

Sectoral training matters more than improvement in foundation skills: how Australian VET programs are associated with graduate employability

Peter Fieger

*Faculty of Education and Arts, Federation University Australia,
Ballarat, Australia and
Business School, University of New England, Armidale, Australia*

Annette Foley

School of Education, Federation University Australia, Mt. Helen, Australia

John Lewis Rice

*College of Business Administration, University of Sharjah,
Sharjah, United Arab Emirates, and*

Stuart Levy

Federation University Australia, Mt. Helen, Australia

Abstract

Purpose – This study questions whether foundational skills are associated with occupational mobility in Australian VET for those employed prior to taking up VET training, or if sectoral context matters more. We test whether gains in numeracy/literacy/problem solving skills outweigh training package type as the strongest predictor of career advancement.

Design/methodology/approach – We analyze 2023 NCVER survey data ($n = 64,873$) of employed VET completers who were also employed prior to their training, calculating occupational status gain using McMillan's ANZCO-based scale. Regression and dominance analysis assess impacts of skill improvements, training package, qualification level, age and gender.

Findings – Average gain was 2.7 points. Self-reported writing improvement showed modest benefit; self-reported numeracy gains correlated with lower status; self-reported problem-solving had weak effect. ICT and Aeroskills delivered highest gains; Furnishing and Transport and Logistics showed negative outcomes. Younger graduates (20–24 yrs) gained nearly double older cohorts.

Practical implications – VET policy must prioritise alignment with high-growth sectors over generic skills training. Curricula in underperforming areas should be restructured with industry input. Investment in ICT, and advanced manufacturing yield far greater employability returns.

Originality/value – First study using dominance analysis to show training package dominates occupational gains in VET, not skill improvement. We reframe success as systemic not individual, thus challenging policy orthodoxy.

Keywords Generic skills, Literacy and numeracy, Foundation skills, Labor market, Occupational status

Paper type Research article

Introduction

There is widespread acknowledgment that the skills and knowledge adults need to navigate both work and life in the 21st Century is a significant challenge driven substantially by



technological advancements and shifts in the economy and social change (Payton, 2017). These societal changes offer significant opportunities and promise for future prosperity and job creation in Australia. However, they also create challenges for corporations, societies and governments as the country negotiates these changes across work patterns, available opportunities and lifestyle choices. 21st Century skill requirements are and will continue to be significantly more demanding and require more critical, reflective and reasoning skills and the ability to interpret and understand a broader range of materials and have the competencies to interact with the digital world and new technology (Mahmud and Wong, 2022; see also Tijani and Adeduyigbe, 2026).

Yet despite growing recognition of foundation skills, and their importance vocational learning seems often conceptualized as the transmission of individual competencies, including literacy, numeracy, problem-solving, divorced from the contexts in which they are activated. This paper challenges that disaggregated view by demonstrating how occupational status gains in VET are not merely driven by skill improvement alone, but by the vocational system into which learners enter, namely, the training package and qualification level. We argue that vocational learning must be understood as a system of contextualized practice, where foundational skills gain meaning via their integration with sector-specific knowledge and industry demand.

Along with these changes, the population of Australia is ageing and living longer and is also more diverse culturally and demographically than in the past. Further, shifts in the population have implications for the labor market and hence the workforce skills and the Australian VET system that is tasked with training a significant percentage of the workforce. To cater for these changes the Australian VET system requires a focus on the importance of foundations skills, including literacy and numeracy and critical thinking skills to better prepare graduates for today's world of work. As Australia mobilizes to navigate economic challenges and ensure equitable access to labor market opportunities, the VET system will need to consider an expanded training package offering across new industries that incorporate foundations skills that support a 21 Century career (see also DEWR, 2024).

Education and training have never been more important to the Australian economy and the Australian way of life. It is time to “reimagine” VET qualifications “in view of the emergence of the Fourth Industrial Revolution and the growing demand for ‘soft skills’ or enterprise skills” (Payton, 2017, p. 6). The Australian VET system, along with education systems generally, needs to evolve with the changes to enable greater opportunities for lifelong learning to cater for those commencing their working life, for those reskilling or for those up-skilling to navigate new technologies and to take up new opportunities (DEWR, 2024; González-Pérez and Ramírez-Montoya, 2022).

The importance of research on the impact of improved foundation skills on occupational status gains among Vocational Education and Training (VET) graduates who were employed both before and after their training is important to understand the impact on and the challenges of teaching foundations skills to VET students in a time of significant change.

Literature review

Introduced in Australia to increase Australia's competitiveness in a globalized economy Goozee, 2001, competency-based training (CBT) has underpinned the Australian VET system since the early 1990s. CBT is a system delivered via national training packages that specify industry-defined units of competency and observable standards of workplace performance. Educators in the VET system are obliged to take the documents into account when they design learning, teach and assess. The Australian implementation of “competency-based training”, like implementations elsewhere, demands that educators rigidly adhere to the documents as they go about their work (Hodge, 2016).

Indeed, literature consistently identifies CBT as an outcomes-focused model intended to align skills formation with labour market needs. Competency based documents are not

designed to convey knowledge but rather are concerned with observable performance (Wheelahan, 2007). Initial reviews into CBT highlight the tensions in how “competence” is conceptualized either as a context-specific occupational performance or as a broader personal capability suggesting a need to balance behavioral specifications with deeper understandings of learning (Guthrie, 2009).

Many critiques of CBT focused on the reduction of learning to measurable outcomes and the use of observable performance at the expense of theoretical understanding, thereby constraining access to knowledge (Wheelahan, 2007). Smith (2010) identifies a “thin pedagogy” driven by assessment of discrete tasks, reinforcing compliance rather than deep learning.

Tuononen *et al.* (2023) argue that generic skills, such as critical thinking, problem solving, communication and the ability to apply knowledge across contexts, are increasingly important for employability and lifelong learning. In contrast, Smith (2010) and Wheelahan (2007) contend that CBT reduces learning to discrete, observable tasks, which can limit workers’ ability to transfer skills beyond immediate job requirements. These perspectives suggest a tension: while competency frameworks aim to standardize and assess performance in vocational education, they may restrict the development of the deeper conceptual and relational knowledge needed to build generic skills. From this viewpoint, Tuononen *et al.*’s emphasis on integrative and transferable capabilities can be seen as a response to the limitations identified by Smith and Wheelahan. It points toward a more expansive approach in which competency-based systems are complemented by curricula that prioritise a deeper understanding and adaptability.

In Australia and internationally generic skills can be known by a number of terms including core skills, key skills, foundation or basic skills, essential skills and workplace know how. Skills such as critical thinking, collaboration, communication and problem solving are often referred to as cognitive skills or higher order thinking skills which are important to navigate today’s workplace (Tuononen *et al.*, 2023; Mahmud and Wong, 2022). The importance of generic skills has been highlighted in the transition phase to work and also as an essential skill through an individual’s working life. Across different countries, approaches to skill development vary: some place greater emphasis on workplace-specific skills, while others prioritise broader social relevance (Hall and Soskice, 2001; Thelen, 2004). In Australia, the significance of generic skills was first recognized in the 1980s and later revitalized through the 1990 and 2000s (Gibbs, 2004). Their importance has grown, with generic skills now seen as essential for citizens of the twenty-first century (OECD, 2019; Chen, 2023). Adult language, literacy, numeracy and digital capabilities – along with employability skills such as problem-solving, collaboration and self-management – are widely referred to as foundation or generic skills. These capabilities underpin effective participation and productivity in the workforce while also enabling broader social engagement (DEWR, 2024).

The requirement for individuals to build and develop their foundational skills is becoming more important with ongoing growth in the use of technology in the workplace and technology rich environments (Payton, 2017 cited in Circelli *et al.*, 2022; see also Iniguez;Berrozpe and Boeren, 2020). While much literature treats foundation skills as “portable competencies,” recent scholarship in vocational pedagogy (e.g. Black and Yasukawa, 2012; Tuononen *et al.*, 2023) has challenged this notion, arguing instead for a contextualist perspective: that literacy, numeracy and problem-solving are not standalone abilities, but are shaped by domain-specific demands. In VET, writing skills in healthcare differ from those in ICT; numeracy in construction is not the same as in manufacturing. This paper builds on that insight, asking not whether foundation skills improve, but in what vocational environments they translate into career advancement.

In their report “Literacy Changes Lives”, Clark and Dugdale (2008) show that literacy “has tangible relationships with many aspects of a person’s life, not just educational attainment, but also economic wellbeing, aspirations, family circumstances, physical and mental health as well as civic/cultural participation” (Clark and Dugdale, 2008, p. 3).

Similarly, [Balatti et al. \(2010\)](#) linked literacy and numeracy outcomes to a social capital perspective where they found that:

Participation in accredited adult literacy and numeracy courses produced social capital outcomes for 80% of the students interviewed, even though improved literacy and numeracy skills were not necessarily present (p. 5).

More recently the Australian government focus has been on the development of literacy and numeracy skills for jobs and to improve economic competitiveness ([National Foundation Skills Strategy for Adults, 2015](#)). Certainly, in today's economy, generic skills are essential to gain employment and to progress and succeed in the workplace ([Gibb, 2004](#)). The importance of generic skills has also been highlighted as essential for the transition phase to work along with being considered essential for 21st Century skills in various policy papers and reports ([Tuononen et al., 2023](#); [OECD, 2019](#); [DEWR, 2024](#)).

There is general consensus that developing capabilities to cater for 21st Century skills is required and needs to be cultivated to assist learners to succeed in modern society ([Australian Government, 2023](#)). These capabilities are based on knowledge and innovation and that embedding them into existing teaching practices should be a priority ([World Economic Forum, 2016](#); [Roseth et al., 2016](#); [González-Pérez and Ramírez-Montoya, 2022](#)). Within these 21 Century capabilities there are broader ranges of skills beyond literacy and numeracy. The United Nations 2030 Agenda, for example, Sustainable Development, and Sustainable Development Goal 4 “achieving an inclusive and quality education for all” has enhanced the focus on development of broader skills. Research has identified that cultivating these broader skills within the learning context can enhance students’ knowledge and application of skills ([Mahmud and Wong, 2022](#); [Scouler et al., 2016](#); [Baghaei et al., 2007](#); [Wong and Cheung, 2020](#); [Soller, 2001](#); [Webb et al., 1998](#); [Zhang, 1998](#)).

As we move into the future there are particular skills required in technology rich environments, many of these are aligned with critical skills such as “mathematics, programming, systems analysis, critical thinking and computer use along with a communication skills set, made up of active listening, speaking, writing, coordination, service orientation, instructing, and negotiation skills” ([Payton, 2017](#), p. 5; [Iniguez-; Berrozpe and Boeren, 2020](#); [Australian Government, 2023](#)). A decline in writing skills in the school's system and workplaces across disciplines has been noted by [Coyle \(2010\)](#) who makes the case that “substandard writing skills have been noticed in schools and workplaces across disciplines. Writing courses and writing centre programs can teach students about grammar and composition . . . however, writing skills which are often related to specific disciplines or professions, are learned indirectly” (p. 195). Coursework that prepares students for different careers generally focuses on curriculum content rather than writing skills. Yet according to [Coyle \(2010\)](#) “writing ability is often vital for effective work performance, thus demonstrating writing skills that are relevant to future employment is an essential learning outcome” (p. 195). Similarly, [Rios et al. \(2020\)](#) “identified from a descriptive analysis of 142,000 job advertisements” [t]he four most in-demand 21st-century skills . . . were oral and written communication, collaboration and problem solving” (p.88). Equipping the VET sector to embed and deliver these skills will be critical in the emergence of the “Fourth Industrial Revolution” ([Payton, 2017](#), p. 6).

Occupational work ready skills

The relationship between foundation skills and occupational status gains among VET graduates has been widely debated ([Circelli et al., 2022](#); [Walstab and Doecke, 2023](#); [Palmer, 2022](#)). A recent NCVER report involving tracking “at least one of 131 different nationally recognised foundation skills programs in scope over a five-year period from 2016 onward” showed that the value of foundation skills for students undertaking VET programs “can improve completions and job-related outcomes” ([Hughes et al., 2025](#), p. 8).

In a further study by [Obiakor and Newman \(2022\)](#) undertaken in Australia, an examination of the effects of literacy and numeracy on labor market outcomes, identified that approximately one-half of the total effect of schooling on labor force participation and on unemployment can be attributed to literacy and numeracy ([Chiswick et al., 2002](#)). Necessarily, for VET to succeed students must apply their foundational skills in nuanced ways, such as problem solving and development of generic skills. Providing contextualized learning and teaching approaches in literacy and numeracy education ([Black and Yasukawa, 2012](#)) in the VET context can provide students with appropriate work-ready skills which can bridge the skills gap in the labor market.

Data and methods

In this research, we use data from the National Centre for Vocational Education Research (NCVER) Student Outcomes Survey. These data come from the 2023 wave of a yearly national survey of VET student's experiences and outcomes in Australia. The survey aims to assess how effectively VET supports students' employment, skill development and well-being. The survey is managed by NCVER, a not-for-profit research group owned by federal, state and territory ministers responsible for VET, and carried out by the Social Research Centre (SRC), with funding from the Australian Government Department of Employment and Workplace Relations. Ethical clearance for secondary analysis was obtained from NCVER in 2023. All survey participants provided informed consent as part of the original NCVER data collection process.

This survey is based on Australian residents aged 15+ who engaged in VET training during the previous calendar year, categorizing them into four groups: qualification completers, part-completers, short course students and subject-only completers. Data were collected between June and August 2023 using a multi-method approach (e.g. email, SMS or mail with unique codes) to maximize response rates. Follow-up reminders were sent, supplemented by telephone interviews.

The survey collects categorical and continuous data on three main topics. First, it examines enrollment motivations; for example, why people signed up (to get a job, advance in their career, for personal reasons or because their employer required it). Second, it tracks outcomes after training, including employment changes (e.g. moving from unemployed to employed), skill improvements, promotions and further study. Third, it collects feedback on training quality, assessment fairness, provider support and likelihood of recommending the program.

After data collection, the survey underwent a detailed editing process, including post-stratification and raking, to ensure representative weights. For further information on the student outcome survey, see [Fieger \(2015\)](#).

For the present research, we used occupational status scores derived by [McMillan et al. \(2009\)](#) and applied them to every observation in the SOS that had a four-digit Australian and New Zealand Standard Classification of Occupations (ANZSCO) for occupation with an available occupational status score before and after completion of the training. We then created a new variable, 'Occupational Status Gain', by subtracting the pre-training occupation status score (OSS) from the same occupational metric after the training was completed. Consequently, if a respondent held the same job before and after training, their status gain would equal zero, whereas someone with a pre-training OSS of 30.7 (retail sales assistant) and a post-training OSS of 40.8 (retail sales manager) would display an occupational status gain of 10.1.

We cleaned the dataset to include only respondents who completed a Certificate I–IV or diploma, were employed both before and after their VET training, had complete pre- and post-training occupational data, had available self-reported skill improvement data for writing, numeracy and problem-solving (including those reporting no improvement) and provided age and gender information. We also kept only those with training package data (the standard Australian VET curriculum units that define qualifications by sector (e.g. ICT, Health, Manufacturing)). We excluded packages with fewer than 100 responses to ensure reliable estimates. Consequently, non-completers, part-time/casual workers and respondents not employed prior to training were excluded from analysis. [Table 1](#) presents key demographic

Table 1. Overview of population and sample data

		Unweighted	Weighted
<i>Age Group</i>	15–19 years	10,305	46,519
	20–24 years	8,746	38,837
	25–44 years	28,429	120,445
	45–64 years	16,646	50,632
	65 years and over	747	2,217
<i>Qualification level</i>	Diploma	11,953	44,243
	Certificate IV	19,457	72,867
	Certificate III	24,011	99,567
	Certificate II	8,346	36,393
	Certificate I	1,106	5,580
<i>Gender</i>	Males	26,952	131,591
	Females	37,921	127,060
<i>Sum</i>		64,873	258,651

details about the study group. The analytical approach involved two stages. First, we estimated an OLS regression model with occupational status gain as the dependent variable and skill improvements (writing, numeracy, problem-solving) plus confounders (training package, qualification level, age, gender) as predictors. Second, we employed Shapley value-based dominance analysis to quantify relative importance of each predictor across all possible variable subsets, allowing us to rank variables by their contribution to explained variance rather than relying on regression coefficients alone.

The average occupational status gain was 2.7 (SD = 13.2) which, considering an overall occupational status scale of 1–100, suggests a fairly modest improvement for employed VET graduates.

We use an OLS regression model to examine how improvements in writing, numeracy and critical thinking skills affected occupational status gains, adjusting for confounding variables. Confounding variables include respondents' age group, gender, level of qualification pursued and training package. We will estimate marginal effects to identify patterns across demographic and educational groups and assess disparities after adjusting for confounding factors.

We also assess the relative importance of predictors of occupational status gains. We used Luchman's (2014) implementation of Shapley value-based dominance analysis (Shapley, 1953).

Results

Table 2 shows the regression model parameters. The model is based on 64,873 respondents, allowing for reliable statistical analysis. The overall F value of 27.9 ($p < 0.001$) indicates substantial explanatory power. While the R^2 of 0.027 may appear modest by predictive modeling standards, this study is not oriented toward explaining variance in occupational status gain, but rather toward identifying causal patterns and relative effect sizes of explanatory variables. Our focus lies in estimating marginal effects of skill improvements while controlling for other confounders (training package, qualification level, age), which are known to dominate labor market outcomes.

Figure 1 shows that improved writing skills are associated with higher occupational status gains. Those who reported no improvement in writing skills gained 2.1 and 2.5 points on average, while those who reported improvement gained 2.8 points. While these patterns were statistically significant ($p < 0.05$), the practical magnitude was small (approximately 0.3–0.7 points on a 100-point scale) compared to the 7.1-point gain observed for ICT training package completers.

Table 2. OLS regression occupational status gain

Predictors occupational status gain	Coefficient	Std err	t	t > p	Margin
<i>Imp Writing Skills (ref. Strgly disagree)</i>					
Disagree	0.38	0.46	0.82	0.41	2.1
Neither	0.75	0.46	1.62	0.106	2.5
Agree	0.73	0.47	1.56	0.119	2.8
Strongly agree	0.67	0.50	1.32	0.187	2.8
<i>Imp Num.I Skills (ref. Strgly disagree)</i>					
Disagree	-0.81	0.44	-1.83	0.067	3.6
Neither	-1.04	0.45	-2.34	0.02	2.8
Agree	-0.85	0.46	-1.85	0.064	2.6
Strongly agree	-0.81	0.49	-1.66	0.097	2.8
<i>Impr ProbSolv. Skills (ref. Strgly disagree)</i>					
Disagree	0.39	0.63	0.63	0.528	1.8
Neither	0.64	0.60	1.07	0.286	2.2
Agree	0.98	0.60	1.62	0.105	2.5
Strongly agree	1.15	0.62	1.87	0.062	2.8
<i>Qualification Level (ref. Diploma)</i>					
Certificate IV	-1.55	0.18	-8.58	<0.001	4.4
Certificate III	-1.76	0.18	-9.67	<0.001	2.9
Certificate II	-3.36	0.23	-14.34	<0.001	2.7
Certificate I	-3.07	0.34	-9.13	<0.001	1.1
<i>Age Group (ref. 15 to 19 years)</i>					
20-24 years	1.26	0.21	5.95	<0.001	3.7
25-44 years	-1.09	0.18	-6.21	<0.001	4.9
45-64 years	-2.83	0.19	-15.07	<0.001	2.6
65 years and over	-3.66	0.48	-7.7	<0.001	0.8
<i>Gender (ref. Males)</i>					
Females	-0.78	0.13	-5.79	<0.001	0.0
<i>Training Package</i>					
omitted, see Figure 2					3.2
Intercept	2.58	0.67	3.87	<0.001	2.4

Note(s): Population = 258,651 Sample = 64,873 $F(57;64,811) = 27.9$ $p < 0.001$ $Rsq = 0.027$

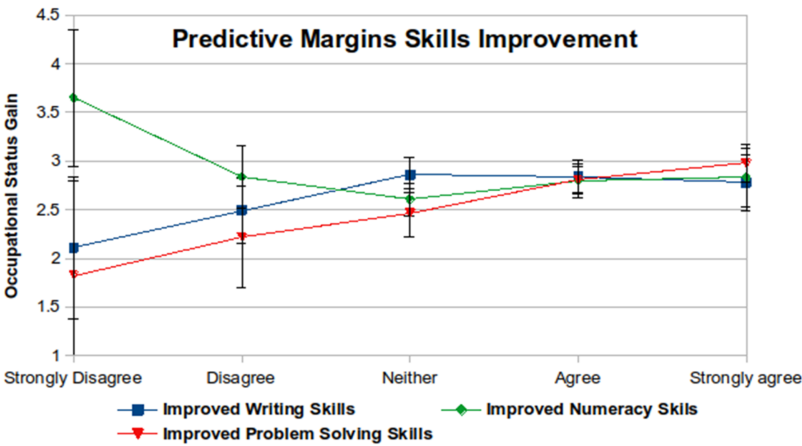


Figure 1. Skills improvement and occupational status gain

The relationship between numeracy improvement and occupational status follows a J-curve: those who reported no improvement gained the most (3.6), while those who reported improvement gained 2.8.

Confounding variables vary substantially, so we examine their influence on occupational status gain. Specifically, it is reasonable to expect that the training package a VET student is enrolled in significantly affects changes in occupational status. [Figure 2](#) shows a graphical representation of occupational status gain by training package, with all other independent variables held constant.

Given the overall status gain of 2.7, it is evident that differences between training packages are substantial. The largest status gain occurs in the Information and Communications Technology (ICT) training package (7.1), followed by Aeroskills (MEA) and Correctional Services (CSC) Training Packages (5.6 and 5.2, respectively) across the sectors listed in [Appendix](#). It is also apparent that several training packages do not exhibit a status gain significantly different from zero, including three with negative estimates: Furnishing (MSF), Sustainability (MSS) and Transport and Logistics (TLI) training packages (−0.4, −0.4 and −0.3, respectively).

Looking at the relationship between qualification level and occupational status gain ([Figure 3](#)), it is not surprising that a higher qualification level is associated with a larger improvement in occupational status. Qualification completers with a diploma gain on average 4.4 units in occupational status compared to their pre-training status, whereas Certificate IV, III, II and I gain 2.9, 2.7, 1.1 and 1.4 units, respectively. This trend toward higher qualifications is further exemplified in specialized sectors such as nursing, where the transition from a VET Diploma to a Bachelor of Nursing program serves as a critical professional milestone for achieving Registered Nurse status ([Fieger et al., 2025](#)).

With respect to age groups, it is evident that younger people gain significantly more occupational status than older age groups ([Figure 4](#)). VET graduates from the 20 to 24 age groups post particularly high occupational status gain (4.9), followed by 15- to 19-year-olds (3.7), while 25 to 44-year-olds still receive occupational status gains of 2.6. For older adults, status gain reduces dramatically, with 45- to 64-year-olds the average occupational status gain

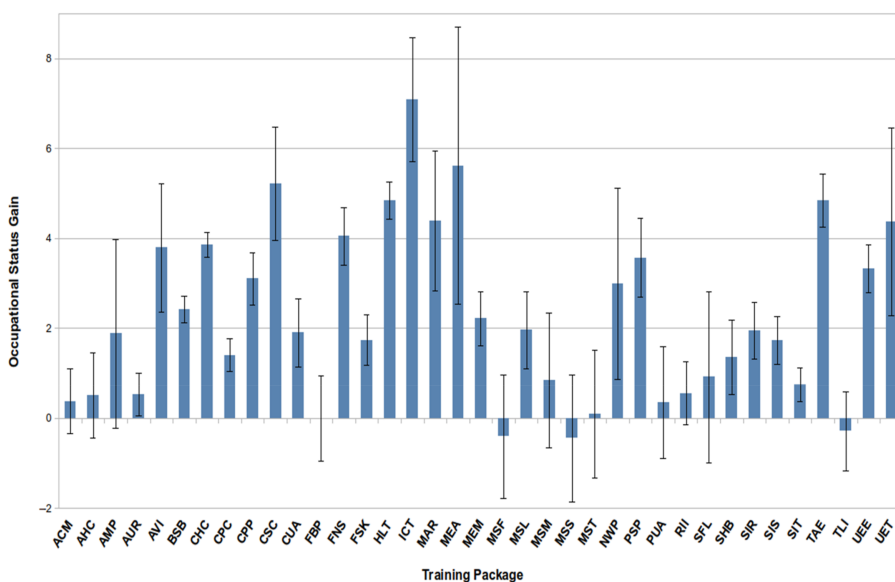


Figure 2. Occupational status gain by training package

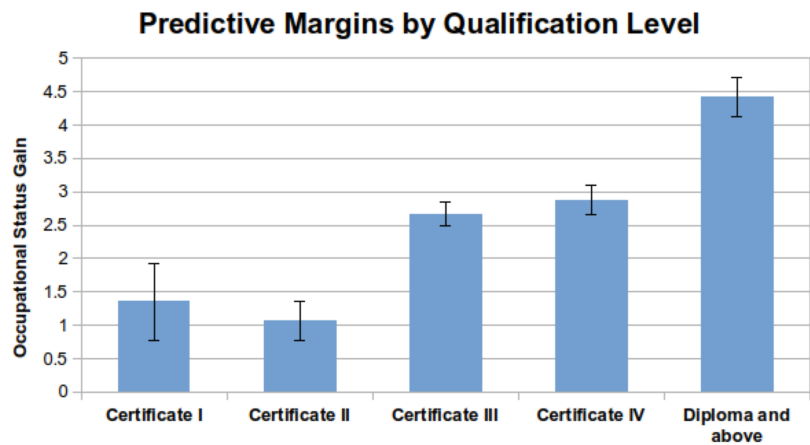


Figure 3. Predictive margins occupational status gain by qualification level

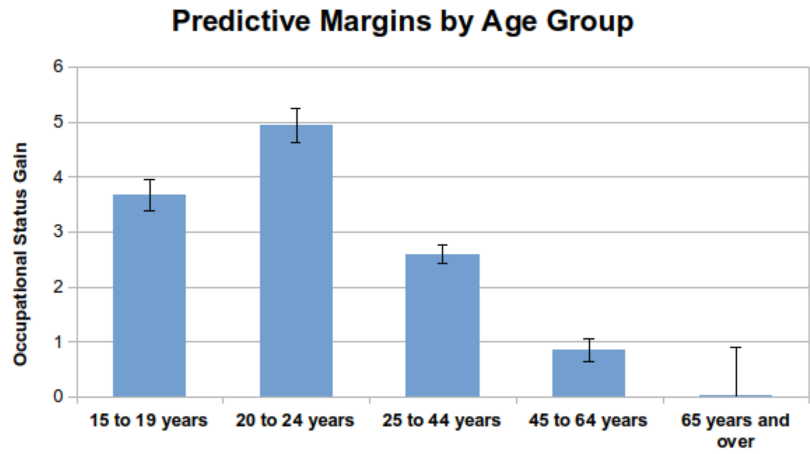


Figure 4. Predictive margins occupational status gain by age group

only amounting to 0.8, far below average status gain across the graduate population of 2.7. VET graduates of ages 65 and older do not post any occupational status gains at all (0).

Finally, the gender of the respondent is associated with occupational status gain, with males (3.2) posting an average significantly higher change in occupational status than females (2.4).

We were also interested in estimating which of the available predictor variables have the most profound impact on change in occupational status from VET education. This can be difficult to determine via ordinary regression modelling due to the nature of categorical variables involved. For this reason, we have employed dominance analysis, a technique based on the Shapley value approach. This method creates an interpretable measure of variable importance that considers both individual and joint effects. Key aspect of this method is the estimation of the incremental contribution of each variable to the explained variance across all possible subsets of variables.

In the present analysis (Figure 5), it is the respondent's training package that has the most substantial contribution to changes in occupational status, followed by age group and qualification level. The impact of core skills improvement is comparatively minor as is the influence of gender.

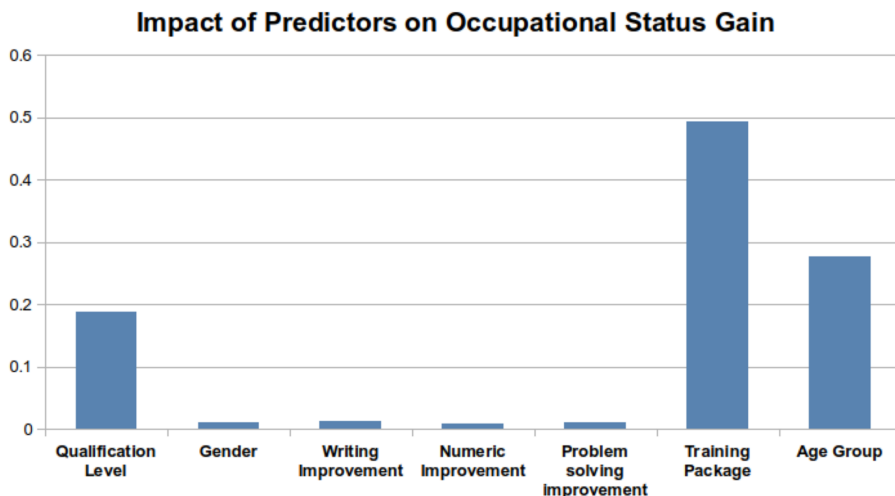


Figure 5. Dominance analysis of impact of predictors on occupational status gain

Findings

The central hypotheses of this study, whether sectoral context (e.g. training package) matters more than foundational skill gains for occupational mobility in employed VET completers, and whether skill improvements outweigh training package type as the strongest predictor of career advancement, were strongly supported. Contrary to policy orthodoxy that holds that basic skills like reading, math and problem-solving are “portable” across different work environments (e.g. [National Foundation Skills Strategy for Adults, 2015](#); [OECD, 2019](#)), our dominance analysis showed that the training package is by far the biggest predictor of moving up to a better job (as seen in [Figure 5](#)). Qualification level and age came next. *Based on self-reported data, foundational skill improvements showed comparatively minor effects relative to training package selection. This challenges, though but does not disprove, the assumption that individual skill development is the primary pathway to VET-related career advancement* ([Circelli et al., 2022](#); [Walstab and Doecke, 2023](#)). The dominance of sectoral context should be interpreted as relative rather than absolute, pending confirmation from objective skill assessments.

One of the most striking result of this study is the modest overall post-training gain in occupational status. The weighted mean occupational status gain of 2.7 points (SD = 13.2) is surprisingly low (given an occupational status scale from 0 to 100), suggesting that VET alone rarely leads to large upward mobility for employed course completers. This confirms [Clark and Dugdale’s \(2008\)](#) observation that literacy and skill gains often translate to incremental rather than transformative economic outcomes. It could also reflect the conservatism of the [McMillan et al. \(2009\)](#) occupational status scale, which gives higher weights to stable socioeconomic indicators over dynamic career changes (e.g. salary growth or autonomy). Alternatively, the sample restriction to employed pre- and post-training respondents may exclude some individuals who switched sectors or roles dramatically, thereby underestimating potential status gains for some subgroups. [Lee \(2010\)](#) also investigated education-related changes in occupational status, albeit in a wider context. His analysis showed a clear educational gradient in occupational prestige, for example, holders of bachelor’s degrees enjoy substantially higher occupational status at age 26 and a faster status growth rate than their non-degree peers. The modest 2.7-point post-training occupational status change evident from our study shows that, compared to this pattern, vocational training alone delivers relatively small status gains for employed qualification completers, in line with Lee’s finding that gaps widen over time and are often driven by qualification level. This aspect of our study also corresponds

with Lee's observation that occupational gains vary across different career choices and that the occupational status scale may under-weight changes such as switches between industry sectors or salary growth.

The relationship between foundational skills and gains in occupational status was shown to be quite subtle, which does not fully support the hypothesis that greater skill improvement necessarily translates into higher occupational status.

Writing skills showed a positive association: graduates who reported improving their writing skills gained 2.8 points on average, compared to 2.1–2.5 points for those who disagreed. This is in line with [OECD \(2019\)](#) and [World Economic Forum \(2016\)](#) frameworks, which rank communication as a 21st-century skill important for succeeding in modern work environments. This corresponds to [Coyle's \(2010\)](#) research by supporting the notion that better writing can enhance occupational prospects. Writing proficiency improves employability in roles requiring teamwork or formal reporting, and such skills are required in industries like healthcare, education and professional services.

Numeracy skills demonstrated an unexpected J-curve pattern: graduates who strongly disagreed with numeracy skill improvement reported the highest status gains (3.6 points), while those who agreed or strongly agreed had substantially lower gains (2.8 points). [Liu and Fernandez \(2018\)](#) found a strong positive link between numeracy scores and occupational status, which supports our observation that graduates with stronger pre-existing numeracy tend to achieve higher status gains. Their analysis also shows interaction effects: low-numeracy workers benefit more from certain soft skills, which could mean that when self-reported skill improvement is low, existing proficiency may still drive occupational status gains, pointing to the J-curve pattern we have found. Alternatively, it could also indicate that those who reported 'no improvement' may have started at higher baseline numeracy levels and had less room to report improvement, yet still possessed the foundational competence needed for status advancement. VET numeracy training failed to meaningfully improve skills for some learners, leaving their occupational status gain dependent on already existing skills rather than on skill improvement following from the training they received. Future research could use a more objective assessment of numeracy skills, for instance, via standardized tests, which would help shed more light on the possible explanations for our findings.

Problem-solving skills demonstrated an almost perfect linear positive relationship with status gains (consistent with [Roseth et al., 2016](#)), but their overall impact was minor in dominance analysis. This suggests that problem-solving is a consistent but fairly weak predictor of status gains, possibly because it is context-dependent, for example, effective problem-solving in VET can only translate to status gains if paired with sector-specific training (e.g. engineering or ICT). [Mainert et al. \(2019\)](#) found that complex problem-solving skills explain additional variance in salary (around 3%) and job complexity (around 7%) beyond general mental ability and education, although they did not predict higher job levels. This pattern aligns with our result that problem-solving is a consistent, albeit weak, predictor of status gains: its influence appears limited unless combined with industry-related expertise. Thus, our study provides empirical support for Mainert *et al.*'s finding that problem-solving skills matter for status gains, although this also depends on sector and is modest in overall impact. In technology-related environments, problem-solving skills have been positively associated with employment outcomes such as incomes and more skilled occupations; however, the explanatory power is relatively modest compared to other background variables – a finding reported by [Liao et al. \(2019\)](#), who also corroborated our result that the impact of these skills is dependent on industry sector.

Dominance analysis has demonstrated that the training package is the single strongest predictor of occupational status gain. High-growth sectors such as ICT (7.1 points, SE = 0.7) and Aeroskills (5.6 points, SE = 1.57) had status gains substantially above the average gain of 2.7, while some sectors, like Furnishing (−0.4, SE = 0.70), Sustainability (−0.4, SE = 0.72) and Transport/Logistics (−0.3, SE = 0.45), showed negligible or marginally negative gains that were not significantly different from zero. This supports [Payton's \(2017\)](#) "Fourth

Industrial Revolution” thesis, stating that VET’s success hinges on preparing learners for tech-driven sectors. For example, ICT training integrates digital literacy – also a foundation skill – with industry requirements for technical knowledge, creating an additional effect that outweighs improvements in generic skills alone. Our results also expand upon the findings of [Hauser *et al.* \(2000\)](#), who showed that post-secondary education is the most powerful driver of occupational status gain and specifically that the strength of education’s effect varies across occupations, confirming the variability of sector-specific status gains.

Unsurprisingly, qualification level correlated very strongly with occupational status gains: diploma holders averaged 4.4 points, more than double the gain for Certificate I/II holders (1.1–1.4 points). This supports [Gibbs and Coffey’s \(2004\)](#) argument that higher qualifications signal greater skills to employers, helping with access to roles with higher occupational status. On the other hand, lower-level certificates may focus on entry-level skills rather than the critical thinking or leadership required for higher occupational status. These findings also provide additional empirical support for the long-standing assertion that lower-level VET qualifications provide limited benefit to their holders (see, for instance, [Karmel and Fieger \(2012\)](#) or [Polidano and Ryan \(2016\)](#)).

The addition of key demographic variables has further stratified our observed outcomes. Younger learners (20–24 years: 4.9 points; 15–19 years: 3.7 points) posted substantially greater occupational-status gains than older cohorts, with 45–64-year-olds gaining just 0.8 points and those over 65 showing no gains at all. This reflects the plasticity of foundational skills in younger populations ([Scoular *et al.*, 2016](#)) and the challenge of upskilling older workers in established careers where VET may not address existing skill gaps. It further substantiates [Kratz *et al.*’s \(2019\)](#) findings that vocational education confers a strong early-career advantage that diminishes as workers age, a pattern that mirrors our results, showing larger occupational-status gains for younger cohorts versus the minimal or even absent gains for older qualification completers.

Males gained 3.2 status points on average, compared to 2.4 points for females. This gap, while quite small, may result from occupational segregation: males are traditionally overrepresented in the training packages identified as having high status gains (e.g. ICT, Aeroskills), while females concentrate more in sectors with lower status gain (e.g. healthcare or community services). [Colley *et al.*’s \(2003\)](#) analysis shows how gendered vocational cultures impact learning and identity; for example, women are largely drawn into lower-status care fields (childcare, health) while men dominate higher-status technical fields such as engineering or information technology. This mirrors the occupational-segregation pattern we believe is responsible for the status-gain discrepancy found in our study, where males achieve higher status gains on average because they complete and attend training packages related to higher-pay sectors (ICT, Aeroskills) that are less popular with women. Further research should examine whether differences in training access or skill improvement are responsible for this disparity.

Discussion

Contribution to theory

The paper reframes occupational mobility in VET as a system-level outcome shaped primarily by sectoral allocation rather than individual skill accumulation. In a lay analogy, VET training corresponds to different occupational trajectories depending on the industry of education. Some ladders have many rungs (like ICT or advanced technical fields), while others tend to be short and provide little lift (like some low-growth service sectors). Our research suggests that improving key skills helps you climb your occupational ladder, but it cannot change which ladder you are on and the consequent gains achieved. Career progression comes from starting on a taller ladder that opens more and higher outcome options rather than starting and staying on a short one.

Most importantly, training packages are associated with different occupational outcomes, suggesting they function as institutional sorting mechanisms. High-growth packages such as ICT and Aeroskills produce gains well above the average, while others deliver negligible or

even negative outcomes. This suggests that the vocational learning benefits are mediated by sectoral labour-market structures that value and activate skills within institutions and sectors, rather than by the enhancement of individual skills alone. However, with an R^2 of 0.027, our model explains only 2.7% of the variance in occupational status gain, meaning most variation remains unexplained. Some unmeasured employer characteristics may matter more such as firm size or industry growth. Other factors relevant include regional labour market conditions, social capital networks and prior work experience not captured by training alone.

One striking theoretical implication is the incremental rather than discontinuous mobility for those already employed. This aligns with earlier work showing that literacy and skill gains frequently translate into limited occupational movement (Clark and Dugdale, 2008). In a conceptual sense, this finding reinforces the view that vocational education functions more as a mechanism of stratified progression than as a broad equalizer of occupational opportunity across sectors.

The analysis also refines understanding of how foundational skills operate within vocational systems. Writing skills show a small but consistent positive association with occupational status gain, suggesting that communication capabilities act as complementary enablers rather than primary drivers of advancement. Numeracy displays an unexpected J-curve relationship, where those reporting no improvement achieve higher gains. While this is consistent with evidence that baseline numeracy proficiency may underpin access to higher-status roles (Liu and Fernandez, 2018), the pattern could also reflect reference-group bias or reverse causality in self-reporting rather than true skill dynamics. This finding supports a non-linear threshold gain from improved numeracy. Foundational competence in numeracy is seen to enable mobility, while additional improvement in this learning outcomes yields diminishing returns. Problem-solving skills show a linear but weak association with status gain, indicating that such skills generate occupational value primarily when paired with sector-specific expertise.

Implications for policy and practice

The findings indicate that improving VET outcomes requires more than expanding generic skills provision. At the system level, policy should prioritise investment in high-performing training packages (e.g. ICT +7.1 points, Aeroskills +5.6 points) and reform underperforming sectors (Furnishing -0.4, Transport/Logistics -0.3) that offer clear occupational progression pathways. This implies that a shift away from uniform foundation-level skills towards a differentiated, sector-focused model should enhance aggregate positive outcomes.

At the provider level, foundational skills such as writing, numeracy and problem-solving should be embedded within sector-specific curricula rather than delivered as standalone competencies. This approach increases the likelihood that skills are translated into recognised occupational value through industry-aligned assessment, credentials and work practices.

At the learner level, guidance and advice should emphasize sectoral choice and qualification level alongside skill development. Lower-level certificates remain important entry points into VET, particularly for younger learners, but they yield limited occupational mobility for those already employed. For older workers, or for those in occupations needing specific skills that they do not have, the offering of targeted and relevant micro-credentials may offer greater returns than broad foundational skills training. Given that workers aged 45+ showed only minor status gains (0.8 points) compared to younger cohorts (20–24 years: 4.9 points), policy should prioritise alternative pathways for older workers such as credential recognition, targeted upskilling in their current occupations or career transition support rather than broad VET qualifications. Additionally, the modest gender gap (males +3.2 vs females +2.4) suggests that encouraging female enrollment in high-growth technical sectors identified in this study (ICT, Aeroskills) through mentorship programs and targeted recruitment could help reduce occupational segregation.

Gender differences in occupational status gain are modest but persistent. While not large in magnitude, these differences point to occupational and sectoral segregation across training packages. We find that policy interventions aimed at increasing female participation in high-

Limitations and future directions

This study has some limitations. We relied on self-reported skill improvement, which may over-state or understate actual skill gains due to social desirability bias, reference-group bias and potential reverse causality (high-status individuals may perceive less need to report improvement). Consequently, the J-curve pattern observed for numeracy could be entirely artifactual rather than reflecting true skill changes. Objective pre/post skill assessments (e.g. PIAAC-style standardized tests) are needed to confirm these findings. Our study excludes non-completers, respondents who were unemployed or working part-time/casually prior to their training, potentially underestimating status gains for such marginalized groups. It is possible that foundation skills may matter more for these excluded populations (e.g. unemployed individuals seeking labour market entry) than for the employed completers in our sample. All data were collected by way of survey questionnaire. Finally, our analysis focuses only on three foundational skills (writing, numeracy, problem-solving), and explains just 2.7% of variance in occupational status gain. Unmeasured factors such as employer characteristics, regional labour market conditions, social capital and prior work experience likely account for most variation. We also overlook emerging 21st-century skills like collaboration or critical thinking (Tuononen *et al.*, 2023).

To address gaps, future studies should use objective skill assessments (standardised tests) instead of self-reports; include non-completers and students unemployed prior to their training, in order to capture more aspects of occupational mobility; expand the skills framework to include other “soft skills” such as collaboration and critical thinking and investigate sectoral segregation by gender to explain the status gain discrepancy between males and females. Longitudinal re-search could also explore how training package effects persist over different career trajectories, particularly for older workers where gains were minimal.

Conclusion

This study makes two original contributions to knowledge in the vocational education field. It provides the first empirical demonstration using dominance analysis that training package (e.g. the sectoral context) type dominates generic skill gains as a predictor of occupational status in Australian VET. While the general proposition that sector matters more than skills has theoretical precedent, this study is novel in empirically quantifying the relative importance through Shapley value-based analysis. Second, it re-positions vocational education success as systemic rather than individual: substantial career advancement via VET depends not only on portable skill improvement, but on careful alignment with high-growth sectors where skills are domain specifically developed (Tuononen *et al.*, 2023). This shifts the focus from learner-level “skill development” to more institutional factors such as training package design and industry demand, which would mean a shift from models of VET effectiveness focused on individuals.

VET policy should consider focusing on targeted investment in high-growth sectors (ICT, renewables, advanced manufacturing) where training packages are associated with higher occupational status gains and consider reform of sectors showing negligible gains (Transport/ Logistics, Furnishing) via industry-led curriculum updates that integrate emerging skills (digital automation, sustainability). Foundational skills (such as technical writing in ICT, data numeracy in manufacturing) appear best positioned for embedding within sector-specific training rather than being taught as standalone competencies. However, this recommendation assumes that the observed modest effects of self-reported skill improvements reflect true marginal returns; objective assessments may reveal different patterns.

While lower-level qualifications such as Certificates 1 and 2 can be important entry points into VET for younger learners (20–24 years) and can help to build foundational skills for

upward mobility, older adults (45+) would benefit from micro-credentials targeting skill gaps in their current occupations to avoid minimal status gains (Kratz *et al.*, 2019).

The gap in gender-based status gains uncovered in this research is relatively small, though it could be addressed by promoting female enrollment in high-growth sectors (ICT, Aeroskills) via means such as mentorships, which would also help in reducing occupational segregation (Colley *et al.*, 2003).

In sum, this study reinterprets the effectiveness of VET an individual skill-development model to a perspective of sectoral re-orientation. Future research in this area should investigate how training package reforms in underperforming sectors might reproduce the success of high-growth training packages like ICT and Aeroskills. While this study highlights sectoral dominance in the Australian context, comparative political economy literature suggests these dynamics may differ in coordinated market economies where skill formation relies more heavily on collective employer engagement. Ultimately, Australian VET policy must recognize that occupational mobility is determined less by how learners improve individually than by which industry areas they enter based on their choice of qualification.

Appendix

Table A1. List of training packages

Abbreviation	Training Package Name
ACM	Animal care and management training package
AHC	Agriculture, Horticult, Conserv. and Land Management Training Pkg
AMP	Australian Meat Processing Training Package
AUR	Automotive Retail, Service and Repair Training Package
AVI	Aviation Training Package
BSB	Business Services Training Package
CHC	Community Services Training Package
CPC	Construction, Plumbing and Services Training Package
CPP	Property Services Training Package
CUA	Creative Arts and Culture Training Package
FBP	Food, Beverage and Pharmaceutical Training Package
FNS	Financial Services Training Package
FSK	Foundation Skills Training Package
HLT	Health Training Package
ICT	Information and Communications Technology Training Package
MEA	Aeroskills Training Package
MEM	Manufacturing and Engineering Training Package
MSF	Furnishing Training Package
MSL	Laboratory Operations Training Package
MSM	Manufacturing Training Package, Manufactured Mineral Products
MSS	Sustainability Training Package
MST	Textile, Clothing and Footwear Training Package
NWP	National Water Training Package
PSP	Public Sector Training Package
PUA	Public Safety Training Package
RII	Resources and Infrastructure Industry Training Package
SFL	Seafood Industry Training Package
SHB	Hairdressing and Beauty Services Training Package
SIR	Retail Services Training Package
SIS	Sport, Fitness and Recreation Training Package
SIT	Tourism, Travel and Hospitality Training Package
TAE	Training and Education Training Package
TLI	Transport and Logistics Training Package
UEE	Electrotechnology Training Package
UET	Transmission, Distribution and Rail Sector Training Package

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Corresponding author

Peter Fieger can be contacted at: p.fieger@federation.edu.au