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Great expectations: Confidence and knowledge of education-employment pathways in commencing higher education students

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Abstract

Higher education providers face increasing pressure to support students along the education-employment pathways that lead through university study and into a career. Understanding students' confidence and knowledge with respect to education-employment pathways represents a key challenge because students enter with different levels of each. The present study investigated what types of demographic and education characteristics are associated with confidence in and knowledge of career outcomes in 902 commencing Australian university students. Findings show that most students entered university with high levels of confidence in education-employment pathways. Low levels of confidence, where present, were not associated with demographic factors (e.g. socio-economic status), but instead with education characteristics such as course type. More than 40% of participants had little knowledge of the careers associated with their course. Employment support for students should be tailored to the varied patterns of their knowledge and confidence regarding education-employment pathways.

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Practitioner Notes

1. Most students commence higher education with a career goal in mind and have high levels of confidence that their chosen course will lead them to their goal.
2. Education factors have stronger associations with student confidence than demographic factors.
3. Many commencing students have high levels of confidence and knowledge regarding the pathways leading through their course and to their career goal, and less than 10% have both low knowledge and low confidence. The latter require guidance and support.
4. Two other patterns may be more difficult to address: a small proportion of students possess low confidence and high levels of knowledge, suggesting they may experience imposter syndrome and be at risk of attrition, whereas more than two fifths of students report high levels of confidence even while demonstrating limited knowledge of career pathways.
5. Supporting students to successfully pursue education-employment pathways will require practitioners to target specific types of courses and to provide the most relevant and supportive approaches given the specific needs of each cohort.

Keywords

transition pedagogy, employability, education-employment pathway, knowledge, student confidence

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Introduction

The idea that university study should lead students to meaningful employment has become ubiquitous, and is shared by governments, higher education institutions and students (Australian Government, 2024; Baik et al., 2015; Lock & Kelly, 2020). While the extent to which university courses deliver on the promise of meaningful employment is important, so too are students' thoughts and feelings regarding the career outcome towards which their courses lead, as these factors are known to impact on their success as they transition into and through university (Tomlinson et al., 2023). Thoughts, or cognitive factors like students' knowledge regarding the purpose and nature of their course, impact how students engage with their learning, both within and beyond the classroom (Brinkworth et al., 2009). Feelings, or affective factors like confidence about the value of their course, matter because they are associated with resilience, motivation and persistence and therefore, are closely tied to retention (Sander & Sanders, 2009). Given the importance future employment has for commencing students (Grebennikov & Shah, 2012) and the impact that students' knowledge and confidence have on their success (Nicholson et al., 2014), having an accurate understanding of these factors is paramount if universities are to retain and support them as they transition into, through and out of higher education.

While the importance of cognitive and affective factors is now recognised within higher education research related to both employability skill development and practice (Jackson, 2016; Tomlinson, 2007) and student success (Kahu & Nelson, 2018), research regarding students' thoughts and feelings about their education-employment pathways remains limited. Exploratory research by Lock and Kelly (2020) suggests a high proportion of commencing Australian higher education students are enrolling in courses, the career outcomes of which they have only a limited understanding. Furthermore, qualitative research (Lock & Kelly, 2022) identified that students from a broad range of courses may only realise the limitations of their knowledge regarding the career pathways as they approach graduation, which was found to cause distress and dissatisfaction regarding their experience.

A further and important finding from these studies (Lock & Kelly, 2020, 2022) is the variation in knowledge regarding such pathways is associated with the broad type of course a student is enrolling in. For this research, a course refers to an approved set of academic subjects that lead to a higher education award (e.g. a Bachelor's degree). Within the Australian context, students can enrol into single courses culminating in a single award (e.g. Bachelor of Arts) or dual courses culminating in the awarding of two degrees upon graduation (e.g. Bachelor of Law / Bachelor of Commerce). In addition, courses can be categorised based on their structure and purpose. Generalist courses support broad fields of study and prepare students for a wide range of employment settings by offering them considerable choice in content (e.g. Bachelor of Arts). Specialised courses are typically narrow in structure and designed to lead to a specific career outcome, one typically linked to the title of the course (e.g. Bachelor of Nursing). Finally, mixed courses are, on face value, similar to specialised courses in having a career name referenced in their titles, however they are courses that actually offer diversity in both skill development and career outcome (e.g. Bachelor of Psychology).

A challenge for researchers is how to get an understanding of students' knowledge and confidence about the courses they have chosen to enrol in prior to their actual commencement of those courses. Exploring students' expectations of university after they have undertaken one or

two semesters, while of some value, cannot help us support students during their initial transition into university, because those expectations will already have been influenced by their experience in higher education. The period between finishing secondary education and commencing higher education, while often brief, is pivotal as students often perceive they are no longer supported by any formal education system (Worsley et al., 2021). This is also a time when students may be required to redirect their plans following the release of results used for university admissions, as only 24% of students receive their first preference (University Admissions Centre, 2023). A better understanding of how such students think and feel about their soon-to-be-commenced courses would aid universities in creating proactive, targeted and effective transition processes for new students that fill knowledge gaps and help to build confidence.

To address this issue, this research aims to investigate the following questions:

1. How confident are commencing university students that their chosen course will lead them to their ideal career and what factors influence this confidence?
2. Are patterns of confidence in course choice and knowledge of education-employment pathways present across commencing university students and, if so, are such patterns associated with specific student characteristics?

Literature

The importance and impact of students' thoughts and feelings surrounding higher education have been a subject of interest for academic researchers for some time (Sander et al., 2000; Tomlinson et al., 2023). In general, recognition of the importance of this topic has emerged alongside broader trends in higher education including the widening of access and the move towards fee-based funding models (Australian Government, 2024). Such research can be situated in relation to contemporary efforts to support student transition into university. Research shows commencing and first-year students are at particularly high risk of leaving university, with this risk being exacerbated further for students from backgrounds that are traditionally underrepresented in higher education (Kift, 2015). The basic premise here is, as more and more diverse cohorts of students are entering higher education, understanding their potentially diverse thoughts and beliefs regarding university study becomes increasingly important (Crisp et al., 2009). This literature review aims to focus on the current body of research investigating the impact of cognitive and affective factors on students' capacity to transition successfully into, through and out of university. It will also consider the demographic and educational characteristics that are associated with these cognitive and affective factors.

The Influence of Cognitive Factors: The Role of Knowledge in Shaping Students' Transition to University

Research investigating the knowledge commencing students have regarding higher education varies considerably, both in terms of the focus of the knowledge (e.g. knowledge of assessment or expected workload) and the methods employed to gauge knowledge (Tomlinson et al., 2023). Within higher education, researchers have examined topics including knowledge regarding the role of university teachers (Voss et al., 2007), which teaching methods will and should be used (Sander et al., 2000), what is required in terms of independent study (Nicholson et al., 2014), and what assessment tasks will entail (Scutter et al., 2011). Research into student knowledge of their education-employment pathways, that is, the pathways available to them through higher

education and into work (Lock & Kelly, 2020), is fairly limited. Much work to date has focused on students' perspectives and ideas more so than the extent and accuracy of their knowledge (Cheng et al., 2022; Pereira et al., 2020; Tymon, 2013). This approach is adopted as it often includes a comparison of student perspectives (at varying points of their degree) and employers' or external stakeholders' perspectives. While the findings of such research are important, these studies all share a limitation in identifying the role of higher education as the nexus between students and future employers.

Research has also identified that the knowledge of students undertaking higher education is not always accurate. Lock and Kelly (2019) conducted cross-sectional research that showcased that approximately 55% of commencing students with a career goal had an inaccurate understanding of whether postgraduate studies were required to achieve their goal. The findings showed that this proportion rose in students undertaking generalist, mixed or dual degrees. While there are limited findings exploring knowledge of career pathways, students commencing university with inaccurate knowledge is not limited to this domain of higher education. Scutter and colleagues (2011) also showed that only 30% of surveyed students had realistic knowledge regarding the workload needed to succeed at university. Without addressing these kinds of inaccuracies, students are at risk of financial and academic consequences.

The Influence of Affective Factors: The Psychology of Confidence in Higher Education Students

Another key focus of such research has been the exploration of how students feel about their studies, with particular interest arising with regard to the confidence that students have regarding higher education (Sander & Sanders, 2009). Research regarding affective factors, those related to feelings, has largely been motivated by recognition that the confidence students have regarding their studies impacts student satisfaction and success. There is little doubt that this consideration is of importance in higher education sectors that are increasingly influenced by nation-wide student satisfaction surveys (Grebennikov & Shah, 2012). Research also shows that affective factors can impact what and how much students learn (Nicholson et al., 2014). Finally, researchers have explored the interplay between experiences and motivation (Tomlinson et al., 2023) with research indicating experiencing a gap between knowledge and reality can lead to diminished student confidence, declining engagement, and increased risk of attrition (Ferrao & Almeida, 2021). Such findings may be particularly relevant when it comes to student knowledge and understanding regarding the employment outcomes associated with university study. Confidence that higher education study will lead to a desired career outcome is likely to impact student success to the extent it is associated with higher motivation, given student motivation helps to drive student success (Tymon, 2013).

While some researchers have explored the impact of both cognitive and affective factors on student success, others have explored the sometimes-complex relations between the two. For example, some studies have evidenced the presence of the Dunning-Kruger effect, a phenomenon where people with limited competence overestimate their knowledge (Kruger & Dunning, 1999) and demonstrated its persistence and prevalence across different courses and disciplines (Bunay et al, 2018; Pavel et al, 2012; Surdilovic et al., 2022). These studies showed that students with lower skills or knowledge consistently showed unrealistic and positive images

of their abilities in the classroom when compared to their peers. This in turn limited their engagement with opportunities to receive feedback or develop professionally. Similarly, imposter syndrome, the inverse of the Dunning-Kruger effect, is also prevalent amongst higher-achieving students who consistently underestimate their knowledge and subsequently, their ability and skillsets (Pavel et al., 2012). However, while such research suggests imposter syndrome may be present amongst higher-achieving students, it has yet to explore the prevalence of this issue across different course types.

Importantly, the research noted above challenges common notions that low knowledge must correlate with low confidence (Fong & Krause, 2014; Kift, 2015). When targeting potentially "at risk" students who may need extra support, higher education providers commonly focus on supporting students who may have less access to knowledge and support and thus, it is sometimes assumed, will be less confident (Dory et al., 2019; Longwell-Grice & Longwell-Grice, 2008; O'Shea, 2015). This support may look like extra workshops or check-ins by various stakeholders within the university (e.g. peers, teachers, professional staff) (Lock & Kelly, 2022). However, if students with low knowledge have high confidence, they may be less likely to engage with these initiatives as they may not believe them to be relevant. Together, therefore, this research highlights, first, that patterns of confidence and knowledge across the student body may be diverse and, second, that the development and implementation of interventions aimed at enhancing students' knowledge and/or confidence will have to take account of such variation. Such interventions must be grounded in an understanding of commencing students' actual confidence and knowledge regarding the education-employment pathways on which they have embarked if they are to be supported in successfully transitioning into, through and out of university.

Demographic and Educational Characteristics: Their Impact on Student Outcomes and the Importance of Understanding These Factors

Demographic factors have been found to impact student achievement across the lifespan (Marks, 2016). Specifically, factors such as socio-economic status, disability status, language background and Indigenous status have been found to have a persistent impact on individuals from year 3 through to year 12 in the context of formal Australian education. These factors have also been found to influence student success in higher education, as well as whether individuals engage with higher education at all (Gale & Parker, 2013). Students from equity groups often face complex and varied forms of disadvantage stemming from the broader social and economic influences during their upbringing, and these may impact both the thoughts and feelings students have about education. For example, students whose parents have not attained university qualifications are much less likely to aspire to attend university than those with university-educated parents. Furthermore, individuals from equity groups often have less access to guidance and information, and this can result in lower levels of knowledge entering university and subsequently less confidence in their education choices (Pires & Chapin, 2022).

Our understanding of challenges associated with students' knowledge regarding employment pathways/outcomes is primarily derived from research on specific courses. For example, Mestan (2016) identified students undertaking a Bachelor of Arts, a generalist course, often have uncertainty regarding their future employment, not only at the outset of the course, but even through to graduation. Similarly, Kelly and Lock (2019), showed many students enrolled in a

Bachelor of Psychology lacked knowledge regarding the requirements (beyond an undergraduate degree) required of those seeking to register as a psychologist. Lock and Kelly (2020), aiming to understand these patterns on a broader scale, focused on course types rather than specific courses and found that more than 50% of their sample of students were commencing university with limited knowledge of the careers linked to their courses. This included 82% of students commencing generalist degrees, 77% of students pursuing mixed degrees and 69% of students commencing dual degrees. The only course type where a higher proportion of students had extensive knowledge rather than limited was that of specialised courses (with 26% of the sample having limited knowledge). Such research shows the value of considering educational factors when exploring cognitive features of students, but there remains a lack of research considering this in commencing students.

The Present Study

This study is part of a broader project investigating commencing students' expectations about their chosen undergraduate course and their education-employment pathways. Specifically, this study aimed to investigate what demographic and educational characteristics are associated with different levels of confidence and knowledge.

This study was conducted in two phases. The first phase aimed to identify whether any specific demographic or education characteristics influenced the confidence a commencing student has that their course will lead them to their career goal.

Hypothesis 1a. Demographic characteristics will impact confidence.

Hypothesis 1b. Education factors will impact confidence.

The second phase aimed to group students based on levels of knowledge and confidence in their course and identify common characteristics associated with each group. This phase saw the comparison of four groups: low knowledge/low confidence, low knowledge/high confidence, high knowledge/low confidence and high knowledge/high confidence.

Hypothesis 2a. Knowledge and confidence groupings will vary by demographic variables.

Hypothesis 2b. Course types will be associated with knowledge and confidence groupings.

Method

Participants

The present research utilised purposive convenience sampling. Data was collected from 1125 individuals during January and February from 2020 to 2023. Inclusion criteria stipulated participants must have received an offer for an undergraduate course (specifically a bachelor's degree) at an Australian institution and have enrolled in but not yet commenced the course. Participants were excluded if they were commencing a sub-bachelor level degree or a postgraduate degree, or if they had already commenced their studies. Participants were also excluded if they did not complete the survey questions related to confidence, knowledge, and enrolment. No identifying information was collected, and no incentives were offered. The final

participant count was 902. All participants were recruited from university social media pages (specifically those on Facebook, Reddit, ATAR Notes, and Whirlpool). These pages were selected as they had high levels of engagement from students following offers and prior to the commencement of university. All pages were community-based and run by students currently undertaking higher education.

Materials

An online survey of 32 questions was developed for the broader project and presented in Qualtrics. All questions were presented in the same order for all participants. To address the research questions of the present study, data was extracted from 16 questions. These were demographic questions including age, gender, disability status, postcode, heritage, first language spoken and parental education level; education factors including Australia Tertiary Admissions Rank (ATAR, an education score that Australian students receive on completion of high school that ranks students within a state) or equivalent, degree enrolled into, and presence of a career goal prior to enrolling); confidence (How confident are you that your chosen course will lead to your career goal, on a scale from 0 - 10 whereby 0 = not at all and 10 = completely confident); and knowledge (What career can your degree lead to? Name as many as you can).

Procedure

Ethical approval was obtained from the Victoria University Human Research Ethics Committee (HREC-17-192). Participants were recruited online, on university-related social media groups for Australian students/universities, where a flyer with the survey link was posted. The link took participants to the plain language statement of the project. If the participant provided consent they were taken to the first page of the survey. Participants were required to complete the survey in a single session.

Researchers' Positionality

As lecturers and researchers in higher education, the authors have a professional interest in the student transition experience. Our disciplinary backgrounds in psychology, humanities and education have shaped our focuses on student confidence, preparedness and the enrolment decision-making processes. Moreover, we have both held positions as first-year teaching specialists, roles of which inspired the present study. While the current study uses quantitative methods and aims to maintain objectivity, we acknowledge that our perspectives influenced decisions such as inclusion criteria and the selection of recruitment platforms. Recognising our roles within the university sectors, we have sought to mitigate bias through transparent reporting and rigorous survey design.

Data Analysis

Data Coding

To enable quantitative analysis and comparison of data, participants' responses to questions which provided a text entry box needed to be converted into categorical variables. This process followed the procedure outlined in Lock and Kelly (2020). The title of the participants' degree was

categorised into two variables. First, the degree was classified as either a single course (e.g. Bachelor of Arts) or a dual course (e.g. Bachelor of Commerce/Bachelor of Law). Second, courses were categorised into one of the three types described above: generalist, mixed, and specialised.

To determine participants' level of knowledge of the career pathways linked to their course, a spreadsheet was first developed containing a list of all the courses currently offered at Australian universities. A list of possible career pathways was developed for each course based on the information about employment outcomes provided on university course pages. To ensure this list was comprehensive, employment outcomes were collated from every institution that offered the course. Participants' responses to the knowledge question were then compared to the data in the spreadsheet. Based on their response, participants were placed into one of four categories: 1) Limited knowledge: Participants who responded with either a blank response, or a variation of 'I don't know'; 2) Somewhat limited knowledge: The participant responded with few answers relative to the possible options (typically 1-3), varying only slightly from one another; 3) Somewhat extensive knowledge: The participant responded with multiple answers, with some variation present between job roles or discipline fields; 4) Extensive knowledge: An individual responded with multiple career outcomes that, in the case of mixed or generalist courses, extended beyond the namesake of the course and, where relevant, beyond the discipline/field. In the case of specialised courses, 'extensive' knowledge was demonstrated through the identification of further specialisations that exist within a specific career.

Parents' education attainment was used to identify if a participant was of the first generation in their family to attend university (Patfield et al., 2022). If either of a student's parents had a bachelor degree or higher as their highest level of education attainment, they were coded as not first-generation status. If neither parent had a bachelor degree or higher they were coded as first-generation status.

Socio-economic status was determined by matching participant postcodes to the Socio-Economic Indexes for Australia (Australian Bureau of Statistics, 2023). This area-based measure is commonly used in Australian population and health research as a proxy for individual SES, providing a standardised indicator of relative socio-economic advantage and disadvantage across geographic regions.

Quantitative Analysis

To allow for comparative quantitative analysis, raw counts of participants for each variable were first converted to percentages. All data were collated and analysed in jamovi. Phase 1 aimed to determine if there were specific demographic or educational factors that influenced a participant's confidence levels. Where two groups were present (for example, when considering single and dual course types), an independent *t*-test was conducted. Assumptions of normality were checked, and no outliers were present. Equality of variance was evaluated using Levene's test and this assumption was met (as indicated by a Levene's value >.05) for all analyses. *G* power analysis suggests a sample size of 210 is sufficient for detecting moderate effect sizes. Thus, the sample size was deemed appropriate. To evaluate effect size Cohen's *d* (Cohen, 1988) was used and effect sizes were interpreted as <.2 = small, <.7 = moderate, >.7 = large.

Where three groups were present (for example, when analysing differences across generalist, mixed, and specialised courses), an independent analysis of variance (ANOVA) was conducted. Assumptions of normality were checked, and no outliers were detected within groups. Homogeneity of variance was checked using the Levene's test and this assumption was met for all analyses included in the results. *G* power suggests a sample size of 305 was needed to detect moderate effect sizes. Sample size assumptions were not met for data related to First Nations heritage and thus analysis of this variable was not conducted. All other variables met the sample criteria. Where significant findings were found, post hoc analyses were conducted to determine where these differences were present. Tukey's HSD was selected as it is considered a robust and conservative test that reduces the probability of type 1 errors. To evaluate effect size in ANOVA, partial eta square was utilised (η^2), and effect sizes were interpreted as .01 = small, .06 = moderate and .14 = large (Cohen, 1973).

Where both variables were continuous (for example, age and confidence), Pearson's correlations were utilized to evaluate whether a relation was present. Assumptions of normality were assessed through visual inspection of Q-Q plots. The assumptions of linearity and homoscedasticity were evaluated through visual inspection of a scatter plot between the two variables. *G* power suggests an appropriate sample size for a Pearson's correlation is 111 and thus the present sample was deemed appropriate.

Phase 2 first involved the additional comparison of two categorical variables, therefore, a series of chi-square tests of independence were conducted in conjunction with the parametric tests. To conduct a chi-square test of independence, data is presented as a frequency count, and the data in each category needs to be independent. A sufficient sample size is present if it is greater than the number of cells multiplied by five. The largest array in this study comprised 12 cells, and thus, a sample size >60 was deemed sufficient. When a chi square test of independence was significant, to determine where the association was present observed frequencies are compared to expected frequencies. Expected frequencies for each cell were calculated by multiplying the corresponding row and column totals and dividing by the overall sample size.

Results

Sample Characteristics

Following data screening, 902 participants were eligible for inclusion. Details of the participant group are presented in Table 1.

Phase 1: Confidence in Course Choice Leading to Their Career Goal

Students who said they had a career goal were asked to rank their confidence that the course they had chosen would lead them to this goal (see Figure 1). The mean confidence score was 7.97 (*SD* = 1.99), meaning that most students had high confidence.

Hypothesis 1a: Demographic characteristics will impact confidence

To explore what demographic characteristics may impact confidence, independent t-tests were conducted for variables that contained two groups. No significant differences in confidence were present for participants with a disability (*M* = 7.88, *SD* = 1.73) compared to those without (*M* =

7.99, *SD* = 2.02, *t*(899) = 0.50, *p* = .61, two-tailed, *d* = .05). Similarly, no significant difference was present for participants who were of the first generation in their family to attend university (*M* = 8.09, *SD* = 1.96) when compared to participants who were not (*M* = 7.90, *SD* = 2.00, *t*(898)= 1.41, *p* =.16, *d* = .09). A significant difference was present between individuals who had English as a first language (*M* = 8.09, *SD* = 1.93) and those who did not (*M* = 7.55, *SD* = 2.11, *t*(898) = -3.43, *p* <.001 *d* = -.03).

A Pearson's correlation was conducted to determine if a relation was present between age and confidence. No significant relation was observed (*r*(900) = .04, *p* = .32). A Pearson's correlation was also conducted to determine if a relation was present between socio-economic status and confidence. No significant relation was observed (*r*(900) = -.01, *p* = .68).

Table 1

Summary of Sample Demographic and Education Characteristics (n=902)

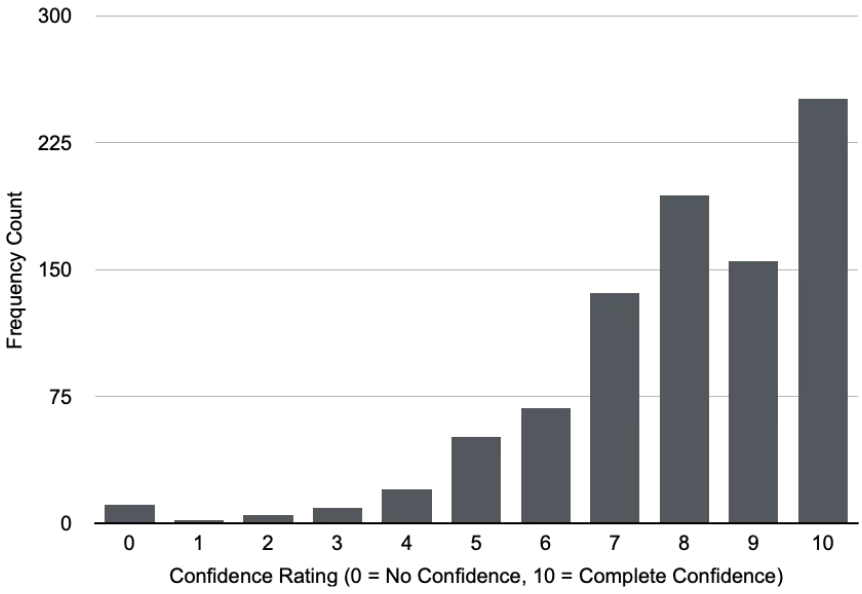
Variable	Sample Details
Age	*M* = 20.90 (*SD*=7.42)
Gender	Female = 75.20% (*n*=680)
	Male = 23.20% (*n*=210)
	Gender X = 1.30% (*n*=12)
First Nations Heritage	1.40% (*n*=12)
Has a Disability	8.60% (*n*=77)
First Language Other than English	19.60% (*n*=177)
First-Generation	44.61% (*n*=397)
Socio-Economic Status	*M* = 6.76 (*SD*=2.58)
Australian Tertiary Admission Rank (ATAR)	*M* = 72.20 (*SD*=19.06)
Course Type	Singular = 76.20% (*n*=687)
	Dual = 23.80% (*n*=213)
Course Type	Generalist = 24.70% (*n*=223)
	Mixed = 45.70% (*n*=412)
	Specialised = 29.60% (*n*=267)
Have a Career Goal?	84.83% (*n*=765)
Level of Knowledge	Limited = 27.10% (*n*=244)
	Somewhat Limited = 28.10% (*n*=254)
	Somewhat Extensive = 34.60% (*n*=312)
	Extensive = 10.20% (*n*=92)

Hypothesis 1b: Education factors, including course type and ATAR, will impact confidence

To explore what education-based variables may impact confidence, four analyses were carried out. First, an independent samples t-test demonstrated that students enrolled in singular courses (*M* = 8.08, *SD* = 1.91) were significantly more confident than those enrolled in dual courses (*M* = 7.60, *SD* = 2.16, *t*(877) = 2.99, *p* < .01, *d* = .24).

Figure 1

Confidence in Course Choice Leading to Career Goal (n=765)



Second, an ANOVA yielded a significant difference between course type (generalist, mixed, specialist) and confidence ($F(2, 877) = 38.80$ $p < .001$, $\eta^2 = .08$). Tukey HSD post hoc analyses (using an alpha set at .05) indicated that the differences were present between students pursuing generalist courses ($M = 7.28$, $SD = 2.06$) and those pursuing mixed courses ($M = 7.77$, $SD = 2.01$), those pursuing generalist and specialised courses ($M = 8.73$, $SD = 1.67$) and those pursuing mixed and specialised courses. These analyses indicate that those commencing generalist courses were the least confident that their chosen course would lead to their career goal and those commencing specialised courses were the most confident. While students commencing mixed courses were significantly more confident than those commencing generalist courses, they were also significantly less confident than those commencing specialised courses.

Third, an ANOVA also yielded a significant difference between students' knowledge of the career outcomes linked to their chosen course and their confidence that their chosen course will lead to their career goal ($F(3, 889) = 11.40$ $p < .001$, $\eta^2 = .04$). Tukey HSD analyses (with alpha set at .05) indicated differences exist between students with limited knowledge ($M = 7.58$, $SD = 2.15$) and those with somewhat extensive knowledge ($M = 8.37$, $SD = 1.81$) and those with limited knowledge and those with extensive knowledge ($M = 8.32$, $SD = 1.71$). Differences were also present between those with somewhat limited knowledge ($M = 7.59$, $SD = 2.06$) and those with somewhat extensive *and* extensive knowledge. This finding showcases students who had less of an understanding of the career outcomes linked to their chosen course showed significantly less confidence that their course would lead to their career goal than those who had a more extensive understanding of the career outcomes linked to their course.

Finally, a Pearson's correlation was conducted to determine if a relation was present between ATAR score (or equivalent) and confidence. No significant relation was observed ($r(638) = -.03$,

p = .44), indicating that there was no relationship between ATAR score and confidence that their chosen course will lead to their career goal.

Phase 2: The Relation Between Confidence and Knowledge

The second phase of the study aimed to investigate the relation between participants' knowledge of careers associated with their chosen course and their confidence in having the right course. Students were assigned to one of four groups based on confidence and knowledge. Participants were assigned to these groups using predetermined cut-off scores. Threshold values were selected over cluster analysis to ensure clarity and interpretability of group membership, which was essential given the applied nature of the research question and the theory-informed expectations around confidence and knowledge. While cluster analysis is suitable for uncovering latent group structures in large, complex data sets (Everitt et al., 2011), threshold-based classification is more appropriate when categories are theoretically or practically defined (Hair et al., 2019; Gravetter & Wallnau, 2016), as was the case in the present study. This approach also allowed for more straightforward comparison between clearly delineated confidence-knowledge profiles. Quartile splits were avoided in favour of tailored thresholds to better reflect the uneven distribution of responses across the four identified categories (Gravetter & Wallnau, 2016).

Specifically, participants with limited/somewhat limited knowledge were classified as 'low knowledge' and participants with extensive or somewhat extensive were classified as 'high knowledge'. Those with a confidence score of 0-5 were classified as 'low confidence' and those with a confidence score of 6-10 were classified as 'high confidence'. This resulted in four groups: low knowledge and low confidence n = 63, low knowledge and high confidence n = 371, high knowledge, low confidence n = 39, and high knowledge, high confidence n = 409.

Hypothesis 2a: Knowledge and confidence groupings will vary by demographic variables

As in phase one, the first step involved analysing demographic data to determine if there were any variables associated with specific groups. To achieve this a series of chi-squares was conducted to compare variables when both were categorical. First, a chi-square was conducted to evaluate whether the first language someone speaks impacts which knowledge/confidence group they are in. The chi-square test was not statistically significant ($\chi^2(3, 895) = 4.84$, p = .18). Second, a chi-square test was conducted to evaluate whether disability status is associated with specific groups. The chi-square test was not statistically significant ($\chi^2(3, 895) = 2.78$, p = .43). Finally, a chi-square test was conducted to determine whether being of the first generation in a family to attend university was associated with a specific knowledge/confidence grouping. The chi-square was not significant ($\chi^2(3, 893) = 1.77$, p = .62).

Following this an ANOVA was conducted in cases where there was a continuous outcome variable. An ANOVA yielded no significant difference when investigating whether the mean age of participants varied between knowledge/confidence groups ($F(3, 856) = 1.29$ p = *.28*, η^2 = .01). An ANOVA also yielded no significant difference when investigating if the mean socio-economic status varied between knowledge/confidence groups ($F(3, 866) = 0.39$ p =*.76*, η^2 = .01). These findings indicate demographic variables had no connection to the knowledge/confidence groups of participants in this sample.

Hypothesis 2b: Course types will be associated with knowledge and confidence groupings

Due to the categorical nature of these variables, a series of chi-squares was conducted to investigate which education variables were associated with specific knowledge and confidence groups. First, a chi-square test (with alpha set at .05) was used to assess whether there was an association between knowledge/confidence and whether students pursued a singular or dual course. Table 2 depicts the observed frequencies.

Table 2

Crosstabulation Table Depicting Frequency Counts of Students in each Knowledge/Confidence Group According to Course Type (Singular and Dual)

Group	Singular Course	Dual Course	Total (*n*)
Low Knowledge/Low Confidence	46	16	62
Low Knowledge/High Confidence	264	87	351
High Knowledge/Low Confidence	26	13	39
High Knowledge/High Confidence	335	74	409
Total	671	190	861

The chi-square test was statistically significant ($\chi^2(3, 861) = 8.64$, $p = .03$), indicating that some groups were present in certain courses at a higher frequency than expected. Specifically, students undertaking dual courses were more likely to have low knowledge of the career pathways available to them. Furthermore, students pursuing singular courses were more likely to have high knowledge/high confidence.

Second, a chi-square test (with alpha set at .05) was used to assess whether participants in specific groups were more likely to pursue certain course types. Table 3 depicts the observed frequencies. The chi-square test was statistically significant ($\chi^2(6, 882) = 240.41$, $p < .001$), indicating certain groups were associated with specific courses. Specifically, participants enrolled in generalist courses were more likely to have low knowledge of career outcomes than high knowledge. Participants enrolled in mixed courses were more likely to have low knowledge and high confidence than expected, and less likely to have high knowledge of career pathways. Finally, students enrolled in specialised courses were the most likely to have high knowledge and high confidence when compared to other participants.

Table 3

Crosstabulation Table Depicting Observed Frequencies of Knowledge/Confidence Groups Across Generalist, Mixed and Specialised Course Types

Group	Generalist Courses	Mixed Courses	Specialised Courses	Total (*n*)
Low Knowledge/ Low Confidence	27	35	1	63
Low Knowledge/ High Confidence	123	210	38	371
High Knowledge/ Low Confidence	11	11	17	39
High Knowledge/ High Confidence	48	123	238	409
Total	209	379	294	882

A chi-square test (with alpha set at .05) was used to determine whether students commencing university with a career goal were more likely to be present in specific groups. Table 4 depicts the observed frequencies. The chi-square test was statistically significant ($\chi^2(3, 888) = 82.00$, $p < .001$), indicating that some groups were more or less likely to have a career goal than expected. Specifically, students with a career goal were most likely to have high knowledge of their course and confidence in their choice whereas students without a career goal were overrepresented in the low knowledge/low confidence group.

Finally, an ANOVA was conducted to determine if mean ATAR score (or equivalent) varied depending on knowledge/confidence group. This ANOVA yielded no significant difference ($F(3, 883) = 2.24$ $p = .08$, $\eta^2 = .01$), meaning that commencing students' education rank was not associated with their knowledge/confidence levels.

Table 4

Crosstabulation Table Depicting Observed Frequencies of Knowledge/Confidence Groups and Career Goal Response

	Career Goal Present	Career Goal Not Present	Total
Low Knowledge/ Low Confidence	32	30	62
Low Knowledge/ High Confidence	229	40	269
High Knowledge/ Low Confidence	29	11	40
High Knowledge/ High Confidence	370	37	407
Total	660	118	778

Discussion

This study investigated the demographic and educational characteristics associated with varying levels of confidence and career-related knowledge among Australian students commencing higher education. This topic is important because research shows that students' confidence and knowledge regarding higher education can influence factors ranging from engagement and attainment to satisfaction and retention (Tomlinson et al., 2023). The research was conducted in two phases. Phase one examined whether specific demographic or educational factors influenced students' confidence that their chosen course would support their career goals. The key finding from this phase was that course type emerged as the primary variable linked to students' confidence, while demographic factors showed minimal to no association. Phase two aimed to categorise students based on their levels of knowledge and confidence, and to identify characteristics associated with each group. The findings from this phase echoed those of phase one: course type was significantly associated with group differences, whereas demographic variables were not.

Phase 1: Confidence in Course Choice Leading to Their Career Goal

The first phase of this study aimed to explore which demographic and educational factors are most strongly related to confidence that a course would lead to a student's career goal. The factors associated with confidence are important to consider if we are to better identify the types of students who might have low confidence and be at risk of withdrawal. It was hypothesised that demographic factors would influence confidence scores, as prior research shows that students belonging to specific underrepresented groups, particularly those who may have less access to knowledge regarding higher education than others, may be at greater risk of commencing university with low knowledge, low confidence, or both (Kift, 2015; Yorke, 2004). This hypothesis was not supported, with findings from this study showing no strong connection between most demographic factors and confidence that a chosen course would lead to their career goal. Language background was the only factor yielding a significant finding.

In terms of education factors, it was hypothesised that students pursuing generalist and dual courses would have the lowest confidence, a hypothesis based upon prior research showing a lack of confidence regarding career outcomes amongst students in such courses (e.g., Mestan, 2016). This was partially supported. Students entering singular courses were found to be significantly more confident that their course would lead to a career goal than those commencing dual courses. While students commencing mixed courses were significantly more confident than students commencing generalist courses, they were also significantly less confident than students commencing specialised courses, indicating a hierarchy of confidence is present across course types. This finding, when considered alongside the lack of association found between demographic factors and confidence, suggests that those seeking to support low-confidence students so as to improve transition experiences and retention rates would do well to focus attention on students enrolling in types of courses rather than on categories of students defined in demographic terms (e.g., Kift, 2015). What remains uncertain, however, is how this association might best be explained, with it remaining unclear whether confident students are more likely to pursue specialised courses, or if enrolment in specialised courses generates higher confidence.

Phase 2: The Relation Between Confidence and Knowledge

The second phase of this study aimed to explore the relation between knowledge and confidence in deeper detail. Specifically, these findings relate to the complex associations between student knowledge of employment pathways and their confidence that they have chosen the right course. While one might anticipate that confidence and knowledge would largely correlate, we know from research regarding the Dunning Kruger effect and imposter syndrome that this is not necessarily the case (Bunay et al., 2018; Pavel et al., 2012; Surdilovic et al., 2022). In this phase, four categories of students were identified: those with high knowledge and high confidence, those with low knowledge and high confidence, those with high knowledge and low confidence, and those with low knowledge and low confidence. Each of these categories warrants acknowledgment when considering how universities can respond to these findings.

Of the four groups identified within the sample, that of least concern are the high knowledge/high confidence students because this pattern of expectations is typically associated with student success in higher education (Nicholson et al., 2014). It was hypothesised that this group would contain a higher proportion of students undertaking specialised courses, and this was supported.

Members of this group comprised 45.6% of the sample but were disproportionately represented among participants commencing specialised courses when compared to those commencing generalist or mixed courses. High levels of knowledge suggest that such students' learning experiences related to employability are likely to match their expectations, reaffirming the appropriateness of their course choice (Tomlinson et al., 2023). Furthermore, if hurdles are encountered, the confidence of such students that they are in the right course may enable greater resilience, giving them a higher chance of overcoming challenges when encountered (Ferrao & Almeida, 2021). Given the recruitment approach adopted in this research it is possible that the proportion of students in this group is overrepresented in this sample. As participants were recruited from university social media pages, it may well be that an element of proactiveness towards their studies is present in this sample. Students outside this group who lack confidence or knowledge may be less likely to opt into such engagement prior to commencing their studies and thus, may actually represent a larger proportion of the commencing student population. Given their high knowledge and high confidence this group requires the least intervention from university staff concerned with supporting successful transition and retention (Kift, 205).

The second category identified in this study includes students with low confidence and high knowledge. This group was small in size, constituting only 4.5% of the sample. The pattern of confidence and knowledge defining this group aligns with descriptions of imposter syndrome observed in past research (Pavel et al., 2012). Similarly to the present study, this past research did not identify specific courses associated with imposter syndrome. However, findings from the present study did suggest that students undertaking dual courses were present at higher rates in this group. Given that dual courses often have higher admission rankings than singular this may correlate with the past finding that high achievers are more at risk of imposter syndrome. While fewer in number, this type of student may be at risk of early withdrawal from study due to their lower levels of confidence regarding their course (Tomlinson et al., 2023). For such students, a period of vulnerability is something course teams should certainly attend to, but those interested in intervening should be able to leverage the alignment between student knowledge and the realities of learning and teaching within those students' courses, with any confirmation of expectations likely to lead to a growth in confidence over time (Newton, 2016).

Based on past research investigating knowledge and accuracy of career pathways, it was hypothesised that students commencing mixed courses would have high confidence in their choice but a lower understanding of the careers available to them than students pursuing other courses. This was partially supported, with students pursuing both generalist and mixed courses showing over representation in this group. While the mixed course finding was expected, the finding regarding generalist course students was surprising given that prior research has highlighted that these students are often low in confidence due to the broad and varied nature of their course. Perhaps one of the most important findings of this study is the sheer proportion of students (43%) in the high confidence/low knowledge group. This pattern of knowledge and confidence is not entirely unique. In other areas of higher education similar patterns of low knowledge and high confidence in students have been found (Newton, 2016; Scutter et al., 2011) and these patterns align with those investigating the Dunning Kruger effect (Bunay et al, 2018; Pavel et al, 2012; Surdilovic et al., 2022). The implications of this finding, however, are particularly challenging. While high confidence in the value of their course may help students to persist at university, limited knowledge of relevant career outcomes, especially if that lack of knowledge is

foregrounded in early learning experiences, may impact student success in the medium to long term. On the one hand, students may encounter a disconnect between their expectations and their experience and have their confidence in their higher education choices undermined (Ferrao & Almeida, 2021; Sander & Sanders, 2006). On the other, students' confidence in their course may lead them to ignore aspects of their studies that are not consistent with those expectations, as was noted by Lock and Kelly (2022) based upon data drawn from interviews with final year students. Students confident that they are on the right path, but lacking in knowledge regarding actual career outcomes available to them may ignore opportunities to develop employability skills, thinking, perhaps wrongly, that they are not relevant to their futures. Supporting this cohort of students may therefore prove challenging, with universities needing to work collaboratively and persistently to correct their expectations while seeking to maintain their confidence (James, 2002).

The final category of students, those who were low in knowledge and low in confidence, while constituting only 7% of the present sample, are those who contemporary literature might describe as being at particular risk of disengagement, failure, and attrition (Kift, 2015). Intervening to support such students may well be challenging but will likely require the early and explicit introduction of learning regarding education-employment pathways within a course (Jackson, 2016). Here, the development in students of knowledge regarding how they can reach employment outcomes may be able to enhance the accuracy of their expectations and build their confidence regarding the purpose and value of their studies. Interestingly, existing research has most commonly associated this cohort with specific 'equity groups' (Gale & Parker, 2013), yet this was not found to be the case in the present study. Specifically, no demographic variables were found to be associated with this (or any other) phase 2 group. This finding should encourage higher education providers to challenge preconceived notions of which students may be at most risk in contemporary university settings. Rather than focusing on students in equity groups, it may be important to attend to those students commencing university without a career goal, especially if they enrol into generalist or mixed courses.

Limitations and Implications for Research and Practice

This study aimed to explore the confidence and knowledge regarding education-employment pathways held by Australian students prior to the commencement of their studies. Reaching such an audience is challenging, and so this study has limitations as well as advantages. While the sample size is large, it is unlikely to be representative of all students given that to participate in this study, students had to have voluntarily engaged with social media sites and they had to have voluntarily responded to the invitation to participate in this research. The impact of this recruitment process is hard to predict: such students may be strongly motivated and informed, or anxious and uncertain about their futures, either of which could affect the findings presented here. In addition, the analysis of knowledge about future study relied on a comparison of students' responses to information provided through university course webpages. Such a comparison, particularly at scale, may fail to capture the nuanced variation in employment outcomes associated with particular courses. That said, this method did allow for consistent coding of information across the diverse course types.

The appropriate response to the limitations noted above is further and more refined exploration of students' knowledge and confidence regarding their courses. Given the known importance of

students' initial experiences of university study (Kift, 2015), such research should begin examining student expectations prior to their commencement at university so that institutions can tailor orientation and engagement activities to their needs. This study offers valuable insight into the types of at-risk students that exist and where they might be found. In addition, there is value in longitudinal research across students' years of study regarding the interplay between knowledge and confidence on the one hand, and student experiences and outcomes on the other (Tymon, 2013). Given that prior qualitative research has shown that a lack of knowledge of employment outcomes can persist well into students' final years of study (Lock & Kelly, 2022), the tracing of student knowledge and confidence over time would seem warranted.

This study highlights a problem to which universities should respond. Universities have both access to students from the moment of enrolment, and a direct interest in understanding and responding to their expectations regarding study. The gathering of data regarding students' knowledge and confidence, the use of such data in decision-making regarding course design, and the evaluation of the impact of interventions, are all steps universities should take to promote improved student transition and success. The findings of this study provide higher education institutions with guidance regarding how they might identify students with low knowledge and/or low confidence, either of which might hinder their transition into university.

Finally, while this study was conducted using an Australian sample, the core findings are relevant internationally. Behind the findings related to student knowledge of education-employment pathways lie global trends associated with, for example, the widening of participation in higher education and the growing complexity of career pathways. Similarly, the challenge of supporting student transition into, through and out of university has been acknowledged across multiple countries. This suggests findings from this study regarding the sometimes-limited knowledge of students, the potential for misalignment between knowledge and student confidence, and the lack of association between patterns of knowledge and confidence on the one hand, and demographic factors on the other, may also be relevant across many countries. For example, the lack of an association between demographic factors and knowledge of course pathways may suggest that students are less reliant on family and local community for information about university study and its value, relying instead on engagement with online sources of knowledge, a phenomenon that is likely to be global rather than national in scope. Cross-sector comparative research would certainly be of value, particularly regarding the potential for variation in the systems and processes (e.g. careers counselling services, university entry processes) that students encounter during their transition into university study. In addition, a key to understanding the influence education factors may have on knowledge/confidence may be in investigating the sources of engagement for students in this pre-university period.

Conclusion

Overall, this study provides important findings regarding the cognitive and affective features of commencing university students' expectations regarding their education-employment pathways. These findings contribute to the existing literature by demonstrating that students' knowledge of these pathways and confidence regarding where their course will lead are distributed in complex ways across different cohorts. Furthermore, these findings question the value of assuming that vulnerable students – those lacking in confidence and/or knowledge – are identifiable based on their background, be it demographic or educational. Higher education institutions must take

seriously the challenge of working to uncover commencing students' expectations about higher education so that employability teaching and learning can be best designed to support student success. The findings of this study can aid higher institutions' student services teams and teaching staff to collaboratively deliver employability support tailored to the needs of students with varying degrees of confidence and knowledge. Future research could usefully explore the sources of pre-university information students engage with and examine how varying education systems and support structures across countries shape students' knowledge and confidence during this transition period.

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