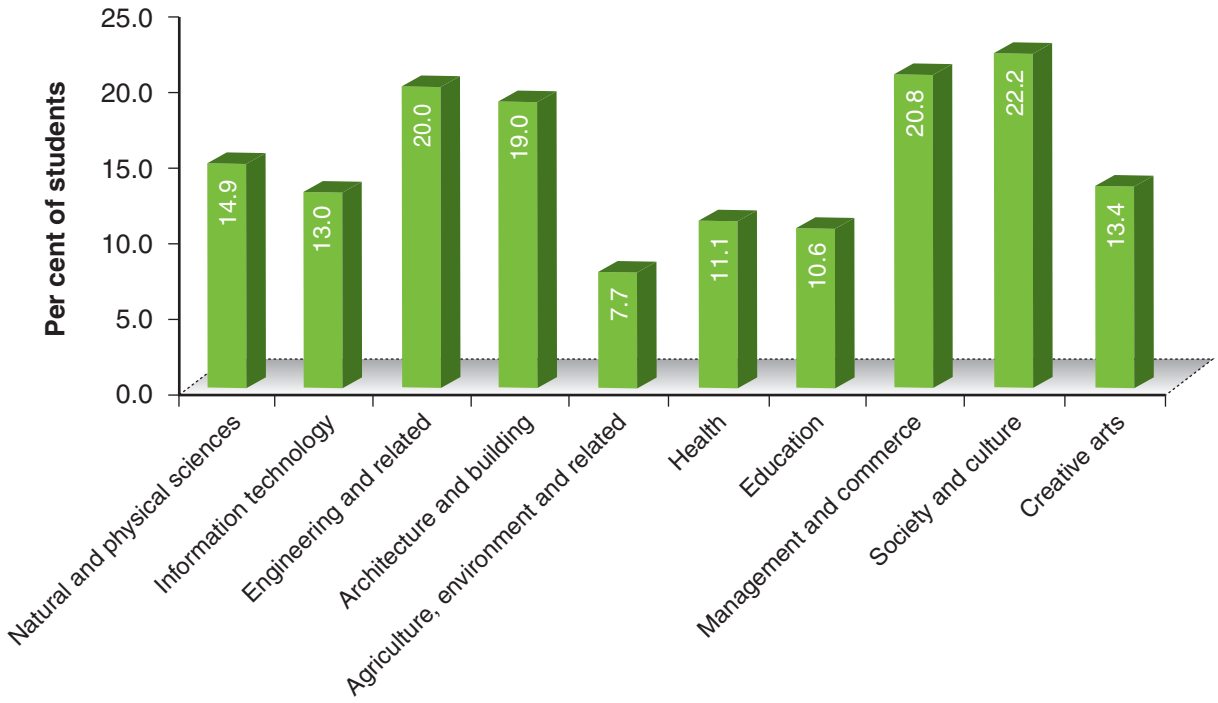


Figure 48: Proportion of research students who have participated in training for university teaching during research degree, by field of education– Students with plans for academic career in medium- to long-term only

University type also has an influence on teaching training participation. The groupings used in Figure 49 are based on DEEWR's categorisation of universities in Australia which is related in part on universities' self-grouping. The results show that students from Group of Eight, Innovative Research and Non-Aligned Metropolitan universities are more likely to have participated in training than students from other institutions.

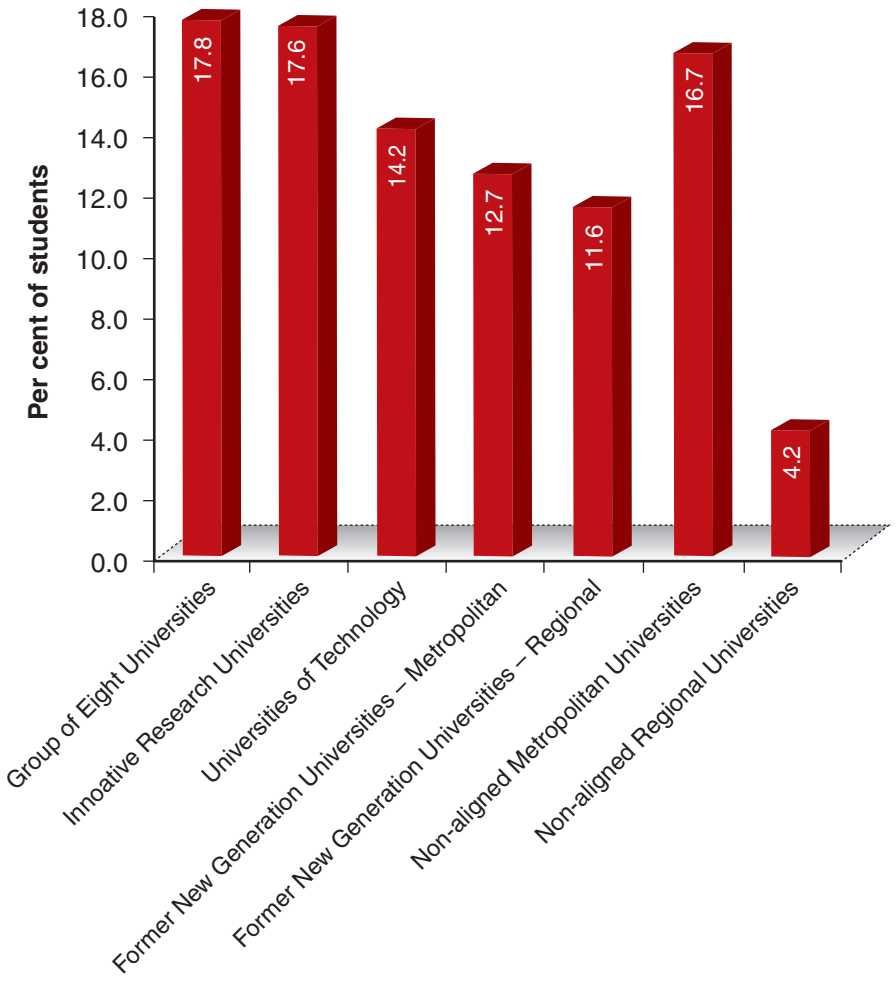


Figure 49: Proportion of research students who have participated in training for university teaching during research degree, by university type – Students with plans for academic career in medium- to long-term only

Figure 50 shows the extent to which research students with medium- to long-term ambitions to work in the university sector have been involved in a range of different types of training for university teaching. Overall, the most commonly attended type tends to be general short induction courses (5.4 per cent of this group of students have participated in mandatory courses and 4.9 per cent in a voluntary capacity). Short courses on specific facets of teaching in universities are the next most common, with very few students participating in award course qualifications. This is likely to be due to university restrictions on students enrolment in more than one recognised university qualification at a time.

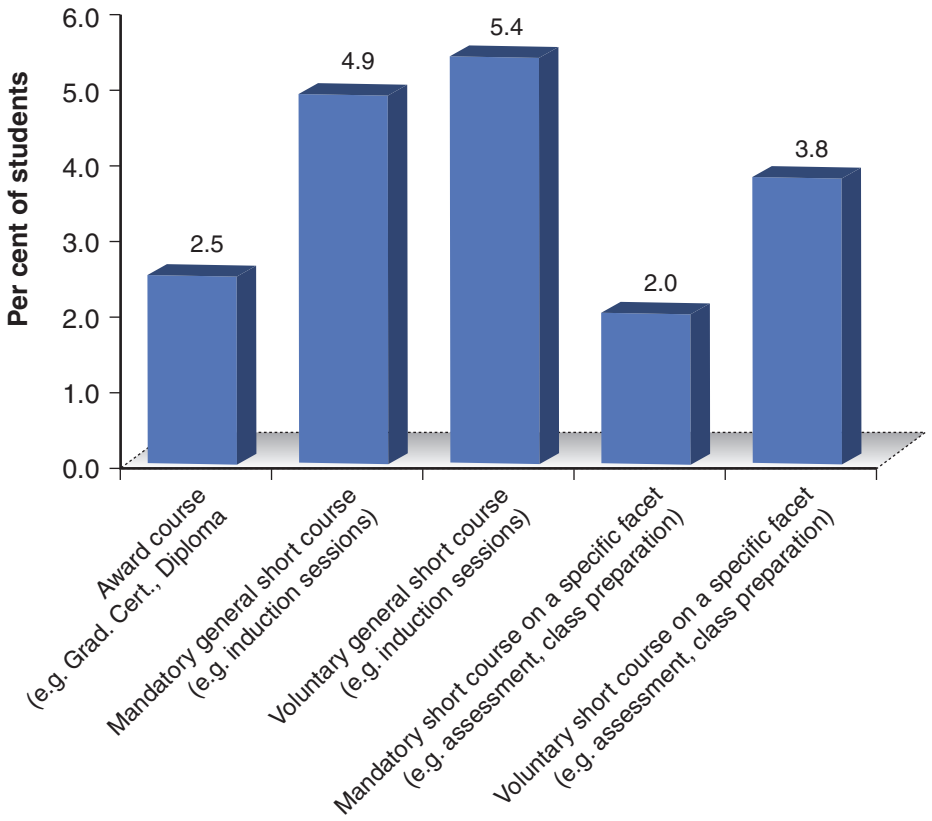


Figure 50: Proportion of research students who have participated in training for university teaching by type of training course – Students with plans for academic career in medium- to long-term only

In addition to these more formal courses and qualifications, a small proportion of students also indicate that they have received informal advice and support for university teaching during their degree. The sources of this support and the proportion of all students who have received such support are shown in Figure 51 (note that respondents were able to choose more than one category of informal support, therefore individuals may be represented in more than one column in this figure).

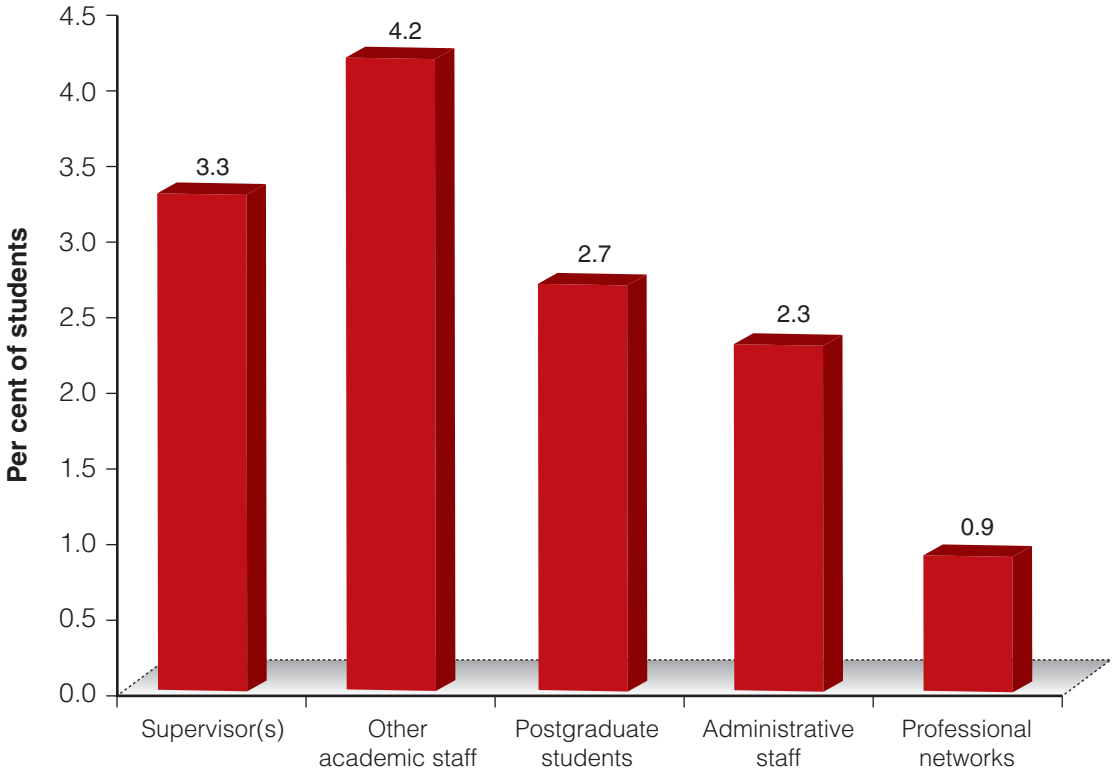


Figure 51: Sources of informal support for university teaching and proportion of students who have received such support – Students with plans for academic career in medium- to long-term only

For those students in the academic aspirant group who have not participated in any training for university teaching, there ae a number of reasons expressed for their non-participation. Almost two in five (37.7 per cent) of the non-participants give their reason for not doing so as being a lack of time. Indeed, under current arrangements the Australian HDR is notably shorter in duration that that of many other countries and further crowding it with teacher training may diminish the time students have to complete the degree. Under these arrangements it appears that courses of shorter duration are more attractive to research students as they provide training that fits within their time-constraints. However, a key issue is whether shorter courses are the most appropriate and effective form of providing training in university teaching. Any change in arrangements for the HDR qualification may allow research students to undertake a wider range of forms of teacher training.

A further 43.6 per cent of non-participants expressed interest in doing such training sometime in the future. Only a small proportion (4.4 per cent) of these respondents indicate that the main reason for not taking part in any training was a lack of interest in teaching. One positive to be drawn from these responses is that very few (0.7 per cent) did not participate because they had reason to think that such courses were no good. The main reasons for non-participation are shown in Figure 52.

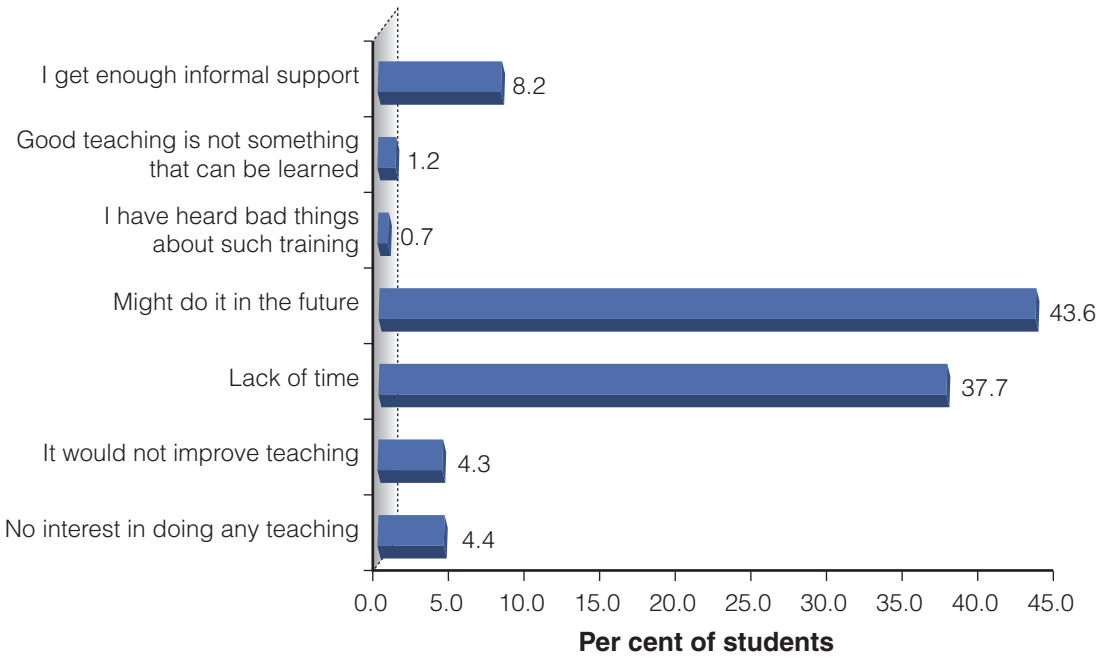


Figure 52: Main reason given for non-participation by those who have not participated in training for university teaching – Students with plans for academic career in medium- to long-term

6.3.3 Preparation for Teaching Work

While only a small proportion of students with plans for an academic career have been involved in training, most students who have undertaken teaching work felt that they were well prepared for the teaching work they undertook. All research students with experience in university teaching were asked to reflect on how well prepared they felt for the first lecture, tutorial or demonstration that they gave at university. Importantly, almost half (49.7 per cent) indicated that they were 'well prepared' for this work. A further 42 per cent said they were 'moderately prepared' and only 8.3 per cent suggested they were 'unprepared' for such work. This is an important finding as it shows that despite only small numbers of students undertaking training, those who are teaching feel prepared for this type of work. It should be noted, however, that this is a self-assessment of their preparation for teaching and not an objective assessment of their effectiveness as teachers.

All students engaged in university teaching were also asked about their satisfaction with this work. The vast majority indicated being either 'satisfied' (51.8 per cent) or 'very satisfied' (31.5 per cent). As with the question of preparation, this finding reflects well on universities and the conditions under which research students undertake the teaching work they do.

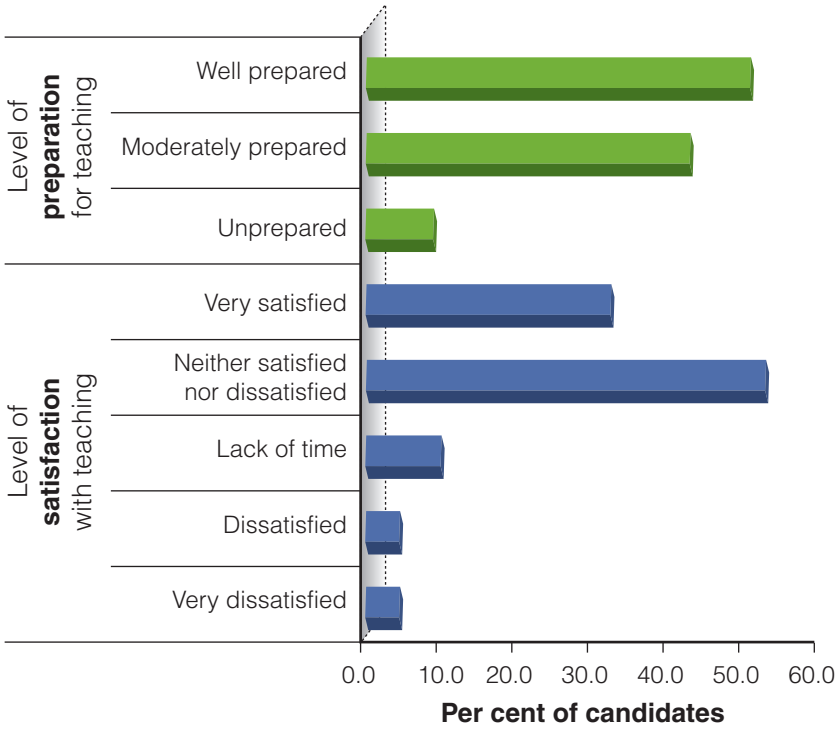


Figure 53: Research students who have undertaken teaching work: response to questions about preparation and satisfaction with this work

All participants in the NRSS were also asked to indicate if they thought that a qualification for university teaching should be mandatory for all people employed to teach at a university. Overall, respondents were closely divided on this question, with 52.4 per cent of students believing a qualification should be mandatory and 47.6 per cent believing it should not. There were some interesting differences in opinions relating to this question when experiences in training and in teaching at universities were examined. Less than half (47.5 per cent) of students who had been teaching during their degree thought that a qualification should be mandatory, while 56.5 per cent of those who had not taught during their degree indicating that they thought a qualification should be required. This may reflect that those students who are not teaching during their degree feel they do not have the skills to undertake teaching and would appreciate the opportunity to participate in training. Among those with ambitions in the medium- to long-term for an academic career, 51.4 per cent believe a qualification should be mandatory, while 48.6 did not agree with this idea.

6.3.4 Elements and important aspects of training for university teaching

The first figure in this section examines the amount of time that research students with plans to pursue an academic career have spent in training for university teaching during their current research degree. Interestingly, 17 per cent of those who have participated in training have spent more than a week in such training while also completing their research degree (Figure 54). A further 32 per cent have spent between one and five days. However, for the most part students are participating in short courses of a day or less with 51 per cent of students indicating that the training they undertook lasted for this amount of time. This finding indicates that the courses that last for a day or less have been the most popular among time constrained research students. This is in line with the findings in Figure 53 that shows that those who didn't undertake training did so because of a lack of time.

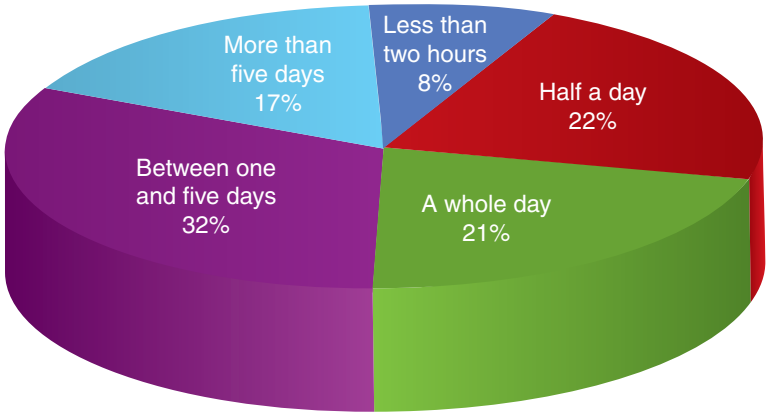


Figure 54: Amount of time spent in training for university teaching among participating research students with medium- to long-term plans for an academic career

In the Institutional Survey, six institutional respondents reported offering half-day workshops in training for university teaching, five offered a series of classes, and four a full day workshop. Two offered research students a Graduate Diploma, Certificate or other award and one a workshop of less than half a day (some institutions offer more than one form of course).

Offering dedicated training in the skills necessary for an academic career to only those research students who are interested in an academic career and who do not already have established professional skills in the academic arena is another way of ensuring early career academics are adequately prepared without the risk of over-crowding the HDR program with extra components that may be irrelevant to many students.

However, it is extremely important to remember that training and support for early career academics exists across the system in Graduate Certificates of University Teaching and similar programs. While recognising that many research students become (or, indeed, already are) academics, it is not obvious that the HDR is the appropriate location for the professional development of the full suite of skills needed for an academic career, but rather that such training may be best undertaken upon professional appointment at a university.

Responses to the Institutional Survey affirmed the diversity within HDR cohorts and in the paths to, and through, an academic career. One respondent noted that many of their research students were already academics, and that the professional skills they needed to develop were within the research, rather than the teaching, sphere:

> *'…at our university the majority of our research students are/were academics first (often with strong teaching experience, qualifications and capabilities). In such cases [our] focus tends to be much more on building into their HDR experience and graduate capabilities development the things they need to be fully accomplished and qualified academics, and these relate primarily to research and associated generic skills (e.g. academic writing in various genres)… The Grad Cert in Tertiary Teaching is mandatory for anyone appointed to a contract or ongoing position, whereas it is optional for sessionals… [It] is not easy to convey the breadth of local level approaches at the level of Department/School that apply in a more de-centralised model of induction and preparation for teaching than occurs for sessional tutors, demonstrators and lecturers. For us the only common element is the Grad Cert, and then each school has its own approach.'*

This response also illustrates the diversity of practice at the disciplinary level. The kinds of skills needed to teach successfully within the 'hard sciences,' for example, will be very different to those in the professions, or the greater degree of abstraction found within the humanities.

The practice of offering the Graduate Certificate in University Teaching across disciplines to new staff, and supplementing the professional development that occurs within the Graduate Certificate with more specific support and mentoring at the disciplinary level allows for a diversity that reflects the breadth of skills research students themselves bring to professional academic positions. Other responses to the Institutional Survey echoed these sentiments: 'Most formal teacher training happens if and when PhD students achieve a permanent position… We require all new teaching staff to take up a Grad Cert offered through our education school...'

6.3.5 Content of Teacher Training

Figure 55 explores the types of issues covered in training for university teaching courses that have been attended by research students. This analysis is based on the responses of those who have participated in training during their research degree and who have the ambition to become an academic in the medium- to long-term. Advice about teaching methods for small groups is the most commonly covered topic in such training, with 85.5 per cent of all participants indicating that their course covered this aspect of teaching in universities. This is no doubt a result of the heavy involvement of research students in tutoring at universities. For more than half of those participating in this training, assessment practices, academic integrity and tips for working with students from diverse backgrounds were topics taught in their training courses. The least commonly covered topic in this list is in relation to record keeping and administration in university teaching – an area perhaps where there is less responsibility for research students.

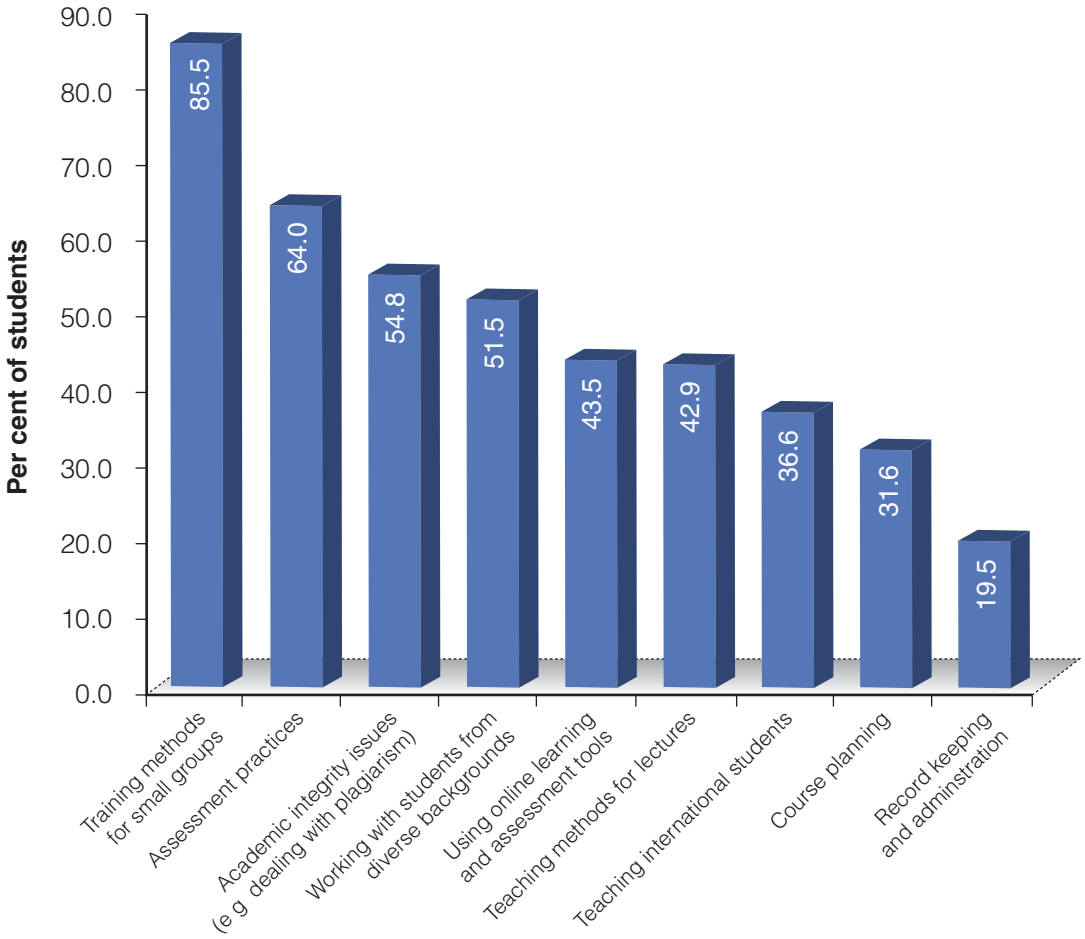


Figure 55: Topics covered in training for university teaching - research students with academic career plan medium- to long-term who participating in such training

Responses to the Institutional Survey show a general alignment with the experiences of students. According to institutional leaders, the most common practices covered in the training offered to students are small group teaching methods, assessment practices and academic integrity issues. Also commonly mentioned by IS respondents were training in the use of online tools, lecturing and covering issues relating to students from diverse backgrounds. The least common aspect recorded in the IS was record keeping and administration. Further details relating to responses to this question can be found in Table 19 in Appendix E.

Participants in training for university teaching were also asked about the effectiveness of their course in preparing them for a range of different areas of teaching. These results are displayed in Figure 56. The positive level of responses in many ways matches the pattern in Figure 55 above, suggesting that a wide range of areas are covered in the training for university teaching, but that some are more effective than others. Course planning is an example of one area where students indicated that their training has not been particularly effective. Participants are most likely to see the facilitation of methods for small group teaching as being the most important aspect of this training for them. In particular, comments from students responding to the NRSS such as, 'Learning how to sustain tutorial participation' and 'Tips on how to engage students in course materials' were indicative of the aspects that are seen as most useful to students in this regard.

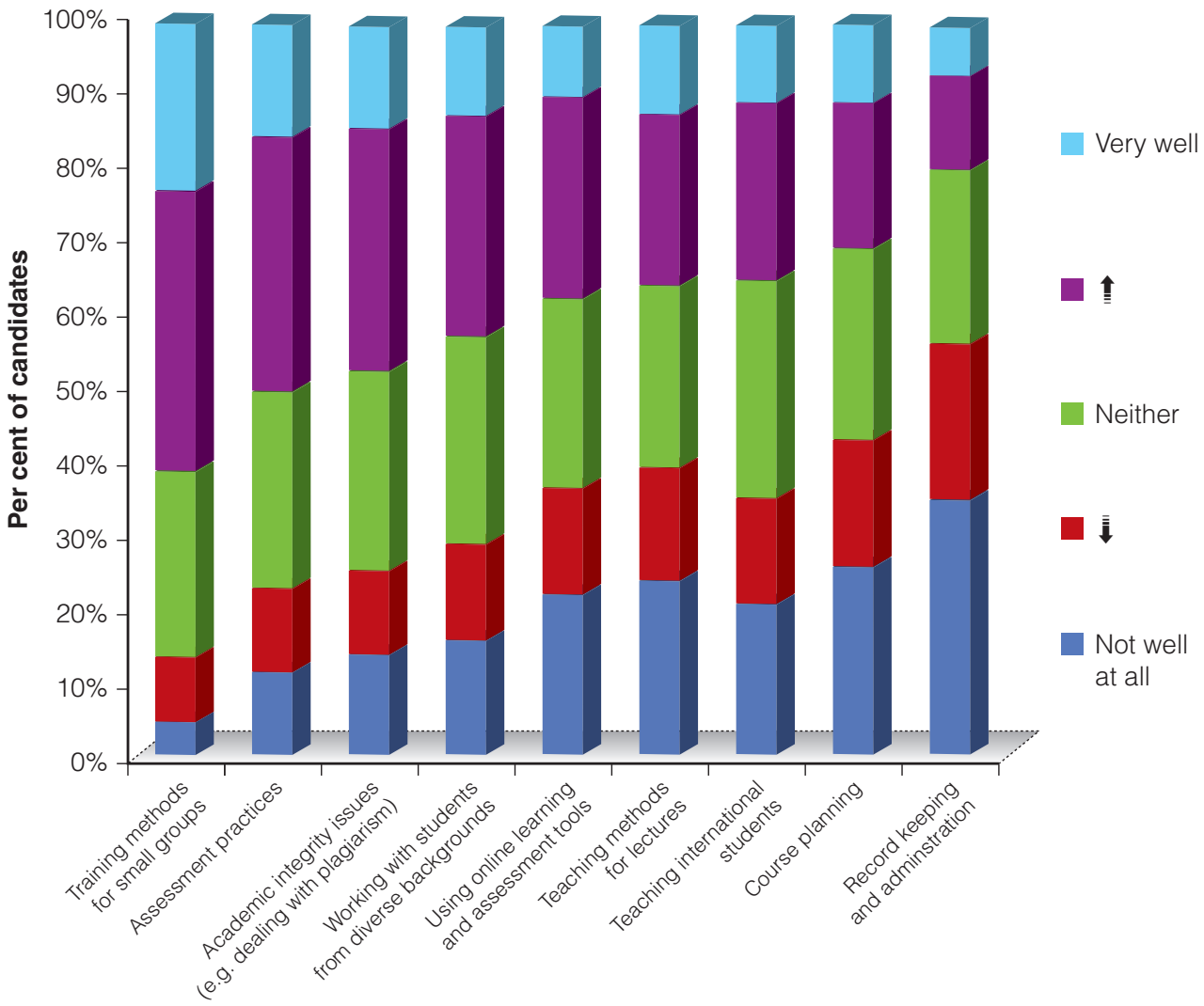


Figure 56: Response distribution to question 'How well did the training for university teaching prepare you for the following…' by topic of training – Students with plans for academic career in medium- to long-term only

Analysis of the qualitative responses about the most useful part of the training for university teaching that students had been involved in also shed light on two crucial aspects not covered in the discussions above. The most common relate to the fact that these courses facilitated contact with academics who are good teachers and with other postgraduate students who are going through the same experiences. Typical comments relating to this positive aspect included: 'Current postgraduates were there to share their own real life teaching experiences', 'Hearing stories and scenarios from other postgrad students taking the course about their early experiences of teaching was really helpful', 'The connections I made with other research students also starting out in teaching', 'Cross disciplinary participation and exchange with other faculties', 'The interaction with other staff attending' and 'We developed a support group of tutors who could discuss issues which was very helpful in developing wider experience quickly'. These support networks acquired through the training and the ability to learn from others with experience appears to be highly valued.

Another positive aspect of the training expressed commonly by research students is the fact that it helped to clarify objectives and allowed them to build confidence in their teaching abilities. Comments such as: 'It mostly just gave me confidence to enter the classroom', 'Not knowing what to expect can be daunting, so I think this training helps', and 'It has all been really important and confidence building. It has been good having ongoing support and someone to consult as challenges arise', are common among this group of students.

While most students are on the whole positive about their experiences in training for university teaching, there are a small minority who voiced concerns or cynicism about such programs. Negative comments included 'I gained nothing from the course – it was a bit of a waste of time. I went to a research colloquium on teaching and learning however and that was useful', 'Don't know that I see any actual benefits from taking the course other than to be able to tick it off in regard to my CV and promotion applications' and 'Perversely, it was a confidence-booster to find that expectations of us (postgraduate students) as tutors were so low'.

The Institutional Survey asked university leaders to rate the quality of training in university teaching offered to research students. While none described the training their institution offered as 'world class,' two institutions felt theirs was 'among the best offered in Australian universities,' and 13 felt theirs was 'relatively good in comparison to other Australian universities.' One institutional respondent indicated their university's offerings were below average.

6.3.6 Characteristics of students who have participated in training for university teaching

The focus of this section is on all students who have taken part in training for university teaching during their research degree, and compares the characteristics of this group with the whole HDR population in order to establish if there are any specific or unique characteristics that differentiate these students.

Figure 57 displays the distribution of training participants and of all research students in terms of their plans for a career in the medium- to long-term. As the figure shows, those who have been involved in training for university teaching are more likely than the general population to have an interest in pursuing an academic career – hence the focus in the previous section on this particular group. In total 64.7 per cent of the group of students who have participated in teaching training are interested in entering the academic workforce, a difference of more than ten percentage points from the average across the whole HDR group.

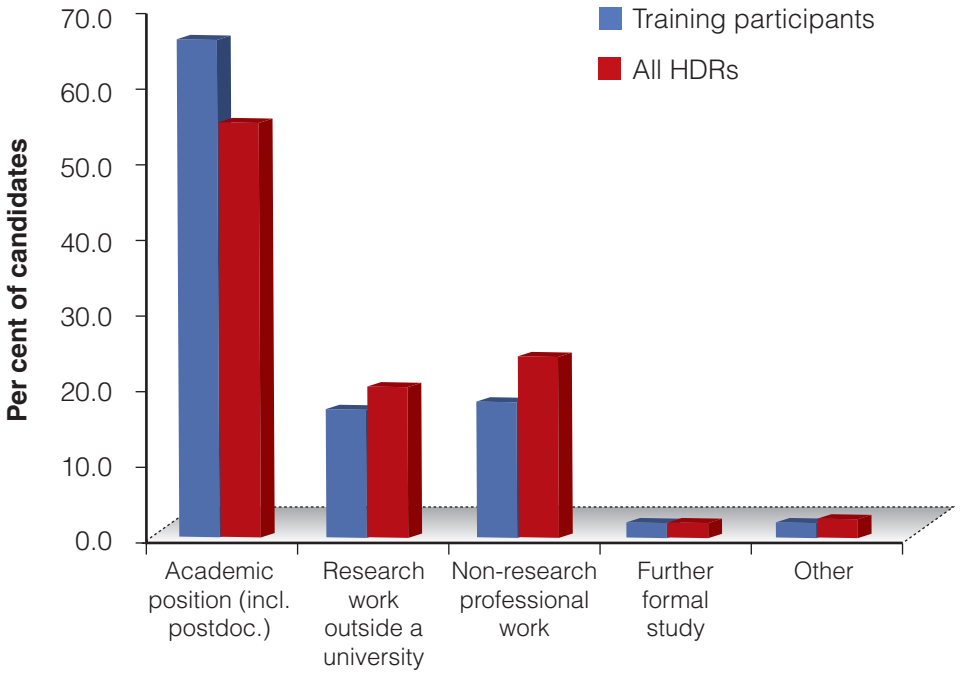


Figure 57: Medium- to long-term career plans of research students, by participation in training for university teaching

Training participants are also much more likely to have experience working as a university tutor, lecturer or demonstrator when compared to the average across all students (Figure 58). This is not necessarily surprising, but it helps to illustrate that almost all those who have participated in training for university teaching have also had experience in such work. Analysing these variables from a different perspective, overall 27.6 per cent of those students who have at some stage been employed to teach at university have also participated in training for this teaching. This suggests that almost three quarters of research students who have been employed as teachers at universities have not received any training for teaching during their degree.

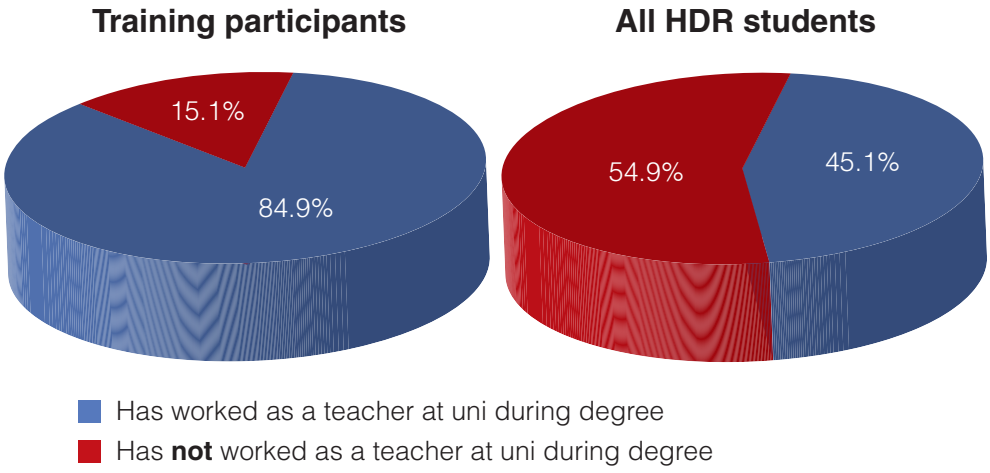


Figure 58: Proportion of research students who have worked at university in a teaching role, by participation in training for university teaching

A broader range of characteristics of students is explored in Table 9. For each variable, the distribution of characteristics across the training participant group and the full HDR cohort are displayed. This analysis provides an opportunity to examine some of the key differences and similarities between these two groups. Notably,

characteristics such as gender, indigenous status and domestic/international student status tend to remain similar in their distributions. However, interesting differences are apparent in a number of other characteristics. For example, students aged 25 to 29 are more heavily represented among the group who have taken part in training for university teaching than in the general population, while the more mature-aged students are underrepresented in the training participant group. Students from an English speaking background are also more likely than those with other language backgrounds to have been in training when compared with the share of these groups in the full HDR population – an interesting fact given that there is little difference in the distribution among the international and domestic students on this measure. There is also a larger representation of PhD students among the teaching training participants than Masters students. Students studying part-time are not particularly well represented among training participants, and neither are those who do not spend the majority of their time on campus – unsurprising given that participation in this training is probably more convenient for those with greater contact time at a university. The other notable difference is that students who had completed honours in the year before commencing their research degree were more likely to have participated in training.

Among the fields of education, larger shares of students who have done such training are found in the society and culture field and engineering, and smaller shares in health, education and agriculture than would be expected if the population was distributed in the same way as among all HDRs.

Table 9: Comparison of students who have been involved in training for university teaching with the whole HDR population, selected characteristics

Characteristic		Training participants	All HDRs
Sex	Male	49.8%	48.3%
	Female	50.2%	51.7%
Age	Less than 25	12.0%	12.0%
	25 to 29	37.8%	28.4%
	30 to 34	18.0%	17.8%
	35 to 44	18.0%	20.6%
	45 and above	14.2%	21.1%
Indigenous status	Not Aboriginal or Torres Strait Islander	99.6%	99.5%
	Aboriginal or Torres Strait Islander	0.4%	0.5%
Main language spoken at home	English	92.2%	82.3%
	Language other than English	7.8%	17.7%
Student type	Domestic	74.2%	74.5%
	International	25.8%	25.5%
Qualification	Doctorate by research (PhD)	92.7%	85.4%
	Masters by research	6.7%	13.9%
	Professional doctorate (mainly coursework)	0.6%	0.8%
Broad field of education	Natural and physical sciences	18.5%	18.7%
	Information technology	3.4%	4.0%
	Engineering and related technologies	17.3%	12.3%
	Architecture and building	1.6%	1.4%
	Agriculture, environmental and related studies	2.3%	4.6%
	Health	11.0%	16.0%
	Education	4.5%	7.6%
	Management and commerce	8.5%	6.9%
	Society and culture	28.0%	22.1%
	Creative arts	4.8%	6.3%
	Food, Hospitality and Personal Services	0.0%	0.0%
Enrolment type	Part-time	19.2%	25.1%
	Full-time	80.8%	74.9%
Scholarship student?	No	26.6%	32.9%
	Yes	73.4%	67.1%
Main study location	At my university in a private office provided to me as a research student	14.8%	11.1%
	At a computer or desk assigned to me in a shared office at my university	49.7%	44.1%
	In a shared computer lab / office / library at my university in which no computer or desk is assigned to me	4.2%	4.3%
	At my university in an office which I use for paid university work	5.2%	2.9%
	At home	23.5%	30.5%
	At work outside the university	2.0%	5.2%
	External research institute	0.4%	1.3%
	Elsewhere	0.2%	0.7%
Main activity in the year prior to commencing research degree	Undergraduate university study (excluding honours)	3.9%	3.6%
	Honours at university	29.1%	20.4%
	Postgraduate university study	18.2%	16.2%
	Vocational education and training (VET)	0.3%	0.4%
	Full-time employment	38.2%	45.6%
	Part-time or casual employment	8.1%	9.6%
	Looking for work	0.4%	1.0%
	Caring for family	0.6%	1.4%
	Travelling	1.1%	1.2%
	Other	0.1%	0.5%

6.4 What institutions value in new academic staff

The Institution Survey asked university leaders what factors they believe to be most important in the decision to appoint a recent HDR graduate to an academic role (teaching and research) at their university. The results detailed in Figure 59 are telling, with a formal qualification in university teaching seen as not being very important (only two institutional respondents see it as important, and none as very important). This is an important finding, as it suggests that students' low take-up rate of training in university teaching may be based on a pragmatic decision that such experience is in actuality not particularly valuable in securing academic positions. By far the most important factor was a students having published refereed journal articles or books, followed by a track record of winning grants. The results from the previous chapter suggest that supervisors encourage students to focus on the development of their research skills and this may be because supervisors are aware of the greater emphasis placed on research experience in recruitment practices. However, experience teaching was seen as important by just over half the respondents.

Overall, these views of institutional leaders relating to the importance of various factors in hiring new academics matched relatively well with the perceptions of research students about what universities valued. This suggests that research students in general understand the factors that most influence the hiring practices of universities. As discussed already, this may help to explain the lower participation in training for university teaching among research students – because they recognise that at present, such a qualification is not necessarily a highly valued asset when it comes to university recruitment policies.

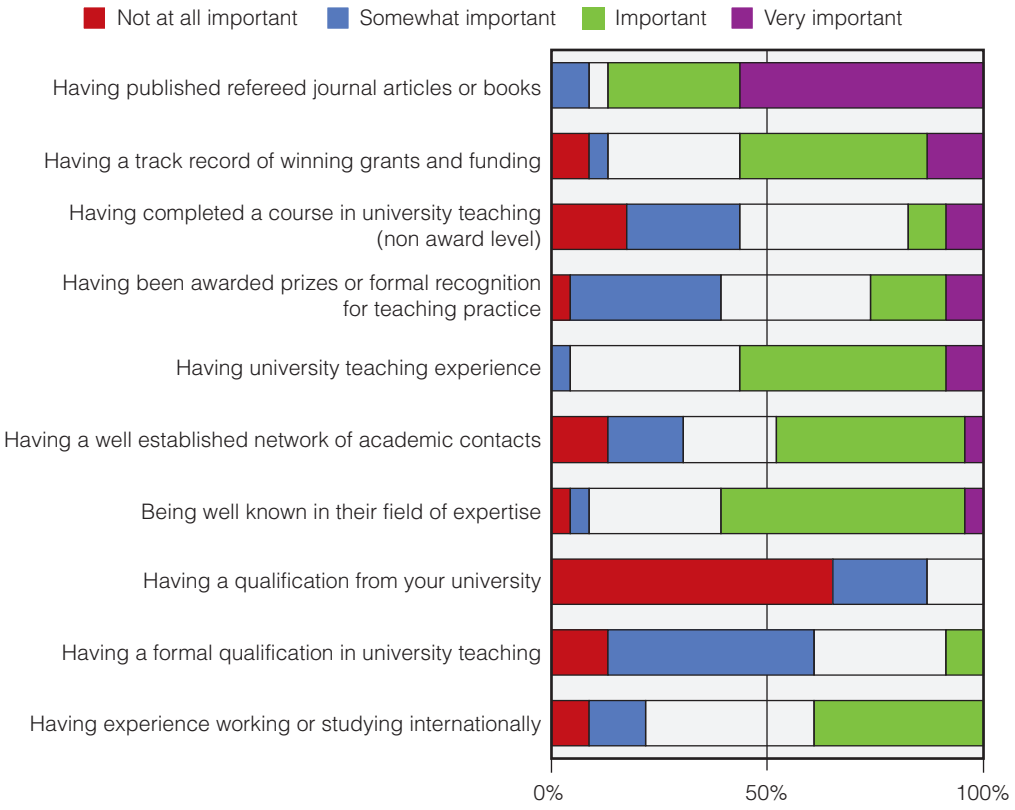


Figure 59: Institutional leaders' response distribution relating to importance of various factors in the appointment of recent HDR graduates into academic positions

6.5 Conclusion

Understanding the role that training for teaching has in the experiences of research students is important, especially in the context of research students' interest in entering the academic workforce in the future. Results from the NRSS clearly illustrate that among those students planning to pursue an academic career in the future, there is a general lack of awareness of the existence of courses facilitating training for university teaching, with more than half (54 per cent) of these students unsure of whether their institution offers any such training. Given this outcome, it is unsurprising that fewer than one in five of these research students report having participated in teaching training during their research degree.

However, these findings need to be considered alongside the understanding that the HDR is a qualification with a focus on research at its core. Further, the findings from the Institutional Survey indicate that institutions themselves do not really value recent graduates having undertaken training in university teaching when they are employing new staff. Feedback from institutional leaders in graduate and research education suggests that many universities prefer to develop teaching skills among their junior academic staff once they have been appointed, rather than expecting them to have completed such training before they enter an academic career.

It is nonetheless important to remember that almost half of all research students undertake teaching work during their degree. Therefore, putting off teaching training until these students take up their first full-time position may not be appropriate. The results in this chapter show that only one-quarter of students who have undertaken teaching work have received training during their HDR. While some of these students may have received training prior to their HDR the findings indicate that only a small proportion of those undertaking teaching have been formally prepared for the work. Despite this, most students who were participating in teaching work felt prepared and satisfied in the teaching work they undertook.

Students not participating in training tended to indicate lack of time as being the most notable impediment to their involvement, with many also expecting that they might be involved in such training at a later date. These findings suggest that short courses may be more attractive to research students. This is supported by the finding that the most common type of training for university teaching taken by research students with academic career ambitions is in the form of a short course of general or introductory nature or a short course in specific facets of teaching. A key issue, however, is whether shorter courses are the most appropriate and effective form of providing training in university teaching.

The most effectively covered topic of training according to research students was the provision of teaching methods for working with small groups. However, students are also very positive about the connection such training provides with other postgraduate students in a similar position and with experienced and competent academic teaching staff. Training was seen to be less effective in providing preparation and skills for course planning and administration.

7 Discussion and Conclusion

The results detailed in the previous three chapters raise a number of crucial issues relating to the future of the academic workforce and the nature of the research degree within the Australian context. The implications of these and other yet untapped findings from the NRSS will continue to be considered and used to produce further analyses and inform policy for years to come. At the institution level, the formulation and implementation of strategic workforce plans may be informed by some of the findings in this report. In this final chapter, some key issues of particular relevance to the original aims and intentions of this research are explored in more detail. Some figures from other data sources and deeper analysis of the data is employed to focus on issues of policy relevance.

The discussion in this chapter begins with an exploration of the available demand and the NRSS-generated supply estimates for the academic workforce (Will supply of academics from Australian universities meet demand?), continues with a discussion of the key issues that encourage attraction to the academic profession (How do we attract research students to academia?), and finishes by questioning whether the current PhD and masters by research programs in Australia are meeting the professional/occupational/vocational needs of research students (Do research degree programs fulfil the vocational needs of students?).

In general, the analysis of available data helps to highlight that while the NRSS findings shed important new light on the supply-side, the workforce data and growth estimates are currently insufficient for making robust judgements about demand for academics in the future. However, from the trends seen in recent years, the current growth policies for higher education in Australia and the demographic situation of the academic workforce, there is clearly a need for renewal and growth in the number of academics in Australia over the coming decade.

A critical factor in ensuring this supply remains at high levels to respond to these issues is the extent to which the academic profession is seen as an attractive proposition. The attractors and detractors of academic work identified through responses to the NRSS can be helpful in creating policy – both at the national- and the institutional-level – to ensure that sufficient numbers of qualified individuals are drawn to, and are adequately prepared for, this kind of work. Factors such as greater emphasis on highlighting the availability of positions, improving remuneration benefits and improving job security, while continuing to ensure flexible work conditions will all help to sustain and improve the attractiveness of the academic career. Linked with this is the need to ensure that the research degree is providing students with the necessary skills they need to pursue their chosen career. For those interested in pursuing an academic career, the inclusion of training for university teaching may be a desirable component. For those interested in following work outside the university sector (it is clear that the PhD provides a path to many professions, and also that the path to an academic career often does not proceed directly from the PhD), other components may be of use in providing desirable skills and attributes for non-university work. Where appropriate, equipping research students with other, perhaps more commercial, skills will not only help them, but is likely to make them more desirable to potential employers.

7.1 Will supply of academics from Australian universities meet demand?

As detailed in Chapter 4, more than half (54.1 per cent) of all research students are planning to pursue an academic career in the medium- to long-term. The extent of interest in an academic career revealed in the NRSS findings was higher than expected given the outcomes of a smaller-scale study carried out in the mid-2000s (Pearson, et al., 2008), and while this finding will be greeted with interest by the university sector, there is still some cause for trepidation when considering the supply and demand issues for this profession in the future. Firstly, substantial numbers (43 per cent) of those planning academic careers intend to pursue this work overseas. Second, a major disincentive to following academic work is a perceived lack of availability of positions. Third, students tend to believe that the salaries obtained in an academic career are not as attractive as options that are available through other work opportunities they have considered. These three issues are discussed in more detail in the section which follows, but suggest that increasing the attractiveness of the academic career in Australia is very important for ensuring that those with plans to pursue such work do follow through with this ambition.

The reason that these issues are so important is that currently the future sustainability of the academic profession in Australia is under threat. Hugo (2005a, 2005c, 2008; Hugo & Morriss, 2010) in particular has been at the forefront in raising of awareness of the demographic issues facing this increasingly ageing workforce. Policy developments stemming primarily from the Bradley and Cutler reviews in 2008 (Bradley, et al., 2008; Cutler, 2008) have also added pressure to the demographic issues for the workforce, mainly as a result of Government targets for increasing undergraduate enrolments in Australian universities (Birrell & Edwards, 2009; Edwards, 2010; Edwards, et al., 2009; Edwards & Smith, 2010). This section provides an initial exploration of these issues in light of the findings from the NRSS.

7.1.1 Estimating future demand

Since early 2009, DIISR have been setting the foundations for a Research Workforce Strategy (DIISR, 2010b). Part of building this strategy has involved the commissioning of research to explore trends in supply and demand for those with HDR qualifications in Australia. This research (Access Economics, 2010; Edwards, et al., 2009) was essentially targeted at the wider research workforce, rather than specifically at the university sector, so there are substantial limits to applying these models to the academic workforce in isolation.

However, with this large caveat in mind, for the purpose of this discussion, two of the demand estimate models from the DIISR funded research (one from research conducted by ACER (Edwards, et al., 2009) and one from Access Economics (2010)) have been applied to the most recently available figures for the Australian academic workforce. The ACER demand estimates are based on data from the MONASH Model (for details, see Edwards, et al., 2009). In addition to this, an estimate based on recent supply trends (2003 to 2009) in the number of academics in Australian universities has also been calculated. The projected workforce figures have been applied to a base figure of the academic workforce in 2009.

It is important to note that the growth estimates applied from the Access Economics report for DIISR (2010) are based on the average annual growth estimates for employees with a doctorate by research in the Education and Training industry – base case scenario (see Access Economics, 2010, Table E.11). This estimate of annual growth is based on figures for the whole of the doctorate-qualified Education and Training industry and is not specifically tailored to the academic workforce only. As such, the outcomes in this analysis should be interpreted as indicative estimates only.

The 2009 base figures used in this modelling are for people working in an academic position who also hold a PhD or masters by research qualification, extracted from the DEEWR Staff Collection, 2009.

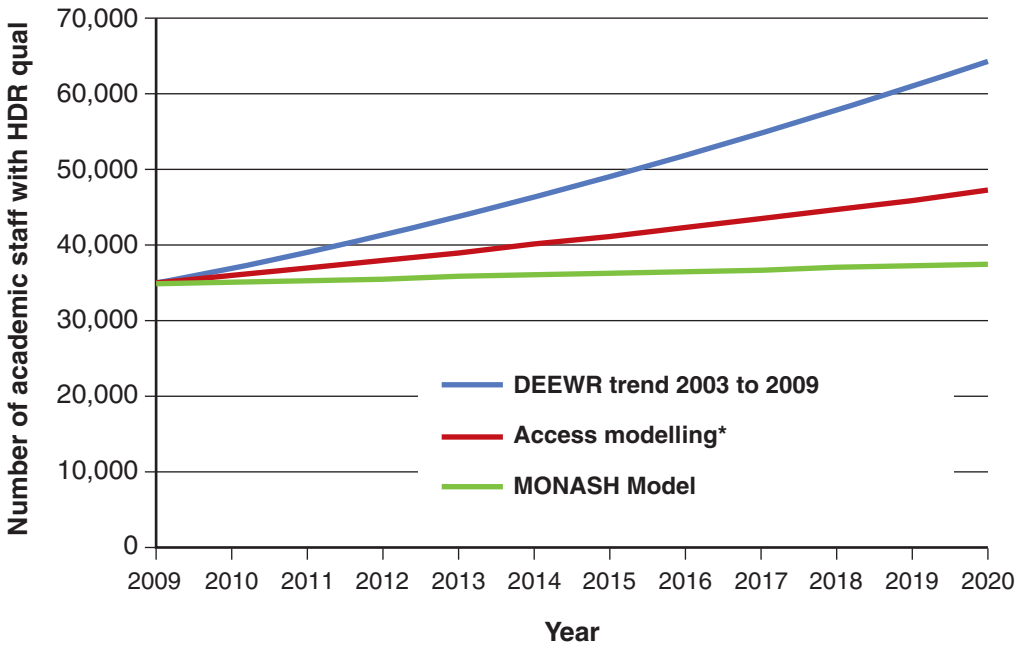
Bearing in mind the caveats stated above, as shown in Figure 60, the outcomes of these three scenarios are *substantially* different, especially when projected out to 2020. This highlights the difficulty with making such estimates in general, but in the case of the academic workforce it emphasises that a more specific model for this sector is needed.

Based on the simple application of the trends in number of HDR qualified academics according to DEEWR figures over the past seven years, the estimate here suggests that the continuation of this trajectory could result in an 80 per cent growth in just over a decade. The estimate based on the data from the MONASH Model is much more conservative, and as was highlighted in the original publication of these estimates by Edwards et al. (2009, p. 55), does not account for the recent policy targets set for university attainment growth. In this estimate, a small growth in the number of employed academics with an HDR qualification (7.3 per cent) is projected to occur over the period highlighted here.

The modelling for DIISR by Access Economics (2010) provides another scenario for consideration, albeit one that was based on a model that drew estimates for the doctorate workforce in the whole Education and Training industry. It suggests a forecast growth of 34.2 per cent between 2009 and 2020. Among the three models used here (and the massive variation in predictions), this provides a 'middle' scenario. Overall, these Access-based estimates indicate the workforce is forecast to grow by about 12,000 over this period, with an increase of 6,000 from 2009 to 2015 and a further 6,000 from 2015 to 2020.

It is important to note that while these figures provide basic estimates; the Access and ACER workforce models produced for DIISR are based on the results of studies that were very broad in nature and not focused specifically on the academic profession. Therefore, nuances within policy, field of education and other issues are not necessarily taken into full account – rather the estimates are based on these particular occupations within the broader economic modelling of the economy.

This exercise highlights that the current analyses and data used are not yet sufficient for making robust and statistically sound conclusions about the future size of the academic workforce. Further work into academic workforce demand in particular is needed before more robust estimates can be built. However, it is clear that the need for a new generation of academics over the coming years is inevitable. The policy plans for substantial growth in the sector (Australian Government, 2009b), recent growth trends and the demographic situation facing the academic workforce (Edwards & Smith, 2010; Hugo, 2008) are clear indicators pointing in the direction of expansion.



* based on a percentage growth estimate derived for the doctorate workforce in the whole Education and Training industry.

Figure 60: Projected workforce numbers — Academics with HDR qualification, Australia 2009 – 2020

7.1.2 Estimating future supply

Using the results of the NRSS, it is possible to begin to estimate the extent to which the interest of research students in an academic career might translate into actual numbers of academics in the pipeline (while noting that HDR graduates are not the only source of supply for the future academic workforce). The outcomes of the NRSS now enable a much more nuanced and accurate picture of supply for the academic workforce to be developed – once demand-side data and estimates are improved, the ability to evaluate the situation for universities in the coming decades will be substantially enhanced.

Applying the NRSS response distributions for the question relating to career plans for the medium- to long-term to the actual full population numbers of research students in Australian universities, it is estimated that about 26,000 current research students in Australia have a plan to enter the academic workforce within five to seven years of completing their degree.

As noted in Chapter Four (Figure 9), the largest numbers of research students with academic career plans are in the younger age brackets, with nearly 60 per cent of the total currently being aged under 35 years. About 11 per cent, or 2,800 of these students are aged over 50 and would therefore have a shorter potential period within the workforce if they pursued this plan.6 In terms of the future generation of academics in Australia (i.e. from 2020 onwards), realistically the bulk will come from those in the younger age brackets.

7.1.3 Matching supply to demand

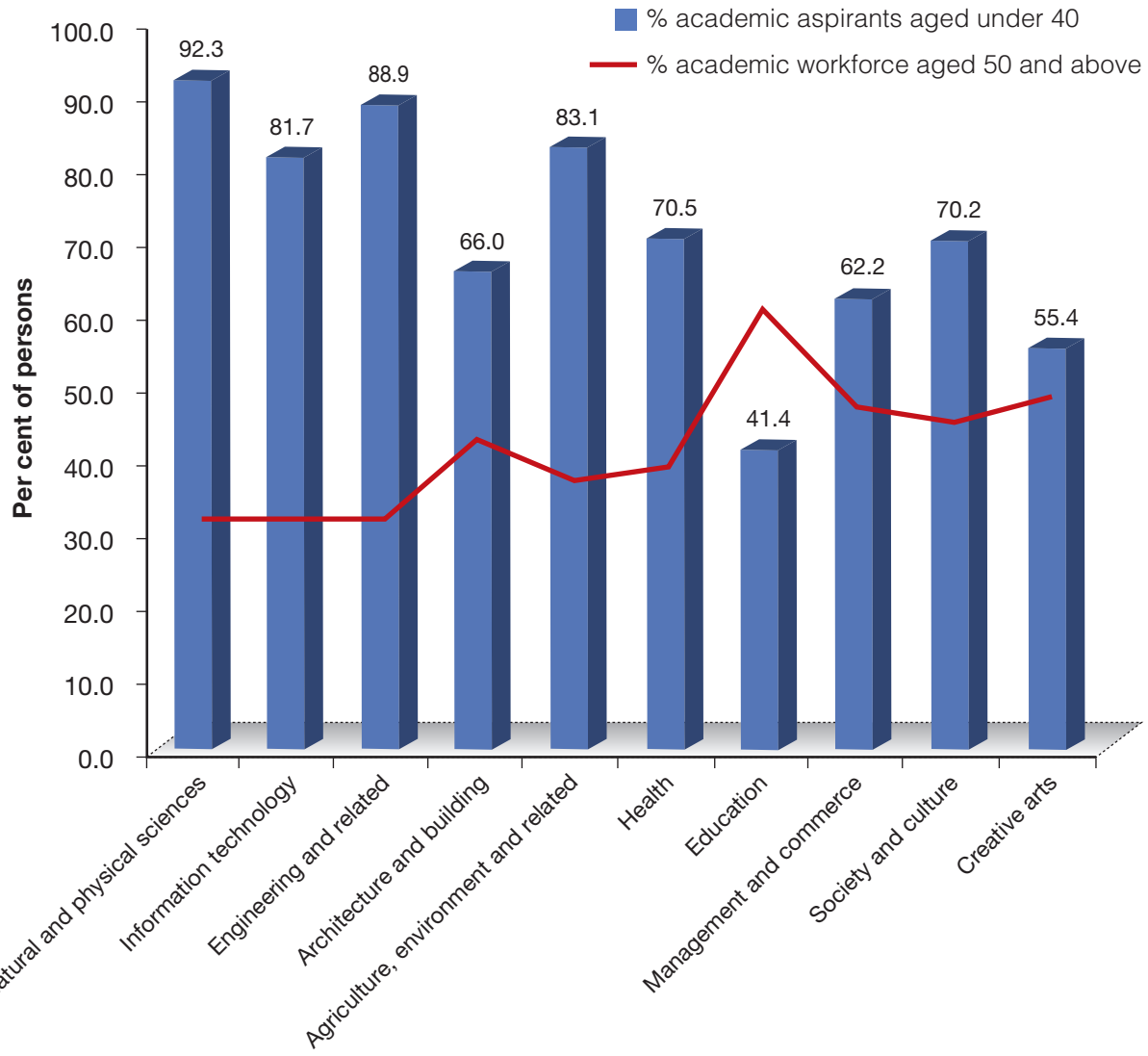
So how do these figures sit when considering the workforce population forecasts? Based on age and focusing on those aged under 40 (so the eldest in this group would be 50 in 2020), it is estimated that there are about 19,000 current research students with serious career plans and potential to enter academia over the coming decade. These numbers fit somewhere between the basic demand estimates of 12,000 predicted growth in the Access model and the 28,500 growth of HDR qualified academics in the DEEWR trend model.

However, there are other factors to be considered before drawing conclusions about matching supply and demand. This initial supply estimate does not take account of the fact that 43.2 per cent of those with a medium- to long-term ambition to enter the academic workforce plan to pursue this profession outside Australia (see Table 6, Chapter 4). When this is taken into account, the estimated supply oTable 6: Region of work anticipated by type of workmics to Australian universities from the current cohort is about 11,000 – a figure likely to be on the low-side of the demand requirements.

[6] It is also likely that some of the students in this older age bracket are actually already working as academics (see discussion of contract types in Chapter Five).

Further, issues of immigration of academics (as Hugo (2008) points out, Australia has been a net beneficiary of academics in terms of migration), differences by field of education, the fact that for some these future plans may not come to fruition and the assumption that the current structure of the academic profession is suitable also significantly cloud the ability to accurately predict the demand levels for the academic profession in the coming years. These issues are not able to be adequately addressed here due to the vast range of data sources and analyses required. If nothing else, this exercise helps to highlight the need for more detailed and specific modelling to be carried out in relation to estimating the supply and demand for the academic profession in Australia.

However, one particular area where the NRSS can provide additional assistance is in relation to field of education and age. The columns in Figure 61 show the dramatic differences in the proportion of research students aged under 40 with an ambition to enter the academic workforce for each of the main fields of education. The science and engineering fields tend to have a young cohort of academic aspirants, while education in particular is at the other end of the spectrum. The red line in Figure 61 provides the inverse picture. Using DEEWR data, it shows the proportion of current academic staff with an HDR qualification aged 50 years and older. As can be seen here, there is a tendency for the 'younger' fields in terms of current academic workforce to also have the youngest cohort of aspiring academics. The outcomes here tend to suggest that fields such as science, engineering, agriculture and IT appear to be in a relatively good position in terms of the ages of current and potential future staff. On the other hand, problems for academic renewal in the field of education appear to be serious, with a small proportion (41.4 per cent) of the current crop of research students being aged below 40 and an already very high proportion of academic staff aged above 50 (64.9 per cent).



Source: NRSS and DEEWR Staff Statistics, 2008.

Figure 61: Percentage of research students who plan to follow academic career that are aged under 40 years (column) and percentage of academic workforce in 2008 aged 50 and above (line), by field

7.1.4 Future analysis of the supply and demand for academic careers

As shown here, the results of the NRSS are relatively effective for carrying out estimates of future domestic supply to the academic profession. Further analysis of these responses and modelling to estimate the movement of successive cohorts into academic work would strengthen these basic estimates. Indeed, the very recent findings from the CSHE survey of academic work (Bexley et. al., 2010) indicate that there may be a growth in the availability of academic positions in the medium term, with substantial proportions of academics indicating medium to long term intentions (for the next five to ten years) to move to an overseas institution (25 per cent); to leave the higher education sector all together (26 per cent); or to retire (21 per cent). Participants in the academic work survey were able to select multiple options, so this should not be construed as representing a projected loss of 70 per cent of the workforce. However, overall, the CSHE study indicated that 48 per cent of the academic workforce intend to retire, move to an overseas university or leave Australian higher education at some time in the next ten years.

However, in order to be able to achieve a more nuanced understanding of the extent to which supply is likely to meet demand, the estimation of demand for academic jobs in Australia into the future still needs considerable work, as do estimations of supply of academics from overseas. This work would include in-depth analysis of the very different age structures within the academic profession when examined by field and the fact that this will require a variety of targeted approaches to regenerating the academic workforce for the future.

Further, this matching of supply to demand assumes that the status quo for the provision of teaching and research within universities is satisfactory. This is an extremely important issue in the context of mapping demand. Australian findings from the Changing Academic Profession survey (Coates, Dobson, Goedegebuure, & Meek, 2009; Coates, Dobson, Edwards, et al., 2009) have suggested that the current formation of the academic profession – in particular the heavy reliance on casual and short-term work by universities – is possibly untenable into the future. Therefore, the extent to which demand is currently assessed within the system requires re-evaluation. In this case, the mapping of supply to demand will need to be revisited in the near future.

7.2 How do we attract research students to academia?

The figures in the section above rely on those students expressing a desire to enter the academic workforce to actually follow through with this ambition. Ensuring that this is the case is far from a simple proposition. The first and most obvious issue in this regard is creating the conditions within the research degree to facilitate completion by the majority of students – hence the importance of the items in the NRSS relating to student experiences and support during their degree. The other core issue is making the academic profession an attractive proposition to research student graduates. If the attractive elements of academic work begin to wane, or if the unattractive elements continue to exist, then the likelihood of maintaining research students' interest in such a career becomes much more difficult.

This discussion condenses some of the findings from the NRSS in order to highlight the attractors and detractors of an academic career in the eyes of the current cohort of research students in Australia. Identifying these issues is important from the perspective of individual universities because it provides opportunities to tweak policy and highlight certain attributes of jobs when creating positions and hiring new academics. It is also important from a broader policy perspective because it identifies the key levers that can be pulled at the national level to increase the capacity of the academic workforce.

7.2.1 Student engagement during the research degree

On the whole, the findings from the NRSS suggest that students tend to feel well supported in their studies by their institutions and were also very positive about the support they received from their supervisors. Nearly half (49.8 per cent) of all research students strongly agree with the statement: 'My main supervisor has been very supportive during my studies', and 28 per cent indicated general agreement. There were also relatively large proportions of students indicating that the overall support they received from their institution, and the support they received from university administrative staff, had been satisfactory during their degree. The support and supervision provided to students also appears to be relatively consistent across all fields of education. For universities and their academics, this is a pleasing finding because it confirms that in general, research students are satisfied with the support offered by their institution.

While students were relatively happy with the support they received from their supervisors and institution, the level of engagement students felt they have with their peers and with university life was generally lower. One note of concern was that almost one-quarter of research students agree or strongly agree with the statement 'I feel very lonely and isolated in my studies'. There was also wide variation in engagement by field of education. Students from the sciences have the largest mean scores on average for this scale suggesting that they are well connected and engaged with their fellow students. At the other end of the spectrum, education and creative arts students record quite low scores on the engagement scale. These low scores were also found to be associated with an increased propensity to have contemplated withdrawing from their HDR. This suggests that the fields in which students are most disengaged from other students and university life in general are also the fields most likely to have students contemplating withdrawal from their degree. It will be important for universities to monitor the engagement and retention of students in these particular fields in order to ensure their successful completion of their research degree.

7.2.2 Factors, influences and elements that attract (and detract) research students to academic work

A number of measures within the NRSS enable key issues relating to the attractiveness of the academic profession to be examined. Factors that attract and detract interest in such work, influences from people and experiences during the research degree, and elements of academic work that encourage interest are highlighted in the discussion below. These things all work together to create an impression of academic work that have an impact on the career decision-making process of research students.

Table 10 summarises the most important attractors and detractors relating to academic work, based on the responses of all students to the NRSS, regardless of their career plans. As was the case in Table 8 of Chapter 4, this table shows that there are more elements that are positive factors about this work than there are negative. The second largest positive influence noted here – interest and challenge – is arguably the most crucial element attracting people with these degrees to work. Importantly, the fact that regardless of career ambition, most research students see an academic career being better than another career on this factor is notable. It shows that there is a genuine understanding among research students about the positive stimulation that such a career can involve. Other positive factors here are also extremely important to personal and professional wellbeing; with flexibility, work/life balance and job satisfaction in particular playing important parts in the work choices of most people. Overall, these responses suggest that there are a substantial number of important factors which exist within academic work that have the ability to make it an extremely attractive proposition to research students.

The confounding issue here relates to the two detracting factors identified with academic work. The most influential factor in this regard was the perceived lack of availability of academic positions by research students. This is a fundamental factor for decision-making about a career. No matter how attractive an occupation may be on the core factors listed on the left side of the table, if a student believes there are no positions available, then the chance they will pursue this line of work is likely to be greatly diminished. As shown in the discussion of results earlier (Figure 23), and further below, there is some variability in these results by field of education in particular – an important finding in the context of this discussion because it again highlights that there are nuances within the HDR population that must be taken into account when investigating issues relating to future workforce capabilities.

The NRSS shows that students who expect to miss out on their ideal of an academic career instead expect to pursue either research work outside a university or non-research professional jobs. This suggests that some students are making a pragmatic decision to pursue careers outside of academia despite these careers not being their ideal choice. Academic salaries are also seen by students to be less attractive than for other occupations.

In the context of an ageing academic workforce, these findings on job availability are important as it appears that the gaps in the academic workforce are not yet apparent to these research students or that the gaps are appearing at higher levels of academic work and not at the entry level required for these students. From examination of these factors, it is reasonable to suggest that if positions in academia were more widely available – as may be the case over the coming decade when large numbers of the current academic workforce enter retirement – and the onset of this availability more widely promoted, the interest in the academic profession among research students may increase, based on the positive factors of such work identified by these students.

Table 10: Key factors attracting and detracting interest in an academic career (in comparison to other career options)

Attractors*	Detractors^
Development of new knowledge	Availability of positions
Interest/challenge	Salary
Flexibility	
Contribution to community	
Travel opportunity	
Work/life balance	
Collegiality (networks with peers)	
Prestige	
Job satisfaction	
Autonomy	

* More than 50% respondents believe academic work is better or substantially better on these measures.

^ More than 45% respondents believe academic work is worse or substantially worse on these measures.

The analysis of attractors and detractors is examined in more detail in Table 11, which shows the outcomes for these items for each field of education. It reveals that in general, the trend shown in Table 10 permeates throughout the student population, but that there are some nuanced differences among fields of education. Understanding these nuanced differences provides a more accurate tool for policy makers and human resources professionals to understand the key factors that 'push the buttons' within individual fields. For example, research students in the education, humanities and creative arts have serious doubts about the availability of academic positions in their fields in relation to other job opportunities, but are less likely than other groups of students to see salary as a detractor. The health field is also interesting, with research students in this field having serious doubts about the attractiveness of the academic profession on both the availability of positions and in terms of salary, and also being less attracted on factors such as job satisfaction, autonomy, job security and work/life balance than students from many the other disciplines, suggesting it is perhaps likely to be harder to convince these students to join the academic ranks than those in some other fields.

Table 11: Key factors attracting and detracting interest in an academic career (in comparison with other career options), by field of education

	Science	IT	Engineering	Architecture	Agriculture	Health	Education	Management	Humanities	Creative arts
Availability of positions	🔴	🟡	🟡	🟡	🔴	🔴	🔴	🟡	🔴	🔴
Salary	🔴	🔴	🔴	🟡	🔴	🔴	🟡	🔴	🟡	🟡
Interest/challenge	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢
Work/life balance	🟡	🟢	🟢	🟢	🟢	🟡	🟡	🟢	🟢	🟡
Job security	🟡	🟢	🟢	🟢	🟡	🟡	🟡	🟢	🟡	🟡
Prestige	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢
Prospects for career advancement	🟡	🟡	🟡	🟡	🟡	🟡	🟡	🟡	🟡	🟡
Autonomy	🟢	🟢	🟢	🟢	🟡	🟡	🟢	🟢	🟢	🟡
Travel opportunity	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢
Job satisfaction	🟡	🟢	🟢	🟢	🟡	🟡	🟢	🟢	🟢	🟢
Workload	🟡	🟡	🟡	🟡	🟡	🟡	🟡	🟡	🟡	🟡
Collegiality	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢
Flexibility	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢
Contribution to community	🟢	🟢	🟢	🟢	🟢	🟡	🟢	🟢	🟢	🟢
Development of new knowledge	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢

🟢 = More than 50% respondents believe academic work is better or substantially better on this measure.

🔴 = More than 45% respondents believe academic work is worse or substantially worse on this measure.

🟡 = neither of the above two scenarios are present for this measure.

The job of an academic is varied and involves a range of tasks. Table 12 highlights the elements of academic work that are seen as attractive and not attractive by students who have made the decision to pursue a career in this area. Importantly, the two main pillars of academic work – research and teaching are seen as attractive elements of the job. For almost 70 per cent of research students planning to pursue an academic career an ideal academic position would provide a balance of teaching and research work. However, while research was seen as attractive to students regardless of discipline, the range within the fields of education on the extent to which teaching was a positive aspect did differ (see Figure 58), with science, IT and agriculture students generally having less positive responses than those from other fields; especially education, and management and commerce.

Factors relating to the other core pillars of the profession – administrative duties and serving the university were perceived by students to be unattractive elements of this work. A potential way of reversing some of this negative attention would be to make these factors of academic work better understood among the research student cohort and perhaps by treating HDR students more as 'junior colleagues,' and involving them more in these aspects of academia during candidature.

Involvement in academic work on campus (both teaching and research) is also identified by students as having a positive influence on their choice to pursue an academic career. Detailed multivariate analysis (not displayed here) of the NRSS responses also reveals that the involvement in work at university is independently the most powerful variable in explaining the choice to pursue an academic career when a range of other characteristics are controlled for.

The influence of the 'overall university environment' is another issue that is revealed to be important in making the decision to become an academic. While this is somewhat an abstract and subjective concept, it is important to note that for those students who are not based on campus to study, it is unlikely that they will have had the opportunity to develop a positive impression of the university environment.

Table 12: Key influences improving interest in an academic career – research students with plans for academic work in medium- to long-term

Most positive influences on choice of academic career
Observing my postgraduate supervisor
Paid university teaching work
The overall university environment
Paid university research work

Note: More than 40% of selected respondents indicated these influences made them 'more interested' in an academic career (5 out of a 5 point likert scale).

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Table 13: Elements of academic work that attractive and unattractive - research students with plans for academic work in the medium- to long-term

Attractive elements*	Less attractive elements^
Research	Administrative duties
Teaching	Serving the university
Building a research profile	Developing a public profile
Leading your field	
Building academic networks	
Academic autonomy	
Mentoring others	

* More than 65% of selected respondents believe these elements contribute 'quite a bit' or 'very much' to the attractiveness of academic work.

^ More than 25% of selected respondents believe these elements contribute 'very little' or 'not at all' to the attractiveness of academic work.

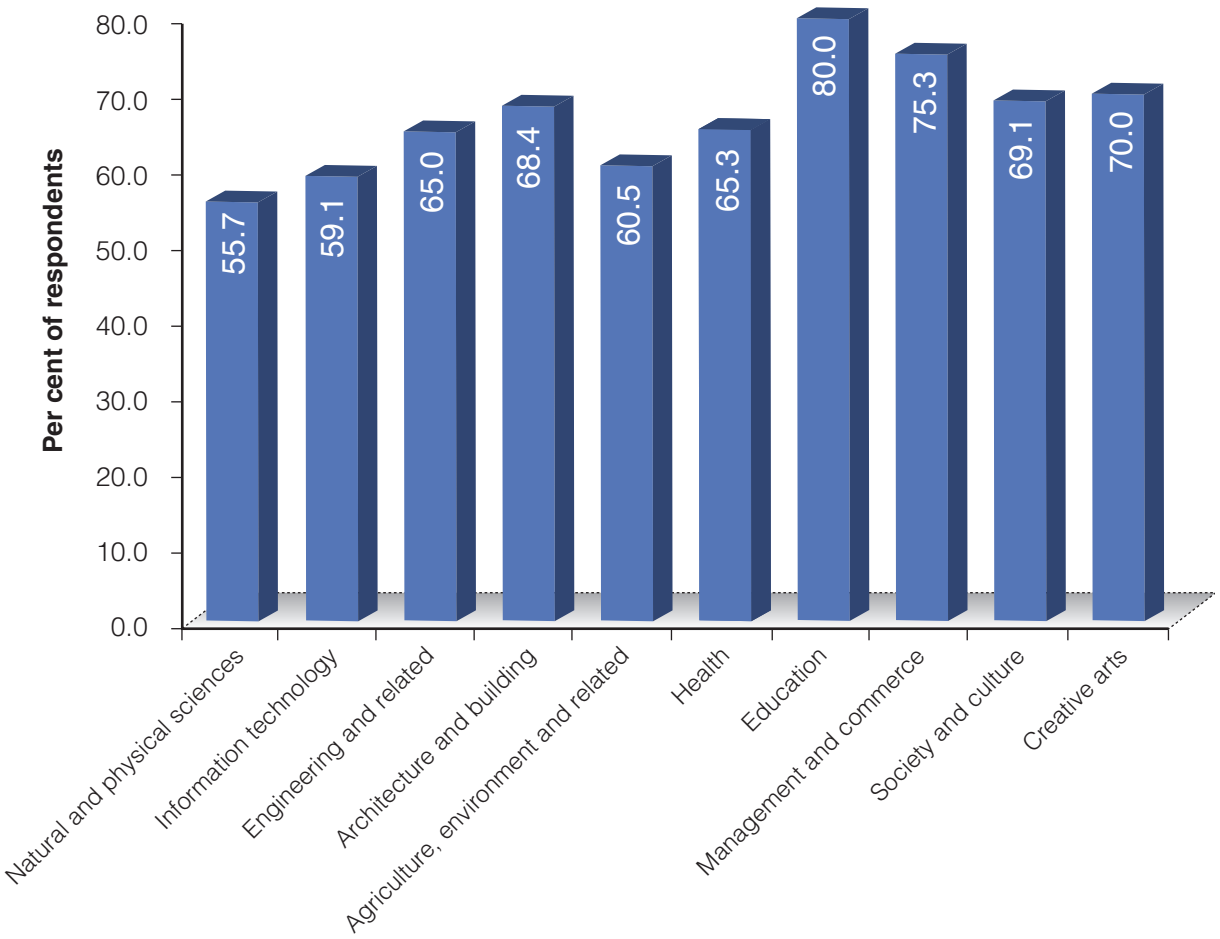

Figure 62: Percentage of academic aspirants indicating that teaching is 'quite a bit' or 'very much' an attractive element of academic work, by field of education

These broad analyses of responses among the research students enrolled in Australia helps to again highlight two key points. First, that in general, research students have a positive impression of the academic career that is built by positive influences within the university, especially supervisors – contrary to expectations at the beginning of this research and contrary to international research on this issue. Second, that while positive impressions are strong, there is a perception that positions in university are not widely available; and this is fundamental to the likelihood of students pursuing a career in this area.

Following from these findings, there are clearly a number of local and national practices that could be implemented to ensure that those with the ambition to follow an academic career maintain this ambition and to attract other research students to consider such work.

The 2010 CSHE study of academic work (Bexley, et. al., 2010), which ran concurrently to this project suggests a number of principles to guide planning for the future academic workforce which are relevant to the present study: indeed, there was a great deal of collegial exchange between the two projects and aspects of each informed the other. Principles recommended in the CSHE report of relevance to the present project included: the need to establish better pre-conditions for more stable forms of employment in the academic workforce; support for the development of a national early career academic scheme, possibly in the form of a two- or three-year postdoctoral fellowship including professional development support; the need for a greater understanding of issues around sessional and short-term academic work; and the need for casual/sessional and short-term contract staff load to be shifted to longer term and ongoing forms of employment.

At the national level, highlighting and promoting the issues relating to an impending workforce shortage and the imperative that renewal comes from the current generation of research students is be likely to increase awareness and provide a renewed focus for this cohort. At the institution level, the formulation and implementation of strategic workforce plans, identifying and creating positions to attract a new generation to the profession are important. These plans already exist in some institutions, so in these cases, the promotion of the vision behind these plans is important to providing the student cohort with an understanding of the opportunities that may be available.

7.3 Do research degree programs fulfil the vocational needs of students?

Issues explored above in attracting students to the academic profession are important. But if these students are ill-equipped for this work, or lack a true understanding of what such a role entails, then their ability to contribute to the regeneration of the academic workforce will be limited. At the other end of the spectrum, it must be recognised that

for a substantial group of the research student cohort pursuing academic work is never going to be on the agenda – so how useful is the research degree for the future professional needs of students? This discussion begins by considering these issues in relation to aspirants for the academic workforce and then discusses the relevance of the research degree to those with non-academic career plans.

7.3.1 An academic apprenticeship

The NRSS findings reveal that majority (54.1 per cent) of students enrolled in research degrees in Australia have a medium- to long-term plan to follow an academic career path. Among those enrolled specifically in a PhD, the figure is higher, at 57.1 per cent. It could therefore be reasonable to assume that a vast number of the research students in Australia envisage the research degree (and in particular the PhD) as a kind of apprenticeship for the academic profession.

Research students in Australia clearly see their degree as being effective at preparing them for a range of research tasks that might have to be undertaken during an academic career. Almost 60 per cent of students indicate that their degree will prepare them 'very much' for academic and scholarly research. Writing academic articles and books was seen as another key skill provided through the research degree by 52 per cent of students and 46 per cent thought that the HDR provided good preparation for presenting research at conferences. Given that the qualifications that these students are enrolled in are, by definition, *research* degrees this finding is positive and not necessarily surprising.

On the other hand, there is mixed evidence coming out of the NRSS on the extent to which the research degree prepares students for the teaching aspects of academic life. In response to the same question above, fewer research students believe that the degree is assisting in preparation for teaching roles within university. Students generally feel that their degree will not prepare them for tasks such as coordinating undergraduate subjects (28 per cent believe the degree will be 'not at all' useful for this), supervising postgraduate students (16 per cent) and giving lectures (11 per cent).

This is perhaps not surprising given that very few students have undertaken formal teacher training. Only 16 per cent of students with academic career ambitions have involved themselves in training for university teaching during their degree. A small proportion of students have also received informal advice and support for teaching during their degree. It appears that the low levels of participation in teacher training reflect a lack of awareness amongst research students with more than half of research students with ambitions to become academics not knowing whether their institution provides training. These low levels of participation in training mean that only one-quarter of research students who have undertaken teaching work (and have ambitions to become academics) have participated in teacher training.

However, in terms of their preparation almost half of students (48.7 per cent) who undertook teaching work during their degree indicated that they felt 'well prepared' for their first lecture, tutorial or demonstration at university. This suggests that despite the low levels of participation in formal training programs, students still feel relatively confident in their ability to teach classes. It is important to note, however, that students have only provided a self-assessment of their preparation for classes and the NRSS does not provide an objective measure of the quality of teaching of these students. It is possible that students over-estimate their preparation for these classes when asked how prepared they felt. This may explain the difference between the low participation in teacher training and the high level of reported preparation for teaching.

These findings provide a mixed message on the effectiveness of current HDR teacher training. On the one hand students report feeling prepared for the teaching work they pursue while completing their degree yet, on the other, only a small proportion undertake training and few report that their research degree has provided adequate training for teaching aspects of an academic career. As such, low participation in teacher training programs is an issue given the high proportion of research students already undertaking teaching work, however, the key issue for consideration is whether this training is most effectively undertaken during the HDR or whether it is more appropriate upon professional appointment.

Among those who plan to follow an academic pathway, nearly three-quarters plan to include university teaching as part of this career, therefore, it could be argued that some kind of formal preparation during the degree for this kind of work might be beneficial. In addition to this, the high proportion of students undertaking paid teaching work suggests that students may benefit from teacher training prior to their formal appointment to the academic profession. Another positive benefit of providing training during the HDR could be the impact on engagement of students. The qualitative responses to the NRSS show that students appreciated that collegiality and peer networks that were formed through training participation. However, the idea of 'internships', 'work experience' or 'academic secondments' within the PhD is problematic in that they impinge on what is already considered a limited timeframe for such a degree. There is also a sizeable minority of students (45 per cent of students) who do not plan to pursue an academic career in the medium- to long-term. It is important to recognise that teacher training is probably not a key skill these students are looking to develop during their HDR qualification.

In terms of whether training would be more effective upon professional appointment, it is apparent from the Institutional Survey that institutions tend to focus their attention on providing training for university teaching mainly at this later stage. While training is available earlier, it is not seen as either a priority during the HDR or in institutional recruitment practices. For example, supervisors provide the most support and encouragement for research activities as opposed to teaching activities. It is also apparent that institutions do not place a high value on teacher qualifications in their recruitment of early career staff with only two institutional respondents seeing a

formal qualification in university teaching as important, and none as very important. This probably reflects that most institutions are currently providing teacher training upon professional appointment and so do not expect these skills of new staff.

Given the lack of objective assessment of the effectiveness of teacher preparation of research students and that institutional practices are currently weighted towards training upon professional appointment, any change to include teacher training as part of the HDR would have to be given careful consideration. Factors that may need to be considered include that students ideally want a balance of teaching and research roles in their work so teaching skills are important to develop; that there is currently low participation in teacher training during the HDR; and, that students do not think the HDR prepares them for teaching roles. On the other hand, institutional practices are focused towards training upon professional appointment and students report feeling prepared for the teaching work they undertake. All of these factors would need to be given careful consideration before an assessment could be made as to whether teacher training should become part of the HDR.

7.3.2 Fostering skills for outside the academy

Historically the primary employment pathway from the PhD was into the academic sphere. However, as the number of people with this qualification has grown and the economy has become increasingly complex, the pathways from the PhD have branched out considerably. According to the 2006 Census of Australian Population and Households, 45 per cent of all employed people with a PhD qualification were working in the education and training industry (Edwards, et al., 2009). The remaining 55 per cent worked within a range of other industries, with the scientific and technical services industry, and the health care and social assistance industry being the next most common. Coupled with the diversity of career plans stated by research students in the NRSS, this evidence shows that the pathway to academia is only one of a range of employment options considered and followed by people with research degrees in Australia.

While this diversity of employment outcomes is now the norm for research graduates, the extent to which their degree prepares them for non-academic research tasks is questionable. In the NRSS, despite positive responses relating to the extent of degree preparation for scholarly research and writing academic journals or books, less than half (40 per cent) of research students indicated that their degree would 'very much' prepare them to do applied research. In addition, 24 per cent indicate that their degree would 'not at all' prepare them for a non-academic job outside their field and 11 per cent thought this would be the case for a non-academic job within their field.

This view of unpreparedness for non-academic work was also identified in a recent wide-ranging study of Australia research degrees in the science and mathematics fields (Edwards & Smith, 2008a). This research showed that not only did PhD students feel that their degree was unlikely to equip them with the skills that employers outside the university sector were seeking, potential employers of these students had the view that 'PhD graduates were seen as more narrowly focused and generally less adaptable to employer requirements' (p. 23).

These findings suggest that some avenues built into the research degree that provide skills for employment outside the university sector could be useful to the large minority of students with career ambitions for non-academic work. Specific programs relating to commercialisation, mentoring links between industry and universities, and opportunities for work placements during the research degree are examples of how skills can be transferred during the degree. Programs in this vein already exist (such as the arrangements between Cooperative Research Centres and universities (Edwards & Smith, 2008a)), but still permeate only a minority of research degree students.

As with the discussion on equipping students with skills for the academic workforce, finding space within the research degree to provide training and information about such skills is extremely difficult. However, by again tapping into the activities already being undertaken by research students – 82 per cent of those working outside the university sector are already employed in work that is related to their study – it is possible that tailored programs to build professional development in skills relating to future career ambitions could be implemented.

7.4 Conclusion

The NRSS provides a rich source of information about the motivations, experiences and interests of research students in Australia. The findings highlighted here provide an entrée into the complexities of the HDR and the substantial issues faced by students when considering future careers and occupational pathways. These outcomes provide important insight for universities and policy-makers, particularly in relation to the sustainability and future of the academic workforce in Australia.

Clearly one of the greatest impediments in students' decisions about their careers in the academic sphere is the perception that there is a general lack of positions available in universities. The reality of this situation is obviously also of interest in this regard – with the projections above and the demographic situation within the academic workforce suggesting that there appears to be no shortage of demand in the coming decades. However, the fact that these perceptions exist is enough to suggest that things must change in order change these perceptions and increase the attractiveness of the academic position to the next generation of potential academics. Factors such as greater emphasis on highlighting the availability of positions, improving remuneration benefits and improving job security, while continuing to ensure flexible work conditions, will all help to sustain and improve the attractiveness of the academic career.

Another crucial policy issue raised through the NRSS is the question of whether the research degree (especially the PhD) as it is currently conceived in Australia is actually adequate in preparing students for embarking on the types of careers they wish to pursue. The findings here certainly show that these qualifications are effective in preparing students specifically for research work within universities and research agencies; but only a small proportion of students have a research-only career in mind for the future. As such, further thinking about the extent of support provided to students during their degree to prepare them for work outside the university sector and/or for the academic tasks of teaching, research and administration is needed. In particular, the lack of awareness and low participation in training for university teaching is an issue for those planning to pursue academic careers. Ensuring a balance between the alignment of the research degree with the realistic career ambitions of students is important whilst at the same time recognising that some specific career-related training is perhaps best undertaken after the foundation of the HDR is set. Achieving this balance of skill development is critical for nurturing the successful career pathways of research students in Australia.

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Appendix A – Method

Overview

This appendix details the steps followed in the administration of the NRSS and the Institutional Survey. It explores recruitment and promotion, survey design and format, the fieldwork phase, and analysis.

Consultations and promotion of the project

To enhance the policy impact of this project a series of focused, but informal consultations with universities and other stakeholders was undertaken in the early phase of the research. These consultations were carried out with key postgraduate representative groups and with core parts of institutions that work with research students and areas that provide teacher training to this group of students. A strategic collaboration with the Council of Australian Postgraduate Associations (CAPA), a key stakeholder for research students, was formed during this stage. The research team also liaised with Universities Australia (UA), the Deans and Directors of Graduate Studies (DDOGS) and individual academics within Australian universities. This process was important in providing stakeholders with information about the project and helping with the recruitment of universities for participation in the NRSS and Institutional Survey.

Engaging institutions

Engaging a sufficient number and range of institutions in this study was critical to its success. The initial consultation phase outlined above helped to set the foundations for the recruitment of universities for the NRSS and Institutional Survey.

Invitations to participate in the research were sent to all university Vice Chancellors in Australia (39 in total), informing them of the research focus and objectives. The letters to Vice Chancellors were copied to relevant senior university personnel, generally the DVC or PVC (Research) and the Dean of Graduate Studies (or equivalent). Universities were provided with an added incentive to participate by offering to provide those involved with an Institutional Summary Report at the conclusion of the study, comparing the responses of their students in relation to the national findings.

The original aim of the study was to secure at least 20 universities for the study. A successful recruitment campaign meant that 38 of the 39 universities in Australia participated in the research. A list of participating institutions is provided in Appendix A.

Institutional Survey (IS) and secondary analyses

The Institutional Survey was complementary to the main student survey and designed to gather information about institutional practice from the key personnel responsible for training for university teaching within each university in Australia. These responses from this survey were supplemented by examination of secondary sources, such as university websites and policy documents, building a comprehensive picture of the extent to which training for university teaching is offered, required, encouraged and supported for research students in Australian universities.

The Institutional Survey targeted two key personnel at each university – the appropriate Pro- or Deputy Vice Chancellor (for example DVC Academic, PVC Teaching and Learning) as well as the Head of Graduate Studies or equivalent. The relevant personnel for each institution were identified through the consultation process outlined above, via networks that have already been established by the research team, and through the implementation process for the NRSS.

The Institutional Survey was designed by ACER and CSHE in consultation with DEEWR and other industry stakeholders. The instrument was delivered online with respondents individually emailed a link to the survey. The survey was designed to be completed in less than five minutes. It was necessarily generalised, but offered respondents the opportunity for specific comment about particular practices within individual faculties or schools where necessary. Non-response was followed up by subsequent emails.

The survey invitation was sent to the target group on Wednesday 15 June, 2010 and respondents were given ten days to complete the survey. Follow-ups were carried out on 21 June, and where necessary 23 June.

Of 70 targeted personnel, 24 responses to the survey were received, garnering a response rate of 34.3 per cent. Respondents had the option of recording the institution they represented in their responses to this survey. Thirteen of the 24 respondents specifically identified their institution, and all were from different universities. It is estimated that responses to this survey were received from between half to two-thirds of the 38 participating universities.

National Research Student Survey (NRSS)

Designing and validating the survey instrument

The ACER/CSHE team designed, developed and produced the NRSS instrument. The design and development was undertaken in close consultation with DEEWR, the Technical Working Group (TWG) formed by DEEWR for the project (see Appendix C for a list of the TWG members), CAPA, DDOGS, and academics from institutions across

Australia.

A number of steps were conducted to validate the NRSS instrument and ensure it provided measurement with required levels of precision. A small but targeted pilot test of the instrument was carried out with research students spanning a range of disciplines and geographic locations in Australia. This pilot was facilitated by CAPA and was used to hone the items for clarity and relevance. It involved students completing the survey and follow up interviews to gather reactions and suggestions for alteration of the instrument. A report of responses from those involved in the pilot was compiled by CAPA for the ACER/CSHE team.

Survey format and delivery

The NRSS instrument was produced and administered in an online format. The online delivery of the NRSS was used as the exclusive format for the research primarily due to the time constraints on the project and the additional time-burden that other formats (such as paper) place on the process of survey administration.

The online instrument was developed within ACER's standard online testing platform. This is a highly flexible and robust system and has previously been used in studies targeting all Australasian tertiary providers. ACER's software engineers provided extensive technical support during the administration of the instrument and extraction of response data.

The online NRSS instrument was distributed to students by their institution via an email invitation from a relevant senior person within the university. Each institution was provided with a unique link to the survey instrument, enabling fast and efficient monitoring of response numbers at individual institutions.

For the purpose of this project, which seeks to collect baseline data, a census collection process was used for the NRSS, in which all individuals in that target population are sent a questionnaire.

Target population

In consultation with DEEWR and a number of university stakeholders, a population of the research student cohort was established to set parameters for all fieldwork, data preparation and statistical analyses.

The target population consisted of all HDR (postgraduate research) students enrolled at the 38 universities participating in the project. Research students were defined as those whose course has a research component of at least two-thirds, and are thus not more than one-third coursework (the definition used in the Higher Education Information Management System [HEIMS]). This definition encompasses two main qualifications: the Doctorate by Research and the Masters by Research. Both domestic and international students were included in the population. Students enrolled 'offshore' were not included.

All participating universities provided ACER with a de-identified list of their student population for the NRSS as of 1 June, 2010. In total, the national target population for the survey consisted of 45,969 research students.

Fieldwork phase

The fieldwork phase involved coordinating operations at participating universities, and managing central data entry and preparation activities.

Fieldwork operations for this project were designed to maximise the nature and level of survey response. A 'devolved but controlled' survey administration methodology was used to ensure the smooth running of the survey and the participation of all institutions.

An important first step in this phase involved engaging each participating university's operational staff in the fieldwork process. Their active involvement was critical for project outcomes.

An Institution Administration Manual was developed for university operational staff that provided guidance on managing their involvement in the study. As with the manuals developed for the Graduate Pathways Survey (Coates & Edwards, 2009), the Australian Graduate Survey (Coates, Tilbrook, Guthrie, & Bryant, 2006), the Australasian Survey of Student Engagement (AUSSE) and the Changing Academic Profession (CAP) surveys (Coates & Murphy, 2007), this manual offered a succinct overview of the study's focus and method, operational details on identifying the population, and information on distributing emails.

- In summary, the approach to the fieldwork phase of the survey involveinstitutions compiling a list of students in the defined target population and supplying a de-identified copy of this list to ACER;
- ACER reviewing this list in consultation with institutions and returning a validated list to institutions;

- institutions re-attaching graduate contact details to the list and emailing participants an invitation and link to online survey; and
- completed responses to the online survey being collected directly by ACER.

A key benefit of this 'devolved but controlled' process was that at no time was ACER privy to the individual contact or name details of any survey participants.

Students were sent an initial invitation email from their university with their institution-specific link during the week of 7 June, 2010. Reminder emails were sent in the following week. Some institutions also sent a third email reminder in the final week of administration. The survey remained open until 25 June. In addition to the institutional email invitations, CAPA also distributed an email to its student members during these weeks, encouraging participation in the NRSS. An incentive of the chance to receive one of fifteen $500 book vouchers was offered for respondents who completed the survey within the specified time-frame. These vouchers were distributed in the weeks after the survey was closed to respondents.

Careful management of fieldwork operations was critical to the success of the project. ACER maintained regular contact with universities throughout this phase to help guide and support their operations. This close liaison with universities played a critical role in ensuring the integrity of survey processes and hence project outcomes. The operation and administration of the NRSS was smooth and successful, thanks largely to the cooperation and professional coordination of staff from all 38 universities involved.

Completed online surveys were returned directly to ACER for logging, collating and cleaning. Response rates were monitored in real time, and feedback was provided to university staff to help them manage follow-up distributions.

Response numbers and sample verification

Procedures for administering the survey were undertaken to ensure the highest possible response rate given the time and resource constraints for the project.

In total, after data cleaning and file preparation, 11,710 valid responses from research students were used for the analysis. This constitutes a national response rate of 25.5 per cent. These response numbers represent the largest collection of survey responses from research students ever undertaken in Australia. Individual university response rates varied from 12.2 per cent to 39 per cent. Institutional response rates (and the national rate) are displayed in Table 13. There is a range of reasons for the institutional response differences – some universities were not able to send invitation emails to students in the first week of administration, others were not willing or able to send reminder emails to students.

Table 14: NRSS response numbers by institution

Institution	Target population	NRSS valid responses	NRSS response rate (%)
James Cook University	678	108	15.9
Murdoch University	827	145	17.5
University of Western Australia	1,802	524	29.1
University of Wollongong	1,246	311	25.0
University of Ballarat	160	36	22.5
Swinburne University of Technology	700	147	21.0
Central Queensland University	220	81	36.8
University of Southern Queensland	280	103	36.8
Edith Cowan University	538	88	16.4
Curtin University of Technology	1,560	231	14.8
University of Canberra	352	115	32.7
Charles Darwin University	202	44	21.8
Bond University	147	18	12.2
University of Western Sydney	698	126	18.1
Charles Sturt University	439	116	26.4
Australian Catholic University	313	59	18.8
Victoria University	673	96	14.3
University of Tasmania	970	217	22.4
University of Adelaide	1,553	439	28.3
University of New South Wales	3,180	940	29.6
University of Newcastle	1,070	308	28.8
University of Technology, Sydney	1,083	260	24.0
University of Queensland	4,019	704	17.5
La Trobe University	1,385	212	15.3
Macquarie University	1,550	392	25.3
University of South Australia	970	266	27.4
Flinders University	856	334	39.0
Deakin University	997	246	24.7
Griffith University	1,415	181	12.8
RMIT University	1,485	316	21.3
Monash University	3,730	617	16.5
University of Melbourne	3,944	660	16.7
Southern Cross University	387	81	20.9
University of New England	657	194	29.5
University of Sydney	4,010	978	24.4
Queensland University of Technology	1,664	306	18.4
University of the Sunshine Coast	144	52	36.1
University of Notre Dame, Australia	65	14	21.5
No university recorded		1,645	
Total	45,969	11,710	25.5

A range of sample verification analyses were undertaken on the responses. In summary, these were to:

- compare the sample data against key marker variables;
- analyse and treat item-level missing data;
- calculate response and non-response rates;
- calculate post-stratification weights and final composite weights; and
- calculate standard errors of the sample based on the effective target population size.

Careful weighting, validation and analysis of non-response was undertaken on the final analysis file to ensure that the sample secured was able to provide statistically robust findings and to make estimations with confidence.

Post-stratification weights were calculated based on the target population list and four key variables: institution, field of education, gender and qualification type. Responses with missing data for these key variables were weighted by institution and by sex where possible and by a national weight where there was no recording of these characteristics. This weighting has been used for the analyses in the findings chapters of this report. Employing this method helps to adjust for bias in the response sample. Appendix D provides further detail relating to the weighted response numbers and missing data.

These analyses of sample adequacy play a critical role in ensuring the veracity of the project report and hence outcomes. As documented in the 2005 study of non-response in the Graduate Destination Survey (Coates, et al., 2006), these procedures are used to help reduce bias and ensure reliability of statistical results.

Towards the end of the fieldwork phase, ACER focused on generating, building, tidying and validating the responses of research students. Standard cleaning processes were used to ensure the quality and integrity of the final analysis file. A main raw data file was produced, annotated and archived. A series of derivative files were produced for various aspects of psychometric and statistical analyses, such as item response modelling, multilevel analysis and construction of scales for analysis. A range of descriptive crosschecks were performed to check responses and data quality. Further psychometric analysis of response items was undertaken to validate scales and ensure the veracity of the data.

Analysis and reporting

The main work in the analysis phase involved statistical analysis of the variation in the data. Statistical analyses, conducted using SPSS included:

- univariate, bivariate and multivariate descriptive analyses; and
- covariance analyses designed in response to the project objectives.

Findings are generally reported as response proportions of the weighted data. In reporting the precision of these inferences two approaches were followed: an estimation-based approach using the method for recommended for proportions by Newcomb and Altman (2000), and indications of statistical significance. Confidence intervals are particularly useful where differences between groups are small as the width of the interval conveys precision (an interval from 10 per cent to 30 per cent offers a less precise estimate of the true population percentage than an interval that extends from 15 per cent to 25 per cent). Where confidence intervals are reported they are calculated using the unweighted data. The 95 per cent confidence intervals acknowledge that there is a small chance (5 per cent) that the population value is not contained in the interval. Estimation is rapidly replacing significance testing as the preferred approach across the disciplines (Fidler, Cumming, Burgman, & Thomason, 2004). Estimation encourages a more sophisticated interpretation of data by drawing attention to the size of effects and the presence of trends, rather than encouraging simplistic accept/reject decisions based on statistical significance. However, where statistically significant relationships exist, they are reported in the text at the $p<0.05$ level (corresponding to the 95 per cent confidence intervals). Statistical significance can also be read directly from the 95 per cent confidence intervals such that when 95 per cent confidence intervals (on independent group data) overlap by approximately one-quarter of the average of their total widths, the difference between the two estimates is statistically significant at $p=0.05$ (Cumming & Finch, 2005).

Appendix B – Participating Universities

Institution

- Australian Catholic University
- Bond University
- Central Queensland University
- Charles Darwin University
- Charles Sturt University
- Curtin University of Technology
- Deakin University
- Edith Cowan University
- Griffith University
- James Cook University
- La Trobe University
- Macquarie University
- Monash University
- Murdoch University
- Queensland University of Technology
- RMIT
- Southern Cross University
- Swinburne University of Technology
- The Flinders University of South Australia
- The University of Adelaide
- The University of Melbourne
- The University of New England
- The University of New South Wales
- The University of Newcastle
- The University of Queensland
- The University of Sydney
- The University of Western Australia
- University of Ballarat
- University of Canberra
- University of Notre Dame Australia
- University of South Australia
- University of Southern Queensland
- University of Tasmania
- University of Technology, Sydney
- University of the Sunshine Coast
- University of Western Sydney
- University of Wollongong
- Victoria University

Appendix C – Project Technical Working Group Members

- Mr Phil Aungles – Director, Performance and Analysis Section, Department of Education Employment and Workplace Relations (DEEWR) (Chair)
- Ms Anita John – A/g Assistant Director, Performance and Analysis Section, DEEWR
- Professor Geoff Scott - Pro-Vice Chancellor (Quality), University of Western Sydney
- Ms Shard Lorenzo - Director of Human Resources, University of Queensland
- Dr Joanne Bright – Manager, Research Performance and Analysis, Department of Innovation, Industry, Science and Research (DIISR)
- Ms Katherine Vickers – Director, North Asia Americas and Middle East Section, DEEWR
- Mr Paul Kniest – Policy and Research Coordinator, National Tertiary Education Union (NTEU)
- Ms Tammi Jonas – National President of the Council of Australian Postgraduate Associations (CAPA)
- Dr Nathan Cassidy - Policy Officer, Universities Australia

Appendix D – NRSS Sample Characteristics

Full target population, sample and weighted response numbers for the NRSS are detailed in this Appendix. Figures for key population characteristics are presented in Table 14, while institution figures are shown in Table 15. Respondents who did not answer questions relating to these key aspects are not included in the totals for each variable. However, the 'Total Population' row at the bottom of Table 14 shows the full target population, full response numbers and final weighted rTable 15: Population characteristics of NRSS – target population, responses and weighted for the NRSS. The extent of missing data for these core characteristic variables is shown in Table 16.

Overall, the response yield detailed in Table 14 and Table 15 show that the NRSS respondents were representative of the whole research student population targeted for this research. The main areas among the raw response numbers where there was some discrepancy with the target population share were: gender, where females are over-represented; qualification, where doctorate students are over-represented; student type, where domestic students are over-represented; and in some fields of education. The fields where some minor imbalance is noticeable are Health, where the response numbers are over-representative of the target population, and in Engineering and Society and Culture, which are each slightly under-represented in the sample.

As noted earlier, the weighting of the NRSS sample has been calculated based on institution, gender, qualification and field of education. This weighting has corrected any sample bias attributable to response anomalies within these variables. As the final column of Table 14 shows, the minor issues relating to representativeness of the sample in these variables are corrected via the weighting.

The fact that domestic students were more likely than international students to respond to the NRSS is unsurprising, given issues with language and perceived relevance of this survey among these two groups. However, despite a slightly lower than representative share of responses from international students, the response numbers from this group of students are still relatively large and sufficient for the purpose of analysis.

Table 15: Population characteristics of NRSS – target population, responses and weighted

Variable		Target population		NRSS Responses		NRSS weighted	
		Count	*Per cent*	*Count*	*Per cent*	*Count*	*Per cent*
Gender	Male	21,683	48.8	4,224	42.0	22,681	48.3
	Female	22,723	51.2	5,830	58.0	24,260	51.7
	Total	44,406	100.0	10,054	100.0	46,941	100
Qualification of enrolment	Doctorate	38,868	84.6	8,710	87.2	40,133	86.0
	Masters	7,099	15.4	1,282	12.8	6,529	14.0
	Total	45,967	100.0	9,992	100.0	46,662	100.0
Broad field of education	Natural and Physical Sciences	8,932	19.4	1,719	17.1	8,787	18.7
	Information Technology	1,495	3.3	448	4.5	1,855	4
	Engineering and Related	6,015	13.1	1,038	10.3	5,792	12.3
	Architecture and Building	791	1.7	125	1.2	677	1.4
	Agriculture, Environ and Related	1,776	3.9	566	5.6	2,159	4.6
	Health	7,169	15.6	1,997	19.9	7,492	16
	Education	3,441	7.5	920	9.2	3,581	7.6
	Management and Commerce	3,176	6.9	600	6.0	3,238	6.9
	Society and Culture	10,421	22.7	2,011	20.0	10,342	22.1
	Creative Arts	2,741	6.0	605	6.0	2,963	6.3
	Food, Hospitality & Personal S'vs	5	0.0	17	0.2	17	0
	Mixed fields programs	4	0.0	-	-	-	-
	Total	45,966	100.0	10,046	100.0	46,903	100
Attendance type	Part-time	12,288	26.7	2,557	25.4	11,781	25.1
	Full-time	33,668	73.3	7,492	74.6	35,138	74.9
	Total	45,956	100	10,049	100	46,919	100
Student type	Domestic	29,966	67.5	7,564	75.5	34,877	74.5
	International	14,436	32.5	2,460	24.5	11,959	25.5
	Total	44,402	100.0	10,024	100	46,836	100
Total population		45,969		11,710		53,480	

Note: figures here for specific variables do not include missing data in totals or in percentage calculations. Full count is provided in the final row.

Table 16: Institution numbers NRSS - target population, responses and weighted

Institution	Target population		NRSS Responses		NRSS weighted	
	Count	*Per cent*	*Count*	*Per cent*	*Count*	*Per cent*
James Cook University	678	1.5	108	1.1	607	1.3
Murdoch University	827	1.8	145	1.4	802	1.7
University of Western Australia	1,802	3.9	524	5.2	1,802	3.8
University of Wollongong	1,246	2.7	311	3.1	1,294	2.8
University of Ballarat	160	0.3	36	0.4	148	0.3
Swinburne University of Technology	700	1.5	147	1.5	875	1.9
Central Queensland University	220	0.5	81	0.8	252	0.5
University of Southern Queensland	280	0.6	103	1	323	0.7
Edith Cowan University	538	1.2	88	0.9	501	1.1
Curtin University of Technology	1,560	3.4	231	2.3	1,511	3.2
University of Canberra	352	0.8	115	1.1	376	0.8
Charles Darwin University	202	0.4	44	0.4	170	0.4
Bond University	147	0.3	18	0.2	162	0.3
University of Western Sydney	698	1.5	126	1.3	725	1.5
Charles Sturt University	439	1.0	116	1.2	455	1
Australian Catholic University	313	0.7	59	0.6	301	0.6
Victoria University	673	1.5	96	1	686	1.5
University of Tasmania	970	2.1	217	2.2	969	2.1
University of Adelaide	1,553	3.4	439	4.4	1,573	3.3
University of New South Wales	3,180	6.9	940	9.3	3,243	6.9
University of Newcastle	1,070	2.3	308	3.1	1,062	2.3
University of Technology, Sydney	1,083	2.4	260	2.6	1,172	2.5
University of Queensland	4,019	8.7	704	7	4,025	8.6
La Trobe University	1,385	3.0	212	2.1	1,390	3
Macquarie University	1,550	3.4	392	3.9	1,547	3.3
University of South Australia	970	2.1	266	2.6	984	2.1
Flinders University	856	1.9	334	3.3	903	1.9
Deakin University	997	2.2	246	2.4	1,123	2.4
Griffith University	1,415	3.1	181	1.8	1,358	2.9
RMIT University	1,485	3.2	316	3.1	1,558	3.3
Monash University	3,730	8.1	617	6.1	3,781	8
University of Melbourne	3,944	8.6	660	6.6	4,130	8.8
Southern Cross University	387	0.8	81	0.8	387	0.8
University of New England	657	1.4	194	1.9	689	1.5
University of Sydney	4,010	8.7	978	9.7	4,277	9.1
Queensland University of Technology	1,664	3.6	306	3	1,690	3.6
University of the Sunshine Coast	144	0.3	52	0.5	134	0.3
University of Notre Dame, Australia	65	0.1	14	0.1	46	0.1
Total	45,969	100.0	10,065	100.0	47,030	100

Table 17: Overview of NRSS response numbers for key characteristics variables (un-weighted)

Variable	Valid responses	Missing	% missing
Gender	10,054	1,656	16.5
Institution	10,065	1,637	16.3
Attendance type	10,049	1,661	16.5
Broad field of education	10,046	1,664	16.6
Student type	10,024	1,686	16.8
Qualification of enrolment	10,068	1,642	16.3

Appendix E – Summarised findings of the Institution Survey

Table 17: Organisational unit(s) responsible for delivering training in university teaching at each responding institution (respondents were asked to choose all that apply)

Special academic development unit n=14	Individual faculties, dep'ts or schools n=10	Graduate school or similar n=3	Jointly with another institution n=1
✓	✓	✓	
✓	✓		
✓	✓		
✓	✓		
✓	✓		
✓	✓		
✓			
✓			
✓			
✓			
✓			
✓			
✓			
✓			
	✓		
	✓		
	✓		
	✓	✓	
		✓	
			✓

Table 18: Type of staff who deliver the training in university teaching to research students at each responding institution (respondents were asked to choose all that apply)

Academic staff n=18	Specialist training staff n=10	Research students n=1	Administrative staff n=3
✓	✓	✓	
✓	✓		
✓	✓		
✓	✓		
✓	✓		
✓	✓		
✓	✓		
✓	✓		✓
✓			✓
✓			✓
✓			
✓			
✓			
✓			
✓			
✓			
✓			
✓			
	✓		
	✓		

Table 19: Teaching practices covered in training workshops for research students (findings from the Institutional Survey)

Practices covered in training workshops	No. of institutions
Record keeping and administration	6
Teaching methods for small groups	18
Teaching methods for lectures	15
Teaching international students	12
Working with students from diverse backgrounds	14
Assessment practices	18
Course planning	12
Using online learning and assessment tools	16
Academic integrity issues (e.g. dealing with suspected plagiarism)	19

Appendix F – NRSS Instrument

The NRSS instrument can be viewed by following the link below:

http://ausse-survey.acer.edu.au/index.php?sid=59942&lang=en

Please email highereducation@acer.edu.au if you have any problems following this link.

Appendix G: The National Research Students Survey and the CSHE 2010 survey of academic staff

Concurrently with this project, the Centre for the Study of Higher Education undertook a parallel project for DEEWR investigating the current attitudes of the academic profession in Australia towards academic work and academic careers (Bexley, James, & Arkoudis, 2010). The project aimed at informing possible strategies for the recruitment and retention of academic staff in the context of workforce planning at the national and institutional levels. The research was conducted across 20 universities and a total of 5,525 responses were received from Australia's academics, including sessional and casual staff. At a number of places throughout the NRSS report references are made to the academic survey, linking findings and results to highlight the complementary nature of these two separate projects. The Australian academic profession in transition: Addressing the challenge of reconceptualising academic work and regenerating the academic workforce (Bexley, James and Arkoudis 2010), which are relevant to the present study.