

Student Satisfaction in Australian Agriculture VET: Quality Indicator or Incomplete Picture?

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Abstract

The increasing technological complexity of Agriculture 4.0 has intensified demand for a skilled and adaptable agricultural workforce. While Vocational Education and Training (VET) is positioned as a key mechanism for workforce development, the extent to which Agriculture Technical and Vocational Education and Training (ATVET) delivers quality outcomes remains unclear. This study evaluates whether student satisfaction provides a meaningful indicator of ATVET quality. NCVER Student Outcomes Survey unit record files from 2020-2024 were merged (N = 746,678 records), yielding an analytic sample of 587,389 valid responses after exclusion of partial and non-responses. Satisfaction outcomes were compared between agriculture and non-agriculture programs across teaching, assessment, resources, and support services. Chi-square tests and Cramer's V were used to assess statistical significance and effect size. Agriculture students reported consistently higher satisfaction than non-agriculture students (e.g., 93.8% vs 90.4% for completers), although effect sizes were negligible ($\phi < 0.02$). Satisfaction was lowest for student support services and varied minimally across demographic and institutional factors. Workplace learning was associated with higher satisfaction, with a moderate association observed between workplace learning participation and student satisfaction. ATVET operates within a broader agricultural learning system incorporating workplace learning and industry-based knowledge exchange. Greater integration between formal training and extension-based environments is required, particularly in workplace learning and support services. Student satisfaction reflects the process dimension of VET quality but does not adequately capture training effectiveness or workforce readiness. This study provides one of the largest empirical evaluations of ATVET quality in Australia and situates satisfaction within agricultural education and extension systems.

Keywords

Agriculture Education, ATVET, Vocational Education and Training (VET),

1. Introduction

1.1. Background

The evolution of agriculture has occurred across four major phases, each shaped by technological and social interruption. Agriculture 1.0 was characterised by manual labour and animal power, while Agriculture 2.0 emerged through mechanisation during the Industrial Revolution. Agriculture 3.0, associated with the Green Revolution, introduced chemical fertilisers, irrigation, genetic selection, and early automation to improve productivity. More recently, the sector has transitioned towards Agriculture 4.0, marked by the integration of digital technologies including artificial intelligence, robotics, precision agriculture, and data-driven decision-making systems (Fragomeli et al., 2024).

Technological innovation has meant that agricultural occupations now require higher levels of scientific literacy, technological capability, and adaptive problem-solving (FAO, 2022; OECD, 2023). This shift is reflected in industry workforce analyses, which emphasise the need for future-ready workers capable of integrating technical, digital, and adaptive skills within agricultural systems (AgriFutures Australia, 2021). As a result, workforce preparation has become increasingly dependent on formal education systems capable of developing both technical and transferable skills. Vocational Education and Training (VET) is well placed as a key mechanism for preparing a skilled workforce aligned with evolving industry needs (Skills Impact, 2021; ASQA, 2021; Jobs and Skills Australia, 2023).

However, despite these increasing demands, the agricultural workforce has historically relied on informal and workplace-based learning pathways. In 2021, approximately 49% of individuals employed in Australian agriculture held no post-secondary qualifications, compared with 29% across the broader workforce (ABARES, 2023). This reflects a longstanding reliance on experiential “on-the-job” skill development rather than formalised training (Billett, 2011).

As agricultural systems become more technologically advanced, concerns emerge regarding the extent to which Agriculture Technical and Vocational Education and Training (ATVET) aligns with these evolving skill requirements. Evaluating the quality of ATVET is therefore critical in determining whether vocational training systems are effectively preparing a workforce capable of operating within increasingly complex and digitalised production environments.

In Australia, VET is delivered through Registered Training Organisations (RTOs), including Technical and Further Education (TAFE) institutes, private providers, universities, and schools offering VET in Schools (VETiS). Training is based on nationally endorsed training packages that define competency standards aligned with industry requirements. The quality of VET provision is regulated through a compliance-based framework, with the Australian Skills Quality Authority (ASQA)

assessing providers against national standards using a risk-based approach (ASQA, 2023).

One component of this regulatory system is the Student Outcomes Survey (SOS), which provides national data on learner satisfaction. Satisfaction measures capture learners' perceptions of teaching quality, assessment practices, learning resources, and institutional support, and are often used as indicators of training quality (Lee & Polidano, 2010). However, reliance on satisfaction as a proxy for quality remains contested.

The concept of quality in vocational education is inherently multidimensional, encompassing not only learner experience but also labour market outcomes, workplace learning conditions, and alignment with industry needs (CEDEFOP, 2017; OECD, 2021). From an integrative learning perspective, effective vocational education requires the synthesis of theoretical knowledge, practical skills, and authentic workplace experience (Tynjälä, 2013). Similarly, recent international empirical research demonstrates that training quality is shaped by multiple interacting factors across institutional and workplace contexts (Böhn & Deutscher, 2021; Deutscher et al., 2026).

Systemic evaluation frameworks provide a structured approach to capturing this complexity. The Context-Input-Process-Product (CIPP) model conceptualises educational quality across multiple dimensions, including contextual relevance, institutional inputs, delivery processes, and training outcomes (Stufflebeam, 1971; Ratnaya et al., 2022; Zhang et al., 2011). Within this framework, learner satisfaction represents an indicator of the process dimension, but must be interpreted alongside broader measures such as completion rates and employment outcomes.

Despite increasing attention to VET quality, empirical evaluations of ATVET remain limited. In particular, little is known about whether national student satisfaction data can provide meaningful insight into the quality of agricultural training programs.

1.2. Conceptual Framework

This study is guided by the Context-Input-Process-Product model (CIPP) evaluation framework developed by Daniel Stufflebeam (1971). The CIPP model conceptualises educational quality as a multidimensional construct comprising contextual relevance (Context), institutional and learner characteristics (Input), delivery and learning experiences (Process), and educational or workforce outcomes (Product). Within vocational education, this framework has been widely applied to evaluate training effectiveness across both institutional and workplace settings (Ratnaya et al., 2022; Zhang et al., 2011).

The selection of the CIPP model reflects the complexity of Agriculture Technical and Vocational Education and Training (ATVET) within the context of Agriculture 4.0. As agricultural industries become increasingly dependent on technological capability, adaptive expertise, and workplace integration, evaluat-

ing training quality requires consideration of multiple interacting dimensions rather than reliance on a single indicator of performance. While learner satisfaction provides insight into students' perceptions of teaching quality, assessment practices, learning resources, and institutional support, it primarily reflects the process dimension of educational quality.

Accordingly, this study conceptualises student satisfaction as one component of a broader ATVET quality system. Contextual variables such as field of education and provider characteristics, input variables including student demographics and qualification levels, and product indicators such as completion and occupational outcomes are incorporated to support a more comprehensive interpretation of training quality. The conceptual relationship between these dimensions informed both the analytical structure of the study and the interpretation of findings.

This study, therefore, addresses the following research questions:

RQ1: Do student satisfaction levels differ between agriculture and non-agriculture VET programs?

RQ2: Which aspects of training delivery contribute most strongly to satisfaction among ATVET students?

RQ3: How do demographic and contextual factors influence satisfaction within agricultural VET programs?

2. Methodology

2.1. Data Source and Sample

The data for this study were obtained from the National Centre for Vocational Education Research (NCVER), which commissions the Social Research Centre (SRC) at the Australian National University (ANU) to administer the annual National Student Outcomes Survey (SOS). This month-long survey collects information on the satisfaction and experiences of students undertaking, part completing or having graduated from vocational education and training across Australia during the preceding year. The survey employs stratified sampling procedures designed to produce nationally representative estimates of VET student outcomes across Australian states and provider types.

De-identified unit record files (URFs) for the years 2020 to 2024 were accessed through NCVER. These individual datasets were imported into SPSS and merged to produce a consolidated file representing a total of 746,678 respondents across the five-year period. The merged NCVER unit record file contained 746,678 respondent records across the 2020-2024 survey years. Following removal of partial and non-responses for satisfaction variables, the analytic sample used for satisfaction analyses comprised 587,389 valid responses. Within this sample, Agriculture students (ASCED FOE 0501 and 0503) represented approximately 1.2% of respondents ($n = 6875$), with the remainder classified as Non-agriculture. Consistent with NCVER's published reporting approach, short-course participants were excluded. Two main respondent groups were considered: those who had

completed their qualification at the time of the survey (completers), and those who had withdrawn or were still enrolled (part-completers). The time period for this study was selected as it was the only time frame available that utilised the national survey instrument in comparative forms. While this period incorporates the COVID-19 global pandemic, analysis evaluated any inconsistencies over the timeframe.

2.2. Classification of Fields of Education

Programs were classified using the Australian Standard Classification of Education (ASCED) framework. This framework classifies educational areas by their various sector grouping, subject areas and occupations within each sector. Each respondent was coded as belonging either to the Agriculture or Non-agriculture category according to their reported Field of Education (FOE). Respondents were classified as Agriculture where their reported Field of Education was coded to ASCED 0501 Agriculture or ASCED 0503 Horticulture and Viticulture. All other ASCED fields were classified as Non-agriculture. This classification included Agricultural Science, Animal Husbandry, Wool Science, Horticulture and Viticulture programs. Forestry, Fisheries, Aquaculture, Environmental Studies and Conservation-related fields were excluded because they fall outside ASCED 0501 and 0503 and were not considered production agriculture for the purposes of this study, as demonstrated in **Table 1**.

Table 1. Inclusion of Field of Education detailed codes in “Agriculture” cohort (adapted from ABS, 2015).

Fields of Education Included			
0501	Agriculture	050101	Agricultural Science
		050103	Wool Science
		050105	Animal Husbandry
		050199	Agriculture, n.e.c.
0503	Horticulture and Viticulture	050301	Horticulture
		050303	Viticulture

Each record was coded according to whether the respondent had completed or not completed their program of study at the time of survey administration. A review of the encoded identifiers confirmed that there were no duplicate respondents, supporting the assumption of independent responses across years.

2.3. Completion and Enrolment Data

Data relating to program enrolments and completions were obtained from the most recent National Centre for Vocational Education Research (NCVER) publications (NCVER, 2024b), covering the period from 2019 to 2023. These datasets were filtered using the same four-digit Field of Education (FOE) codes described

above to enable consistent identification of Agriculture and non-agriculture programs. Completion to enrolment ratios were calculated as the proportion of recorded completions relative to total enrolments within each sector, allowing comparison between agricultural training programs and the broader VET population. Because enrolment and completion counts do not track the same student cohort over time, the measure should be interpreted as a completion-to-enrolment ratio rather than a true longitudinal completion rates for a tracked cohort.

In addition to program completers, the analysis included a group classified as part-completers. This category comprises respondents who had not completed their qualification at the time of survey administration and includes both individuals who had formally withdrawn from their training and those who remained enrolled but had not yet reached completion. As such, the category represents a heterogeneous population of learners at different stages of program participation. However, the available dataset does not clearly differentiate between those who have permanently withdrawn from training and those who remain enrolled but have not yet completed their qualification. Consequently, the data do not provide a comprehensive picture of the experiences of students who have actively exited training.

This limitation is important when interpreting the results. Students who withdraw from training may do so for a variety of reasons, including dissatisfaction with teaching quality, assessment practices, program relevance, institutional support, or broader personal and employment circumstances. Research on vocational education has shown that learner dissatisfaction and disengagement are often associated with increased likelihood of withdrawal or non-completion (Billett, 2011; Lee & Polidano, 2010). If individuals who withdraw are less likely to respond to post-training surveys, their perspectives may be underrepresented in the dataset. As a result, the available satisfaction data may disproportionately reflect the experiences of students who remained engaged with training or who completed their qualification. This potential underrepresentation of withdrawn students limits the ability of the present analysis to fully identify weaknesses in training delivery or other factors that may contribute to program discontinuation.

2.4. Data Preparation and Statistical Approach

Survey participants responded on a five-point Likert scale ranging from very satisfied to very dissatisfied. Likert responses were collapsed into three categories (satisfied, neutral, dissatisfied) following NCVER reporting conventions to facilitate comparison with published national results. Partial and non-responses were removed, yielding a total of 587,389 valid responses. Frequencies and percentages were generated using SPSS, with summary tables prepared in Microsoft Excel.

Analyses were conducted using the unweighted unit record data. The purpose of the study was comparative analysis between Agriculture and Non-agriculture cohorts rather than estimation of population parameters. While NCVER weighting procedures are used for official national reporting, unweighted analyses preserve

observed respondent frequencies and are appropriate for examining associations between variables. Results should therefore be interpreted as reflecting relationships within the survey sample rather than weighted national estimates.

Three main analyses were conducted:

- Overall satisfaction comparisons between cohorts
- Satisfaction with specific program aspects
- Demographic influences on satisfaction among Agriculture students
- Overall Satisfaction

To evaluate for differences in satisfaction between cohorts, a chi-square test of independence was employed to determine whether satisfaction distributions differed between groups. Chi-square tests were used due to the categorical nature of the satisfaction variables and the large sample size of the dataset. Due to the very large sample size of the SOS dataset, statistically significant chi-square results should be interpreted cautiously. Large datasets can detect extremely small differences that may not represent meaningful practical effects. For this reason, and because contingency tables exceeded a 2×2 table, effect sizes were measured using Cramer's $V(\phi_c)$, which determine the substantive strength of associations. The strength of association was interpreted using the thresholds outlined in **Table 2**.

Table 2. Effect size and strength of association using Cramer's V (Sapra & Saluja, 2021).

Effect size	Strength of association
0 - .09	Negligible association
.1 - .2	Weak association
.2 - .4	Moderate association
.4 - .6	Relatively strong association
.6 - .8	Strong association
.8 - 1	Very strong association

2.5. Satisfaction with Program Aspects

The satisfaction indicators used in the analysis are derived from summary variables in the NCVER Student Outcomes Survey dataset. These variables are constructed from Likert-scale survey items measuring learners' perceptions of different aspects of their training experience. **Table 3** summarises the constructs used in the analysis and the corresponding survey items from which they are derived. Chi-square tests were again used to determine whether responses differed between Agriculture and Non-agriculture students, and Cramer's V was used to interpret effect size.

Following NCVER reporting conventions, responses were recoded into broader satisfaction categories for comparative analysis across training fields. While the original responses are measured on ordinal Likert scales, recoding was undertaken to enable cross-tabulation and comparison with national NCVER reporting formats. Because the SOS variables are provided as validated summary indicators by

NCVER, internal reliability statistics are not reported within the URF dataset.

Table 3. Satisfaction summary variables (adapted from NCVER, 2024a).

Construct used in analysis	Example SOS survey item	Response scale
Overall satisfaction	Overall, how satisfied were you with this course?	Very satisfied - Very dissatisfied
Teaching quality	How satisfied are you with the quality of your trainers/teachers/instructors?	Very satisfied - Very dissatisfied
Assessment	How satisfied are you that the way you were assessed was a fair test of your skills and knowledge?	Very satisfied - Very dissatisfied
Training facilities	How satisfied are you with the facilities available at your training provider (e.g. classrooms, workshops, etc.)?	Very satisfied - Very dissatisfied
Learning resources	How satisfied are you with the learning resources provided by the trainer (e.g. textbooks, online materials, etc.)?	Very satisfied - Very dissatisfied
Student support services	How satisfied are you with the support services offered by your training provider? Note: Support services include help with additional learning needs, English language assistance, career advice, counsellors, etc.	Very satisfied - Very dissatisfied
Provider location	How satisfied are you with the location of your training provider?	Very satisfied - Very dissatisfied

2.6. Demographic and Contextual Analysis

The third stage of analysis examined demographic and contextual influences on satisfaction among Agriculture students. Overall satisfaction scores were cross-tabulated against demographic and institutional factors listed in **Table 4**. Each variable was analysed using chi-square tests to determine significance and Cramer's V to assess association strength.

Table 4. Description of demographic and descriptive grouping variables (adapted from NCVER, 2024a).

Name	Description
Gender	Respondents identified as Male, Female or Other/Unknown
Age group	Respondent age was used to categorise as either Youth (<17 years) or Adult (>17 years)
Disability status	Respondents identified as having a disability, not having a disability or unknown

Continued

Indigenous status	Respondents identified as Indigenous, non-Indigenous or unknown
Remoteness	Respondents were categorised as residing in a major city, inner regional, outer regional, remote, and very remote, unknown/not stated
Level of qualification	Respondents were classified by level of qualification associated with their response—Diploma and above, Certificate IV, Certificate III, Certificate II, Certificate I, or a statement of attainment
Registered Training Organisation type	RTOs classified as either TAFE, University, Community Education, Private or School
Registered Training Organisation (RTO) state of operation	RTOs identified by state according to head office location—NSW, ACT, Vic, Tas, SA, WA NT, Qld
Amount of real workplace learning (also known as Work Integrated Learning [WIL])	1 week, 2 - 4 weeks, 5 weeks or more, School based traineeship or apprenticeship, No workplace learning, Not stated
Occupational Destination	Respondents were classified as having undertaken one of the following—In the same industry as qualification, different industry to qualification, unknown, not specified

The demographic results are presented by group to enable comparison across population subcategories and to identify patterns relevant to satisfaction within agricultural training programs.

2.7. Operationalisation of the Contextual Framework

To clarify how the conceptual framework was operationalised in the empirical analysis, **Table 5** maps the key dimensions of the Context-Input-Process-Product (CIPP) evaluation model to the variables available within the NCVER Student Outcomes Survey dataset and associated enrolment and completion data. This approach allows student satisfaction measures to be interpreted as indicators of the training process dimension, while contextual and outcome indicators provide a broader perspective on ATVET program quality.

This operationalisation enables the analysis to examine student satisfaction within a broader framework of ATVET quality while maintaining consistency with the research questions guiding the study. As the SOS dataset was not originally designed as a comprehensive program evaluation instrument, the variables available represent proxy indicators of the CIPP dimensions rather than direct measures of all elements of vocational training quality.

Table 5. Operationalisation of the CIPP evaluation model in the analysis of ATVET quality.

CIPP dimension	Conceptual indicator	Variable used in analysis	Data source
Context	Field of education sector context	Agriculture vs Non-agriculture (ASCED FOE 0501, 0503)	NCVER URF
Inputs	Institutional and program characteristics	RTO type, qualification level	NCVER URF
Inputs	Student characteristics	Age group, gender, disability status, Indigenous status, remoteness	NCVER URF
Process	Teaching quality	Satisfaction with teaching	SOS
Process	Assessment quality	Satisfaction with assessment	SOS
Process	Learning environment	Satisfaction with training facilities	SOS
Process	Learning resources	Satisfaction with learning resources	SOS
Process	Institutional support	Satisfaction with student support services	SOS
Process	Program accessibility	Satisfaction with provider location	SOS
Process	Experiential learning	Amount of workplace learning/work-integrated learning	SOS
Products	Educational outcomes	Program completion rates	NCVER
Products	Labour market outcomes	Occupational destination after training	SOS

3. Results

3.1. Completion to Enrolment Ratios

Figure 1 presents completion-to-enrolment ratios for the period 2019-2023. Across the study period, agricultural programs recorded lower completion-to-enrolment ratios (24% - 29%) than the overall VET population (30% - 33%). Completion rates for structured and contextualised training pathways, such as the Ag-CAREERSTART program, have been reported at substantially higher levels (exceeding 80%) ([National Farmers' Federation \[NFF\], 2023](#)).

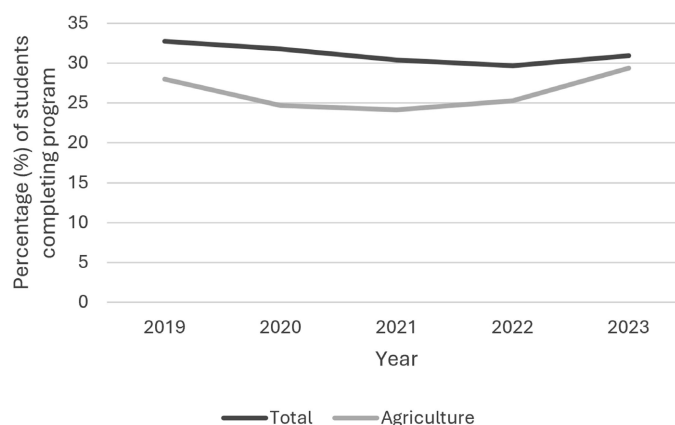


Figure 1. Comparison of completion-to-enrolment ratios (percentage of completions versus individual enrolments) for all VET courses and Agricultural programs (FOE-0501 and FOE-0503), 2019-2023 (Adapted from [NCVER, 2024b](#)).

3.2. Overall Satisfaction, Completers Relative to Part-Completers

Table 6 presents overall satisfaction rates expressed as within-group percentages. Across both completion groups, Agriculture students reported higher levels of satisfaction than Non-agriculture students.

Among completers, 93.8% of Agriculture students reported satisfaction compared with 90.4% of Non-agriculture students. Among part-completers, satisfaction was lower overall, with 86.9% of Agriculture students and 80.6% of Non-agriculture students reporting satisfaction.

Table 6. Student satisfaction by training aspect, program type, and completion status (percentages and differences), 2020-2024 (adapted from NCVER, 2024a).

Training aspect	Status	Non-Ag (%)	Ag (%)	Difference (Ag - Non-Ag)	χ^2 (df = 2)	p-value	ϕc	Interpretation
Overall satisfaction	Completers	90.4	93.8	+3.4	—	<.001	.010	Negligible
	Part-completers	80.6	86.9	+6.3	17.66	<.001	.017	Negligible
Teaching	Completers	89	93	+4	52.38	<.001	.009	Negligible
	Part-completers	82	87	+5	12.68	.002	.014	Negligible
Assessment	Completers	90	93	+3	40.05	<.001	.008	Negligible
	Part-completers	83	89	+6	17.30	<.001	.017	Negligible
Learning resources	Completers	86	90	+4	60.25	<.001	.010	Negligible
	Part-completers	80	86	+6	18.11	<.001	.017	Negligible
Training location	Completers	86	90	+4	42.60	<.001	.009	Negligible
	Part-completers	81	87	+6	15.13	<.001	.016	Negligible
Facilities	Completers	86	91	+5	87.03	<.001	.012	Negligible
	Part-completers	80	85	+5	8.92	.012	.010	Negligible
Support services	Completers	80	84	+4	44.29	<.001	.009	Negligible
	Part-completers	73	76	+3	5.41	.067	.009	Not significant

The part-completer category includes both learners who had withdrawn from training and learners who remained enrolled but had not yet completed their qualification. Satisfaction outcomes for this group should therefore be interpreted cautiously, as the category combines both disengagement and normal progression through training pathways.

Across all measures, satisfaction was lower among part-completers than completers. The reduction in satisfaction between completers and part-completers was approximately 7 percentage points for Agriculture students and 9 percentage points for Non-agriculture students.

Chi-square analyses indicated statistically significant differences between Agriculture and Non-agriculture groups across most satisfaction measures; however, effect sizes were consistently negligible ($\phi c < .02$), indicating very weak associations.

Across training aspects, satisfaction with teaching and assessment was highest, while student support services were the lowest-rated component for both cohorts. Learning resources, facilities, and training location showed intermediate levels of satisfaction.

3.3. Demographic Influences on Satisfaction

Figure 2 presents satisfaction rates within the Agriculture cohort across demographic and institutional variables. Overall satisfaction ranged between approximately 86% and 92% across all groups.

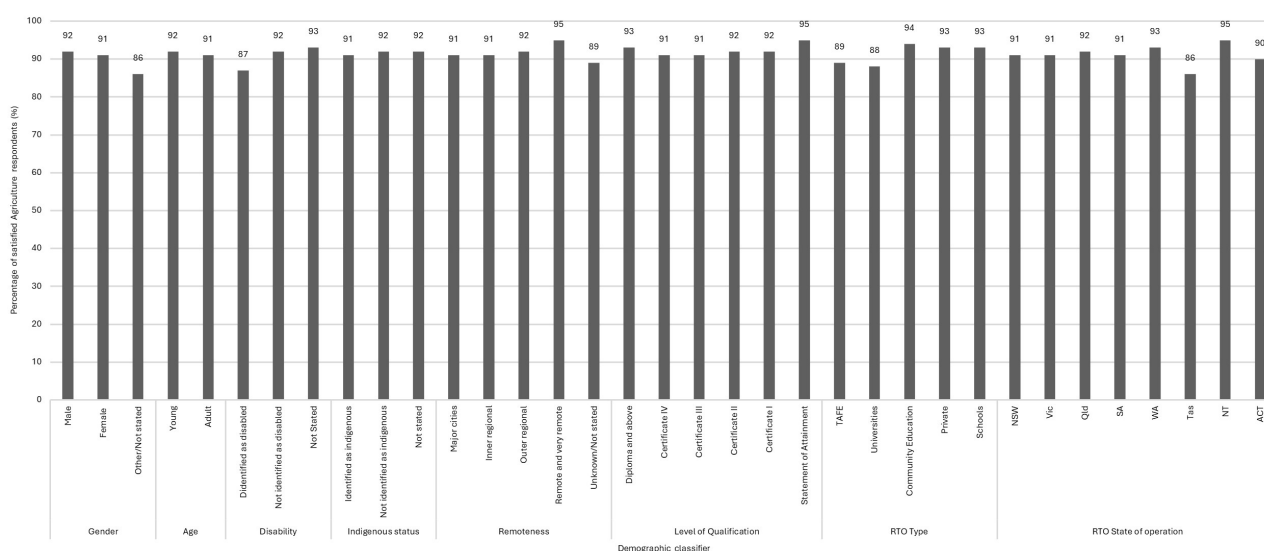


Figure 2. Percentage of survey respondent satisfaction in Agriculture-based qualifications by demographic classifiers, 2020-2024 (Adapted from NCVET, 2024a).

A statistically significant association was observed between gender and satisfaction ($\chi^2 (4, N = 6556) = 12.66, p = .013$), although the strength of association was negligible ($\phi_c = .031$).

Age group also showed a statistically significant association with satisfaction ($\chi^2 (2, N = 6556) = 8.23, p = .016$), with a negligible effect size ($\phi_c = .035$).

Disability status was associated with satisfaction ($\chi^2 (4, N = 6556) = 19.33, p < .001$), although the strength of association remained weak ($\phi_c = .054$).

No statistically significant association was observed between Indigenous status and satisfaction ($\chi^2 (4, N = 6556) = 0.53, p = .971$), with a negligible effect size ($\phi_c = .009$).

Remoteness showed no statistically significant association with satisfaction ($\chi^2 (8, N = 6556) = 12.78, p = .120$), with a negligible effect size ($\phi_c = .031$).

Level of qualification was statistically associated with satisfaction ($\chi^2 (15, N = 6875) = 46.02, p < .001$), although the effect size was negligible ($\phi_c = .047$).

Registered Training Organisation (RTO) type showed a statistically significant association with satisfaction ($\chi^2 (15, N = 6875) = 69.27, p < .001$), with a weak

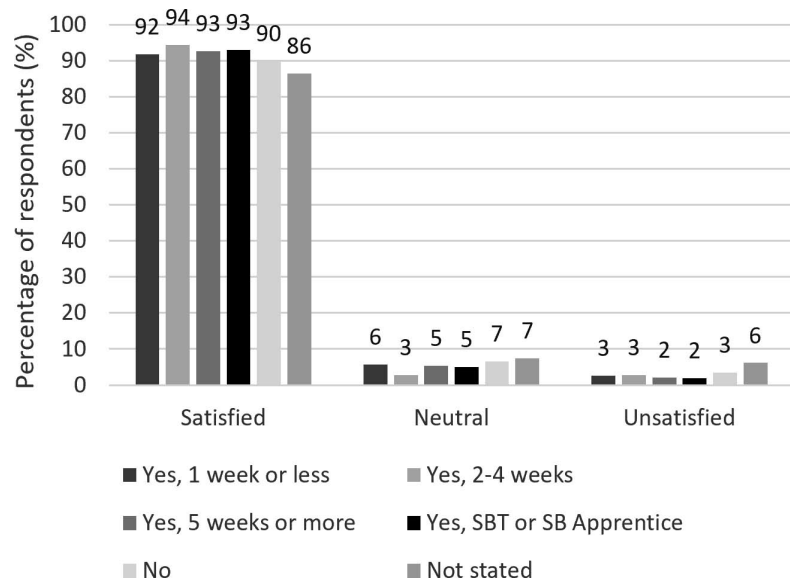
effect size ($\phi_c = .058$).

State of operation was also statistically associated with satisfaction ($\chi^2 (15, N = 6875) = 38.78, p < .001$), although the strength of association remained negligible ($\phi_c = .043$).

Across all demographic and institutional variables, effect sizes were small, indicating minimal practical differences in satisfaction outcomes.

Satisfaction of school-based Agriculture respondents by level of real workplace training.

Figure 3 shows satisfaction among Agriculture students by level of workplace learning participation. A statistically significant association was identified ($\chi^2 (15, N = 2558) = 451.039, p < .001$), with a moderate effect size ($\phi_c = .242$).



Note: $\chi^2 (15, N = 2558) = 451.039, p < .001, \phi_c = .242$.

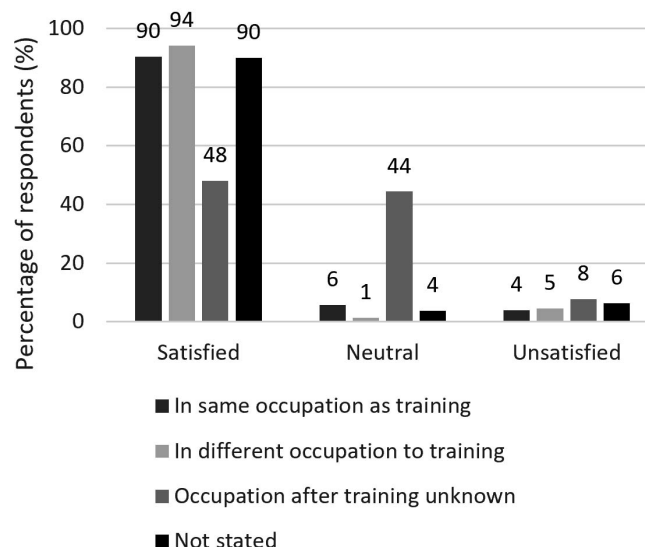
Figure 3. Percentage of survey respondent satisfaction in school-based Agriculture qualifications by level of real workplace training included in the qualification, 2020-2024 (Adapted from [NCVER, 2024a](#)).

Programs incorporating workplace learning showed higher levels of satisfaction compared with those without workplace learning. However, increasing levels of workplace participation did not correspond to proportional increases in satisfaction.

3.4. Satisfaction of Students by Occupational Destination

Figure 4 presents satisfaction by post-training occupational destination. A statistically significant association was observed ($\chi^2 (9, N = 6875) = 663.881, p < .001$), with a weak effect size ($\phi_c = .179$).

Satisfaction was lower among respondents with unknown occupational destinations compared with those employed in the same or different industries.



Note: χ^2 (9, N = 6875) = 663.881, $p < .001$, ϕ_c of .179.

Figure 4. Percentage of survey respondent satisfaction in Agriculture-based qualifications by post-training occupational destination, 2020-2024 (Adapted from [NCVER, 2024a](#)).

4. Discussion

The findings of this study provide a nuanced perspective on the quality of Agriculture Technical and Vocational Education and Training (ATVET) in Australia. While student satisfaction levels are consistently high across both Agriculture and Non-agriculture programs, the significance of the differences between groups is small and effect sizes are negligible. This indicates that, although statistically significant differences exist, they have limited practical significance. However, this does not mean that satisfaction is not high.

From a learner perspective, ATVET programs appear to provide positive educational experiences, particularly in relation to teaching and assessment. However, the consistently lower satisfaction observed among part-completers highlights the importance of considering student progression and completion status when interpreting satisfaction data. As noted in the methodology, the part-completer group includes both students who have withdrawn and those who remain enrolled, and the dataset does not distinguish between these groups. Because the SOS dataset does not distinguish between withdrawn and continuing students within the part-completer cohort, the lower satisfaction observed among part-completers cannot be attributed solely to training disengagement. This suggests that the experiences of students who disengage from training may not be fully captured, potentially resulting in an overestimation of satisfaction levels.

The relationship between satisfaction and program outcomes further highlights the complexity of evaluating vocational education quality. Agricultural programs demonstrate a slightly lower completion to enrolment ratio than the overall VET population. As these ratios are derived from annual aggregate enrolment and

completion counts rather than longitudinal cohort tracking, they should be interpreted as indicators of relative completion activity rather than true completion rates. If completion is considered an indicator of training quality, as suggested in earlier comparative VET studies (Nielsen & Visser, 1997), this may indicate potential limitations in program effectiveness. However, the substantially higher completion rates observed in structured, contextualised programs such as Ag-CAREERSTART (NFF, 2023) suggest that workplace centric program design and delivery contexts may play a critical role in influencing completion outcomes.

The findings also demonstrate that student satisfaction exhibits limited variation across demographic and institutional variables. Although statistically significant differences were observed across variables such as gender, age, disability status, and RTO type, the negligible effect sizes indicate that these factors have minimal influence on satisfaction outcomes. This reinforces the interpretation that student satisfaction is broadly consistent across the VET system and may reflect baseline system performance rather than meaningful differences in program quality.

The relationship between workplace learning and satisfaction provides one of the strongest findings of this study. Programs incorporating workplace learning were associated with higher levels of student satisfaction, with a moderate association observed between workplace learning participation and satisfaction outcomes. This supports the importance of experiential learning in vocational education and aligns with Billett's (2011) emphasis on authentic workplace experiences in developing vocational competence.

Similarly, students who transition into employment report higher levels of satisfaction. While this suggests a relationship between training experiences and employment outcomes, the weak strength of association indicates that this relationship is complex and cannot be fully explained through satisfaction data alone.

Taken together, these findings reinforce the limitations of using student satisfaction as a sole indicator of vocational education quality. Although satisfaction provides valuable insight into learners' perceptions of their educational experiences, it does not capture broader dimensions of program effectiveness, including completion, skill development, workplace readiness, alignment with industry needs as well as employment rates and longevity.

In this context, the Context-Input-Process-Product (CIPP) model provides a useful framework for interpreting the findings. Student satisfaction can be understood as an indicator of the process dimension, reflecting learners' perceptions of teaching quality, assessment, and support. However, other dimensions—such as completion rates (product), workplace learning opportunities (process), and alignment with occupational outcomes (product)—are necessary to develop a more comprehensive understanding of ATVET quality.

There are some limitations that need to be considered when interpreting these findings. The analysis utilised unweighted survey responses and therefore reflects relationships within the respondent sample rather than weighted national estimates. The analysis relies on responses from the Student Outcomes Survey, which

may underrepresent students who withdrew from training, potentially biasing satisfaction estimates toward more engaged learners. Additionally, satisfaction measures derived from Likert-scale responses capture perceptions of training experiences but do not directly reflect competence development or labour-market readiness. In addition to this, the large sample size increases the likelihood of detecting statistically significant differences with negligible practical importance, and the use of chi-square analysis does not explain causal relationships. The data span the period 2020-2024, during which training experiences may have been influenced by pandemic-related disruptions. It is also apparent that the study is situated within the Australian VET system, and caution should be exercised in generalising findings to other national contexts.

These findings are particularly relevant in the context of Agriculture 4.0, where the increasing technological complexity of agricultural work requires a workforce with both technical and adaptive capabilities. Ensuring that ATVET programs are responsive to these demands requires evaluation approaches that extend beyond learner satisfaction and incorporate multiple indicators of training quality.

5. Conclusion

This study provides a large-scale analysis of student satisfaction in ATVET using national Student Outcomes Survey data. Across the 2020-2024 period, students undertaking agricultural qualifications consistently reported high levels of satisfaction across measures of teaching quality, assessment practices, learning resources, facilities, and student support services. Compared with the broader VET population, Agriculture students reported slightly higher levels of satisfaction across most indicators, suggesting that ATVET programs generally provide positive educational experiences for those who engage in training.

However, the findings highlight important limitations in interpreting satisfaction as an indicator of vocational training quality. Agricultural programs demonstrate slightly lower completion rates than the overall VET population, and the relationship between satisfaction and workplace learning participation was moderate, whereas the association with occupational outcomes remained comparatively weak. These results indicate that student satisfaction alone provides only a partial and potentially optimistic representation of ATVET effectiveness, particularly given the likely underrepresentation of students who disengage from training.

The findings reinforce the importance of evaluating vocational education using multidimensional frameworks. As demonstrated in the literature, training quality cannot be fully understood through learner satisfaction alone (Lee & Polidano, 2010). Instead, quality must be considered across multiple dimensions, including contextual relevance to industry needs, institutional inputs, the quality of training delivery, and educational and employment outcomes. The Context-Input-Process-Product (CIPP) model provides a useful structure for such evaluation by situating learner satisfaction within a broader system of program inputs, processes,

and outcomes (Stufflebeam, 1971; Zhang et al., 2011).

This study contributes to the limited empirical literature on ATVET by providing one of the first national-scale quantitative analyses of learner satisfaction in agricultural training. While the results indicate that ATVET programs are positively perceived by students, they also demonstrate that satisfaction is not a sufficiently sensitive indicator to distinguish program effectiveness or identify areas for improvement in isolation.

These findings are particularly relevant in the context of Agriculture 4.0, where increasing technological complexity requires a workforce equipped with both technical expertise and adaptive capability. Ensuring that ATVET programs are aligned with these evolving demands requires evaluation approaches that extend beyond learner satisfaction to include measures of completion, workplace learning integration, and employment outcomes.

Future research should therefore adopt more comprehensive analytical approaches, incorporating longitudinal tracking, multivariate modelling, and employer perspectives to better understand the relationships between training experiences, skill development, and workforce outcomes. Such approaches will support a more robust and holistic evaluation of ATVET quality and its role in preparing a capable and future-ready agricultural workforce.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

- ABARES (2023). *Snapshot of Australia's Agricultural Workforce*. Australian Bureau of Agricultural and Resource Economics and Sciences.
<https://www.agriculture.gov.au/abares/products/insights/snapshot-of-australias-agricultural-workforce>
- ABS (2015). *Australian Standard Classification of Education, 2001*.
<https://www.abs.gov.au/statistics/classifications/australian-standard-classification-education-asced/2001>
- AgriFutures Australia (2021). *Pathways to Develop a Future Ready Workforce*.
<https://agrifutures.com.au/product/pathways-to-develop-a-future-ready-workforce/>
- Australian Skills Quality Authority (ASQA) (2021). *Standards for VET Accredited Courses—Standard 10.6: Foundation Skills*. Australian Government.
<https://www.asqa.gov.au/standards/vet-accredited-courses/standards/standard-106-foundation-skills>
- Australian Skills Quality Authority (ASQA) (2023). *Annual Report 2022-23*. Australian

- Government.
<https://www.asqa.gov.au/resources/annual-reports/2022-23-annual-report>
- Billett, S. (2011). *Vocational Education: Purposes, Traditions and Prospects*. Springer.
<https://doi.org/10.1007/978-94-007-1954-5>
- Böhn, S., & Deutscher, V. K. (2021). Development and Validation of a Learning Quality Inventory for In-Company Training in VET (VET-LQI). *Vocations and Learning*, 14, 23-53. <https://doi.org/10.1007/s12186-020-09251-3>
- CEDEFOP (2017). *The Changing Nature and Role of Vocational Education and Training in Europe: Vol. 1. Conceptions of VET: An Analytical Framework (CEDEFOP Research Paper No. 63)*. Publications Office of the European Union.
<https://op.europa.eu/publication-detail/-/publication/d43d2858-deee-11e7-9749-01aa75ed71a1>
- Deutscher, V., Ma, B., Kroetz, M., & Winther, E. (2026). Training Quality as a Dynamic Construct: Longitudinal Evidence of Changing Effects on Vocational Competence Development. *Vocations and Learning*, 19, Article No. 2.
<https://doi.org/10.1007/s12186-026-09381-0>
- FAO (2022). *The Future of Work in Agrifood Systems*. FAO.
<https://www.fao.org/3/cb9333en/cb9333en.pdf>
- Fragomeli, R., Annunziata, A., & Punzo, G. (2024). Promoting the Transition towards Agriculture 4.0: A Systematic Literature Review on Drivers and Barriers. *Sustainability*, 16, Article 2425. <https://doi.org/10.3390/su16062425>
- Jobs and Skills Australia (2023). *Agriculture Workforce Study*. Australian Government.
<https://www.jobsandskills.gov.au/publications/agriculture-workforce-study>
- Lee, W. S., & Polidano, C. (2010). *Measuring the Quality of VET Using the Student Outcomes Survey*. Melbourne Institute of Applied Economic and Social Research.
<https://library.bsl.org.au/jspui/bitstream/1/2339/1/Measuring%20the%20quality%20of%20VET.pdf>
- National Centre for Vocational Education Research (2024a). *VET Student Outcomes 2024*.
<https://www.ncver.edu.au/research-and-statistics/publications/all-publications/vet-student-outcomes-2024>
- National Centre for Vocational Education Research (2024b). *Total VET Students and Courses 2023*.
<https://www.ncver.edu.au/research-and-statistics/publications/all-publications/total-vet-students-and-courses-2023>
- National Farmers' Federation (NFF). (2020). *2030 Roadmap: Australian Agriculture's Plan for a \$100 Billion Industry*.
https://nff.org.au/wp-content/uploads/2020/02/NFF_Roadmap_2030_FINAL.pdf
- National Farmers' Federation (NFF). (2023). *Submission to the Inquiry into the Perceptions and Status of Vocational Education and Training*.
<https://nff.org.au/wp-content/uploads/2023/03/Inquiry-into-the-Perceptions-and-Status-of-Vocational-Education-and-Training.pdf>
- Nielsen, S. P., & Visser, K. (1997). *Quality Debate in Initial Vocational Education: School-Based Quality Measures at Intermediate Level: A Danish-Dutch Comparison*. CEDEFOP.
<https://www.cedefop.europa.eu/en/publications/1707>
- OECD (2021). *OECD Reviews of Vocational Education and Training: Strengthening the Governance of Skills Systems*. OECD Publishing. <https://doi.org/10.1787/3a4bb6ea-en>
- OECD (2023). *Innovation, Agricultural Productivity and Sustainability in Australia*. OECD Publishing. <https://doi.org/10.1787/02fdc0cc-en>

- Ratnaya, G., Indriaswuri, R., Widayanthi, D. G. C., Atmaja, I. M. P. D., & Dalem, A. A. G. P. K. P. (2022). CIPP Evaluation Model for Vocational Education: A Critical Review. *Education Quarterly Reviews*, 5, 1-8. <https://doi.org/10.31014/aior.1993.05.03.519>
- Sapra, R. L., & Saluja, S. (2021). Understanding Statistical Association and Correlation. *Current Medicine Research and Practice*, 11, 31-38. https://doi.org/10.4103/cmrrp.cmrrp_62_20
- Skills Impact (2021). *Industry Skills Forecast and Proposed Schedule of Work: Annual Update 2021—Agriculture, Horticulture and Conservation and Land Management*. Prepared for the Australian Industry and Skills Committee. https://www.skillsimpact.com.au/getehap/2021/06/ISF.AHC_JRCSkillsForecast.2021AnnualUpdate.Final_.pdf
- Stufflebeam, D. L. (1971). The Relevance of the CIPP Evaluation Model for Educational Accountability (Occasional Paper No. 27). *ERIC*. <https://eric.ed.gov/?id=ED062385>
- Tynjälä, P. (2013). Toward a 3-P Model of Workplace Learning: A Literature Review. *Vocations and Learning*, 6, 11-36. <https://doi.org/10.1007/s12186-012-9091-z>
- Zhang, G., Zeller, N., Griffith, R., Metcalf, D., Williams, J., Shea, C., & Misulis, K. (2011). Using the Context, Input, Process, and Product Evaluation Model (CIPP) as a Comprehensive Framework to Guide the Planning, Implementation, and Assessment of Service-Learning Programs. *Journal of Higher Education Outreach and Engagement*, 15, 57-84. <https://files.eric.ed.gov/fulltext/EJ957107.pdf>
- Zoellner, D. (2015). Quality in Vocational Education and Training: An Essentially Contested Concept. *International Journal of Training Research*, 13, 262-271. <https://doi.org/10.1080/14480220.2015.1102469>