



Australian Government



Jobs and Skills Australia

# Pathways to economic mobility and improved equity

Unlocking enhanced VET analysis through the VET National Data Asset (VNDA)

Technical Paper

December 2025



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## **Acknowledgement of Country**

Jobs and Skills Australia acknowledges the Traditional Owners of Country throughout Australia and recognises the continuing connection to lands, waters and communities. We pay our respects to Aboriginal and Torres Strait Islander cultures, and to Elders past and present.

# Context

## Purpose

This technical report serves as a companion document to the main 2020-21 VET National Data Asset (VNDA) descriptive statistics report. It provides in-depth information on the analysis methodology, data sources used and variable construction in the descriptive statistics analysis. This supplementary information aims to facilitate a deeper understanding of the results and limitations of the analysis.

The 2020-21 VNDA descriptive statistics release utilises extracted student outcomes data from VNDA for students that completed a nationally recognised VET qualification in 2020-21. It is a follow-up to the 2019-20 'Strong and Responsive VET Pathways' publication.

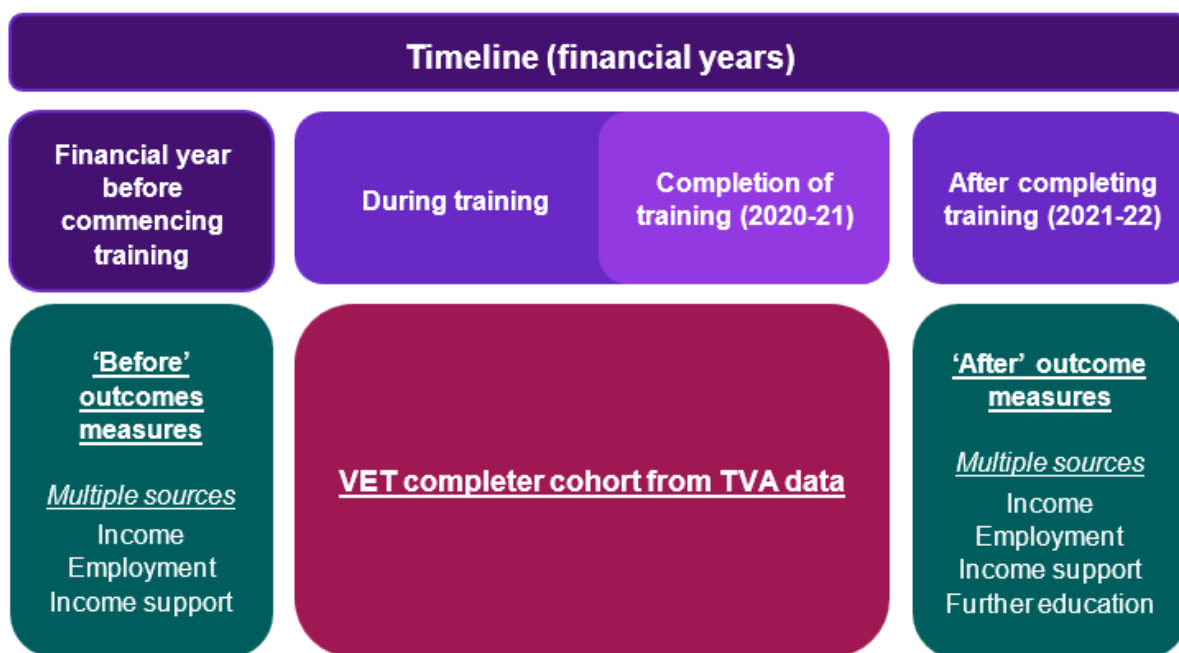
## Background

VNDA was initiated in 2021 under the National Skills Commission and transitioned to Jobs and Skills Australia following the passing of the Jobs and Skills Australia Act 2022. It is a collaboration between Jobs and Skills Australia and the Australian Bureau of Statistics (ABS).

VNDA is a secure data asset that links unit records from the Total VET Activity (TVA) data collected by the National Centre for Vocational Education Research (NCVER) with government administrative data from the Australian Taxation Office, Department of Social Services (DSS), Department of Education (DoE) and other sources within an ABS secure environment. VNDA leverages the ABS' existing Person Level Integrated Data Asset (PLIDA) and Business Longitudinal Analysis Data Environment (BLADE) data assets.

VNDA enables examination of a broad range of short-term and long-term outcomes following the completion of training. For example, it contains information on employee income, employment status, employment occupation, reliance on and exits from income support, and progression to further education and training. By using administrative data collected over multiple years, a range of measures can be observed in the years following training. It is also possible to compare values before the student's engagement in training. This means VNDA can greatly expand on the insights currently available through the NCVER Student Outcomes Survey. Figure 1 provides a broad indication of the data and timelines tracked through VNDA for this analysis.

Figure 1. VNDA design for 2020-21



As detailed in figure 1, the focus is on short-term outcomes post-training in this descriptive statistics release. This is due to the short analysis window available, which begins 1 January 2015 with the introduction of the Universal Student identifier (USI). As the analysis window widens, future publications could focus on longer term outcomes, such as three years after training, which is the timeline used for higher education graduates in the Graduate Outcomes Survey – Longitudinal (GOS-L).

It should be noted that the measured outcomes have one financial year after qualification completion as the post-training period.

#### Scope

The analysis for this release is limited to domestic, non-school, VET students who completed a nationally recognised VET qualification in financial year 2020-21.

The data were then aggregated as follows:

- National and state and territory totals
- Australian Qualification Framework (AQF) level (national and state/territory)
- Field of Education (FoE) for each AQF level (national and state/territory)
- Qualification (national)
- Selected student characteristics, such as gender, First Nations, disability, age, location (national), Socio-Economic Indexes for Areas (SEIFA), Culturally and Linguistically Diverse (CALD) people and occupation.

To be included in the 2020-21 release, qualifications had to meet the following criteria:

- Have more than a minimum number of completions
- Have a defined FoE.

Programs were also excluded from the analysis if the release of program-level data may have enabled any Registered Training Organisations (RTOs) that provide the program to be uniquely identified (this is described in the following confidentiality section).

For students that completed multiple qualifications in 2020-21, outcomes are recorded against the qualification with the highest AQF level. In the rare case where a student has completed multiple qualifications at the same highest AQF level, that particular student was scoped out of the analysis.

## Partial completers

The analysis for partial completers was limited to domestic, non-school, VET students who started a nationally recognised VET qualification in financial years 2015-16, 2016-17, 2017-18 or 2018-19, but never completed the qualification.

To define the partial completer population, the following rules were applied:

1. once started, there must be at least two consecutive years without any enrolments for that student-qualification pair before it is classified as a partial completion.
2. The student must have successfully completed at least one non-compliance unit within the partially completed qualification.
3. To ensure outcomes are correctly attributed to the partially completed qualification, the student must not have completed any other 'Qualification' or 'Accredited Course' during the period of enrolment for the partially completed qualification.

Outcome statistics are based on the financial year prior to enrolment for the pre-training period and the financial year following the end of the last enrolment for the post-training period. A full technical paper will accompany the final "Partial Completers" report when it is released in 2026.

# Data Preparation and Treatment (Methodology)

## Data sources and initial linkage

JSA (formerly National Skills Commission) received approval to develop VNDA from the ABS and data custodians in early 2021. Data used in the development of VNDA were sourced from PLIDA. PLIDA is a detailed microdata product available in the ABS DataLab and provides an integrated longitudinal microdata resource, featuring a wide range of social, health, welfare, education, and economic information on Australian residents.

VNDA integrates a subset of person-level data products available in PLIDA, as listed below in Table 1. To achieve person-level data integration between datasets, the ABS provides a Person Linkage Spine—or simply "Spine"—that uniquely represents an individual.

The spine facilitates linkages between government data assets which in turn enable measurements of student outcomes before and after training. For example, TVA training data are used to source training incidents for students, which can then be linked to ATO data to measure post-training income of VET graduates. Person-level data are then aggregated to the levels described above to create student summary statistics.

**Table 1: Data sources in the VET National Data Asset**

Custodian	Dataset name	Acronym	Reference Period used in this report
ATO	Personal Income Tax	PIT	FY 2013-14 to FY 2021-23
ATO	Payment Summary	PS	FY 2013-14 to FY 2021-23
ATO	Individual Tax Return	ITR	FY 2013-14 to FY 2021-23
ABS	Census of Population and Housing	Census	2021
Multiple	Core Locations	CoreLoc	2006 – 2022
Multiple	Core Demographics	CoreDem	2006 – 2022
DEWR	Training.gov.au	TGA	2024
DSS	Data Over Multiple Individual Occurrences	DOMINO	2006 – 2023
NCVER	Training activity (NAT00120) file	TVA	2015 – 2022
NCVER	Program completed (NAT00130) file	TVA	2015 – 2022
Home Affairs	Migration Demographics (TRIPS and SDB)	MigDem	1990 – 2022

## Overview of linkage between VET completions and enrolments

The analysis described in this paper is limited to VET student completions recorded in the 2020-21 financial year that have an associated TVA enrolment record. To determine the enrolment financial year, TVA completion records were matched with corresponding program enrolment summary records. Matching was achieved through a combination of spine (as described previously), a current program identifier (see characteristics of interest for more details), and an anonymised RTO identifier. Filters were applied to the resulting linked data as detailed in the scoping section.

## Consultation on analytical approach

To facilitate expert input into the development of student outcome measures, JSA established the VNDA Technical Advisory Group (TAG) in March 2021, comprising all VNDA data custodians.

During 2022, custodian involvement and support provided endorsement of outcome measures to ensure VNDA outputs are fit for purpose and appropriately utilised.

Collaboration with data custodians assisted to develop:

- the definition of key outcomes, including VET graduate employment income and employment status
- an approach, in partnership with the ABS, to assess missing data and identify and resolve outliers
- an overall data quality approach, in partnership with the ABS
- a methodology to produce indicators of course performance, and
- the selection of models, variables, cohorts and data sources.

## Characteristics of interest

Table 2 provides details of the input variables used to segment the outcome measures for the descriptive statistics, with more complete definitions provided in Appendix A. Wherever possible, VNDA definitions adhere closely to the rules used by NCVER in its reporting of VET data. In some instances, however, it has been necessary to adopt a different approach, for example:

- NCVER definitions are at a subject level, whereas VNDA seeks to represent data at the qualification (program) level. Such definitions can change over time, either because of a genuine change in student or training characteristics or because of data reporting issues.
- VNDA definitions need to consider disclosure risk, leading JSA to adopt a single definition for state of training delivery when NCVER may use different rules for different collections and reports.

JSA consulted with NCVER and other VNDA data custodians on the definitions for characteristics of interest.

**Table 2: Student and training characteristics**

Student or training characteristic	Brief definition
Current program identifier	A program that uniquely identifies the training package qualification or accredited qualification, agglomerating superseded versions into the same program.
Pre-training period	The financial year preceding the commencement of the training in the program completed by the student.
Post-training period	The financial year following the financial year in which the student completed the program, that is 2021-22.
First Nations people status	Indicates whether a student has identified as a First Nations person.
Apprentice and trainee status	Indicates whether a student is an apprentice or trainee in TVA enrolments.
Gender	Gender is self-reported by the student and indicates whether a student identifies as female, male, or other.
State of training	The state or territory of a student's training at the time of course completion.
Disability status	Indicates whether a student identified as living with a disability.
Secondary school status	Students who are undertaking 'VET in School' program while also completing secondary school studies. Note these students have been scoped out of the analysis.
International student status	Students enrolled with a national funding source in categories 'international client', 'international onshore client', or 'international offshore client'. Please note that international students have been scoped out of the analysis.
Location	Indicates student location (in terms of remoteness area) at time of course completion. Location currently has three distinct categories namely: Major City, Regional and Remote.
Completion time	The number of days recorded between a student's first activity start date and the completion date for their qualification.
Completion age	The student age (years) at the completion date.

Student or training characteristic	Brief definition
CALD status	Indicates whether a student has been identified as having a Culturally and Linguistically Diverse background. Students who were born outside of Australia and who have a main language spoken at home other than English are considered CALD.
SEIFA status	SEIFA is the Socio-Economic Indexes for Areas which summarises the socio-economic characteristics of regions. The Index of Relative Socio-Economic Disadvantage (IRSD) at the quintile level was used.
No Year 12 or Cert III status	Indicates whether a student had not completed Year 12, a Certificate III, or a higher qualification at the time of course completion.

## Outcome measures

Table 3 provides brief definitions for outcome measures used to compute descriptive statistics; Appendix B contains complete definitions. Outcome measure definitions were also discussed with data custodians, with the objective of aligning outcome measures as closely as possible with other existing definitions (particularly regarding treatment of income by the ATO).

**Table 3: Student outcome measures**

Outcome measure	Brief definition
Income (Employee)	Gross employee income (salary and wage data only, no business income), as per completed tax return OR information from payment summary if no tax return was finalised. In the event of missing tax return or payment summary data, it can be supplemented with income data from DSS.
Change in income (Employee)	Employee income in the year following completion (2021-22) minus employee income in year prior to commencement (adjusted to 2021-22 dollars to ensure comparability).
Employment (post)	Employment status in the year following completion, as indicated by presence of Employee Income.
Employment Part time (post)	Part Time Employment status in the year following completion. 'Part-time' work means less than 35 hours per week in all jobs. This status was estimated using a decision tree model based on students' socio-economic, labour market, and demographic characteristics information.
Employment Full time (post)	Full Time Employment status in the year following completion. 'Full-time' work means 35 hours or more per week in all jobs. This status was estimated using a decision tree model based on students' socio-economic, labour market, and demographic characteristics information.
Further VET	An indicator variable representing whether a student enrolled in a higher-level VET qualification, in the same year as the completion of the VET qualification, or the year following completion of the VET qualification.
Any VET	An indicator variable representing whether a student enrolled in any other AQF level VET qualification, in the same year as the completion of the VET qualification, or the year following completion of the VET qualification.
Occupation	Indicates the occupation of a student who was employed in the year following completion. Occupations are based on ANZSCO 1.3 standards.

Outcome measure	Brief definition
Income support exit rate	Percentage of students that were on income support in the month of June in the year prior to enrolment and were no longer on income support in the month of June, 1 year after completion.
Business Income	Business income includes ATO-reported amounts of <ul style="list-style-type: none"> <li>• business nonprimary and primary production</li> <li>• distributions from trusts from primary production</li> <li>• personal services income</li> <li>• distributions from partnerships less foreign income from non-primary production</li> <li>• distributions from partnerships from primary production.</li> </ul>
Total Income	The addition of Employee Income and Business Income.
Change in Total Income	Total income in year following completion (2021-22) minus Total income in year prior to commencement (adjusted to 2021-22 dollars to ensure comparability).
Full-time Total Income	The Total Income of a student who was estimated to be working full-time (35 hours or more per week in all jobs)
Change in Full-time Total Income	Full-time Total income in year following completion (2021-22) minus Full-time Total income in year prior to commencement (adjusted to 2021-22 dollars to ensure comparability).

Please note unlike previous year's VNDA publications, this year JSA was unable to report on the outcomes related to Higher Education (university) progression. This was due to the DoE Higher Education data not being available for reference period 2022 at the time of report analysis.

### Additional income variables this year

Previously JSA was only able to report on employee income. Because of this, there could have been some under-reported income particularly for qualifications that commonly lead to self-employment. This year, JSA has incorporated a business income measure alongside modelled employment type, allowing for a broader set of income measures:

- Income (employee) - consistent with last year's measure
- Business income
- Total income
- Full-time total income - total Income for a full-time worker

### Modelling of Full time and part time employment

This year, JSA has used a decision tree model developed by the ABS to predict whether VET students were working full-time or part-time in the year following completion (2021-22). The model estimates employment type based on socio-economic, labour market, and demographic characteristics.

The following factors are used to predict full-time or part-time status:

- Personal Income
- Gender

- Age
- Occupation
- Industry of employment

The model was originally trained on data from the 2016 Census. It used point-in-time information on employment type to identify the most relevant variables and decision splits for classifying individuals as working either full-time or part-time.

## Wage Price Index

Employee income statistics were determined at two specific time intervals: the financial year prior to student enrolment, and the financial year post completion (i.e. 2021-22). Given the enrolment year varies between students, income statistics were adjusted using the ABS Wage Price Index (WPI) to ensure a relative comparison. The WPI measures changes in the price of labour in the Australian labour market. Applying the index to income recorded in a financial year adjusts wage values relative to a reference year. All income statistics in this release use 2021-22 as the reference year.

## Medians

Median statistics were used for continuous variables and provide an indication of central tendency. Medians have been used for:

- Employee Income (in 2021-22 dollars)
- Business Income (in 2021-22 dollars)
- Total Income (Employee plus Business Income in 2021-22 dollars)
- Full-time Total Income (Full-time workers Total Income in 2021-22 dollars)
- Age at completion (in years)
- Duration of training (in days)

For each income type (Employee, Business, Total, and Full-time Total), individuals who did not report any income of that type in the post-completion reference year (2021–22) were excluded from the corresponding median income calculation. For the median change in income, individuals were included only if they reported income of the relevant type in both the pre-training and post-completion reference years. This approach ensures that the median uplifts reflect income changes among those engaged in employment - either as employees or through self-employment - across both periods.

Please note that for Business income specifically, all six business income fields needed to be zero for an individual to be classified as having no Business income. Consequently, to be classified as having no Total income, an individual must have reported zero Employee income and no Business income (as defined above).

## Percentages

Percentage statistics are used for all other outcomes and student characteristics that are binary or categorical (e.g. percentage of students employed after training and percentage of female students). The form of the percentage is provided below.

If  $y$  is the number of student completers with a particular characteristic post training and  $z$  is the total number of student completers, then the percentage  $x$  is:

$$x\% = \frac{y}{z} \times 100\%$$

## Data confidentiality

JSA analyses and reports on course-level outcomes for identified VET courses. However, only statistics that meet output rules (refer to [Input and output clearance | Australian Bureau of Statistics \(abs.gov.au\)](#) for more information) can be released from the secure ABS DataLab environment. These rules safeguard against the risk of releasing granular-level data that could potentially identify either an individual or an RTO.

### Primary units (students)

JSA has used the method of perturbation to protect student level data. Perturbation is a technique which involves making small, random adjustments to data, and it is considered to be a satisfactory technique for avoiding the release of identifiable data, while maximising the range of information that can be released. These adjustments generally have a negligible impact on the underlying pattern of the statistics. Adoption of this method has also led to a faster turnaround for releasing data from VNDA while enabling the release of data at additional levels of aggregation (levels are detailed in the 'scoping' section above).

For percentage statistics, perturbation involves applying jitter to both the numerator and denominator. Essentially, applying jitter safeguards against users unpicking the statistics and disclosing person-level data. Very occasionally, perturbation may produce statistics that are non-sensical. For example, the numerator being greater than the denominator resulting in percentages greater than 100%. In this case, the resultant statistics were adjusted to equal 100%. Perturbation was also applied to median calculations to safeguard student data.

While perturbation generally has a negligible impact on the accuracy of the statistics released, users of the student outcomes data described in this report should be aware that perturbation potentially has a greater impact on accuracy for statistics which summarise smaller groups of students and those groups with greater variation. Statistics summarising very small groups of students continue to be suppressed, in accordance with ABS DataLab output clearance requirements.

### Secondary units (RTOs)

Where there is a risk of disclosure of an RTO, either by few RTOs offering a qualification, FOE within an AQF level (AQF-FOE) or a large concentration of students studying at one particular RTO, suppression is then applied. In this instance, all statistics for that level can't be released from the ABS secure environment and are excluded from the analysis.

### Rounding

Given the apparent confidentiality treatments and adjustments described above, JSA wanted to avoid conveying unwarranted precision with the results and therefore rounded all percentages to the nearest whole number and rounded median dollar amounts to the nearest hundred.

# Appendix A – Student and training characteristic definitions

## Current Program Identifier

<b>JSA Definition</b>	Uniquely identifies a qualification, course, or skill set.
<b>Data Source</b>	NCVER Training activity, Program completed and Training.gov.au
<b>Treatment</b>	Aggregated cluster grouping of superseded and current program identifier.

## Pre-training Period

<b>JSA Definition</b>	'Pre-training' is defined as the financial year prior to the earliest available date of enrolment for each student.
<b>Data Source</b>	NCVER Training activity
<b>Treatment</b>	Aggregated cluster grouping of superseded and current program identifier.

## Post-training Period

<b>JSA Definition</b>	'Post-training' is defined as the financial year after the completion of a course.
<b>Data Source</b>	NCVER Program completed
<b>Treatment</b>	Financial year derived from completion date for student program.

## First-Nations status

<b>JSA Definition</b>	Indicates whether a student has identified as being First Nations.
<b>Data Source</b>	NCVER Training activity, Program completed, and ABS Combined Demographics
<b>Treatment</b>	<p>The minimum value reported by each student for their qualification will be taken as their reported First Nations status. This approach prioritises students who have ever reported as Aboriginal or Torres Strait Islander (1, 2 or 3) in the TVA dataset, before non-Indigenous (4 or @/missing).</p> <p>For the remaining students that have missing values (4 or @/missing), if possible, we combined (coalesced) with the three ABS Combined Demographics binary variables (ever Indigenous, ever Aboriginal, ever Torres Strait Islander).</p>

## Apprentice and Trainee (A&T)

<b>JSA Definition</b>	A student with an apprenticeship/traineeship training contract.
<b>Data Source</b>	NCVER Training activity
<b>Treatment</b>	<p>The methodology used to develop the A&amp;T indicator is based on the presence of an A&amp;T flag available in TVA enrolments. The following rules were applied to identify the A&amp;T cohort:</p> <ol style="list-style-type: none"><li>1. If an A&amp;T flag exists for a student for any subject as part of a program, then that student is categorised as an A&amp;T for that entire program.</li><li>2. Otherwise, the student is categorised as a non-A&amp;T student.</li></ol>

## Gender

<b>JSA Definition</b>	The gender variable indicates whether a student identifies as female, male, or other. Gender is self-reported by the student and must not be determined by the training organisation. JSA uses the TVA collection as the primary source, supplemented with data from other sources in some instances, to identify the gender of students per program enrolment.
<b>Data Source</b>	NCVER Training activity and Program completed
<b>Treatment</b>	<ol style="list-style-type: none"><li>1. Where a student has completed a program, JSA will take the most recently reported gender value from the TVA completions dataset to determine a student's overall gender for that program enrolment. JSA assumes this to be the last data collection point for a student and therefore their most current gender identity.</li><li>2. Where the reported gender at completion of a program is unspecified (@), JSA will take the value reported at commencement of the program (the gender value reported at the first activity start date in TVA enrolments).</li><li>3. JSA expects there to be instances where students 'have not reported gender at both time points'. Therefore, where a student has reported as unspecified at both completion and commencement of their program, JSA will convert all remaining unspecified values to missing and coalesce the TVA gender variable with the Core Demographics module. This helps reduce the number of unspecified values, by filling in the TVA gender variable with a known value reported in the Combined Demographics module (where available).</li><li>4. Additionally, in the rare scenario where a student has reported multiple gender values at completion of their program and JSA cannot determine whether the student has reported F, M or X (non-binary), then JSA will take their gender from Combined Demographics. For example, where a student has reported an M and an F at program completion, then JSA will resolve the inconsistency by using the gender from Combined Demographics module.</li></ol>

## State of Training

<b>JSA Definition</b>	The state or territory of a student's training for a program enrolment.
<b>Data Source</b>	NCVER Training activity and Program completed
<b>Treatment</b>	<p>JSA approach to deriving a state of training variable for each student per program enrolment is as follows:</p> <ol style="list-style-type: none"><li>1. In the first instance, JSA will take the value reported under state of student residence at completion of a program, where the state value is 01, 02, 03, 04, 05, 06, 07, or 08.</li><li>2. Where the state of student residence at completion of a program is not a code of 01-08, then JSA will apply the following steps to allocate a state of training:<ol style="list-style-type: none"><li>a. Where the state of student residence value at completion is 09, 99, or @@, or where a student has duplicate values (i.e. more than one 01-08 state code reported at this time point), then JSA will take the value reported under state of delivery location at commencement of the program.</li><li>b. Where the state of delivery location value at commencement is 09, 99, or @@, or where a student has duplicate values (i.e., more than one 01-08 state code), then JSA considers the state of training to be unknown.</li></ol></li></ol>

## Students Living with Disability

<b>JSA Definition</b>	The Disability status indicates whether students consider themselves to have a disability, impairment, or long-term condition.
<b>Data Source</b>	NCVER Training activity and Program completed
<b>Treatment</b>	JSA has used the maximum disability status for all subjects in a student's program. This means that if a student has ever reported as living with a disability during any part of their program, they have been classified as living with a disability in this analysis.

## Secondary School Status

<b>JSA Definition</b>	Students who are undertaking vocational education and training (VET) in school program while also completing secondary school studies.
<b>Data Source</b>	NCVER Training activity
<b>Treatment</b>	Where a student has received a VET in Schools Flag value of 'Y' as the last program subject enrolment, then that student will be considered a secondary school student.

## Student location

<b>JSA Definition</b>	The location of a student's training for a program enrolment.
<b>Data Source</b>	ABS Combined locations and NCVER Program completed
<b>Treatment</b>	<p>To ensure consistency with state of training, JSA has used student location at 2020-21, or financial year of course completion.</p> <p>The following steps are used to allocate students to a location in a FY:</p> <ul style="list-style-type: none"><li>• Using ABS Combined locations data for allocation to statistical area (SA) - assign each student to a SA, based on the SA with the highest cumulative duration during that financial year. In the unlikely event of ties, the smallest SA code out of all tied SAs was used.</li><li>• Using the statistical area, remoteness/location codes were merged from the Accessibility/Remoteness Index of Australia Plus (ARIA+) (see: <a href="https://www.abs.gov.au/remoteness-areas">Remoteness Areas   Australian Bureau of Statistics (abs.gov.au)</a>). These remoteness codes serve as the student location variable.</li><li>• Where the remoteness codes/student location variable is not a code of 0, 1, 2, 3, or 4, then the remoteness code value reported for that student under CLIENT_REMOTENESS_ID at completion of a program will be used.</li></ul> <p>Note that in order to output more granular data, inner and outer regional areas were merged into one group (namely regional). In addition, remote and very remote areas have been merged into one group (namely remote).</p>

## CALD (Culturally and Linguistically Diverse background)

**JSA Definition** Indicates whether a student has been identified as having a Culturally and Linguistically Diverse background. Students who were born outside of Australia and who have a main language spoken at home other than English are considered CALD.

**Data Source** ABS Combined Demographics, NCVER Program completed, Home Affairs Migrant Demographics and ABS Census of Population and Housing

**Treatment** JSA follows these general steps to allocate CALD status to each student in a financial year:

1. Define country of birth (COB),
2. Define main language spoken at home,
3. Where a student's country of birth is known and it is not Australia and the main language spoken at home is known and is not English then consider CALD.

Note that both the definition of COB and language spoken at home source appropriate information from ABS Combined Demographics, NCVER Program completed and Home Affairs Migrant Demographics. Definitions are based on majority responses and the relative quality of each data source.

Rules to define country of birth (COB):

1. Take the value if a majority (at least two) of datasets have this value.
2. Take the value of core demographics country of birth, if this value is not missing.
3. Take the value of migrant demographics country of birth, if this value is not missing.
4. Take the value of TVA country of birth, if this value is not missing.
5. Treat any remaining missing values as "unknown".

Rules to define main language spoken at home:

1. Take the value if a majority (two) of datasets have this value.
2. Take the value of Census main language spoken at home, if this value is not missing.
3. Take the value of TVA main language other than English spoken at home, if this value is not missing.
4. Treat any remaining missing values as "unknown".

## SEIFA

<b>JSA Definition</b>	SEIFA is the Socio-Economic Indexes for Areas which summarises the socio-economic characteristics of regions. For this analysis, quintiles of the Index of Relative Socio-Economic Disadvantage (IRSD), were used to classify students by socio-economic status.
<b>Data Source</b>	ABS Combined locations and NCVER Program completed
<b>Treatment</b>	<p>To ensure consistency with state of training, JSA has used student location at 2020-21, or financial year of course completion.</p> <p>The following steps are used to allocate students to a location in a FY:</p> <ul style="list-style-type: none"><li>• Using ABS Combined locations data for allocation to statistical area (SA) - assign each student to a SA, based on the SA with the highest cumulative duration during that financial year. In the unlikely event of ties, the smallest SA code out of all tied SAs was used.</li><li>• Using the statistical area, IRSD codes were merged from the Socio-Economic Indexes for Areas (SEIFA) (see: <a href="#">Socio-Economic Indexes for Areas (SEIFA), Australia, 2021   Australian Bureau of Statistics.</a>)</li><li>• In order to output more granular data, SEIFA_IRSD_Decile was converted to IRSD_Quintile values. These IRSD codes serve as the SEIFA variable.</li><li>• Where the IRSD_Quintile codes/SEIFA is not a code of 1, 2, 3, 4, or 5 then the SEIFA code value reported for that student under CLIENT_SEIFA_IRSD_QUINT at completion of a program will be used.</li></ul>

## No Year 12 or Cert III status

<b>JSA Definition</b>	Indicates a student who has not completed year 12 or Certificate III or above, at the time of completion.
<b>Data Source</b>	NCVER Program completed
<b>Treatment</b>	<p>TVA data uses the ABS Australian Standard Classification of Education (ASCED) to classify the level of education. The highest level of education including post-compulsory education a student had successfully completed before commencing a program is recorded for a program completion. An individual is considered to have completed Year 12, Certificate III, or a higher level of education if their highest level of education prior to commencing the program is coded as one of the following:</p> <ul style="list-style-type: none"><li>• 611- Year 12</li><li>• 514 – Certificate III</li><li>• Any education code where the first digit is 4 or lower.</li></ul>

# Appendix B – Outcome measure definitions

## Employee Income

<b>JSA Definition</b>	Income earned as an employee (excluding any income earned through self-employment or from the investment of existing capital)
<b>Business Definition</b>	Capture employee income from employment to understand outcomes achieved through VET training.
<b>Data Source</b>	ATO Personal Income Tax Return, ATO Payment Summary, Department of Social Services (DSS) Data Over Multiple Individual Occurrences
<b>Treatment</b>	<p>Employee income is sourced from three locations:</p> <ol style="list-style-type: none"><li>1. ATO Personal Income Tax Return (PIT)</li><li>2. ATO Payment Summary (PS)</li><li>3. DSS Data Over Multiple Individual Occurrences (DOMINO)</li></ol> <p>The following priority method is used:</p> <ul style="list-style-type: none"><li>• Where a PIT record exists (for a given individual in a given year), then PIT is used.</li><li>• If no PIT record exists, then PS is used.</li><li>• If no PIT record, and no PS record, then DOMINO is used.</li></ul> <p>PIT employee income is defined by the adding up the following data items:</p> <ul style="list-style-type: none"><li>• Salary or wages</li><li>• Allowances, earnings, tips, directors' fees etc.</li><li>• Attributed personal services income</li><li>• Reportable employer superannuation contributions</li><li>• Total reportable fringe benefits</li></ul> <p>PS employee income is defined by adding up the following data items:</p> <ul style="list-style-type: none"><li>• Gross payment amount</li><li>• Total allowances</li><li>• Reportable employer superannuation contributions</li><li>• Reportable fringe benefits</li></ul> <p>DOMINO employee income is defined by adding up the following data items:</p> <ul style="list-style-type: none"><li>• Continuous employee income</li><li>• Variable employee income</li></ul>

## Employment Status

<b>JSA Definition</b>	Employment status is defined in Australia with reference to categories used in the Census of Population and Housing (Census) and the Labour Force Survey (LFS). That is, those employed are distinguished from those who are not employed and seeking paid employment ('unemployment'), with those not working and not seeking paid employment regarded as 'not in the labour force'.
<b>Business Definition</b>	Infer employment status from the employee income data to understand outcomes achieved through VET training.
<b>Data Source</b>	ATO Personal Income Tax Return, ATO Payment Summary, DSS DOMINO
<b>Treatment</b>	<p>Employment status is not consistently recorded in any single administrative database for the Australian population in a way that aligns with the requirements for the VNDA project.</p> <p>Consequently, JSA defines employment status in a given financial year as a binary flag based on whether that individual received any employee income in that year.</p>

## Engagement with Further VET

<b>JSA Definition</b>	A student is considered to have progressed to further VET where they have commenced in a qualification at a higher level of education than they completed in VET Education in the same financial year as completing training or in the subsequent financial year.
<b>Business Definition</b>	Understand student educational pathways based on whether students' progress to further VET education after completing a VET qualification.
<b>Data Source</b>	NCVER Training activity, Program completed
<b>Treatment</b>	<p>TVA data uses the ABS Australian Standard Classification of Education (ASCED) to classify the level of education for VET qualifications. To align with ASCED, enable comparison with TVA data and de-duplicate multiple commencements, JSA uses the following processes:</p> <ol style="list-style-type: none"><li>1. Reclassifying the levels of education categories to align with the ASCED codes</li><li>2. Where a student commenced in more than one level of education in the same financial year, the lowest ASCED value (corresponding to the highest level of study) is taken to capture the student's highest level of education commencement.</li></ol>

## Receipt of Income Support

<b>JSA Definition</b>	<p>The income support payments used in this analysis are generally income tested allowances primarily paid to those of working age who are expected to be looking for paid work or undertaking training and education to improve their employment prospects. These payments would be expected to reduce with the skills gained in a qualification.</p> <p>The presence of at least one payment at a specific time and financial year would mean the student is an income support recipient for that financial year.</p>
<b>Income Support Exit rate</b>	<p>Based on a cohort analysis considering only graduates who were on income support in the month of June prior to enrolment, this indicator measures the percentage of graduates that were no longer receiving income support payments in the month of June one year after completing their qualification.</p> <p>Exit rate=(No. of students who are on income support prior but off income support post)/(No. of students on income support prior)</p>
<b>Business Definition</b>	Explore the role the VET system is playing in increasing a student's employability and enabling them to transition off social benefit payments.
<b>Data Source</b>	DSS - Data over Multiple Individual Occurrences (DOMINO)
<b>Treatment</b>	<p>Define receipt of income support in a given financial year as a binary flag on whether an individual received payment(s) during the final reference month of the financial year (June). Using the final reference month of the financial year seems to capture an appropriate segment of the population on transitional and long-term payments.</p> <p>Unlike previous VNDA publications, no adjustments were made to the income support post-training period to avoid the effects of COVID. As such, the reference period remains June 2022, which is one year post-training for the 2020–21 completion cohort.</p>

## Engagement with Any VET

<b>JSA Definition</b>	A student is considered to have engaged with any other VET education if they enrol in another AQF-level VET qualification either in the same financial year as the completion of their qualification, or in the following financial year.
<b>Business Definition</b>	Understand student educational pathways based on whether students' progress to other VET education after completing a VET qualification.
<b>Data Source</b>	NCVER Training activity, Program completed
<b>Treatment</b>	<p>TVA data uses the ABS Australian Standard Classification of Education (ASCED) to classify the level of education for VET qualifications. To align with ASCED, enable comparison with TVA data and de-duplicate multiple commencements, JSA uses the following processes:</p> <ol style="list-style-type: none"> <li>1. Reclassifying the levels of education categories to align with the ASCED codes</li> <li>2. Where a student enrolled in one or more VET qualifications in the completion or post-training financial year, this student will be flagged as engaged with Any Further VET.</li> </ol>

## Employment Part-time or Full-time status

<b>JSA Definition</b>	Estimate whether a student was working on a part-time or full-time basis. 'Full-time' basis means 35 hours or more per week in all jobs. 'Part-time' basis means less than 35 hours per week in all jobs.
<b>Business Definition</b>	Estimate a student's employment status using combined employee and business income data, along with socio-economic, labour market, and demographic characteristics data, to assess outcomes achieved through VET training.
<b>Data Source</b>	ATO Personal Income Tax Return, ATO Payment Summary, Department of Social Services (DSS) Data Over Multiple Individual Occurrences, ABS Combined Demographics, ATO Business records
<b>Treatment</b>	<p>To estimate each graduate's employment status per financial year, JSA applies a decision tree model using the following inputs:</p> <ul style="list-style-type: none"><li>• Total income (combined employee and business income)</li><li>• Gender</li><li>• Age</li><li>• Occupation</li><li>• Industry of employment</li></ul> <p>Some covariates occasionally contained missing or implausible values. To maximise data utility, JSA applied the following treatments:</p> <ol style="list-style-type: none"><li>1. Age is primarily sourced from ATO ITR and PS records. Where age is missing or implausible (e.g., less than 0 or greater than 125), it is imputed using propensity tables developed by combining BLADE ANZSIC data with ATO ITR. These tables are based on age, ANZSIC, and financial year.</li><li>2. Gender is sourced from ATO ITR and PS records. If gender is missing, JSA first attempts imputation using ABS combined demographic data. If still unavailable, gender is imputed using the propensity table approach - constructed from BLADE ANZSIC and ATO ITR - based on age, ANZSIC, and financial year.</li><li>3. Occupation is taken from the individual's tax return. If missing, JSA sets the covariate to 0. This missing or zero group is treated as a valid input category in the model.</li><li>4. Industry reflects the industry of the business where the graduate works and is sourced from ATO ABN business records. When this covariate is missing, it is set to "T" which serves as a valid category to the model.</li></ol>

## Business Income

<b>JSA Definition</b>	Net profit earned by students who own or are partners in an unincorporated business. This definition is consistent with the ABS' definition of Own Unincorporated Business Income (OUBI).
<b>Business Definition</b>	Capture net profit from a student's own unincorporated business to understand outcomes achieved through VET training.
<b>Data Source</b>	ATO Individual Tax Return
<b>Treatment</b>	<p>Business income is derived using six variables from the supplementary section of an individual's ATO Individual Tax Return (ITR). They include:</p> <ul style="list-style-type: none"><li>• net income or loss from business primary production</li><li>• net income or loss from business non-primary production</li><li>• distribution from trusts primary production</li><li>• net personal services income</li><li>• distribution from partnerships less foreign income non-primary production</li><li>• distribution from partnerships primary production</li></ul> <p>Students were classified as self-employed if they have a non-zero value in any variables used to derive business income. Non-zero values suggest business activity through ownership or partnership in an unincorporated business.</p>

## Total Income

<b>JSA Definition</b>	Addition of Employee and Business Income.
<b>Business Definition</b>	Capture total student income from employment to understand outcomes achieved through VET training.
<b>Data Source</b>	ATO Personal Income Tax Return, ATO Payment Summary, Department of Social Services (DSS) Data Over Multiple Individual Occurrences
<b>Treatment</b>	Add Employee and Business Income to create "Total Income" (for further information please see "Employee Income" and "Business Income" definitions and treatments)

## Full-Time Total Income

<b>JSA Definition</b>	"Total Income" for those estimated to be working full-time. Full-time employment is defined as working 35 hours or more per week across all jobs.
<b>Business Definition</b>	Capture full-time total student income from employment to understand outcomes achieved through VET training.
<b>Data Source</b>	ATO Personal Income Tax Return, ATO Payment Summary, Department of Social Services (DSS) Data Over Multiple Individual Occurrences, ABS Combined Demographics, ATO Business records
<b>Treatment</b>	Use Total Income of any student that is estimated to be working full-time (please see "Employment Part-time or Full-time status" for further information)

## Occupation

<b>JSA Definition</b>	The occupation of a student based on the Australian and New Zealand Standard Classification of Occupations (ANZSCO) code
<b>Business Definition</b>	Capture employee occupation from employment to understand outcomes achieved through VET training.
<b>Data Source</b>	ATO Personal Income Tax Return, ATO Payment Summary
<b>Treatment</b>	<p>For any student that is employed (based off employee and business income) the occupation at the ANZSCO Code level is taken from that student's income tax return data. Where the occupation is missing the ANZSCO_Code is set to 0.</p> <p>For the data downloads and dashboard, statistics where the ANZSCO code was "0" or not defined, the code has been set to the more informative label of 'Not stated'. Occasionally there are occupation codes with small sample sizes, these have been set to '*' for confidentiality reasons.</p>