

# Lifting the lid on completion rates in the VET sector: how they are defined and derived

*Alice Bednarz*

NATIONAL CENTRE FOR  
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The views and opinions expressed in this document are those of the author / project team and do not necessarily reflect the views of the Australian Government or state and territory governments.

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# About the research

## *Lifting the lid on completion rates in the VET sector: how they are defined and derived*

Alice Bednarz, National Centre for Vocational Education Research

With the recent policy focus on completions in the vocational educational and training (VET) sector, completion rates are under the spotlight. Demand for completion rates data has grown over recent years, and to this end the National Centre for Vocational Education Research (NCVER) has released several publications about completion rates, both for VET students and for apprentices and trainees. This paper draws these earlier publications together.

This occasional paper aims to 'lift the lid' on completion rates, explaining how they are defined and how they are calculated. Beyond this, the paper considers the value of completing a VET qualification, revealing that the pay-off varies for different groups of learners.

Tom Karmel  
Managing Director, NCVER



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# How we define completion rates

The most intuitive definition of a completion rate is that it is simply the proportion of students who finish the course they started. For example, if 100 students started a course in 2005, and 27 of those students went on to complete their course, we'd say that the completion rate for 2005 is 27%.

Ideally, we need to wait for the course to finish before we can calculate the completion rate. However, this reduces the usefulness of the data, because we potentially have to wait many years to ensure all students have had the opportunity to complete. Instead, we consider a particular 'tracking window', and then estimate the true completion rate using various methods. In general, a completion rate can be defined in terms of three components, which are the answers to the following questions:

- Who or what are we tracking?
- What is the period of time we are tracking over?
- How is the rate calculated?

We consider each question in turn. We then present the latest completion rate figures, before looking more broadly at the value of completing a vocational education and training (VET) qualification. It must be emphasised that the *concept* of a completion rate remains unchanged, regardless of the answers to these questions. All that changes is the group of units we are monitoring, how long we are observing them for, and what method is used to estimate the rate.

## Who or what are we tracking?

NCVER reports completion rates at several different levels – for courses, for subjects, for apprentices and trainees, and for specific sub-groups of students. For each of these, we need to track a certain group of entities, be they courses, subjects, contracts of training, or individual students. A group of entities that started at the same time is called a 'cohort'.

The particular cohort we are tracking is reflected in the name of the completion rate. For example, a 'contract completion rate' means we are tracking a cohort of contracts; a 'qualification completion rate' means we are tracking a cohort of students undertaking a qualification.

## Completion rates for VET qualifications

Let's consider tracking *qualifications*. This gives us a qualification, or course, completion rate. It is defined as follows:

A **qualification completion rate** is the proportion of VET *qualifications* started in a given year that will eventually be completed. It is also referred to as a course completion rate.

Throughout this paper, the terms 'qualification' and 'course' are used interchangeably.

## Subject completion rates

A VET qualification is made up of a number of subjects, also referred to as 'modules' or 'units of competency'. Alongside the completion rates for VET qualifications, NCVER reports subject

completion rates. These are called ‘load pass rates’. Unlike the course completion rate, the subject load pass rate needs to be weighted to account for the fact that subjects are of different lengths. The calculation is based on the annual hours (or full year training equivalent – FYTE) for each assessable module or unit of competency. A subject load pass rate is defined as follows:

A **subject load pass rate** is the ratio of hours studied by students who passed their subject(s) to the total hours committed to by all students who passed, failed or withdrew from the corresponding subject(s).

We can think of a subject load pass rate as the ratio of ‘profitable hours’ to the total hours undertaken by all students in the same year.

Let’s consider a simple example. Suppose two students start and complete a two-hour subject, and another student starts but fails to complete a 100-hour subject. Saying that the pass rate is two out of three, or 67%, is not representative of the fact that the two completed subjects were very short, while the incomplete subject was much longer. To fix this, we weight the pass rates according to the subject hours. That is, we multiply the two completions by two hours and the one non-completion by 100 hours. This is equivalent to looking at the total hours studied by those who completed their subjects, over the total hours studied by all students. So we’d say the pass rate is  $(2 \times 2 \text{ hrs}) / (2 \times 2 \text{ hours} + 1 \times 100 \text{ hrs}) = 4 / (104) = 4\%$  – a very different figure from 67%!

### Completion rates for apprentices and trainees

NCVER also estimates completion rates for apprentices and trainees. Each apprentice or trainee has a contract of training with their employer. To determine completion rates, we can monitor these contracts of training and look at how many contracts are eventually completed. This gives us a ‘contract completion rate’, defined as follows:

A **contract completion rate** refers to the proportion of *contracts of training* started in a given time period that have since been completed.

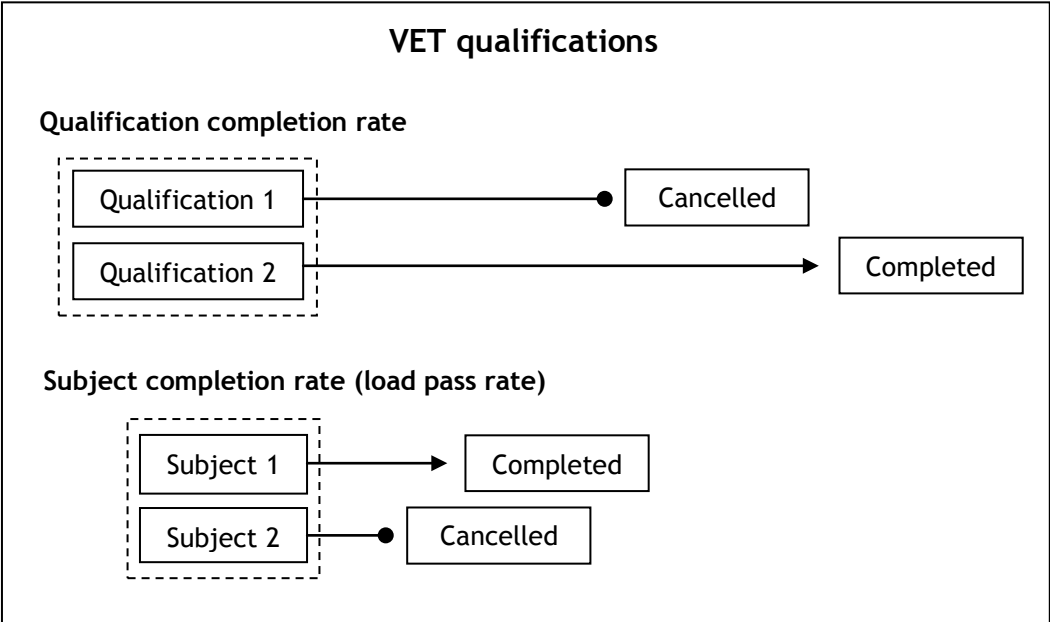
There is an issue associated with tracking contracts of training: an apprentice might start a contract of training with one employer, but then later switch employers and have to begin a new contract of training. If we only monitor contracts of training, the original contract may be recorded as incomplete, even if the student goes on to finish their apprenticeship with the new employer. Approximately one-quarter of trade apprentices swap employers during their apprenticeship in this fashion (Karmel 2011). This leads us to consider individual completion rates, defined as follows:

An **individual completion rate** is an estimate of the proportion of *apprentices and trainees* who started in a given year and who eventually completed their training in the same occupation in which they began, but not necessarily with the same employer.

### Summary of the different levels of completion rates

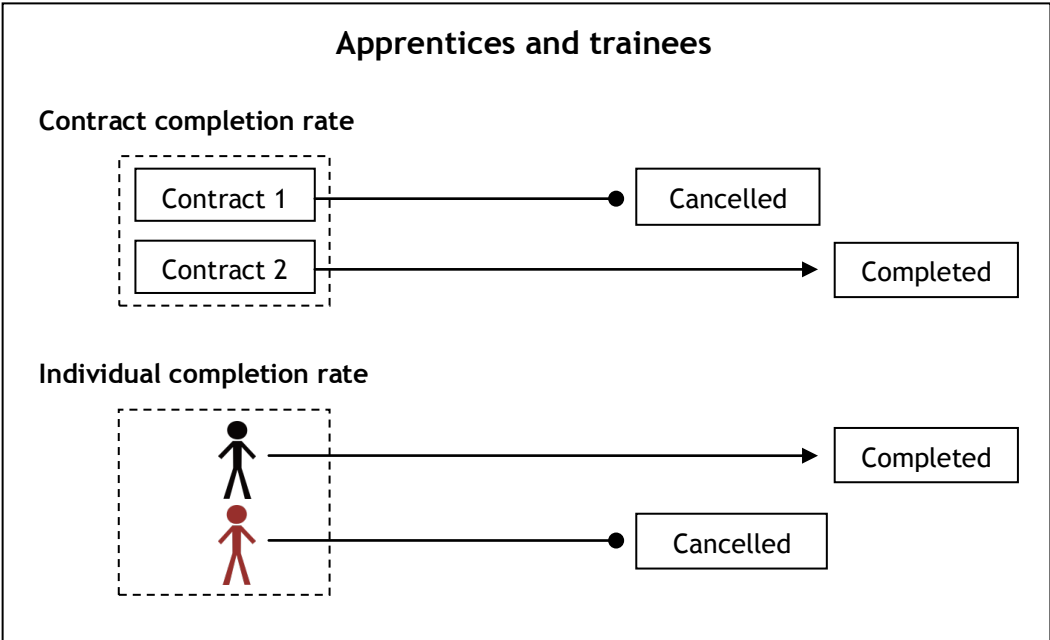
A visual summary of completion rates for VET qualifications is given in figure 1, and for apprentices and trainees in figure 2.

**Figure 1 Visual summary of completion rates for VET qualifications**



Note: For VET students, we consider completion rates at either the qualification level or the subject level. The particular level selected determines what we need to track.

**Figure 2 Visual summary of completion rates for apprentices and trainees**



Note: For apprentices and trainees, we consider completion rates at either the contract level, or at the individual level. The particular level selected determines what or who we need to track.

## What is the period of time we are tracking over?

Ideally, to calculate the course completion rate, we need to wait for all students who started at a given time to either complete or drop out of their course. That is, we need to track each course from start to finish. Only when all courses are accounted for will we know the true course completion rate. However, this could take years. For example, an advanced diploma is generally two years of full-time study, but could take many years if undertaken on a part-time basis.

Hence the longer we wait, the higher the completion rate will be. However, the data become more and more out of date the longer we wait. Therefore, we need to compromise and choose an appropriate ‘time window’ over which to track a cohort. We track a cohort for a particular window only, and then apply an appropriate technique to *estimate* the overall completion rate. The techniques used to estimate the rates are described in the next section. For now, we look at the time windows.

A time window is the length of time *from the cohort’s starting time* until we cease monitoring the cohort. The time windows for various completion rates are shown in table 1. Note that the term ‘projected contract completion rate’ is used to refer to a more up-to-date estimate of the contract completion rate. The projected contract completion rate is based on a much shorter time window (one quarter) than is the regular contract completion rate (four years). Similarly, the term ‘projected qualification completion rate’ indicates that the rate is an *estimate* of the true qualification completion rate.

**Table 1 Length of the time windows for various completion rates**

Completion rate	Who for	Time window
Projected qualification completion rate	VET students	1 year
Contract completion rate	Apprentices and trainees	4 years
Individual completion rate	Apprentices and trainees	4 years
Projected contract completion rate	Apprentices and trainees	1 quarter

Even if we wait long enough for all courses to either be completed or withdrawn from, there is a further problem, because completions are not always reported immediately in the national data collections. There is a delay in reporting completions, meaning that completions occurring in a given year or quarter might take a year or more to be reported (Harvey 2010a). Thus, even for the apprentice and trainee rates which we track for four years, some degree of estimation is still required to account for reporting lags.

## How is the rate calculated?

NCVER uses a range of techniques to calculate completion rates. All completion rates, except for subject completion rates, involve some degree of estimation. For those wanting a high-level picture, we briefly outline the techniques below, providing more detailed step-by-step instructions in table 2.

For qualification completion rates, we track qualifications for one year only and extrapolate the behaviour observed during this time window to predict the long-term completion rate. That is, we monitor how many qualifications are completed or withdrawn from during the time window and assume that this behaviour pattern will continue in later years. A ‘Markov chain’ methodology is used.

For subject completion rates – or load pass rates – no estimation is required; they are calculated from actual data of subject enrolments for a given year.

For contract completion rates, NCVER uses two different methods. One method involves tracking a cohort of contracts for four years. Some adjustments are made to account for reporting lags. The other method, used to find the *projected* contract completion rates, involves tracking a cohort of contracts for one quarter and extrapolating the behaviour to predict the long-term trend. A ‘life tables’ methodology is used.

For individual completion rates, we take the contract completion rates and adjust them according to data about how many apprentices and trainees switch employers during their apprenticeship.

All of the above techniques are explained more fully in table 2.

**Table 2 Methodologies used by NCVER to calculate completion rates**

Completion rate	Methodology used by NCVER
<b>VET qualifications</b>	
Projected qualification completion rate (estimated)	<p>Uses a mathematical model called a ‘Markov chain’. The basic steps are:</p> <ol style="list-style-type: none"> <li>1 Track students who are starting courses in a given year (Group A) along with all existing students (Group B) for one year (from the starting year to the next year).</li> <li>2 Calculate the probabilities of completing, dropping out of, and continuing a course over this one-year period for (i) Group A and (ii) Group B.</li> <li>3 Extrapolate the probabilities in step 2 to find the long-term behaviour of the commencing courses (Group A). This is done using Markov chain theory. We assume that, from their second year of study onwards, Group A will behave like the continuing courses in Group B. See Mark and Karmel (2010) for more details.</li> </ol>
Load pass rate (subject completion rate)	<p>Load pass rates use actual data (no estimation required), since subjects are all completed within a year. The steps are:</p> <ol style="list-style-type: none"> <li>1 Calculate the hours studied by those students who passed their subjects. Call this X.</li> <li>2 Calculate total subject hours committed to by all students who either passed, failed or withdrew. Call this Y.</li> <li>3 Divide X by Y to obtain the load pass rate.</li> </ol>
<b>Apprentices and trainees</b>	
Contract completion rate	<p>The steps to calculate the contract completion rate are:</p> <ol style="list-style-type: none"> <li>1 Track the apprentices and trainees commencing contracts in a given year for four years.</li> <li>2 The completions data received to date are then ‘weighted up’ to account for reporting lags. We use previous quarters to estimate how much the reported number of completions to date will grow by once the full set of data is received. See Harvey (2010b) for further details.</li> </ol>
Individual completion rate (estimated)	<p>The contract completion rates are adjusted, based on average recommencement data, to give an individual completion rate. See Karmel (2011) for details.</p>
Projected contract completion rate (estimated)	<p>A ‘life tables’ methodology is used. The basic steps are:</p> <ol style="list-style-type: none"> <li>1 Label the contracts held by apprentices and trainees commencing in a given quarter as Group A. Label the existing contracts according to how old they are, calling them Group B, Group C etc.</li> <li>2 Determine the probabilities of completing, dropping out and continuing over this one-quarter period for contracts in Group A, as well as for all other groups.</li> <li>3 ‘Stretch out’ the cross-sectional probabilities from step 3 to mimic data with a time dimension. That is, we assume that, in one quarter’s time, Group A will behave like Group B, and in two quarters’ time, Group A will behave like Group C etc. See Karmel and Mlotkowski (2010a) for further details.</li> </ol>

# Latest completion rate estimates

Here we present the latest completion rate estimates. Note that the commencing time period is different for each rate; this is a direct result of the method used to calculate it. Some methods can provide rates for more recent cohorts than others, due to the lengths of the tracking windows discussed earlier.

## Latest completion rates for VET students

The most recent estimates for VET qualifications are presented in table 3. It must be stressed that the national data upon which these rates are based only covers publicly funded enrolments.

**Table 3 Latest completion rate estimates for VET qualifications**

Cohort	Commencing in	Projected qualification completion rate (%)	Subject load pass rate (%)
Students enrolled in AQF qualifications	2008	28	80
Full-time students aged 25 years and under enrolled in AQF qualifications	2008	37	78

Note: AQF = Australian Qualifications Framework  
Source: NCVET (2011b).

As can be seen in table 3, the projected qualification completion rate for all students starting Australian Qualifications Framework (AQF) qualifications in 2008 over the whole of Australia is 28%. If we only consider full-time VET students aged 25 years and under, the figure rises to 37%.

It must be remembered that these are ‘average’ qualification completion rates across all different fields of education and qualification levels. There is considerable variation in completion rates once we break them down by field of education and qualification level. For example, consider looking at the rate for qualifications for full-time VET students, aged 25 and under, broken down by qualification level. This is shown in table 4. We can see that certificate III qualifications have a considerably higher completion rate (46%) than the other levels. Further breakdowns by state and by field of education can be found in *The likelihood of completing a VET qualification 2005–08* (NCVER 2011b).

**Table 4 Projected qualification completion rates and load pass rates for qualifications commencing 2008, full-time, aged 25 years and under, with no prior VET qualification, by level**

AQF qualifications	Projected qualification completion rate (%)	Subject load pass rate (%)
	2008	2008
Diploma and above	35	79
Certificate IV	34	75
Certificate III	46	80
Certificate II	32	71
Certificate I	31	69
<b>Total</b>	<b>37</b>	<b>78</b>

Note: AQF = Australian Qualifications Framework  
Source: NCVET (2011b).

Looking back at table 3, the subject load pass rate for all VET students is quite high, at 80%. However, the corresponding projected qualification completion rate is comparatively low (around 30%). This suggests that, on the whole, the subjects attempted are completed but that students are not completing the whole qualification.

To better understand the differences between low completion rates and high load pass rates, NCVER undertook a survey of students' intentions. Information was collected on students' intentions to complete their course (as opposed to completing subjects only), and the reasons behind these. The results (NCVER 2011c) show that over 90% students intend to complete their qualification (when asked at or close to the time of enrolment).

## Latest completion rates for apprentices and trainees

The latest completion rates for apprentices and trainees are shown in table 5. Notice that the contract completion rate for trades (45%) is lower than that for non-trades (53%); however, once we look at individual completion rates, they are similar. This suggests that looking at contract completion rates alone can be misleading, because individuals in trade occupations often change employers and have to start a new contract of training, which is not captured by the contract completion rate.

**Table 5 Latest completion rates for apprentices and trainees**

Completion rate	Commencing in	Completion rate	
		Trades (%)	Non-trades (%)
Contract completion rate	2006	45	53
Individual completion rate	2006	56	54
Projected contract completion rate	December quarter 2010	46	60

Source: NCVER (2011a).

You might be wondering, given the variety of rates available for apprentices and trainees, which rate should you use? Individual completion rates account for employer switching, but a drawback is that the most recent rates available will be for students who commenced four years ago. If you need up-to-date information, your best option is the projected contract completion rate. These give a prediction of the contract completion rate for much more recent time periods. The latest projected contract completion rate is for the December quarter 2010, whereas the latest contract or individual completion rate is only for 2006. The projected contract completion rates have been validated using historical data, and the predicted values were found to be very close to observed values (Karmel & Mlotkowski 2010a).

The completion rates given in table 5 are average rates; these rates vary considerably by occupation. For example, contract completion rates for students commencing in 2006 range from 27% for food trades workers, through to 64% for carers and aides, while individual completion rates range from 30% for food preparation assistants, through to 67% for carers and aides and electrotechnology and telecommunications trades workers. For a more detailed breakdown of apprentice and trainee completion rates (by occupation), see *Completion and attrition rates for apprentices and trainees 2010* (NCVER 2011a). In the next section, we look at the pay-off from completion of a VET qualification.

# The value of completing a VET qualification

The implicit assumption is that completing a VET qualification, as opposed to only completing *part* of a VET qualification, is beneficial. How true is this assumption? Is completing a qualification of the same benefit to all groups of learners? The answer is ‘yes’ in relation to some outcomes but ‘no’ for others.

Recent work by Karmel and Fieger (forthcoming) finds that completing a qualification is of more benefit for some groups of students than others. Using data from NCVET’s Student Outcomes Survey (NCVER 2010b), the authors run separate models for various outcomes, such as the probability of employment after training for completers and non-completers. This enables a ‘pay-off function’ to be devised by comparing the probabilities for the same student conditional on (i) completing and (ii) not completing. Other outcomes considered include the likelihood of improved salary, going on to further study and occupational status.

In general, the pay-offs are positive, but the size of the pay-off is much larger for some groups of students than others. Consider the outcome of ‘employment after training’. Karmel and Fieger (forthcoming) find that those who complete are around 22% more likely to be employed after training than those who don’t complete. However, this varies according to prior employment status. For those students who were not in the labour force before training, the pay-off rises to 108%, while for those students who were employed before training, the pay-off is only 3%.

Another key finding is that completion does not have a positive pay-off for every student vis-a-vis every outcome variable. When it comes to being in further study, completion has a high pay-off for everyone, regardless of prior employment status, and is particularly high for certificates I/II students. However, when it comes to wages, only around 61% of students can expect higher wages upon completion. Similarly, only around 59% of students have a positive pay-off in relation to improved occupational status after training.

The authors conclude that completion is particularly important for those not employed before training (if the objective is employment after training and higher wages), for certificates I/II (if the objective is further study), and for diplomas and above (if the objective is higher wages). They recommend that it is particularly important to calculate completion rates for these groups.

One might expect that those students who stand to benefit most from completion might be more likely to complete, but this is not the case – the authors find little relationship between the pay-off to completion and the probability of completing. As Karmel and Fieger point out, ‘We cannot leave it to students to understand the benefit from completion’ (forthcoming).

Polidano and Mavromaras (2010) also find that the value of completing varies for different groups. Using data from the Household, Income and Labour Dynamics in Australia (HILDA) surveys from 2001 to 2007, they find that completing a VET qualification provides no further employment benefits for those already employed, but that it significantly increases the likelihood of subsequent employment for those who are not working.

The employment benefits are even greater for unemployed individuals with a disability. Polidano and Mavromaras (2010) find that for an average person who is out of work *and* has a disability, completing a VET qualification is estimated to increase their probability of employment from 9% to 29% in their



first year after completion. In other words, the probability of employment triples. On the other hand, for an average person who is out of work and *doesn't* have a disability, completing a VET qualification is estimated to increase their probability of employment from 52% to 62% in their first year after completion – a more modest improvement of 20%.

VET completion was also found to have longer-term employment benefits; for example, those who were unemployed and had a disability had around a ten-percentage-point increase in the chances of being in work for up to three consecutive years after completion (Polidano & Mavromaras 2010). Those who were unemployed without a disability had around a seven-percentage-point improvement.

## Value of completing an apprenticeship or traineeship

What about the value of completing an apprenticeship or traineeship? For those studying a trade, the monetary reward of completing their apprenticeship is substantial, with the average annual income for trade apprentices in 2010 jumping from \$36 600 during the last week of their apprenticeship, to \$52 500 upon completion (NCVER 2010a). Looking at individual occupations within the trades, all enjoy substantial pay increases on completion, except for hairdressers. The pay rise ranges from only \$630 for hairdressers, up to \$23 000 for electrotechnology and telecommunications (Karmel & Mlotkowski 2010b). For non-trade occupations, the pay rise associated with completing is far more modest – the average annual income for non-trade occupations in 2010 moves from \$40 700 during the last week of training to around \$45 900 upon completion (NCVER 2010a). There are even some non-trade occupations for which there is a *negative* pay-off associated with completion. For example, sales workers who complete earn, on average, \$4000–5000 *less* than those who don't complete (Karmel & Mlotkowski 2010b). These findings show that not everyone who completes an apprenticeship or traineeship will be rewarded with a higher income and bring into question the value of the training for those occupations with a negative payoff (Karmel & Mlotkowski 2010b).

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