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vocational education and training:  
Evidence from Australia**

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# Determinants of completions and completion deficits in VET: Evidence from Australia

Peter Fieger<sup>12</sup>

## Abstract

### **Purpose**

*Completion rates in Australian vocational education and training (VET) are notoriously low. While there are conventional reasons such as issues with course, health, institutional factors, financial and family problems and dissatisfaction with the training experience, more VET specific explanations have included that students may discontinue their studies when they have obtained the specific skills they were seeking or they have gained employment. This present study seeks to examine whether the original intention of students at the time of enrolment along with satisfaction and the benefit that could be obtained from completion have any bearing on completion patterns.*

### **Methodology**

*This study utilises the 2011 Student Outcomes Survey and Student Intentions Survey and develops a data integration method to relate intention data to student outcomes. The concept of completion deficit is developed as the difference between the probabilities of intention to complete and probability to actually complete. Regression models and chi squared automated interaction detection are applied to evaluate the relationship between intentions, satisfaction, completion pay-offs and completion patterns.*

### **Findings**

*Main findings of this study include the preponderance of part-time students enrolled in lower VET qualifications with high completion deficits. Furthermore, the completion pay-offs in respect to salary and improved employment conditions relate to increased completions and decreased completion deficits, while satisfaction plays only a minor role in shaping completion patterns.*

### **Originality**

*This study contributes to the existing body of knowledge about completions in VET by including the original completion intention of students in the examination of completion patterns.*

## Introduction

In recent years there has been an increased policy focus on qualification completions in both VET and higher education sectors in Australia. Governments are keen to know

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the extent to which students complete the qualifications or studies they commence because they want to ensure adequate accountability for the expenditure of any public training funds that may have been used. In the university sector it has long been recognised that the completion of an undergraduate degree imparts significant social and economic benefits on students and society as a whole (Borland, 2002; James, 2001; Marks, 2007). As a consequence of the perceived and real benefits of obtaining a university degree, completion rates have been recorded at a relatively high level of 80%, along with an improving trend (ACER, 2011). Completions in vocational education and training (VET)<sup>3</sup> on the other hand have been known to be substantially lower than in the university sector. A variety of reasons have been cited to account for the low VET completions in Australia, including problems with employment and course, health and chance events, institutional factors, and financial and family problems (Long et al. 1995). Other authors concluded from the analysis of the English higher education system that wrong choice of field of study, financial difficulty and dissatisfaction with the training experience (Yorke et al., 1997), as well as inability to cope with the training demands, social dissatisfaction and dissatisfaction with the institutional environment contribute to significant non-completion (Yorke, 1999).

One substantial dissimilarity between the completion of a qualification (or degree) in the university and VET sector context appears to be the perception of non-completion. In the university sector non-completion is often (but not always) associated with failure, while in the VET sector it is accepted that non-completion frequently means that students have achieved the specific training goal which prompted them to enrol in a particular program (McInnes et al., 2000; Karmel & Nguyen, 2006; Mills et al., 2012). For instance, a plumber may enrol in a certain module to acquire the skills involving a new technique without the intention of gaining credit toward a qualification. Cohen and Brawer (1996) commented that to vocational students who are seeking a job, completing their training becomes irrelevant as soon as a job becomes available. There is thus less negative stigma attached to categories such as 'non-completer' or 'dropout'. This, in addition to the above-mentioned impediments, may account for the considerable differences in completion rates and additionally

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<sup>3</sup> Completion rate in the VET sector as used in the paper refers exclusively to course completion rate, unless otherwise specified. There are also module completion rates, which refer to the completion of individual modules. These completion rates do not exhibit the same definition problem as course completion rates, and are calculated simply by (modules completed divided by modules commenced)\*100.

necessitates caution when attempting to directly compare completion rates between both sectors, as these numbers need to be interpreted differently.

An additional issue in assessing the difference in completion rates between the university and VET sector is that there has been some controversy about the way in which completion rates are determined in the vocational system. At the current point in time there is no unique student identifier and the concept of commencement of a qualification is not very well defined in the VET system (Mark & Karmel, 2010). Completion rates can consequently not be calculated in a straightforward manner. In their paper, Mark and Karmel therefore used a modelling technique in an attempt to derive completion rates in Australian vocational education. This approach enabled them to estimate completion rates for students commencing in 2005 and yielded an overall completion rate of 27.1%, with significant variation between several categories of students (for example, full-time, part-time, age groups, course level). The result of this analysis has been met with some scepticism. Ross (2011) cited various industry figures who pointed to substantially higher completion rates in selected fields. For instance, an independent analysis by Service Skills Australia (SSA) yielded completion rates substantially higher than the figures published by Mark and Karmel. Reasons cited as responsible for the discrepancies were temporary withdrawals such as for pregnancy, illness, relocation etc. which were not accounted for in the Mark and Karmel study. The authors of the original study dismissed these objections and suggested that the SSA study relied on cherry-picked training providers and on too short a period of analysis (Ross, 2011). Despite these somewhat conflicting research results with respect to actual completion figures, there is a general perception that Australian VET completion rates are low (Mark & Karmel, 2010; Azemikhah, 2009; Snell & Hart, 2007).

In order to investigate the extent to which students do commence their VET studies with the aim of not completing them, the Australian National Centre for Vocational Education Research (NCVER) designed and conducted the Student Intentions Survey (SIS) in 2011 (NCVER, 2011). This survey was intended to canvas students' completion intentions along with the collection of social and educational data. The surprising main result of this survey was that a surprisingly high percentage of students (93%) set out to complete their qualification. While this figure may have been somewhat inflated (it appears reasonable to speculate that some students may not have been willing to divulge their true intentions as, for instance, government funding may have depended on their declared aim to complete a prescribed course of study), it is of

interest to explore the unexpected large disparity between intended and actual completions.

The purpose of this study is thus to explore some questions that surround issues about completion in Australian vocational education. Specifically, the relationship between student satisfaction, the benefits to completion, the intention to complete and actual completion is investigated. This relationship is analysed in a framework that differentiates by the fundamentally different profiles of part-time and fulltime students. Historically, analyses of completion patterns in the Australian VET sector have focused on uncovering determinants of completion in VET. This approach, however, fails to take account of the unique aspect of VET education that a significant portion of students enter the VET system without the intention of completing a qualification. Therefore, this study employs a two pronged approach. Firstly, the determinants of raw completions are examined. Secondly, the concept of the 'completion deficit', defined as a measure of the divergence between the intention to complete and actual completion, is developed. The benefit of this approach is that it enables the identification of determinants of non-completion while accounting for different individual intentional patterns of students in respect to completion. In addition to uncovering generic patterns of non-completion, the approach introduced here could also enable administrators to identify students with high probabilities of non-completion and focus intervention measures on those who are likely to intend to complete their studies.

### **Data and data preparation**

This study makes use of two surveys conducted in 2011: The Student Outcomes Survey (SOS) and the Student Intentions Survey (SIS). The SOS is an annual survey that focuses on student outcomes with VET and also collects data on personal and training characteristics, as well as student satisfaction and related measures. The SIS was a one-off survey aimed at measuring students' intentions in respect to their plans to complete the course they were enrolled in. The SOS, designed to enable estimates of key indicators at the institution level in 2011, achieved about 110,000 responses out of about 300,000 sampled students. The SIS featured a much smaller received response of 11,000 out of a sample of 23,000 students, as this survey was designed to provide statistically meaningful estimates at the national level only (NCVER 2011). While both surveys gathered a similar level of administrative, demographic and educational student background data, the SIS limited the information that was collected to issues

surrounding the willingness to complete, knowledge about the training at enrolment and attitudes toward the training and vocational education.

The study presented here defines completion based on the classification of Graduates and Module completers in the SOS, where graduates are students who have completed a VET qualification and module completers have successfully completed part of a course (for example, at least one module) without completing a qualification and who have left the vocational education and training system by the time the survey was undertaken (NCVER, 2011a). The benefit of utilising this categorisation was that a large amount of data was readily available for analysis and that the categorisation into these two groups was largely uncontroversial and accepted in the VET community. The primary drawback of this approach was that it omitted those students who enrolled but did not complete a single module. However, with module completion rates of around 90%, it was assumed that this group of students would have accounted for only a very small percentage of non-completing students. Furthermore, the total absence of any data for this type of student at the national level would have made their inclusion in any analysis problematic.

This analysis is aimed specifically at how the benefit to completion, the intention to complete, student satisfaction, and actual completion are related. The benefit to completion for individual students was determined using SOS Data and employing the methodology described in Karmel and Fieger (2012). As can be seen in Table 1, there is significant variability in completion benefits between the various outcomes. While there is a strong completion benefit in terms of further study (e.g. a completer is 125% more likely to be in further study than a non-completer) and also employment after training and improved employment conditions (25%), the benefit to completion in terms of salary and occupational status are diminutive.

**Table 1 Benefit to completion for several outcomes**

<b>Training outcome</b>	<b>Benefit to Completion</b>
Employment after training	16 %
Full-time salary	-2 %
Occupational status	4 %
Further study	125 %
Improved employment conditions	25 %

As the samples for SIS and SOS were drawn from two different populations and thus contained different individual students, a method was devised which allowed the transferral of the information about the intention to complete that was gained from the SIS to the SOS which contained the information about actual completion. This was achieved in the following way: First, using the SIS, a model was developed that estimated the intention to complete (Table 2, in Appendix). This model had fairly substantial explanatory power and explained about 59% of the variance in the intention to complete. It was also noteworthy that females were 38% more likely to intend to complete than males, and younger age groups were more likely to intend to complete than older age groups. Those who were enrolled full-time were three times more likely to intend to complete than part-time students, and non-remote students had a greater propensity to intend to complete than remote students. Not surprisingly, those studying with employment-related goals were more likely to intend to complete than those with personal reasons for study.

Subsequently the coefficient estimates from the intention to complete model in the SIS model shown in table 2 were used to perform an out-of-sample prediction using the corresponding variables from the SOS to predict the intention to complete probabilities for every individual in the SOS.

In order to develop a continuous variable that encompassed the probability of actual course completion a similar model was developed using the SOS (Table 3, Appendix).

It was evident from the 'intention to complete' and 'actual completion' models that the estimated coefficients were reasonably similar, albeit mostly more pronounced in the actual completion model. This could be seen in the much higher propensity of diploma and above students to complete in relation to other qualification levels compared with the intention model. Similarly, in the actual completion model full-time students were 15 times more likely to complete than their part-time counterparts, whereas in the intention model they were only three times as likely. The final group of variables necessary for this analysis comprised three items of, satisfaction with teaching, assessment, and general satisfaction. These variables correspond to three groups of satisfaction items in the SOS. For this study the values of the constituent variables of the three groups were averaged.

### Probability of completing versus probability of intention to complete

After preparing probability scores for completion and intention to complete in the SOS it was of interest how these two variables related. A graph showing this relationship can be seen in Figure 1.

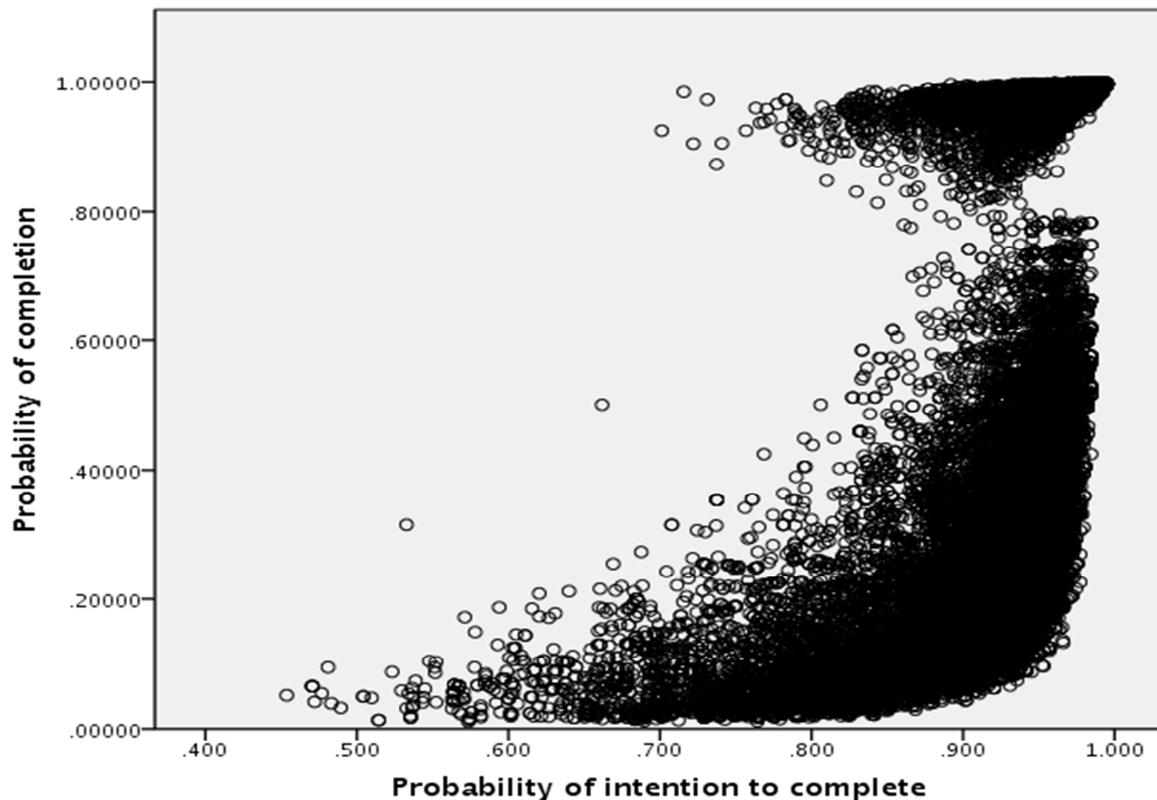


Figure 1 Probability of completing v probability of intention to complete

The relationship between the probabilities of completion and intention to complete was not linear. There appeared to be two subgroups, separated at a probability to complete of about 0.8. The first subgroup, located between a probability of completion of zero and about 0.8, revealed the pattern of a rational function, where, as the probability of intention to complete increases, the probability of completion increases slowly to a certain point and then rapidly over a small increase in the probability of intention to complete. The second subgroup with a probability to complete of above 0.8 exhibited a distinctly different pattern. The shape here had a funnel-like appearance where probability of intending to complete and probability to complete increase at similar rates, and culminate close to the [1,1] nexus of the graph. Further analysis revealed that the first subgroup was representative of part-time students and the second subgroup of full-time students. In the part-time

subgroup there were large numbers of students with a low probability to complete and a much smaller proportion of students with a high probability to complete, while most still had a fairly strong intention to complete. Among full-time students the probability of intending to complete and probability of actual completion was universally strong. Overall the high propensity of intending to complete was no surprise, as in the 2011 SIS 93% of all students stated their intention to complete. Values for the probability of completing on the other hand were distributed across almost the entire spectrum between 0 and 100%, including a substantial number of students exhibiting close to zero probability to complete. The unique pattern of the probability of completing and the probability of intention to complete necessitated that the subgroups of full-time and part-time students were examined in separate analyses.

### Part-time student completions

The relationship between the probability of intention to complete and the probability of actual completion for part-time students appeared to be non-linear (Figure 2).

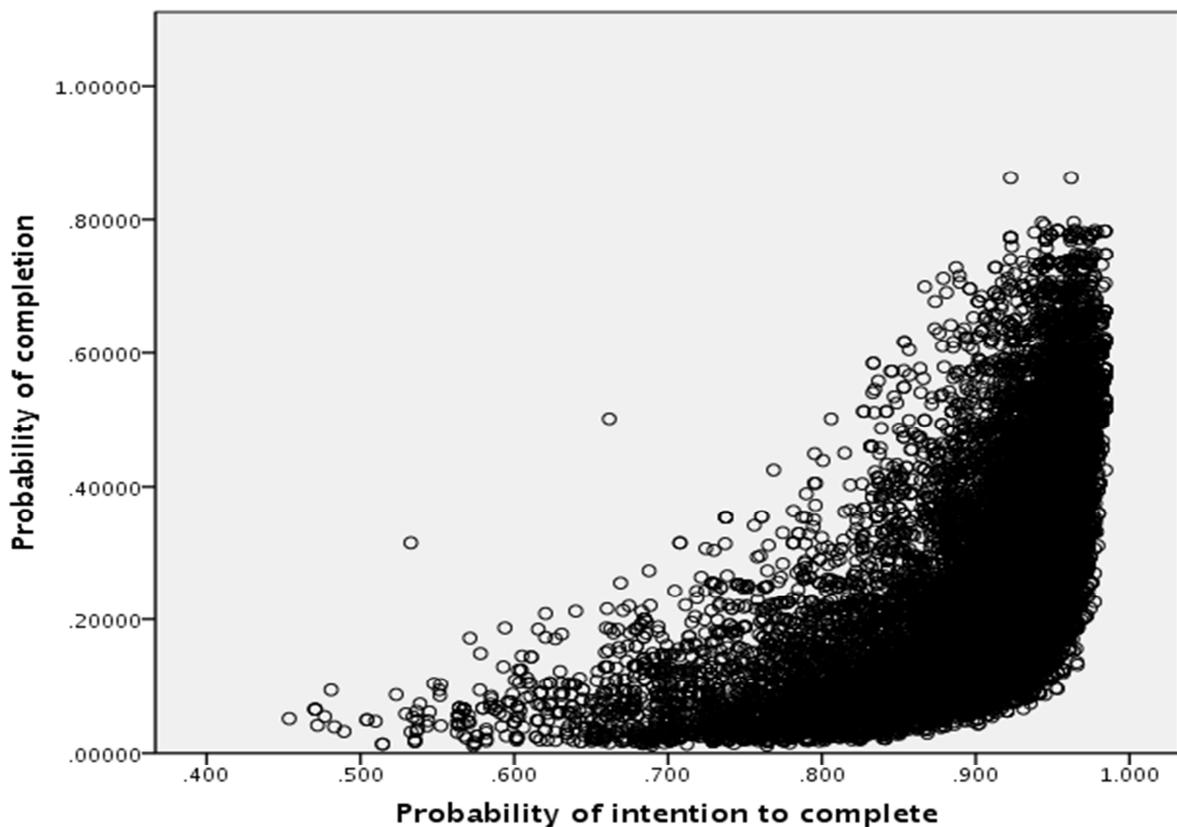


Figure 2 Probability of completing v probability of intention to complete, part-time students only

It was therefore decided to transform the variable indicating the probability of intention to complete. Visual inspection of figure 2 revealed the pattern of a rational function, characterised by this functional form (1):

$$T = \frac{C_1}{(1 - Prob_{completion-intent})} \quad (1)$$

In this formula T represented the transformed variable and  $C_1$  the parameter that had to be determined via a non-linear regression, using a sequential quadratic programming algorithm.  $C_1$  was estimated as 0.016 by the algorithm. Entering this value into the transformation formula and regressing the transformed probability of intention to complete variable on the probability to complete variable improved the fit of the regression estimation from an r-squared of 0.36 (linear) to 0.47 (transformed).

This first analysis employs part-time students' probability of completion as dependent variable and the transformed probability of intention to complete as well as the benefits of completion as predictors in an OLS regression. While it appeared sensible to speculate that intention to complete and the pay-offs related to completion played a major role in modelling completion, it was also expected that students' direct experiences with their training could impact on the probability of completion. Previous research in post-compulsory education has shown that satisfaction with the training was an important factor in non-completion (Yorke, 2000; Martinez, 2001). To determine the impact of the probability of intention to complete and the payoffs to completion on the probability to complete and also to evaluate whether student satisfaction with the training can provide additional power to improve the explanatory value of this model a hierarchical regression was performed. This model employed two sets of predictors: The first set comprised the probability of intention to complete and the benefits to completion (the 'Reduced model'), and the second set added the three categories of student satisfaction from the SOS, e.g. satisfaction with teaching, assessment, and general learning (the 'Full model'). The resulting parameters can be seen in Table 4.

**Table 4 Impact of intention to complete and pay-offs on completion (part-time students)**

		Coefficient	Std error	Beta	t	Sig	
<b>Reduced model</b>	<b>Payoff</b>	Prob. intention to complete	0.53	<0.01	0.51	358.8	<0.01
		Employment	-0.19	<0.01	-0.25	-128.6	<0.01
		FT salary	0.49	<0.01	0.29	145.9	<0.01
		Occupational status	-0.13	<0.01	-0.08	-42.1	<0.01
		Further study	-0.05	<0.01	-0.19	-146.3	<0.01
		Improved empl. condition	0.32	<0.01	0.34	163.6	<0.01
		<i>Constant</i>	-0.31	<0.01		-116.2	<0.01
----- R-squared (adj) = 0.59 F = 67,153 -----							
<b>Full model</b>	<b>Payoff</b>	Prob. intention to complete	0.52	<0.01	0.50	356.9	<0.01
		Employment	-0.19	<0.01	-0.26	-132.9	<0.01
		FT salary	0.50	<0.01	0.29	147.1	<0.01
		Occupational status	-0.14	<0.01	-0.09	-44.6	<0.01
		Further study	-0.05	<0.01	-0.19	-145.1	<0.01
		Improved empl. condition	0.32	<0.01	0.34	165.7	<0.01
	<b>Satis.</b>	Teaching	-0.02	<0.01	-0.09	-47.4	<0.01
		Assessment	0.01	<0.01	-0.01	-3.2	<0.01
		General	0.02	<0.01	0.09	54.7	<0.01
		<i>Constant</i>	-0.27	<0.01		-92.4	<0.01
		----- R-squared (adj) = 0.6 F = 46,017 -----					

The reduced model explained the probability of completing very well with the predictors explaining about 59% of the variance in the probability of completing. All predictors were significant, although standardised regression coefficients suggested that the strongest positive impact on completion by far came from a strong intention to complete. Surprisingly, the employment, occupational status and further study pay-offs had a negative impact on the probability of completion, suggesting that these three pay-off considerations played little substantive role when students decided not to complete their qualification. On the other hand, larger expected pay-offs to completion from salary and improved employment conditions were positively and strongly associated with a higher probability of completion.

The full model added the satisfaction component to the reduced model. As the change in R-squared between the reduced and full model was rather small (0.59 v 0.6), a partial F test (2) was computed to determine whether the addition of the satisfaction component made a significant difference to the model. We calculated the partial F-test via:

$$F = \frac{(SSQ_{res_{red}} - SSQ_{res_{full}})/3}{MSS_{res_{full}}} \quad (2)$$

which yielded an F value of 1,522 ( $p < 0.01$ ), indicating that the addition of the satisfaction component made indeed a significant contribution to the model. General satisfaction had the strongest positive impact of the three satisfaction categories, with higher general satisfaction related to stronger probability of completion. Teaching satisfaction was negatively associated with completion and the impact of satisfaction with assessment was negligible. While the association of decreasing teaching satisfaction with a higher completion probability may appear implausible at first, Edwards and Waters (1982) have also found a reduced role of direct course-related satisfaction with course completion in post-secondary education. In their analysis it was also general satisfaction that exhibited much stronger predictive power for completion.

From this initial analysis it can be concluded that the intention to complete early in the training provides the strongest indicator of actual completion for part-time students. The impact of individual completion payoffs on completion is mixed. While the completion payoff in terms of full-time salary and improved employment conditions appears positively related to the probability of completion, other payoffs investigated played no positive role. Of the satisfaction items it was mainly general satisfaction that was associated with positive completion outcomes for part-time students.

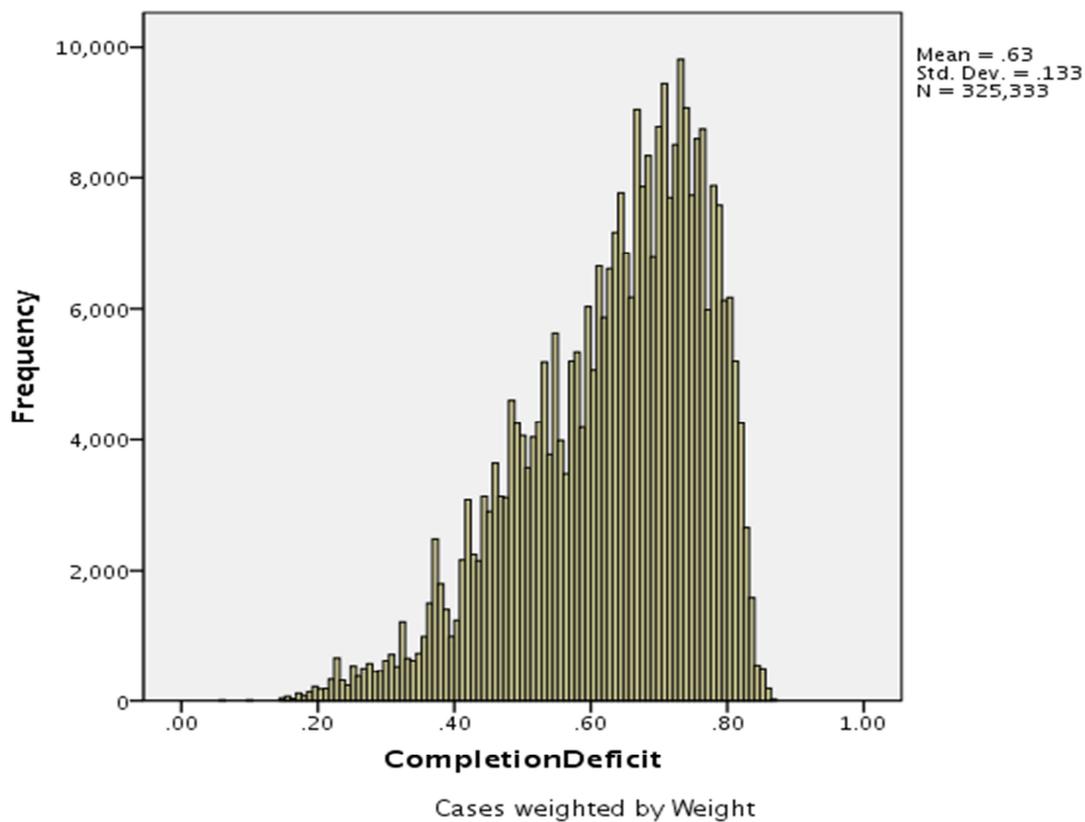
### **Completion deficits of part time students**

It was already pointed out earlier that there appeared to be a striking discrepancy between the relatively strong overall intention to complete a qualification and dismal actual completion. Some commentators have argued that, in addition to 'generic' reasons for non-completion (for example, personal circumstances, financial difficulties, sickness, dissatisfaction; Yorke et al, 1997, Yorke, 2000) there are also VET-specific reasons. The main VET-specific non-completion reason cited in this context was that a substantive number of students only aimed to gain specific skills rather than a full qualification and thus discontinued their studies once those skills had been acquired (Karmel & Nguyen, 2006; Snell & Hart, 2007). While this contention may explain the low actual completion rates, it was still not sufficient to explain the comparatively large proportion of students who appeared to commence their studies with the intention to complete.

To shine a light on this disparity the concept of the completion deficit (CD, (3)) was developed and defined as the difference between the probability of completing and the probability of intention to complete.

$$CD = P[\text{Comp}_{\text{intent}}] - P[\text{Comp}] \quad (3)$$

The range of possible values for this new variable was (-1, 1) where -1 indicates someone who did not intend to complete but did, and 1 denotes a student who intended to complete but did not. Given the robust pattern of part-time students who exhibited a strong probability of intention to complete coupled with a low probability of actual completion (see figure 2), it was expected that the mean of the completion deficit for this student type would be well above 0. The distribution of the CD for part-time students confirms this and can be seen in Figure 3.



**Figure 3 Histogram, completion deficit, part-time students**

In the completion deficit graph no students with a negative completion deficit can be identified. On the right from zero, starting at about 0.15 and with increasing student numbers as the CD increases, were those students who exhibited a positive completion

deficit, e.g. those who were more likely to intend to complete than to actually complete. The number of such students continues to increase up to a completion deficit of about 0.7 and then drops rapidly. The students located between about 0.4 and 0.8 appeared to represent a significant proportion of those students who account for the low completion rates in VET. From a policy standpoint aiming at increasing completion rates this must be considered significant because of the magnitude of the completion deficit and the large number of students exhibiting such substantial completion deficits. From an administrative viewpoint, these students who exhibit such large completion deficits could also represent those who should potentially be targeted in any intervention measures with the aim to increase completion rates. A conceivable benefit of utilisation of the methodology outlined above would be that a completion deficit score could be computed for individual students at the point of enrolment.

The advantage of the completion deficit over the probability to complete in analysing completion patterns is that the completion deficit puts emphasis on those who have a high probability of intention to complete but ultimately a low probability of actual completion. A hierarchical OLS regression was performed to get a basic idea of how the predictors that have been developed in this paper interrelate with the completion deficit. The pay-offs for employment, salary, occupational status, further study and improved employment conditions as well as the different types of student satisfaction were used as predictors and the completion deficit as dependent variable. Again, the secondary aim in this analysis was to determine whether student satisfaction with the training played an additional role in completion patterns (Table 5). The reduced model explained about 29 % of the variance in the completion deficit. Completion payoffs from salary and improved employment conditions were most strongly associated with the completion deficit. In both cases a lower payoff indicated a higher completion deficit, suggesting that a low payoff for these two variables is related to a higher probability of intention to complete paired with a lower probability of actual completion. The impact of payoffs for employment, occupational status and further status on the completion deficit was of smaller magnitude and positive. It was also of interest whether the addition of the satisfaction component improved the completion deficit model significantly for part-time students. The resulting full model had a slightly higher r-squared of around 0.30, indicating the model improved only moderately. However, the partial F test yielded a result of 1,918 ( $p < 0.01$ ), indicating that the added satisfaction component improved the model significantly. General and

teaching satisfaction had opposite effects on the completion deficit with increasing teaching satisfaction related to a higher completion deficit, and thus a bigger rift between the intention to complete and actual completion. On the other hand, higher general satisfaction indicated a reduced completion deficit. Our results thus suggest that an improved overall general VET experience for students may be more helpful to reduce the completion deficit than an increase in teaching satisfaction.

**Table 5 Impact of payoffs and satisfaction on completion deficit (part-time students)**

		Coefficient	Std error	Beta	t	Sig	
<b>Reduced model</b>	<b>Payoff</b>	Employment	0.20	<0.01	0.33	130.2	<0.01
		FT salary	-0.56	<0.01	-0.40	-151.9	<0.01
		Occupational status	0.15	<0.01	0.12	46.1	<0.01
		Further study	0.05	<0.01	0.23	131.7	<0.01
		Improved empl. condition	-0.37	<0.01	-0.47	-184.2	<0.01
		<i>Constant</i>	1.17	<0.01		423.6	<0.01
-----							
R-squared (adj) = 0.289 F = 22,493							
<b>Full model</b>	<b>Payoff</b>	Employment	0.21	<0.01	0.33	134.3	<0.01
		FT salary	-0.56	<0.01	-0.40	-153.6	<0.01
		Occupational status	0.16	<0.01	0.13	50.0	<0.01
		Further study	0.05	<0.01	0.22	130.0	<0.01
		Improved empl. condition	-0.36	<0.01	-0.46	-185.2	<0.01
		<i>Constant</i>	1.12	<0.01		367.0	<0.01
	<b>Satis.</b>	Teaching	0.02	<0.01	0.13	49.7	<0.01
		Assessment	<0.01	<0.01	0.02	6.2	0.77
		General	-0.02	<0.01	-0.14	-64.7	<0.01
<i>Constant</i>	1.12	<0.01		367.0	<0.01		
-----							
R-squared (adj) = 0.304 F = 15,071							

Finally, it was of interest to identify those groups of part-time students who exhibited particularly striking completion deficits in order to enable the easy identification of ‘high risk’ groups based on their demographic and educational characteristics. Chi-squared Automated Interaction Detection was employed to calculate and visualise the classification of groups of part-time students by their respective completion deficit means. Independent variables in this analysis were age group, gender, qualification level, prior education, employment status before training, remoteness, socioeconomic status, field of education and study status. The resulting classification tree can be seen in Figure 4 (Appendix).

Starting with an overall completion deficit of 0.63 for part-time students, the first important split is at the qualification level: Here, it can be seen that Certificate I/II has the poorest outcome with the largest completion deficit of 0.72, whereas Certificates III/IV and Diploma and above qualifications completion deficits were estimated as 0.62 and 0.46 respectively. While node splits after the qualification levels were not uniform across qualifications several patterns emerged. Of those, most notable were that the completion deficit increases with age, males have higher completion deficits than females, and rural and regional students have higher completion deficits than urban students. It can thus be generalised that at the completion deficit extremes of part-time students there are young female, urban, diploma and above students are likely to display relatively low completion deficits, whereas older, male, Certificate I/II students from remote areas are more likely to exhibit high completion deficits.

### Full-time student completions

Full-time students' patterns of the probability of completion and the probability of intention to complete were substantially different from part-time students (Figure 5). Both probabilities were on average substantially higher, and they appeared to be more linearly related.

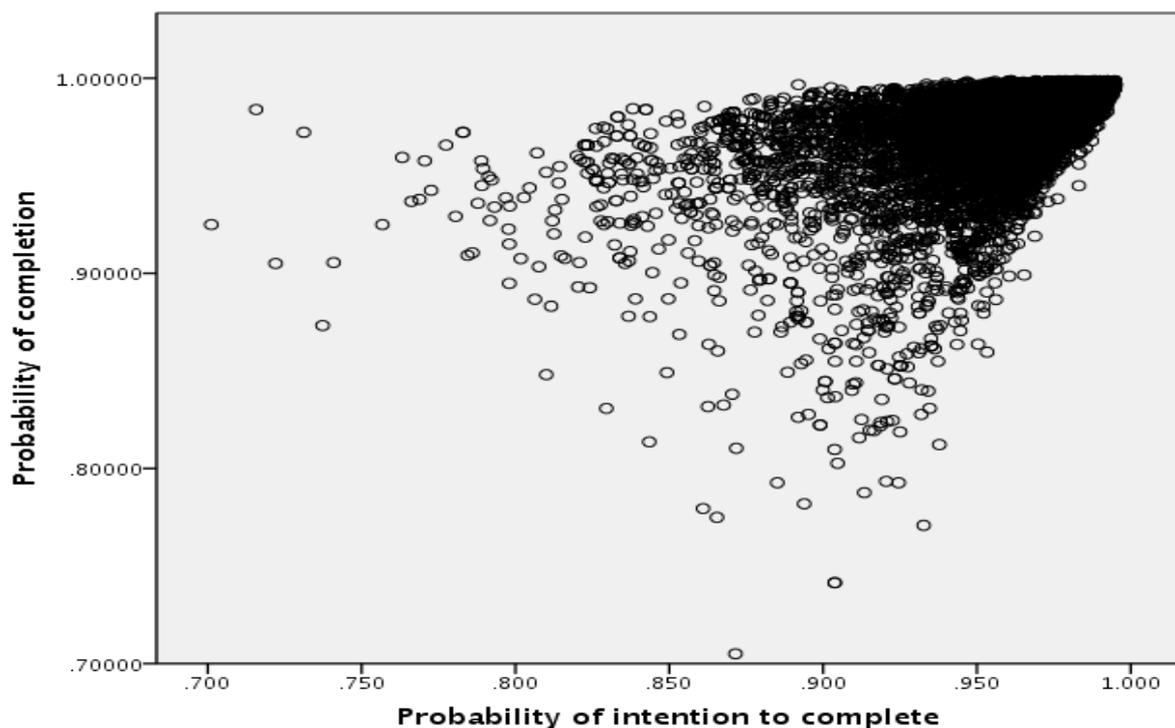


Figure 5 Probability of completing v probability of intention to complete, full-time students only

The funnel-like shape toward the [1,1] nexus in the above graph foreshadowed potential heteroskedasticity problems when subsequently regressing the probability of intention to complete on the probability of completion. While heteroskedasticity does not bias estimated regression coefficients, it does have an impact on standard errors. The ‘robust’ standard error option was therefore used in subsequent regression where the probability of intention to complete was used as a regressor on the probability to complete.

**Table 6 Impact of intention to complete and pay-offs on completion (full-time students)**

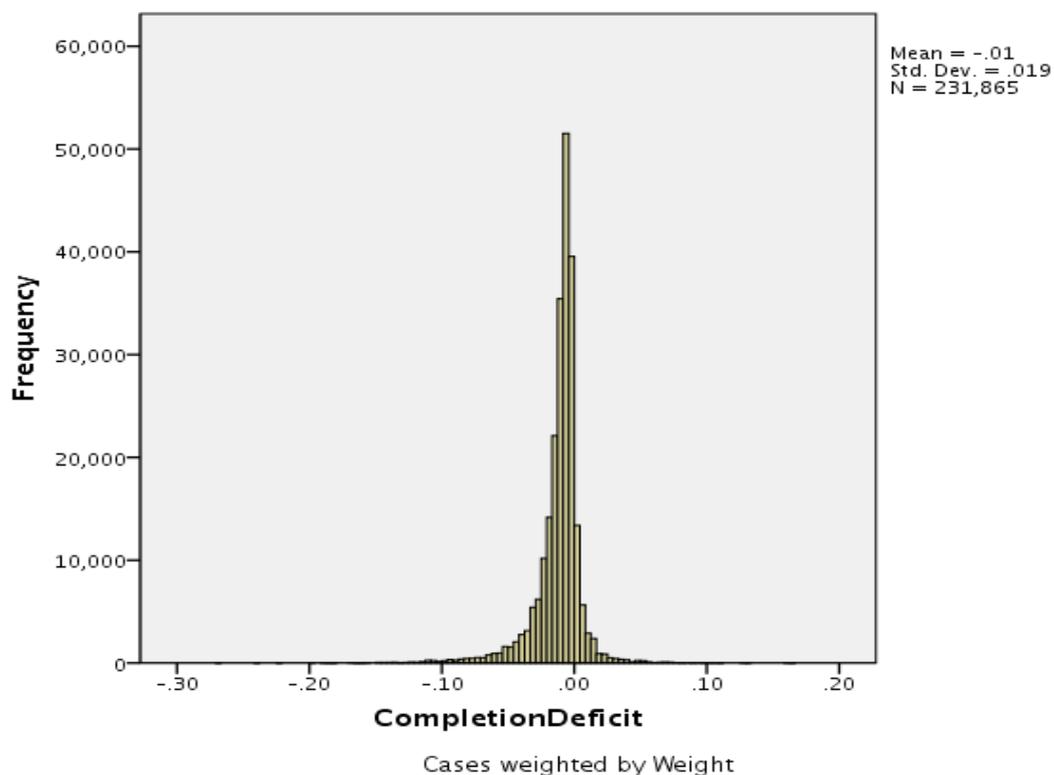
		<b>Coefficient</b>	<b>Std error</b>	<b>Beta</b>	<b>t</b>	<b>Sig</b>	
<b>Reduced model</b>		Prob. intention to complete	0.37	0.01	0.48	259.8	<0.01
		Employment	-0.01	<0.01	-0.12	-55.6	<0.01
		FT salary	0.05	<0.01	0.25	104.5	<0.01
		Occupational status	-0.02	<0.01	-0.13	-52.9	<0.01
		Further study	-0.01	<0.01	-0.16	-92.6	<0.01
		Improve empl. condition	0.03	<0.01	0.22	99.0	<0.01
		<i>Constant</i>	<i>0.59</i>	<i>0.01</i>		<i>473.9</i>	<i>&lt;0.01</i>
-----							
R-squared (adj) = 0.456 F = 29,614							
<b>Full model</b>		Prob. intention to complete	0.37	0.01	0.48	260.5	<0.01
		Employment	-0.01	<0.01	-0.12	-56.2	<0.01
		FT salary	0.05	<0.01	0.25	104.8	<0.01
		Occupational status	-0.02	<0.01	-0.13	-53.8	<0.01
		Further study	0.00	<0.01	-0.16	-91.9	<0.01
		Improved empl. condition	0.03	<0.01	0.22	98.2	<0.01
		Teaching	-0.01	<0.01	-0.04	-15.8	<0.01
		Assessment	0.00	<0.01	0.00	0.3	0.77
		General	0.01	<0.01	0.05	23.8	<0.01
		<i>Constant</i>	<i>0.59</i>	<i>0.01</i>		<i>468.4</i>	<i>&lt;0.01</i>
	-----						
R-squared (adj) = 0.458 F = 19,880							

The reduced model (Table 6) predicting the probability of completion had a slightly less explanatory value for the subset of full-time students (r-squared = 0.46) than the identical model for part-time students (r-squared 0.59). The probability of intention to complete was again the strongest predictor while positive completion payoffs from salary and improved employment conditions were also strong completion payoff predictors. Completion payoffs from employment, occupational status and further study pay-offs played a less pronounced role and did not relate to a higher probability of completion. Adding the satisfaction component to the reduced model increased the explained variance only marginally (r-squared from 0.456 to 0.458). However, the

partial F-test ( $F = 225$ ;  $p < 0.01$ ) indicated that the satisfaction component added significantly to the model. As in the model of part-time students, only general satisfaction was positively related to a higher probability of completion, albeit only to a very small degree.

### Completion deficits of full-time students

Given the shape of the probability of intention to complete and probability of completion displayed in figure 1 it could be expected that the completion deficit of full-time students would be radically different from the part-time students evaluated in the previous section. The histogram in figure 6 shows that this suspicion was warranted.



**Figure 6 Histogram completion deficit full-time students**

The histogram displayed a near normal shaped distribution emerging from about -0.1 to 0.05, and centred slightly to the left of zero. This represented an important discovery as it suggests that the problem with substantial completion deficits lies almost entirely with part-time students. Students with a completion deficit below zero obviously did not have a completion deficit as such as they, against their own expectations, were likely to complete their training despite not intending to do so. On

the right hand side of zero was a small minority of students whose likelihood to intend to complete slightly outweighed the likelihood to actually complete. It would thus appear that generally full-time students do not warrant significant attention from VET administrators aiming to improve completion patterns. It still remained of interest which determinants predicted differences in the completion deficit for full-time students. Completion payoffs and student satisfaction were hierarchically regressed on the completion deficit of full-time students (table 7).

**Table 7 Impact of payoffs and satisfaction on completion deficit (full-time students)**

		<b>Coefficient</b>	<b>Std error</b>	<b>Beta</b>	<b>t</b>	<b>Sig</b>	
<b>Reduced model</b>	<b>Payoff</b>	Employment	-0.01	<0.01	-0.12	-44.0	<0.01
		FT salary	-0.04	<0.01	-0.20	-66.1	<0.01
		Occupational status	0.05	<0.01	0.28	90.0	<0.01
		Further study	0.01	<0.01	0.18	81.9	<0.01
		Improved empl. condition	0.02	<0.01	0.18	66.5	<0.01
		<i>Constant</i>	<i>-0.05</i>	<i>&lt;0.01</i>		<i>-101.7</i>	<i>&lt;0.01</i>
----- R-squared (adj) = 0.086 F = 3,993 -----							
<b>Full model</b>	<b>Payoff</b>	Employment	-0.01	<0.01	-0.11	-43.0	<0.01
		FT salary	-0.04	<0.01	-0.21	-66.8	<0.01
		Occupational status	0.05	<0.01	0.28	91.4	<0.01
		Further study	0.01	<0.01	0.18	81.2	<0.01
		Improved empl. condition	0.02	<0.01	0.18	67.4	<0.01
	<b>Satis.</b>	Teaching	0.00	<0.01	0.02	6.5	<0.01
		Assessment	0.00	<0.01	0.03	10.4	<0.01
		General	<-0.01	<0.01	-0.07	-26.8	<0.01
		<i>Constant</i>	<i>-0.05</i>	<i>&lt;0.01</i>		<i>-91.1</i>	<i>&lt;0.01</i>
----- R-squared (adj) = 0.089 F = 2,595 -----							

The explanatory power of this model was modest (r-squared reduced model = 0.086; full model = 0.089). The strongest predictor was the completion payoff from occupational status and indicated that higher payoffs are related to increased completion deficits. The satisfaction component improved the model significantly (partial F-test F = 241, p<0.01), albeit to a small degree. Decreasing general satisfaction was associated with higher completion deficits.

A CHAID analysis of various full-time student categories in respect to the completion deficit was also performed. However, due to the narrow distribution of the completion deficit this analysis revealed no additional insights and the resulting graph was thus omitted here.

## **Conclusion**

This study analysed completions and the gulf between intended and actual completions in the Australian VET sector. As there were no data available that tracked a cohort of students from enrolment to completion with respect to their intentions, we had to develop models that predicted the probability of intending to complete for those students where we knew the completion outcome from the Student Outcome Survey. It needs to be kept in mind that our analysis was based on such modelled data rather than actual data.

In this paper issues of completion of qualifications in the VET sector were examined. This included the impact of the student satisfaction, the benefit of completion, and the intention to complete on completions. The main finding was that completion issues in the VET sector are predominantly a problem within the part-time student population. The analysis also revealed a relationship between completion and the intention to complete, and to a weaker extent the some pay-offs to completion. Finally, the notion of the completion deficit was developed. This concept was then used to develop a classification of students that exhibited a particularly strong disparity between intended and actual completion. One unexpected outcome of this analysis was the relatively small contribution of student satisfaction to the probability of completion and the completion deficit. While the stronger magnitude of 'general' satisfaction over course-related satisfaction found in earlier research in respect to completion outcomes could be confirmed, it was still striking to observe the relatively low contribution of overall satisfaction to the models dealing with completion. Furthermore, it is possible that, due to the unique properties of the vocational education system discussed earlier in this paper (for instance, that a substantial proportion of non-completers fail to graduate because they have gained the skills they set out to acquire, or non-completion due to arising employment opportunities during the training), satisfaction is indeed less related to completion in the VET system when compared with the higher education sector. Furthermore, it is possible that the small contribution of satisfaction to the probability of completion and the completion deficit may partly reflect deficiencies in the way satisfaction was measured in the vocational sector.

With this study we pursued two goals. Firstly, it was intended to examine contemporary and controversial issues in vocational education and training

surrounding completion. As such this study has found and quantified several determinants of completion in the Australian vocational education sector using the latest available data. This also included the identification of categories of students that exhibit low propensities to successfully complete their qualifications. Secondly, it was intended to develop practical methodologies for educational administrators that could be used with the aim to improve completion outcomes in vocational education. For instance, applying the methods developed in this paper it would be possible to identify students at high risk of non-completion. These could be either students having low probabilities of completion, or students that have a high completion deficit score. The main benefit of the methods developed in this paper is that such scores could be calculated and assigned to students at the time of enrolment. It would thus be possible to potentially 'follow' students at risk of non-completion and aim potential interventions at them.

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## Appendix

**Table 2** Logistic regression parameters for intention to complete

		Probability of intending to complete				
		B	S.E.	Wald	Sig.	Exp(B)
Prior education	<Y12 & Certificate I/II	0.01	0.04	0.0	0.85	1.01
Prior education	Certificate III/IV	-0.13	0.04	11.9	<.01	0.88
Prior education	Diploma and above	-0.21	0.04	29.9	<.01	0.81
Prior education	Y12	0.00				
Field of education	Business	-0.02	0.04	0.3	0.58	0.98
Field of education	Community services	0.39	0.05	69.0	<.01	1.48
Field of education	Other	-1.09	0.05	568.0	<.01	0.34
Field of education	Other services	-0.72	0.04	339.1	<.01	0.49
Field of education	Technical	0.00				
Sex	Female	0.32	0.03	130.1	<.01	1.38
Sex	Male	0.00				
Age group	25–34 years	0.34	0.04	64.3	<.01	1.40
Age group	35–45 years	-0.05	0.04	1.8	0.18	0.95
Age group	<25 years	0.60	0.04	237.9	<.01	1.82
Age group	>45 years	0.00				
Qualification level	Certificate I/II	-0.73	0.07	109.6	<.01	0.48
Qualification level	Certificate III/IV	-0.16	0.06	6.1	0.01	0.85
Qualification level	Diploma	-0.52	0.07	59.7	<.01	0.59
Qualification level	Other	0.00				
Study status	Full-time	1.12	0.03	1,368.1	<.01	3.05
Study status	Part-time	0.00				
Employment status	Employed	0.00	0.03	0.0	0.94	1.00
Employment status	Not employed	0.00				
Remoteness	City	0.25	0.09	7.2	<.01	1.28
Remoteness	Regional	0.27	0.09	8.6	<.01	1.31
Remoteness	Remote	0.00				
SEIFA	Least disadvantaged	0.06	0.04	2.0	0.16	1.06
SEIFA	Somewhat disadvantaged	0.15	0.04	12.7	<.01	1.17
SEIFA	Most disadvantaged	-0.14	0.05	9.0	<.01	0.87
SEIFA	Little disadvantaged	-0.38	0.04	87.4	<.01	0.69
SEIFA	Very disadvantaged	0.00				
Reason for study	Employment related	0.47	0.03	250.3	<.01	1.60
Reason for study	Further study related	-0.28	0.05	35.9	<.01	0.75
Reason for study	Personal	0.00				
Constant		2.10	0.12	282.7	<.01	

N = 6971 Chi-Squared = 5864.7 R-squared(pseudo) = 0.593

**Table 3** Logistic regression parameters for actual completion

		Probability of actual completion				
		B	S.E.	Wald	Sig.	Exp(B)
Prior education	<Y12 & Certificate I/II	0.12	0.02	25.90	<.01	1.13
Prior education	Certificate III/IV	-0.05	0.02	4.24	0.04	0.95
Prior education	Diploma & above	-0.29	0.03	133.32	<.0001	0.74
Prior education	Y12	0.00				
Field of education	Business	0.35	0.03	165.73	<.01	1.42
Field of education	Community services	0.55	0.03	410.76	<.01	1.74
Field of education	Other	-0.11	0.05	4.61	0.03	0.89
Field of education	Other services	-0.83	0.03	677.87	<.01	0.43
Field of education	Technical	0.00				
Sex	Female	0.14	0.02	86.81	<.01	1.15
Sex	Male	0.00				
Age group	25–34 years	-0.04	0.03	2.36	0.12	0.96
Age group	35–45 years	-0.07	0.03	8.94	0.00	0.93
Age group	<25 years	0.53	0.02	494.38	<.01	1.70
Age group	>45 years	0.00				
Qualification level	Cert I/II	1.07	0.09	128.18	<.01	2.92
Qualification level	Certificate III/IV	1.75	0.09	352.30	<.01	5.77
Qualification level	Diploma	2.32	0.10	579.65	<.01	10.14
Qualification level	Other	0.00				
Study status	Full-time	2.71	0.03	7,725.67	<.01	15.07
Study status	Part-time	0.00				
Employment status	Employed	0.10	0.02	35.49	<.01	1.10
Employment status	Not employed	0.00				
Remoteness	City	0.19	0.02	62.75	<.01	1.21
Remoteness	Regional	0.03	0.02	1.20	0.27	1.03
Remoteness	Remote	0.00				
SEIFA	Least disadvantaged	0.01	0.03	0.13	0.71	1.01
SEIFA	Somewhat disadvantaged	0.00	0.03	0.00	0.98	1.00
SEIFA	Most disadvantaged	0.01	0.03	0.20	0.66	1.01
SEIFA	Little disadvantaged	-0.02	0.02	0.89	0.35	0.98
SEIFA	Very disadvantaged	0.00				
Reason for study	Employment	0.08	0.03	6.95	0.01	1.08
Reason for study	Further	0.02	0.05	0.10	0.75	1.02
Reason for study	Personal	0.00				
Constant		0.05	0.10	0.30	0.58	

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N = 67,502 Chi-Squared = 55,773.4 R-squared(pseudo) = 0.761

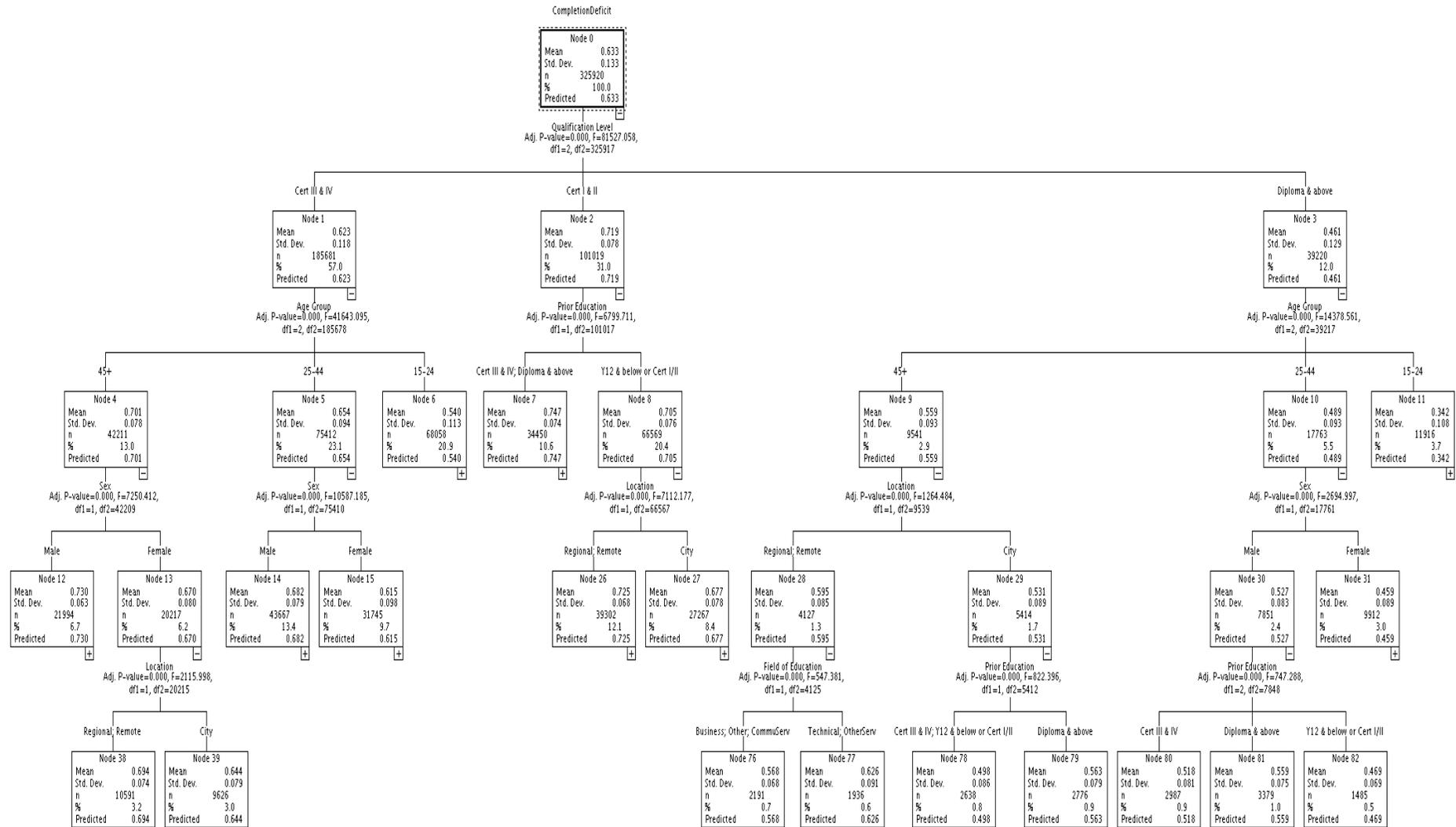


Figure 4 CHAID diagram, completion deficit, part-time students