

Aspiration versus outcome: the career intentions of PhD students in an Australian university

Murray Lane, Karen Dooley, Karen Cavu and Esa Jaatinen
Queensland University of Technology, Brisbane, Australia

Studies in
Graduate and
Postdoctoral
Education

Received 2 December 2024
Revised 16 July 2025
Accepted 6 August 2025

Abstract

Purpose – While PhD qualifications were commonly viewed as preparation for academic careers, graduates are increasingly finding employment beyond the university sector. This study aims to examine the relationship between the career aspirations and confidence levels of PhD students and alumni at an Australian university, and their likely career outcomes.

Design/methodology/approach – To determine career intentions and outcomes of past and present PhD students, the authors conducted a survey at a single Australian university, reaching 445 students and 175 alumni. The survey compares students' career goals, confidence levels, career development training, disciplinary focus, age and experiences in the course using descriptive and statistical analysis.

Findings – The survey revealed that 55% of current students aspired to university roles, with 67% expressing confidence in achieving their desired outcomes. Statistical analysis showed a significant association between confidence in attaining career goals and experiential factors, such as time management skills and a sense of connection within the learning community. However, these factors did not significantly influence the type of career goal itself. A gap remains between students' aspirations and the likelihood of achieving their desired career outcomes, particularly in academic roles.

Practical implications – The research findings emphasise the need for comprehensive career support and realistic career guidance for PhD students, aligning their aspirations with the broader job market.

Originality/value – This study contributes to understanding the evolving career landscape for PhD graduates and underscores the importance of preparing students for diverse career paths.

Keywords Academic aspirations, Doctoral employment, PhD careers, PhD job confidence

Paper type Research paper

Introduction

Historically, in Australia and the UK, PhD qualifications often served as preparation for academic careers (Taylor, 2007), but graduates are increasingly working in non-academic jobs within and beyond universities. During the 21st century, research has revealed that less than half of all doctoral employment occurs in academia (Haynes *et al.*, 2009; King *et al.*, 2008; McGagh *et al.*, 2016; Guthrie and Bryant, 2015). In Australia, studies (Challice, 2021; Guthrie and Bryant, 2015) indicate that less than half of PhD graduates enter academia. Many find employment in government or the private sector, a trend also observed in the UK (Bryan and Guccione, 2018). This shift in career trajectories reflects changes to university employment opportunities, as well as industries and organisations that prioritise research,



© Murray Lane, Karen Dooley, Karen Cavu and Esa Jaatinen. Published by Emerald Publishing Limited. This article is published under the Creative Commons Attribution (CC BY 4.0) licence. Anyone may reproduce, distribute, translate and create derivative works of this article (for both commercial and non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this licence may be seen at <http://creativecommons.org/licences/by/4.0/>

Studies in Graduate and
Postdoctoral Education
Emerald Publishing Limited
2398-4686
DOI 10.1108/SGPE-12-2024-0125

analytical and problem-solving skills employing PhD graduates (Germain-Alamartine *et al.*, 2021). Universities have assisted this development by emphasising transferable skills (Guerin, 2020) and strategies to attract PhD students with promises of benefits beyond academia.

There has been some research on career outcomes of PhD graduates from universities in Europe, North America and Australasia (McAlpine and Amundsen, 2016; Bryan and Guccione, 2018; Sharmini and Spronken-Smith, 2020). However, little research has investigated the likelihood of PhD students' career intentions being realised or considered how confidence levels and skill-building activities contribute to graduates' career outcomes. To address these gaps, this study, undertaken at one Australian university, asks: What are the career intentions of PhD students, and how do these intentions align with their actual and likely career outcomes? By analysing the circumstances and perspectives of current PhD students and alumni, the study provides insights into how demographic and experiential factors shape career aspirations and confidence, highlighting the distinct roles of these factors in influencing PhD career trajectories.

Background

The study was conducted in an Australian university with two groups of survey respondents: PhD students and alumni. It was a component of a larger mixed methods project that also involved PhD supervisor participants. In 2022, the university reviewed its PhD course during internal reaccreditation. To appraise the career relevance of the course, we conducted a survey to investigate the likely career trajectories of PhD students. The survey addressed, *inter alia*, career intentions and outcomes.

The study university is a mid-sized Australian institution with approximately 1,900 enrolled doctoral students across 15 STEM (Science, Technology, Engineering and Mathematics) schools and 13 HASS (Humanities, Arts and Social Sciences) schools. It has a history of, and reputation for prioritising practical, industry-relevant education and research, including for PhD candidates. The turn to industry relevance in Australia has international resonance. Recent scholarship on the global employment outcomes of PhD graduates highlights a 21st century shift, acknowledging that the qualification is no longer preparation only for aspiring academics (Cuthbert and Molla, 2015; Sharmini and Spronken-Smith, 2020). This shift reflects the broad range of careers and industries that now attract PhD graduates (Quality Indicators for Learning and Teaching, 2021) and decreasing opportunities for secure academic work (Cook *et al.*, 2021; Herschberg *et al.*, 2018; Sarrico, 2022).

The upward trend in the number of PhD graduates has prompted discussion about massification of the qualification (Cyranoski *et al.*, 2011; Santos *et al.*, 2016) and the need for graduate attributes to reflect changing career outcomes, which include increased casualisation of the research workforce within and beyond academia. Such attributes include adaptability, project management and enhanced communication skills (Allen *et al.*, 2021). While commentators on PhD employability (Jackson and Michelson, 2014; Mewburn *et al.*, 2017; McAlpine and Amundsen, 2016) have long identified gaps between graduate skills and employer expectations (De Grande *et al.*, 2014; Ferrie and Scott, 2022), there has been considerably less attention to discrepancies between student career aspirations and likely career outcomes.

Massification of the PhD qualification might imply growing demand from students and a corresponding increase in the supply of research student positions. There is evidence to suggest that each of these factors is in play. Globally, doctoral enrolments and completions have both increased (Shin *et al.*, 2018). For instance, in the five years between 2014 and 2019, doctoral level attainment in the Organisation for Economic Co-operation and

Development (OECD) increased by 25% (Sarrico, 2022). This trend is reflected in Australia where Higher Degree Research (HDR) graduations more than doubled from 5,738 in 2001 to 11,165 in 2019 (Department of Education Skills and Employment, 2020).

Statistics on PhD enrolments and completions are readily available in Australia, through the Australian Universities' Review (Torka, 2020). However, this is not the case for PhD graduate career outcomes. There is some recent international research on anticipated career trajectories for PhD candidates. It indicates that candidates are taking diverse pathways, including entrepreneurship, and careers in not-for-profit, industry and government sectors (Howard, 2015; McCarthy and Wienk, 2019; OECD, 2020). This is occurring in both STEM (Dos Santos, 2023; Gibbs and Griffin, 2013; Hancock and Walsh, 2016; Pedersen, 2014; Silva *et al.*, 2019) and HASS disciplines (Guerin, 2020; Higgins and Daniels, 2015; McAlpine and Austin, 2018; Shisong, 2020; Sigler *et al.*, 2018). Global data shows that most of the PhD graduates employed in the commercial sector work in professional services and related market services, with a smaller proportion working in the industrial sector of manufacturing, agriculture and mining (OECD, 2020).

Labour market constraints in higher education internationally suggest that a relatively low percentage of PhD graduates move into secure academic roles (Acker and Haque, 2017; Loxley and Kearns, 2018; Woolston, 2017). Competition can be fierce. Research using data from the Review of Australia's research training system report (McGagh *et al.*, 2016), showed that Australia produced enough PhD graduates to "replace the academic workforce every three years" (Guerin, 2020). Furthermore, the labour market in universities may be relatively weak. Recent analyses of advertisements for research jobs concluded that the post-pandemic labour market was "fairly anaemic" within the higher education sector but demonstrated "continued strength" outside the sector (Grant *et al.*, 2024). At the time of writing, there is widespread media commentary on job-shedding in the sector around the nation, including academic positions (e.g. Hare, 2025).

Determining the employment outcomes of Australian PhD graduates is challenging as there is no universal or systematic means of data collection. McCarthy and Wienk (2019) used Australian census data to estimate graduate academic employment and found that "50% of the employed doctorate holders in 2016 were working in tertiary education and research," implying that this might include both academic and non-academic roles. They also used LinkedIn data, finding that about 52% of PhD degree holders worked in higher education and research. The Australian Graduate Destinations Survey (prior to 2015) and the Graduate Outcomes Survey (since 2016) have been other sources of data for estimating graduate outcomes. Proponents of this approach include Neumann *et al.* (2008) and Guthrie and Bryant (2015) who found that 39% of doctoral graduates gained higher education employment in 2008 and 41% in 2015; and McAlpine (2023) who found that in 2022, 46% of HDR graduates were employed in higher education. While this survey was universally distributed to graduates, participation was voluntary, and the results were generally indicative of employment up to 6 months after student graduation. From this limited sample of data, we might assume that somewhere up to about 50% of Australian PhD students gain higher education employment, but it is unclear what the proportion of academic and non-academic roles might be.

Internationally, research indicates that doctoral students' aspirations to academic employment range between about 50–75% of the candidate population. Analysis of the 2019 Nature PhD Students Survey Data (Nature, 2019) reveals that of the 6,227 PhD students surveyed globally, 56% intended to take up academic roles. On a regional basis, this equated to 57% of the 182 Australian students, 50% of the 1691 North American students and 52% of the 2260 European students aiming for academic positions. Similarly, Casey *et al.* (2023)

found that 46% of the 109 Australian political science PhD respondents aimed for an academic career, while the equivalent PhD students in Canada equated to 73% of respondents. Of these cohorts, 16% of the Australian PhD students and 29% of the Canadian students were confident of success in their career choice. In 2016, a survey of 50 geography PhD students in Australian universities found that 76% were most interested in academic employment but only 36% of these respondents were positive about their prospects (Dufty-Jones, 2018). In short, PhD students were not very confident about attaining the academic employment to which they aspired.

The research literature suggests an array of reasons for low levels of confidence amongst PhD students in achieving academic job outcomes. One key reason is a growing realisation that there may be insufficient jobs available (Li and Horta, 2022) or lower-paying short-term contracts. While no research has directly tracked changes in student perceptions, a study from over a decade ago (McAlpine and Turner, 2012) suggested that doctoral students generally had inflated expectations of their academic job prospects, but more recent studies such as from Casey *et al.* (2023) suggest otherwise. Casey *et al.* (2023) also suggest that a further cause for low levels of confidence in future academic employment may be insufficient training in non-academic careers during their PhD, potentially fuelling career uncertainty. They conclude that, “Australian universities might consider enhancing their approach to provide more robust academic experiences and broader training” (Casey *et al.*, 2023).

Evidence differentiating academic and non-academic career aspirations is limited. It was argued in the study with the international 2019 Nature PhD Students Survey Data (Li and Horta, 2022) that PhD students seeking non-academic careers seem to be “less research-oriented, feel mentally strained during their PhD, and are more sensitive to uncertainty about their career prospects.” While this may influence student career choices, it also reflects a general lack of enjoyment in academic processes, so it is perhaps unsurprising that these students tend to choose careers outside academia. Another notable distinction was that older students were more drawn to non-academic jobs than younger students but the reason for this remains unclear.

Generally, extant evidence focuses on either career intentions (Castelló *et al.*, 2017; Horta, 2018; Kelly, 2016; Casey *et al.*, 2023; Li and Horta, 2022) or career outcomes (Mewburn *et al.*, 2020; OECD, 2020), with limited exploration of their correlation. Further analysis of PhD candidates’ career intentions and awareness of likely outcomes is needed to assess whether they recognise potential disconnects. The study addresses a gap in the literature by examining the relationship between career intentions, confidence levels and actual career outcomes among PhD students and alumni at an Australian university. It distinguishes between aspirations and confidence and explores how factors such as age, discipline and program experiences shape career perceptions.

Methodology

The research question involves a comparison of career intentions of PhD students with career outcomes. To answer this question, using descriptive and statistical analysis, we compared alumni and existing students’ career intentions with:

- actual and likely career outcomes;
- confidence in realising career intentions;
- demographic variables such as stage of PhD candidature, discipline (STEM or HASS) and age; and

- experiential perceptions including satisfaction with career development skills and training, time management skills, supervisory team, sense of connectedness with a learning community and overall PhD experience.

The methodology aimed to address gaps in research on PhD career outcomes by examining confidence levels and career development initiatives. Comparing the career intentions of current students with alumni outcomes and national averages highlights the likelihood of these intentions being realised. Variations in career intentions, confidence, and career development training provide valuable insights into the alignment between intentions and outcomes. Subgroup differences, such as age and discipline, further identify which participants are most realistic about their career goals.

While re-accrediting the PhD of the study university, we evaluated the career intentions and outcomes of past and present PhD students using a survey with Likert scale questions and open-text fields. The survey was emailed to 1,951 current PhD students and 1,269 graduates from the previous five years, with response rates of 23% and 14% respectively. Here we report quantitative analyses, with some illustrative use of open text data. The categorisation of career sectors into Government, Higher education (academic and non-academic), Not-for-Profit and Private and self-employed (retitled Industry here) was based on [Neumann et al. \(2008\)](#).

IBM SPSS Statistics (Version 29) was used to analyse the relationships between PhD students' career goals, confidence levels, and various demographic and experiential factors. The selection of statistical tests was guided by the nature of the variables under investigation. Chi-Square Tests of Independence were employed to identify associations between categorical variables, while Cramér's V quantified the strength of associations for nominal variables, such as career sectors. Spearman's Rank Correlation was used for ordinal variables, such as confidence levels, to evaluate the strength and direction of relationships. As this is a single-institution study, findings are context-specific and may not be generalisable across the sector.

In accordance with the principles of the Declaration of Helsinki, and with approval from the university's Human Research Ethics Committee (approval #1900000758), all participants gave consent for their survey responses to be used for research and publication purposes.

Results

Responses were received from 445 students and 175 alumni. Respondent characteristics generally reflect those of the whole cohort across the two study groups. For instance, the representation of respondents from each university school generally aligned with the relative size of the school, or at least within 3% for all cohorts. The age groups of student respondents also generally matched that of the university PhD population, with the largest group being 30–39-year-olds ([Table 1](#)). Most alumni respondents had graduated recently, with 80% completing their PhD within three years leading up to the study. The only real discrepancy between respondent age groups and university PhD average age groups was amongst alumni, where a smaller than expected proportion of 20–29-year-olds responded (by 23%) and a larger than expected cohort (by 18%) of 40–49-year-olds responded. However, this difference is probably unsurprising given that it could have been up to five years since the respondents were students.

The most popular career intention of respondents during PhD studies was an academic role in higher education with 49% of current students and 65% of alumni making this choice ([Table 2](#)). While there is some variability between students' and alumni career intentions,

Table 1. Age groups of student and alumni respondents

Age group	Students	Alumni
20–29	125	5
30–39	181	75
40–49	83	62
50–59	39	24
60+	17	9
Total	445	175

Source(s): Authors’ own creation

Table 2. Proportion of students and alumni aiming for various careers during the period of their studies

Career intention	Students (%)	Alumni (%)
Government	9	10
Higher education (academic role)	49	65
Higher education (non-academic role)	6	2
Industry (e.g. private sector business)	26	12
Not-for-profit	2	2
I have no specific career intentions	8	9

Source(s): Authors’ own creation

generally the ranking is the same with industry being the second most popular choice followed by government, no intentions, non-academic higher education roles and not-for-profit jobs. More HASS than STEM students and alumni aimed for university roles (Table 3). It is possible that more students and alumni may have wanted to find an academic role than is represented by the responses, as some of their comments suggest abandoned hopes. For instance, an alumnus who aimed for a government job said, “I think academia is currently a huge struggle - otherwise I may have aimed for that career.” Likewise, a student said, “I will not be rewarded for teaching. Instead I am now aiming for a research position in a government organisation.” Alternatively, some respondents changed their career aims, such as this alumnus: “I wanted to enter academia when I began my PhD but realised during the process that my personality would be better suited to an industry role.” Age could also be pertinent, with this over 60-year-old alumnus stating, “If I were younger I most definitely would have pursued an academic career.” While other authors (Li and Horta, 2022) found that younger students were more drawn to academic jobs than older students, our research found only a loose association (Table 4).

Table 3. Proportion of PhD students and alumni who aimed for a higher education (combined academic and non-academic) role according to discipline

Discipline area	Student (%)	Alumni (%)
HASS	61	68
STEM	50	66

Source(s): Authors’ own creation

Table 4. Proportion of PhD students and alumni who aimed for a higher education (academic and non-academic) role according to age groups

Age group	Student (%)	Alumni (%)
20–29	50	60
30–39	57	72
40–49	58	63
50–59	56	63
60 and over	59	67

Source(s): Authors' own creation

The discrepancy between the aims of students and alumni in [Table 2](#) is pronounced. Notably, proportionately more alumni had aimed for academic roles while they were studying than current students by a difference of 16%. One reason for the discrepancy could be that in answering the survey, alumni needed to rely on memory of their intentions up to five years earlier. This could be less reliable than the immediate response for students. Another, perhaps more probable reason could be a disproportionate number of survey responses from academic than non-academic alumni. Perhaps academic alumni were more inclined to take part in academic research, skewing the alumni response – a phenomenon that other researchers have attributed to the stigma of taking non-academic jobs ([Spronken-Smith et al., 2024](#)).

One of the most novel findings of this study is the high level of confidence exhibited by both students and alumni in attaining their career goals. Students and alumni exhibited a reasonably high level of confidence in their career choices with 67% of students and 66% of alumni agreeing that they were confident in attaining their career aims ([Table 5](#)). Both cohorts had a similar level of confidence in attaining academic roles with 68% of students and 71% of alumni respondents agreeing. For instance, one student stated that their confidence stems from their career preparation:

I personally am in a position to be competitive in the academic job market due to choices I have made, such as a PhD by series of publications, contributing to curriculum development, and working for multiple universities.

Confidence in attaining industry and government jobs was also quite high for both groups in comparison to other job types within this study. The level of confidence in attaining academic roles is much higher than the 46% ([Casey et al., 2023](#)) and 36%

Table 5. Average rating of the confidence of students and alumni of attaining their career aims

Confidence in attaining career aims	Students (%)	Alumni (%)
Government	78	61
Higher education (academic role)	68	71
Higher education (non-academic role)	61	33
I have/had no specific career intentions	57	27
Industry (e.g. private sector business)	70	81
Not-for-profit	25	25
All	67	66

Source(s): Authors' own creation

(Dufty-Jones, 2018) found in comparable studies, though different survey questions were used. However, without benchmark data, it is unclear whether confidence levels differ meaningfully from those at other institutions.

There is evidence to suggest that some students were aware of difficulties in attaining academic roles while others were not. For instance, an alumnus said:

I think there are very, very few ongoing, secure academic roles that are available to PhD graduates, and I think it verges on dishonest for supervisors, faculties and universities to not make this clear to commencing students.

Alternatively, a student stated that they, "...have always wanted to be an academic however I have learnt from supervisors and career events that this is not realistic."

Postgraduate outcomes for PhD graduates were determined by responses from the Alumni survey asking about their current job sector. We found that 65% of alumni worked in higher education (59% academic, 6% non-academic) (Table 6). This is higher than previous studies that found about 50% of doctoral alumni worked in academia (McCarthy and Wienk, 2019; Guthrie and Bryant, 2015). The definition of employment could account for this discrepancy. For instance, Guthrie and Bryant (2015) included data on full time employment in higher education whereas we asked respondents about the job in which they worked the most hours. This would mean that academics with casual and part-time contracts would be included in our survey data regardless of their job security. The larger than expected higher education career outcomes might also mean that a greater proportion of academic alumni responded to the survey than those working in other sectors as discussed with respect to our earlier finding that alumni aimed for an academic role at a rate 16% higher than equivalent student respondents.

While completing their degree, PhD students at the study university have been offered optional opportunities to build career development knowledge and skills through workshops, consultations and online modules facilitated by a specialist HDR career advisor. Participants were asked how many of these activities they had attended during their degree, with 77% of alumni and 76% of students stated that they had attended at least one activity. Despite a majority of respondents (53% alumni, 55% students) expressing satisfaction in being better prepared for their career after career development training, there was no statistical correlation between amount of training and career intentions or confidence in achieving career aims. However, there is some anecdotal evidence that a lack of confidence in career direction may have prompted participation in training with an alumnus saying that:

the opportunities were not very clear to me during my PhD candidature. But more networking and training how to job search finally helped [...] and with a good suggestions and guidance from my supervisory team I am able to get the job I was aiming for.

Table 6. Alumni career outcomes across employment sectors

Current career sector	No. of alumni	% of alumni
Government	23	13
Higher education (academic role)	103	59
Higher education (non-academic role)	10	6
Industry (e.g. private sector business)	31	18
Not-for-profit	8	5

Source(s): Authors' own creation

Statistical analysis (Table 7) reveals significant associations between PhD students' career aims and demographic factors like age ($p=0.01$) and field of study ($p=0.01$). Younger students and those in STEM fields tend more towards industry-focused career aims, while older students and those in HASS fields lean more towards academic careers. No significant relationships were found between career aims and program-related factors, such as supervisory support, time management satisfaction, or overall PhD satisfaction, nor between career aims and confidence in achieving them. In contrast, confidence in achieving career aims shows significant but weak associations with several experiential factors. Perceived career skills and overall PhD satisfaction have the strongest, though still weak, correlations with career confidence. Time management satisfaction, sense of community, and supervisory team satisfaction also positively correlate with career confidence.

Discussion

The primary premise of this research was to investigate whether PhD students' career intentions, particularly for university roles, compared with actual career outcomes reported by alumni and reflected in national data. Fifty-five percent of students expressed a preference for university work. If we accept that somewhere between 39% and 52% (Guthrie and Bryant, 2015; McCarthy and Wienk, 2019; Neumann *et al.*, 2008; McAlpine, 2023) of employed PhD holders work in higher education, it is reasonable to assume that some of our students are unlikely to realise their career expectations. Given the different instruments and methods of the extant research, it is not possible to be more precise about the magnitude of discrepancies of aspiration and outcome. This is indicative of a more general data problem in the field.

Table 7. Associations between career aims, confidence in achieving career aims and variables related to PhD student characteristics and experiences ($n=445$)

Variable	Career aims associate (chi-square)	Career aims strength (Cramér's V)	Confidence in career aims association (chi-square)	Confidence in career aims strength (Spearman's rho)
Confidence in attaining career aims	0.09	0.13	–	–
Age	0.01	0.14	0.13	–
Field of study (STEM, HASS)	0.01	0.19	0.97	–
PhD stage	0.65	0.10	0.22	–
Satisfaction with time management	0.63	0.10	<0.01	0.35
Satisfaction with supervisory team	0.37	0.11	0.01	0.18
Feel part of learning community	0.87	0.09	<0.01	0.27
Perceived level of career skills	0.95	0.08	<0.01	0.39
Satisfaction with career training opportunities	0.01	0.15	<0.01	0.25
Satisfaction with PhD experience	0.37	0.11	<0.01	0.37

Note(s): Strength of relationships: Rho values: very weak <0.2, weak 0.2–0.39, moderate 0.4–0.59; chi-square p -value significance < 0.05; Cramér's V: very weak <0.10, weak 0.10–0.19, moderate 0.20–0.29

Source(s): Authors' own creation

The issue of data reliability made our research questions difficult to answer. In Australia, HDR career outcomes can be assessed through four main methods: Australian Bureau of Statistics (ABS) data, Australian Graduate Destinations Survey data, LinkedIn data, and small-scale studies. ABS census data is comprehensive but collected quinquennially and requires extensive processing. The annual Graduate Destinations/Outcomes study surveys PhD holders shortly after graduation and, since 2016, three years later. However, public access to sector-specific PhD career data has been limited since 2015, with few studies using it. LinkedIn analysis, while potentially effective, may not represent PhD holders accurately due to user sample bias. Likewise, in our study we found that surveying alumni may not provide a representative sample if a larger proportion of respondents are from within the university. On balance, a combination of Graduate Outcomes data for short-term trends and ABS data for long-term outcomes holds the most promise, but such analysis remains underexplored.

A further challenge in this study was inconsistent terminology for higher education roles, complicating comparisons of student intentions and outcomes. For example, [McAlpine \(2023\)](#) grouped PhD and HDR graduates, including professional doctorates and research masters, while [Guthrie and Bryant \(2015\)](#) and [McCarthy and Wienk \(2019\)](#) did not distinguish academic from non-academic higher education roles. In contrast, [Neumann *et al.* \(2008\)](#) detailed roles such as academic (teaching and research), research, teaching-only and administration, finding 16% of graduates in research-only roles. Our study found 6% aimed for non-academic higher education roles. Standardised terminology would improve longitudinal and cross-institutional research.

Our findings indicate that current PhD students have diverse career intentions, with roughly half favouring university roles and the other half expressing interest in industry, government, and non-academic sectors. This aligns with recent Australian, North American and European research, indicating continued strong demand for the PhD as a pathway to academia. Notably, a higher proportion of HASS PhD students aimed for academic roles than STEM students, likely reflecting different job prospects outside academia. For instance, 85% of PhD students from nursing aimed for an academic role compared to 20% from earth and atmospheric science. This could indicate a greater potential for career progression and well remunerated jobs for PhD graduates within earth science, in say, the mining industry, compared to the nursing profession.

This study identified relatively high confidence levels among students and alumni in achieving their career goals, particularly in industry and government roles. This contrasts with the lower confidence reported in studies such as [Casey *et al.* \(2023\)](#) and [Dufty-Jones \(2018\)](#). It is possible that these findings may reflect the influence of the university's career support initiatives, which are well-attended and generally well-received by students and alumni. However, without comparative data from other institutions, it is not possible to determine whether these offerings are distinctive. Further research is needed to determine whether these initiatives consistently enhance preparedness, confidence and alignment between career aspirations and outcomes.

The statistical analyses suggest certain associations between demographic characteristics and career aims, as well as between PhD experiences and confidence in achieving career aims. While factors like age and field of study show statistically significant associations with career aims, program-related experiences appear to have minimal influence on these aspirations. The relative stability of career aims across different PhD stages, along with the lack of association with experiential factors, suggests that these aspirations may be shaped more by personal goals or disciplinary norms than by PhD program experiences. In contrast, the findings suggest that PhD program experiences are associated with career confidence,

highlighting the potential role of supportive program experiences in fostering this confidence. Although these correlations are modest, positive experiences with perceived career skills, overall PhD satisfaction, time management, community integration, and supervisory quality all contribute to a degree of increased career confidence. While these experiential factors do not appear to shape career aims, they suggest that supportive elements in the PhD environment may enhance students' belief in their ability to achieve their goals.

These findings highlight the importance of treating career aims and confidence as distinct facets of professional development, each benefiting from tailored support. While career aims appear relatively stable, confidence levels were weakly associated with factors such as career skills development, quality supervision, time management, and a sense of connection within the learning community. These associations suggest that aspects of the PhD experience may relate to students' confidence, though the nature of this relationship remains unclear. Further research, particularly longitudinal studies, could provide deeper insight into how these associations evolve over time and the impact of specific program elements on career confidence. Exploring additional influences on both career aims and confidence, such as mentoring, professional networking, and exposure to diverse career options, could also yield valuable insights. Overall, these findings suggest that while external factors may shape students' career goals, a supportive PhD experience can play an important role in boosting their confidence to pursue these goals.

While the literature suggests that some of our PhD students may miss out on their university career aspirations, a large proportion are likely to be successful. This suggests a feasible career pathway for many students, possibly explaining the high confidence levels amongst them, with 68% expecting success, significantly higher than previous studies (Casey *et al.*, 2023; Dufty-Jones, 2018). This discrepancy could indicate a greater awareness of career outcomes among our cohort, perhaps due to career development training which about three-quarters of respondents attended. As part of that training, a strong message about the value of the PhD degree for careers outside as well as inside academia has been a recurrent theme. The benefit of directly conveying this message is evident in reasonably realistic career aspirations and the high degree of confidence in achieving these goals amongst our PhD student respondents.

Conclusion

The survey study reported here seeks to contribute to the evidence base on PhD career intentions, outcomes, and career preparation. Conducted in an Australian university, the study was set against the backdrop of national policies re-orienting research higher degrees towards industry and a challenging academic labour market. The survey was designed for internal re-accreditation purposes, aiming to assess alignment of the PhD with external policy and work environments and to evaluate effectiveness in fostering employment pathways. This study uses statistical analysis to illuminate the relationships between career aspirations, confidence levels and key factors, offering deeper insights into the dynamics shaping PhD career trajectories.

The results underscore the importance of aligning PhD students' aspirations with possible career outcomes and highlight the role of effective career development programs in enhancing students' confidence to achieve their goals. The analysis revealed that while career aspirations were largely unaffected by program-related factors, confidence in achieving career goals was significantly influenced by elements such as perceived career skills, time management satisfaction and learning community integration. These findings emphasise the potential for targeted interventions to bolster PhD students' confidence, even if their aspirations remain stable.

One limitation, though, is that the study did not disaggregate students' aspirations for work within or beyond Australia. These aspirations cannot be read off the international or domestic status of the respondents because domestic students may seek academic or industry employment internationally; and international students may aspire to Australian employment – something made likely by ties between education and immigration policy.

While studies into career aspirations and outcomes can cast light on the underlying drivers for PhD students, a further layer of complexity warranting investigation involves the types of work contracts offered graduates. Short-term casual and sessional contracts can be both opportunities and constraints in the pursuit of permanent academic work. They can provide introductory experiences to PhD students and graduates, potentially helping them find their next job, but if continuing roles are not forthcoming, they can lock workers into poorly paid and insecure employment that is a source of unhappiness, dissatisfaction and feelings of exclusion (Spronken-Smith *et al.*, 2024). This issue was outside the scope of this study, but our findings suggest that short-term contracts play a significant role in the career trajectory of PhD students. This demands further research.

Another issue warranting deeper investigation is career outcomes beyond academia. We found that 45% of PhD students intended to pursue careers outside higher education but did not consider the value of the degree for government and industry roles. Future research could explore whether a PhD was required or beneficial in the hiring process and examine the practical utility of the PhD in the workplace once employed. The question we did ask in this study revolved around comparison of PhD career intentions and career outcomes. We found some discrepancy but not as much as previous studies (Chen *et al.*, 2024; Le, 2023; Li and Horta, 2022). These results highlight the need for further research to determine whether these findings are unique to this university or indicative of broader trends.

References

- Acker, S. and Haque, E. (2017), "Left out in the academic field: doctoral graduates deal with a decade of disappearing jobs", *Canadian Journal of Higher Education*, Vol. 47 No. 3, pp. 101-119.
- Allen, K.-A., Butler-Henderson, K., Reupert, A., Longmuir, F., Finefter-Rosenbluh, I., Berger, E., Grove, C., Heffernan, A., Freeman, N. and Kewalramani, S. (2021), "Work like a girl: redressing gender inequity in academia through systemic solutions", *Journal of University Teaching and Learning Practice*, Vol. 18, p. 3.
- Bryan, B. and Guccione, K. (2018), "Was it worth it? A qualitative exploration into graduate perceptions of doctoral value", *Higher Education Research and Development*, Vol. 37 No. 6, pp. 1124-1140.
- Casey, D., Rutledge-Prior, S., Young, L., Malloy, J. and Berdahl, L. (2023), "Hard work and you can't get it: an international comparative analysis of gender, career aspirations, and preparedness among politics and international relations PhD students", *PS: Political Science and Politics*, Vol. 56 No. 3, pp. 402-410.
- Castelló, M., Pardo, M., Sala-Bubaré, A. and Suñe-Soler, N. (2017), "Why do students consider dropping out of doctoral degrees? Institutional and personal factors", *Higher Education*, Vol. 74 No. 6, pp. 1053-1068.
- Challice, G. (2021), 2021 Graduate Outcomes Survey-Longitudinal: medium-term graduate outcomes in Australia, *Quality Indicators for Learning and Teaching*.
- Chen, L.A., Mewburn, I. and Suominen, H. (2024), "Australian doctoral employability: a systematic review of challenges and opportunities", *Higher Education Research and Development*, Vol. 43 No. 2, pp. 298-314.
- Cook, E., Crane, L., Kinash, S., Bannatyne, A., Crawford, J., Hamlin, G., Judd, M., Kelder, J., Partridge, H. and Richardson, S. (2021), "Australian postgraduate student experiences and anticipated

-
- employability: a national study from the students' perspective", *Journal of Teaching and Learning for Graduate Employability*, Vol. 12 No. 2, pp. 148-168.
- Cuthbert, D. and Molla, T. (2015), "PhD crisis discourse: a critical approach to the framing of the problem and some Australian 'solutions'", *Higher Education*, Vol. 69 No. 1, pp. 33-53.
- Cyranoski, D., Gilbert, N., Ledford, H., Nayar, A. and Yahia, M. (2011), "Education: the PhD factory", *Nature*, Vol. 472 No. 7343, pp. 276-280.
- DE Grande, H., DE Boyser, K., Vandevelde, K. and VAN Rossem, R. (2014), "From academia to industry: are doctorate holders ready?", *Journal of the Knowledge Economy*, Vol. 5 No. 3, pp. 538-561.
- Department of Education Skills and Employment (2020), "Higher education statistics, award course completions for all students by level of course 2001 to 2019", Australian Government.
- DOS Santos, L.M. (2023), "The motivations, career decisions, and decision-making processes of female PhD students in engineering: experiences and challenges", *International Journal of Instruction*, Vol. 16 No. 3.
- Duffy-jones, R. (2018), "The career aspirations and expectations of geography doctoral students: establishing academic subjectivities within a shifting landscape", *Geographical Research*, Vol. 56 No. 2, pp. 126-138.
- Ferrie, J.M. and Scott, A. (2022), "The PhD and missing skills: capacity and capability building for social science engagement with industry", *Journal of Perspectives in Applied Academic Practice*, Vol. 9 No. 3, pp. 22-31.
- Germain-Alamartine, E., Ahoba-Sam, R., Moghadam-Saman, S. and Evers, G. (2021), "Doctoral graduates' transition to industry: networks as a mechanism? Cases from Norway, Sweden and the UK", *Studies in Higher Education*, Vol. 46 No. 12, pp. 2680-2695.
- Gibbs, K.D. and Griffin, K.A. (2013), "What do I want to be with my PhD? The roles of personal values and structural dynamics in shaping the career interests of recent biomedical science PhD graduates", *CBE—Life Sciences Education*, Vol. 12 No. 4, pp. 711-723.
- Grant, W.X.C., Suominen, H., Hogan, L. and Mewburn, I. (2024), "Researcher demand: exploring the demand for skilled researchers in Australia, February 2024", PostAc, Australian National University.
- Guerin, C. (2020), "Stories of moving on HASS PhD graduates' motivations and career trajectories inside and beyond academia", *Arts and Humanities in Higher Education*, Vol. 19 No. 3, pp. 304-324.
- Guthrie, B. and Bryant, G. (2015), *Postgraduate Destinations 2014: A Report on the Work and Study Outcomes of Recent Higher Education Postgraduates*, [Online]. Graduate Careers Australia, Melbourne, [Accessed].
- Hancock, S. and Walsh, E. (2016), "Beyond knowledge and skills: rethinking the development of professional identity during the STEM doctorate", *Studies in Higher Education*, Vol. 41 No. 1, pp. 37-50.
- Hare, J. (2025), "Thousands of jobs face the axe as unis slammed again. Financial review", (April 17).
- Haynes, K., Metcalfe, J. and Videler, T. (2009), "What do researchers do. First destinations of doctoral graduates by subject", *Careers Research and Advisory Centre*.
- Herschberg, C., Benschop, Y. and VAN DEN Brink, M. (2018), "Precarious postdocs: a comparative study on recruitment and selection of early-career researchers", *Scandinavian Journal of Management*, Vol. 34 No. 4, pp. 303-310.
- Higgins, S.C. and Daniels, M. (2015), "Alternative academics: moving beyond the academy", *Journal of Eastern Mediterranean Archaeology and Heritage Studies*, Vol. 3 No. 3, pp. 238-246.
- Horta, H. (2018), "PhD students' self-perception of skills and career plans while in doctoral programs: are they associated?", *Asia Pacific Education Review*, Vol. 19 No. 2, pp. 211-228.
- Howard, B. (2015), "Pursuing other professions: PhD supply and demand", *Chemistry in Australia*, 26-29.

- Jackson, D. and Michelson, G. (2014), "Factors influencing the employment of Australian PhD graduates", *Studies in Higher Education*, Vol. 40 No. 9, pp. 1660-1678.
- Kelly, F. (2016), *The Idea of the PhD: The Doctorate in the Twenty-First-Century Imagination*, Routledge.
- King, D., Eisl-Culkin, J. and Desjardins, L. (2008), "Doctoral graduates in Canada: findings from the survey of earned doctorates, 2004/2005", Statistics Canada.
- Le, A.T. (2023), "To be or not to be (in academia)? 'Inward calling' and 'academic hazards' in aspiring academics' career prospects in Australia", *Higher Education Research and Development*, Vol. 42 No. 4, pp. 874-887.
- Li, H. and Horta, H. (2022), "Factors influencing PhD students' intentions to pursue careers in the government and nonprofit sectors: evidence from a global survey", *Higher Education Research and Development*, Vol. 41 No. 6, pp. 1946-1961.
- Loxley, A. and Kearns, M. (2018), "Finding a purpose for the doctorate? A view from the supervisors", *Studies in Higher Education*, Vol. 43 No. 5, pp. 826-840.
- McAlpine, L. and Amundsen, C. (2016), *Post-PhD Career Trajectories: Intentions, Decision-Making and Life Aspirations*, Springer.
- McAlpine, L. and Austin, N. (2018), "Humanities PhD graduates: desperately seeking careers? ", *Canadian Journal of Higher Education*, Vol. 48 No. 2, pp. 1-19.
- McAlpine, L. and Turner, G. (2012), "Imagined and emerging career patterns: perceptions of doctoral students and research staff", *Journal of Further and Higher Education*, Vol. 36 No. 4, pp. 535-548.
- McAlpine, A., Gasson, S., Blacker, J., Stoodley, I., Winter, A. and Bruce, C. (2023), "Empowering higher degree researchers' career planning", *Confident Supervisors: Creating Independent Researchers*, James Cook University.
- McCarthy, P. and Wienk, M. (2019), *Advancing Australia's Knowledge Economy: Who Are the Top PhD Employers*, Australian Mathematical Sciences Institute.
- McGagh, J., Marsh, H., Western, M., Thomas, P., Hastings, A., Mihailova, M. and Wenham, M. (2016), "Review of australia's research training system", Australian Council of Learned Academies.
- Mewburn, I., Grant, W.J., Suominen, H. and Kizimchuk, S. (2020), "A machine learning analysis of the non-academic employment opportunities for Ph. D. graduates in Australia", *Higher Education Policy*, Vol. 33 No. 4, pp. 799-813.
- Mewburn, I., Suominen, H., Grant, W. and Kizimchuk, S. (2017), "Tracking trends in industry demand for australia's advanced research workforce", Australian National University.
- Nature (2019), 2019 Nature PhD Students Survey Data, Nature Publishing Group.
- Neumann, R., Kiley, M. and Mullins, G. (2008), "Australian doctoral graduates: Where are they going?", In: *Research, Quality in postgraduate research: Research Education in the New Global Environment*, Australian National University, pp. 84-89.
- OECD (2020), "Careers for doctoral holders", OECD Publishing.
- Pedersen, H.S. (2014), "New doctoral graduates in the knowledge economy: trends and key issues", *Journal of Higher Education Policy and Management*, Vol. 36 No. 6, pp. 632-645.
- Quality Indicators for Learning and Teaching (2021), "2021 Graduate outcomes survey", Social Research Centre.
- Santos, J., Horta, H. and Heitor, M. (2016), "Too many PhDs? An invalid argument for countries developing their scientific and academic systems: the case of Portugal", *Technological Forecasting and Social Change*, Vol. 113, pp. 352-362.
- Sarrico, C. (2022), "The expansion of doctoral education and the changing nature and purpose of the doctorate", *Higher Education*, Vol. 84 No. 6, pp. 1299-1315.
- Sharmini, S. and Spronken-Smith, R. (2020), "The PhD—is it out of alignment?", *Higher Education Research and Development*, Vol. 39 No. 4, pp. 821-833.

-
- Shin, J.C., Kehm, B.M. and Jones, G.A. (2018), "The increasing importance, growth, and evolution of doctoral education", *Doctoral Education for the Knowledge Society: Convergence or Divergence in National Approaches?*, Springer, Cham, pp. 1-10.
- Shisong, Q. (2020), "Employability of humanities PhD graduates and labor market mismatches", *Journal of East China Normal University (Educational Sciences)*, Vol. 38, p. 85.
- Sigler, T., Lieske, S.N., Charles-Edwards, E. and Corcoran, J. (2018), "Why do a PhD in geography? A sympathetic response to 'the career aspirations and expectations of geography students'", *Geographical Research*, Vol. 56 No. 4, pp. 479-483.
- Silva, E.A., Mejía, A.B. and Watkins, E.S. (2019), "Where do our graduates go? A tool kit for tracking career outcomes of biomedical PhD students and postdoctoral scholars", *CBE—Life Sciences Education*, Vol. 18 No. 4, p. 1e3.
- Spronken-Smith, R., Brown, K. and Cameron, C. (2024), "Work happiness of PhD graduates across different employment sectors", *New Zealand Journal of Educational Studies*, Vol. 59 No. 2, pp. 1-18.
- Taylor, A. (2007), "Learning to become researching professionals: the case of the doctorate of education", *International Journal of Teaching and Learning in Higher Education*, Vol. 19, pp. 154-166.
- Torka, M. (2020), "Change and continuity in Australian doctoral education: PhD completion rates and times (2005-2018)", *The Australian Universities' Review*, Vol. 62, pp. 69-82.
- Woolston, C. (2017), "Graduate survey: a love-hurt relationship", *Nature*, Vol. 550 No. 7677, pp. 549-552.
-

Corresponding author

Murray Lane can be contacted at: mc.lane@qut.edu.au