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Have school vocational education and training programs been successful?

Alison Anlezark
Tom Karmel
Koon Ong
National Centre for
Vocational Education Research

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Level 11, 33 King William Street, Adelaide SA 5000
PO Box 8288 Station Arcade, Adelaide SA 5000, Australia
ph +61 8 8230 8400, fax +61 8 8212 3436
email ncver@ncver.edu.au
<http://www.ncver.edu.au>

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Key messages

This report investigates whether school vocational education and training (VET) programs provide successful outcomes for their participants. We define 'success' in the school context as retention to Year 12, and outside school in terms of full-time engagement with employment or learning, or part-time employment combined with part-time study. Finally, we look at whether school VET programs have been successful in establishing post-school VET pathways.

- Participation in school VET programs was found to have a positive impact on Year 10 to Year 11 retention but a negative impact on retention from Year 11 to Year 12. Overall, these programs had a small negative impact on retention from Year 10 to Year 12.
- The overall negative effect on retention from Year 10 to Year 12 is larger for boys than girls, for which it is close to zero. The negative impact is too small to be of any real policy significance. This conclusion is not altered if the vocational equivalent to Year 12 is included.
- There is a clear positive impact on post-school outcomes for students who participate in school VET programs in Year 11 but do not go on to complete Year 12. These gains are more sizeable for girls than boys. Over time, however, the positive effect is diluted. These gains are not seen for those who complete Year 12.
- School VET programs provide a clear vocational pathway for some students, particularly for boys studying in the areas of building and engineering. However, for most students the pathway is not so direct. Further, when comparing students of similar ages, we see different types of vocational education and training studied in and outside the school environment. For most students, there is a poor alignment between the types of VET programs studied at school and the requirements of the world of work or further study.
- Policy issues to emerge include:
  - Should school VET programs be offered at Year 10 rather than being concentrated at Year 11 and Year 12, given that many students leave before Year 11?
  - Should school VET programs be better aligned with the world of work or, alternatively, concentrate on broad pre-vocational skills?

Executive summary

The introduction of vocational education and training (VET) programs into schools, integrated with both the Australian Qualifications Framework (AQF) and the senior secondary certificate, was seen as a means of providing more diverse pathways to work and further study for young people. Since their inception in 1996, we have observed a rapid uptake to the extent that in 2004 around half of all senior secondary students (that is, those in Years 11 and 12) participated in school VET programs. But how successful are these school VET programs?

Our research focuses on a cohort of students from the Longitudinal Surveys of Australian Youth (LSAY), following them from Year 9 in 1998 through to 2002, one year out from Year 12 for the majority of students. During this time frame we had a relatively buoyant labour market, which has historically encouraged early school leaving and falling school retention rates.

To provide context, we first look at the characteristics of students who acknowledged that they participated in school VET programs in Year 11. This in itself is interesting in that we find considerable under-reporting of participation in school VET programs, suggesting that for many students school VET programs are of such similar substance to the existing curriculum that they are not acknowledged as vocational education and training.

We then go on to look at the success of students who did and did not participate in school VET programs in Years 11 and 12. Success is measured at school as retention to Year 12 (or its vocational equivalent) and, after school, as engagement with employment or further learning. Finally, we take a look at the post-school VET pathways of our cohort, comparing them with a broader group of students of equivalent age in the public VET system.

Do school students self-select into VET school programs?

We knew at the outset that there was extensive research on the characteristics of school VET students, including being of lower academic ability, from parents with lower education levels, and attending a government school. Our analysis confirmed this, but we also found that a student's self-perceived academic ability is as good an indicator of propensity to participate in school VET programs as is actual academic ability. This is important because we know that students self-select into school VET programs because they see these programs as providing a better match with their perceived academic ability. However, we did not find that students' perceptions of their peers related to their propensity to participate in school VET programs, which is noteworthy given the importance placed on peer group pressure.

Do school VET programs improve school retention?

In looking at retention, we find a positive effect from participation in school VET programs on retention from Year 10 to Year 11, but a negative effect on retention from Year 11 to Year 12. These effects are found after controlling for a wide range of personal characteristics, including academic ability and socio-economic characteristics. The effects are larger for boys than for girls. Replacing Year 12 with the vocational equivalent does not materially change this result.

Taking the effects together our model indicates an overall decrease in Year 10 to Year 12 retention of -0.5% for boys (or -0.4% if looking at Year 12 vocational equivalent) and virtually no change for girls.

Do school VET programs assist students in their transition from school to work or further study?

We see that the transition for school VET students who leave school after Year 11 is certainly smoother than those who do not participate in school VET programs. However, the gain is soon diminished over time. For students who complete Year 12, we see no benefit from participation in school VET programs; in fact we see a slightly negative effect.

Do school VET programs provide post-school VET pathways?

We find that school VET does provide pathways for some students into further vocational education and training, and that these tend to be boys studying engineering and building courses. While we see equal proportions of boys and girls participating in school VET programs, for girls we see little evidence of post-school continuation with school VET subjects. Thus, it would seem that girls are using school vocational education and training as a 'taster', or for immediate employment outcomes rather than for longer term post-school VET pathways. Indeed, many students are using school VET programs to eliminate what they do not want to do post-school, rather than to direct them into post-school VET pathways.

School vocational education and training is by no means the only pathway into post-school VET courses. We see as much post-school VET activity among students who leave school before they have an opportunity to participate in these programs as we do among school VET students. However, the transition into post-school VET courses is not as smooth for these early school leavers.

In looking at the types of school VET programs, we find that the fields of education delivered in school VET programs do not line up particularly well with VET programs offered outside school (that are more likely to reflect labour market demands), and, as noted above, girls tend to shy away from the VET subjects they studied at school. In comparing VET offerings inside and outside school one note of discord is that school vocational education and training is studied at a lower level, even for the same age groups. Certificate III is the bread and butter of the VET world and there are very few of these offered at school. There may be good reasons for this; for example, schools may not have ready access to appropriate infrastructure and trainers.

This research raises several issues worth further consideration:

- ✧ Is the focus of school VET programs in Year 11 and Year 12 appropriate given that many early school leavers do not get to Year 11, and the evidence is that it does not assist Year 11 to Year 12 retention?
- ✧ Do we need to distinguish between those students who are genuinely looking for a VET pathway and those who may have a passing interest in vocational education and training? Perhaps the administrative data on numbers undertaking VET courses at school are not particularly informative, since both groups are lumped together.
- ✧ Do school VET programs need to focus more seriously on a VET pathway with a clear labour market aim? That is, do school VET offerings need to be better aligned with those offered outside school, in both field and level, and should more attention be paid to employment prospects rather than thinking about school VET programs within its educational setting? Are there other educational settings that could be integrated into the schooling framework?

- ✧ Alternatively, given that school VET programs do not provide a clear vocational pathway for many VET-inclined students, would it be better to downplay the industrial aspects of vocational education and training at school (such as the emphasis on industry competencies and AQF certificates) and emphasise broader vocational education skills? That is, should we consider school VET programs more as pre-vocational preparation? This would certainly lend itself to the school setting.

Introduction

> Vocational education in schools assists all young people to secure their own futures by enhancing their transition to a broad range of post-school options and pathways.
> (Ministerial Council on Education, Employment, Training and Youth Affairs 2002a)

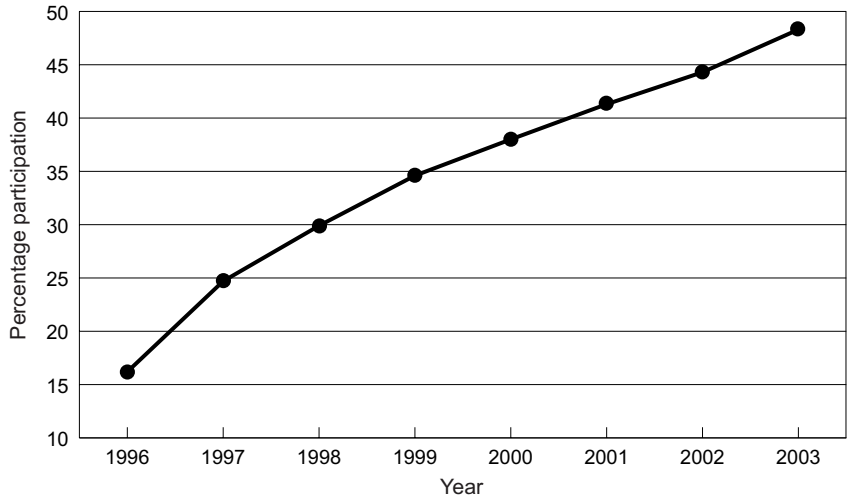
The introduction of vocational education and training (VET) in schools was a significant change to post-compulsory schooling. While vocational subjects have been delivered by schools prior to this, they did not lead to recognised VET qualifications. The VET in Schools program, as adopted by the Ministerial Council on Employment, Education, Training and Youth Affairs (MCEETYA) in the mid 1990s, incorporated vocational subjects which led to recognised Australian Qualifications Framework (AQF) certificates while also counting towards the various state senior secondary certificates (Department of Education, Science and Training 2002).

The introduction of the VET in Schools program was aimed at expanding opportunities for senior secondary students, and to prepare young people for the workplace of the future. In allowing young people to combine vocational studies with their general education curriculum, school VET programs aim to provide young people with better links to industry, and more diverse pathways from school to work and further study.

For students, the attractiveness of school VET programs is that they provide an alternative to the traditional pathway to university. Some students take VET subjects as part of their secondary school certificate, while others are less engaged with school VET programs, using them as a 'taster' of vocational education and training. As noted by Polesel et al. (2004), a number of students are simply unable to participate more fully in these programs because of limitations on provision, while others choose not to do school VET study because vocational education and training does not fit their academic trajectory.

School VET programs are certainly popular among Year 11 and Year 12 secondary school students. Since their introduction in 1996, when 16% of senior secondary school students participated in these programs, their popularity has grown to almost 50% in 2003 (see figure 1).

Figure 1: Participation of secondary students in school VET programs



Source: Ministerial Council on Education, Employment, Training and Youth Affairs (2004)

The number of schools offering these programs is broad. In 2003, over 95% of all schools that provided senior secondary programs included school VET programs in their curricula (Ministerial Council on Education, Employment, Training and Youth Affairs 2004).

The issue that we wish to address in this paper is whether school VET programs have been successful. We focus on two aspects:

- ✧ Year 12 retention (and its vocational equivalent)
- ✧ Post-school pathways.

If school VET programs are achieving their role in making school more attractive for those with more diverse needs and different learning styles, then we would hope to see increased school retention. Similarly, if school VET programs are achieving their role in enhancing post-school transition, and providing more diverse pathways from school to work and/or study, then we should be able to demonstrate that participation in these programs leads to successful post-school outcomes. By successful post-school outcomes we mean post-school full-time engagement with work and learning, or part-time employment combined with part-time study.

In looking at both Year 12 retention and successful post-school outcomes, the picture is complicated by the interaction of other factors. There is extensive literature (see for example Fullarton 2001; Polesel et al. 2004; Ball & Lamb 2001; Dusseldorp 2004; and Lamb et al. 2004) showing that a student's academic ability, gender and parental background, as well as the location and type of school the student attended and his or her engagement with that school, all affect post-school outcomes. These factors are also likely to affect whether a student participates in school VET programs. So, in assessing the impact of school VET programs we need to control for these.

The data set for the analysis is young people who were in Year 9 in 1998, surveyed for the Longitudinal Surveys of Australian Youth (LSAY)—referred to as the Y98 cohort. These data are ideal for this purpose because of their richness in capturing demographic, attitudinal and student outcomes information. We extend the analysis by linking these data with unpublished NCVER National VET Provider Collection data (2000–2003), enabling a more thorough examination of school and post-school VET activity. We are able to compare VET in Schools courses with VET courses undertaken post-school.

This report is in five sections. First, we provide some context and look at the characteristics of those students most likely to participate in school VET programs in Year 11.

The second section looks at the impact of vocational education and training on student retention to Year 12 (or its vocational equivalent). This is a particularly difficult problem because vocational education and training is not an experimental treatment randomly assigned to students, but a choice a student makes.

The third section looks at whether participation in school VET programs plays a role in successful post-school outcomes, defined as engagement with learning or employment one year out from Year 12, or within the same time frame for those who leave school before Year 12.

In the fourth section we assess whether school VET programs establish post-school VET pathways. In particular, we are interested in the relationship between the VET courses studied at school and those studied subsequently. Finally, we draw some conclusions.

Context

School VET programs

In preparing this report we were unable to find an explicit policy statement relating directly to the intended outcomes of VET in Schools programs. What we did find was that school VET programs sit within the broader context of improving the range of post-school pathways for students.

The origin of school VET programs lies in the Australian Education Council's review of young people's participation in post-compulsory education and training in 1990 (Finn 1991 cited in Malley et al. 2001b, p.4). Reflecting the increasing formalisation of a common definition of VET in Schools, the Ministerial Council on Education, Employment, Training and Youth Affairs commenced the collection of VET in Schools data in 1996 (Malley et al. 2001a).

The implementation of school VET programs was supported by a series of goals for national collaboration set out in the Adelaide Declaration on National Goals for Schooling in the Twenty-first Century (Ministerial Council on Education, Employment, Training and Youth Affairs 1999). This declaration contains a range of references to elements of vocational education and training in schools, as well as linkages between the education and training sector, business and industry. Of particular relevance to this report is the third goal of this declaration, which states that 'Schooling should be socially just, so that all students have access to the high quality education necessary to enable the completion of school education to Year 12 or its vocational equivalent and that provides clear and recognised pathways to employment and further education and training' (Ministerial Council on Education, Employment, Training and Youth Affairs 1999, np). In 2002, in response to these national goals, the Ministerial Council on Education, Employment, Training and Youth Affairs Taskforce on Vocational Education and Training in Schools proposed a new framework for vocational education in schools, with an emphasis on improving the transition of all young people from school to work and further study.

The Commonwealth Government provides recurrent funding for government and non-government schools under the General Recurrent Grants (GRG) Programme in support of these National Goals. In addition to this funding, the Commonwealth has provided $20 million between 1997 and 2001, and a similar amount between 2002 and 2004, to support the expansion of VET opportunities in schools. This Commonwealth contribution complements state and territory funding for VET in Schools (Department of Education, Science and Training 2003).

As summarised by Woods (2005), the school VET program definition can be somewhat complicated. What is commonly referred to as 'VET in Schools' is where school students undertake recognised vocational education and training as part of the senior secondary certificate. These students attain a VET qualification, or part thereof, and the senior secondary certificate. However, it is not a single option because, under the VET in Schools arrangements, students can undertake VET subjects or VET courses or school-based New Apprenticeships. When undertaking VET subjects or courses as part of the senior secondary certificate, the program may or may not include structured workplace learning. The exceptions to this are New South Wales and Tasmania, where structured workplace learning is mandatory. School-based New Apprenticeships, on the other hand, always require formal engagement with the workplace and structured learning, since they involve paid employment and a training contract.

School VET programs are usually offered to students in Year 11 and Year 12, but some secondary students are offered these programs in Year 10. There are widespread differences across the various states and territories in the delivery of these programs, and the range offered. New versions of traditional school curricula, specifically information technology, hospitality and office administration, remain the most popular subject areas studied (Polesel et al. 2004), accounting for half of all school VET enrolments (Malley et al. 2001b). However, particularly in regional areas, more locally relevant school VET programs are also offered. These include Certificate I & II in Seafood Industry in aquaculture areas such as in the Eyre Peninsula, and Certificate I & II Food Processing (wine) in wine regions across Australia (Johns et al. 2004).

Outcomes from school VET programs

Outcomes from school VET programs are intrinsically linked to reasons for participation in school VET programs. These are varied, and include widening career options, obtaining workplace training and gaining a VET qualification (Polesel cited in Barnett & Ryan 2004). For students who aspire to university study, Barnett and Ryan report that students may also participate in school VET programs for the bonus marks they bring to their tertiary scores, and for the opportunities they provide in gaining (often part-time) work while going on to further study.

School VET programs have been linked to a number of positive student outcomes, including improved pathways into full-time employment and/or further study. In a broader context, the Organisation for Economic Co-operation and Development (OECD), while supporting vocational learning in schools, argues that school VET programs that show the most advantageous options are those which qualify young people for tertiary study as well as for work (Durand-Drouhin 1998, cited in Barnett & Ryan 2004).

A word of caution is needed when looking at outcomes from school VET programs. We know that both school retention and post-school outcomes are affected by the health of the labour market. The cohort we are considering was in Year 9 in 1998, and so the behaviour of the cohort is in the context of the relatively buoyant labour market between 2000 and 2002. Hence our analysis may not necessarily be applicable to a period of economic recession.

Before we look at outcomes we look at who participates in VET programs at school.

Participation in school VET programs

There is well-documented evidence that students who participate in school VET programs have a distinguishing set of characteristics. Fullarton (2001) reports of an earlier Longitudinal Surveys of Australian Youth cohort (those students who were in Year 9 in 1995) that participation in school VET programs is highest for students who attend a government school, reside in non-metropolitan areas, come from an English-speaking background, have parents in unskilled occupations, and belong to a lower overall academic achievement quartile. In terms of attitude to schooling, Fullarton reports that those with lower levels of engagement with their school have higher participation rates in school VET programs. While noting no gender differences in the propensity to participate in school VET programs, she did find differences in the types of vocational subjects studied at school by males and females.

Polesel et al. (2004), in a review of literature on participation in school VET programs, report similar characteristics, and add that students from lower socio-economic backgrounds, and males more so than females, have higher participation rates in school VET programs.

Participation in school VET programs in our analysis (as in previous Longitudinal Surveys of Australian Youth studies, see for example Fullarton 2001) is defined as students who self-report in Year 11 and/or Year 12 that they took subjects at technical and further education (TAFE) and/or

VET subjects or courses as part of an apprenticeship or traineeship[1]. In using this measure, we find that of the 8212 Longitudinal Surveys of Australian Youth students who were questioned about their school VET activity in 2000 (when 98% of those remaining at school were in Year 11), 26.7% reported that they had participated in some school VET programs in that year. In the subsequent year (when 99% of those remaining at school were in Year 12), a lower proportion (23.7%) indicated that they had participated in school VET programs in that year, and even fewer indicated they had participated in school VET programs in both 2000 and 2001 (15.3%).

This self-reported school VET activity is considerably lower than the official figure reported for students in 2000 and 2001 (38.0% and 41.3%, respectively, of all senior secondary students) (see Ministerial Council on Education, Employment, Training and Youth Affairs 2002b). However, this under-reporting of VET activity may actually strengthen our analysis because we are only counting VET activity for students who recognise that they participated in school VET programs. For those who are under-reported, it can be assumed that their VET activity was of such little substance that they themselves did not acknowledge it, or that it was indistinguishable from their academic subjects.

Statistical modelling

To measure the impact of the various background characteristics on school VET participation, we fitted a logistic regression model (Model A) using information from over 8000 students who were in the Longitudinal Surveys of Australian Youth data set in 2000 (from the Y98 cohort), when the majority (98%) of students were in Year 11.

The demographic variables used in our predictive model were those that had been identified in previous research as being indicative of participation in school VET programs. We also looked for other factors, such as a student's attitude to school and peers. We did consider using a variable that indicated whether or not a student received and read information on vocational education and training at school, but as this was not asked until Year 11, it was signalling actual VET participation rather than adding to the predictive power of the model.

The final probability of a student participating in school VET programs in Year 11 was based on the following set of variables:[2]

- Demographic variables—gender, school type, state where attended school, ethnicity, area of residence, parental occupation and education background, and a student's academic score.
- Attitudinal variables—self-perceived ability (composite variable[3] derived from student self-perceived rating of ability in English, mathematics, science, language other than English and studies of society and the environment), perceived attitude of peers (composite variable derived from students' perceived rating of their peers' ability to make good progress, eagerness to learn, working hard and being well behaved), students' own aspirations (intend to do Year 12 or not as asked while still in Year 10) and engagement with school (composite variable derived from student participation in extracurricular drama, sport, debating, music activities and volunteering).

To give a more intuitive indication of the influence of the various characteristics, we calculated a predicted probability by holding other characteristics constant at their relative proportions in the sample, apart from the variable in question. The resultant predicted probabilities for each characteristic are contained in table 1. For details of the logistic regression modelling and results refer to appendices 3 and 5, respectively.

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[1] QA13 During 2000, as part of your schooling, are you doing, or have you done, study at a TAFE or TAFE subjects at school?
QA19 This year are you doing, or have you done, any non-TAFE VET subjects or courses at school, that is Vocational Education and Training?

[2] See appendix 3 for details of statistical modelling.

[3] See appendix 2 for composite variable derivation.

Table 1: Predicted probability of doing VET in Year 11, holding other variables constant

Student characteristics	Predicted probability %	Student characteristics	Predicted probability %
Gender		**Parental education**	
Male	27.5	Did not complete secondary school	29.1
Female	25.2	Completed secondary school/apprenticeship only	27.7
School type		TAFE	27.8
Government	27.6	University	20.7
Catholic	22.7	**Academic achievement (assessed)**	
Independent	26.7	Low score	31.5
Location where attended school		Lower middle score	25.9
NSW	32.1	Upper middle score	21.7
VIC	21.6	High score	13.5
QLD	27.9	**Engagement with school**	
SA	28.4	Low score	26.7
WA	24.0	Medium score	26.1
TAS	18.9	High score	22.3
NT	28.7	**Aspiration (asked in year 10)**	
ACT	22.8	Intended to do Year 12	24.9
Area of residence		Intended to leave before Year 12	32.4
Metropolitan	24.5	**Perceived attitude of peers**	
Non-metropolitan	28.9	Very poor	26.3
Ethnicity		Poor	26.3
English speaking background	26.0	Good	26.3
Non-English speaking background	30.6	Very good	26.1
Parental occupation		**Self-perceived academic ability**	
Manual	28.6	Low score	30.2
Clerical	25.9	Lower middle score	26.4
Managerial	21.2	Upper middle score	22.6
Professional	28.6	High score	16.6

In table 1 we see considerable variability in the predicted probabilities of participation in school VET programs by location, ethnicity, parental education attainment, a student's aspirations, and their assessed and perceived academic ability. There is little variation by gender and students' perception of the attitude of their peers, which is an interesting finding given the importance many place on peer group pressure. The clear picture is that VET in Schools is attractive to those with lower academic ability and aspirations. This is consistent with the findings of Porter (2006), who notes that one of the reasons students self-select into vocational education and training is because it is a better fit with their academic ability.

In modelling participation in school VET programs we are provided with a better understanding of who is attracted to them. But does this assist school retention? This is the area to which we now turn.

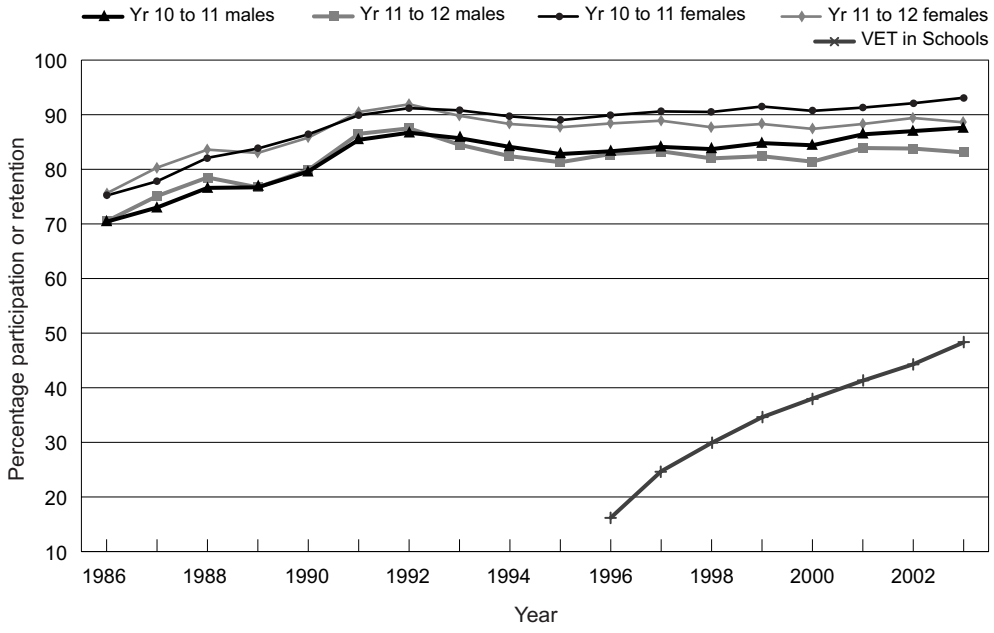
School VET participation and Year 12 retention

Does participation in school VET programs increase retention to Year 12? We approach this question from two directions. First, we consider the trends in retention since 1995, making use of the Australian Bureau of Statistics (ABS) apparent retention aggregate data and correlating this with the penetration of the VET in Schools program. We then take a micro approach based on the Longitudinal Surveys of Australian Youth Y98 cohort. In each case we subdivide the Year 12 retention rate into two components: the Year 10 to Year 11 retention and the Year 11 to Year 12 retention. The reasons for doing this are obvious: substantial numbers of students leave after Year 10 and after Year 11. So Year 12 retention can increase because more students stay on to do Year 11 or because a greater proportion of those in Year 11 stay on to Year 12. The reason for adopting both an aggregate and a micro approach is that if both approaches give similar results, then this gives us some confidence in our findings. If the approaches conflict, then we would have to be rather more circumspect in drawing conclusions.

An aggregate approach

Figure 2 plots the Year 10 to Year 11 retention and Year 11 to Year 12 retention (by gender), together with the percentage of Year 11 and Year 12 students undertaking VET in Schools.

Figure 2: Year 10 to Year 11 and Year 11 to Year 12 apparent retention rates and VET in Schools participation, 1986–2003



Source: ABS *Schools, Australia,* 4221.0 various years; Ministerial Council on Education, Employment, Training and Youth Affairs (2004)

Casual inspection of the graph shows:

- ✧ Year 10 to Year 11 retention is very similar to Year 11 to Year 12 retention for most of the period, and this holds true for both males and females
- ✧ as is well known, retention among girls is higher than retention among boys
- ✧ the Year 10 to Year 11 retention appears to have increased over the period VET in Schools has increased, but this pattern is not so clear for Year 11 to Year 12 retention.

One can hardly draw strong conclusions from these data, given that we have only eight observations (for the VET in Schools data from 1996 to 2003). However, we can get more information by looking at the data at state level.[4] The idea is that the penetration of VET in Schools has occurred at different times across the states, and we can seek to correlate this with changes in school retention.

The formal models used are documented in appendices 3 and 4. Essentially, we pool the data across the six states (we exclude ACT and NT because of the very small bases). This gives us 48 observations. We model the Year 10 to Year 11 retention dependent on:

- ✧ the Year 10 to Year 11 retention rate of the previous year (to allow for peer effects)
- ✧ the proportion of students undertaking VET in Schools
- ✧ a time trend.

The reason for the time trend is that there may have been changes in social attitudes or the labour market occurring over this period and this may be an alternative explanation to the increase in VET in Schools. That is, we are interested in whether our VET in Schools variable explains the variation in the retention rate better than a simple time trend.

It turns out that the VET in Schools variable and the time trend are very highly correlated. If the time trend is included, the VET in Schools variable is not significant (and has a coefficient value of zero to three decimal points). On the other hand, if we exclude the time trend then the VET in Schools variable is significant. While the time trend fits marginally better, its interpretation is difficult. If we assume that it is, indeed, VET in Schools that is the dominant trend affecting Year 10 to Year 11 retention, then it makes sense to use the model with the VET in Schools variable rather than the time trend. On the other hand, if the time trend is included, then the VET in Schools variable has no explanatory power. That is, the variation that occurred among the states in VET in Schools and any associated increase in Year 10 to Year 11 retention provides no further support to the broad observation that both VET in Schools and Year 10 to Year 11 have increased between 1996 and 2003. Thus, one concludes that VET in Schools has led to an increase in Year 10 to Year 11 retention with some nervousness.

We take a similar approach to modelling Year 11 to Year 12 retention. However, in addition we include a variable representing Year 10 to Year 11 retention the previous year. The logic is that the cohort of students moving into Year 11 may well affect the Year 11 to Year 12 retention. Again, we tried formulations with and without a time trend. What emerges is a little ambiguous, as was the case with the Year 10 to Year 11 retention model. What comes out clearly is that Year 11 to Year 12 retention is negatively related to Year 10 to Year 11 retention. That is, if Year 10 to Year 11 retention increases for a cohort then we can expect that Year 11 to Year 12 retention will fall the following year (everything else being constant). The direct impact of VET in Schools on Year 11 to Year 12 retention is not significant if we exclude the time trend, and negative (significant at the 80% level) if the time trend is included. So, our conclusion is that any impact on Year 12 retention from VET in Schools has come through the effect on Year 10 to Year 11 retention, but even here the statistical evidence is not totally convincing.

[4] Ideally, we would have liked to look at males and females separately, but the MCEETYA VET in Schools data do not allow this.

Before leaving this section, it is worth considering the size of any possible effects. The increase in Year 10 to Year 11 retention was, at the Australian level, just less than 4% between 1996 and 2003. If all this is attributed to VET in Schools, then the effect on Year 12 retention will be somewhat less than that because of the likely negative impact on Year 11 to Year 12 retention. A reasonable conclusion is that the upper bound for the impact on the Year 12 retention rate is around 3% up to 2003.[5]

An approach using Longitudinal Surveys of Australian Youth data

Before modelling retention rates for the Longitudinal Surveys of Australian Youth cohort, it is worth considering the retention rates for these students who were in Year 9 in 1998, and therefore we concentrate on the retention rates between 1999 (Year 10), 2000 (Year 11) and 2001 (Year 12). The apparent retention rate, as used by the ABS (2003) and utilised in figure 2, is calculated as the number of school students in a designated level/year of education expressed as a percentage of their respective cohort group (which is either at the commencement of their secondary schooling or Year 10). So, for example, the apparent retention rate from Year 11 to Year 12 would be the number of students in Year 12, expressed as a percentage of the number of students who were in Year 11 one year previous.

In longitudinal studies we are able to follow each individual student in their journey through school, and derive an actual retention rate. Having the actual retention rate is clearly an advantage.

The difficulty we have in using the latter method for the Longitudinal Surveys of Australian Youth data is attrition from the survey, and so our analysis is restricted to only those students who remained in the survey to 2001. We do not know whether students who have left the survey completed their schooling to Year 12 or not, but suspect they had a greater propensity to drop out of school. The retention rate calculation from the longitudinal surveys data is further complicated by the rebuilding of the sample in 2000 (see appendix 1 for more detail). The comparable ABS retention rates and the calculated actual retention rates of our longitudinal surveys cohort are listed in table 2.

Table 2: Retention rates for Year 10 to Year 12 and Year 11 to Year 12, LSAY and ABS

Year	LSAY (actual)			ABS (apparent)*		
	Boys %	Girls %	All %	Boys %	Girls %	All %
Year 10 – Year 12	90.7	93.4	92.2	70.8	80.1	75.4
Year 10 – Year 11	86.7	90.8	88.9	84.4	90.7	87.5
Year 11 – Year 12	89.4	92.9	91.3	83.9	88.3	86.1

*Source: ABS *Schools, Australia*, 4221.0, 1999–2001

Table 2 illustrates that the retention rates for our longitudinal surveys sample are higher than the national apparent retention rate. Of some comfort is the fact that the discrepancy is relatively small for Year 11 to Year 12 retention and the sex differential is observed consistently in both sets of data.

As with the aggregate approach, we look at Year 10 to Year 11 retention separately from Year 11 to Year 12 retention. With the Longitudinal Surveys of Australian Youth data we are assuming that we are running an experiment where the treatment is whether the student undertakes school vocational education and training, being mindful to control for other factors known to have an impact on Year 12 retention such as gender, school type, ethnicity, academic ability, parental education background, parental occupation and location. We acknowledge that this is not ideal because vocational education and training is not an experimental treatment randomly assigned to students, but a choice a student makes.

[5] In fact, this is the precise magnitude of the results of a dynamic simulation based on models 3 and 6 in appendix 4. These models assume that the only external factor affecting school retention between 1996 and 2003 is the introduction of the VET in Schools program.

First, consider Year 10 to Year 11 retention. The first problem that we encounter is that we do not actually observe the school VET variable for the entire sample. In particular, we only observe it for those who stay to Year 11. Our approach to solving the difficulty is to argue that students at Year 10 can observe the extent of vocational education and training at their school. If school vocational education and training is therefore making a difference to Year 11 retention, then the retention of students attending a school with a 'high dosage' of school vocational education and training should differ from those attending a school with a 'low dosage'. Our treatment variable is the extent of school VET provision.[6]

In addition to the variables that were used in the earlier model predicting which students did school vocational education and training, we incorporated an interaction of 'VET dosage' with gender. This, however, proved insignificant and so we dropped it from the preferred model (model B1). Under this model the school VET variable has a positive sign (with a significance level of 16%). As explained in appendix 5 we fitted a logistic regression. This means that the impact of the school VET variable varies according to an individual's other characteristics.[7] To provide an intuitive interpretation to the coefficient we calculate the variable's impact at the Year 10 to Year 11 retention rate in 2001, according to the ABS retention rate (84.4% for males and 90.7% for females).

Table 3: Predicted probability of doing Year 11 from Year 10 at the 2000 ABS Year 10–11 apparent retention rate: With and without VET by gender

Year 10 – Year 11 retention model	Boys			Girls		
	VET	Non-VET	Diff.	VET	Non-VET	Diff.
	%	%	%	%	%	%
School VET 'dosage' at MCEETYA 2000 VET in Schools participation rate of 0.38	86.6	84.4	+2.2	92.1	90.7	+1.4
School VET 'dosage' at MCEETYA 2003 VET in Schools participation rate of 0.48	87.1	84.4	+2.7	92.4	90.7	+1.7

According to our model B1, school VET programs increase retention for boys between Year 10 and Year 11 by about 2.2% at the 2000 school VET rate and 2.7% at the 2003 rate. The impact is slightly less for girls because their retention rate is higher (according to our model, school VET programs increase the Year 10 to Year 11 retention by 1.4% at the 2001 school VET rate and 1.7% at the 2003 rate).

We now move on to retention from Years 11 to 12 (Model C). The treatment variable is 1 if the student undertook vocational education and training in Year 11 and 0 otherwise.[8] We also considered the retention from Years 11 to 12 or its vocational equivalent[9] (model D). In this model, we looked at those who left school in 2001 and included traineeship/apprenticeship, Year 12 studies at TAFE, TAFE/VET certificates III and IV, other trade certificates, TAFE diploma, TAFE advanced diploma/associate degree and University diploma studies as equivalent to participating in Year 12.

6 A further difficulty is that we do not observe the extent of the dosage directly and we have to estimate from our sample. Thus our model suffers from measurement errors. This could lead to an understatement of the effect of the school VET variable.

7 This is a relatively simple statistical approach and does not cover school characteristics. For more detail on the effects of school characteristics on VET in Schools and student outcomes refer to Lamb & Vickers (forthcoming).

8 As noted earlier, the VET variable is not a treatment variable in an experimental sense because students choose to either undertake it or not. This creates a statistical issue (endogeneity) that is very difficult to resolve. An approach that solves this statistical issue is to use a predicted value for the VET variable, but the problem here is to come up with prediction variables that are different from those used to explain Year 11 to Year 12 retention (that is, the issue of identification). We were unable to come up with such variables but the non-linearity of the logistic regression does enable the models to be identified in a numerical sense (that is, the calculations are not degenerate). The results of this exercise are given in appendix 5 and indicate a negative effect for the impact of school VET on the Year 11 to Year 12 retention, the same finding as from the naive approach reported in the text.

9 A certificate III or higher.

The results of the models on retention from Years 11 to 12 are summarised in table 4, evaluating the impact of school vocational education and training at the apparent retention rate from the ABS series (in 2001 the Year 11 to Year 12 apparent retention rates were 83.9% for males and 88.3% for females).[10] The school VET variable has a negative impact for both boys and girls, but the effect is greater for the former. For comparative purposes we have included a simple cross-tabulation which shows a negative impact for vocational education and training, but of a considerably greater order of magnitude.

Table 4: Predicted probability of doing Year 12 from Year 11 at the 2001 ABS Year 11–12 apparent retention rate: with and without VET by gender

Year 11 – Year 12 Retention Model	Boys			Girls		
	VET	Non-VET	Diff.	VET	Non-VET	Diff.
	%	%	%	%	%	%
Model C: Year 11 to Year 12 (using actual VET participation in Year 11)	78.8	83.9	-5.1	86.5	88.3	-1.8
Model D: Year 11 to Year 12 equivalent (using actual VET participation in Year 11)	78.9	83.9	-5.0	88.0	88.3	-0.3
Cross-tabulated result (Year 12)	82.1	92.1	-10.0	90.2	93.8	-3.6
Cross-tabulated result (Year 12 equivalent)	83.2	93.2	-10.0	91.7	94.8	-3.1

The first point to note from table 4 is that, from the simple cross-tabulation, students who participate in school VET programs have significantly lower probabilities, especially for boys, of retention from Year 11 to Year 12 than those who do not participate in these programs. When we control for other characteristics, the size of the effect decreases but still remains very substantial. The effect is larger for boys than for girls. School vocational education and training is having a negative impact on retention from Year 11 to 12, with the impact being more sizeable for boys than girls. When we include a vocational equivalent, the results are virtually the same for boys, but the negative effect is smaller for girls.

We should also note that other factors have considerably more impact on school retention than whether a student participates in school VET programs or not[11]. These factors include academic ability, location, ethnicity and parental background.

Our findings of a positive effect of school vocational education and training on retention from Year 10 to Year 11 but a negative effect from Year 11 to Year 12 begs the question on the overall effect on Year 12 retention. As we have already pointed out, the magnitudes depend on an individual's characteristics (because of the non-linear nature of logistic regressions). To get some idea of the overall impact on Year 10 to Year 12 retention we conducted a mind experiment revolving around those students whom we observe undertaking vocational education and training at Year 11, split by gender. We assume the counterfactual—that there is no vocational education and training at Year 11, and then estimate the changes in retention rates for each of these students based on our logistic regression models of retention (Model B for Year 10 to Year 11, Model C for Year 11 to Year 12 and Model D for Year 11 to Year 12 equivalent). By aggregating over these students we get an overall effect for the school VET students. We then add the retention rates of those students who did not undertake school vocational education and training (we assume that their behaviour is unchanged by the counterfactual). The precise details of the calculations are detailed in appendix 6.

[10] This value is chosen to give an intuitive sense of the order of magnitude of the impact of school VET. The values should not be taken literally. We have arbitrarily chosen the retention rates for 'no VET' and calculated the value for VET relative to this value.

[11] The impact of other variables can be seen from the details of the modelling in appendix 5.

Table 5: Impact of school VET on retention rates

	Year 10 to Year 11 retention	Year 11 to Year 12 retention	Year 11 to Year 12 equivalent retention	Year 10 to Year 12 retention	Year 10 to Year 12 equivalent retention
	%	%	%	%	%
Males—undertook VET at Year 11					
✧ as observed	94.4	85.5	85.9	80.7	81.1
✧ counterfactual (VET not offered at Year 11)	93.0	88.8	89.0	82.5	82.8
✧ impact of school VET (% points)	+1.4	-3.3	-3.1	-1.8	-1.7
Males—did not undertake VET at Year 11					
✧ as observed	96.9	93.2	93.5	90.4	90.6
All males					
✧ as observed	96.3	91.2	91.6	87.8	88.2
✧ counterfactual (VET not offered at Year 11)	95.9	92.1	92.4	88.3	88.6
✧ impact of school VET (% points)	+0.4	-0.9	-0.8	-0.5	-0.4
Females—undertook VET at Year 11					
✧ as observed	96.8	90.7	93.1	87.8	90.0
✧ counterfactual (VET not offered at Year 11)	96.0	92.0	93.7	88.4	90.0
✧ impact of school VET (% points)	+0.8	-1.3	-0.6	-0.6	0.0
Females—did not undertake VET at Year 11					
✧ as observed	97.8	94.6	95.4	92.6	93.3
All females					
✧ as observed	97.6	93.7	94.8	91.4	92.5
✧ counterfactual (VET not offered at Year 11)	97.4	94.0	95.0	91.6	92.5
✧ impact of school VET (% points)	+0.2	-0.3	-0.2	-0.2	0.0

Source: derived from models B1, C and D (see appendix 5)

Taking the effects together our model indicates an overall decrease in Year 10 to Year 12 retention of -0.5% for boys (or -0.4% if looking at Year 12 vocational equivalent) and virtually no change for girls.

These results are centred around the Longitudinal Surveys of Australian Youth sample which we know to be affected by sample attrition. However, they indicate that the overall effect on Year 12 retention is negative but not significant in the overall scheme of things.[12]

It is clear that there is a considerable degree of streaming going on in VET participation. We know that students self-select into vocational education and training because of their limited academic ability, choosing vocational education and training because it is seen as fitting better with a student's academic ability. These students are the ones most at risk of early school leaving, and our analysis indicates that choosing vocational education and training assists Year 10 to Year 11 retention but not Year 11 to Year 12 retention. Two explanations spring to mind. The first is that those who are encouraged to stay to Year 11 with the promise of school vocational education and training are inherently less attached to school than others, and therefore it is not surprising that they have lower than expected Year 11 to Year 12 retention. An alternative explanation is that most school VET programs have some

[12] The retention rates calculated in this mind experiment are somewhat higher than observed in the ABS figures. There are two reasons for this. The first is that sample attrition tends to mean that respondents are higher achievers compared to those that do not respond. The second is that the non-linearity of the logistic model appears to give high predictions of retention. It is emphasised that the main point of this exercise is the comparison of school vocational education and training with the counterfactual of no such program rather than the actual retention rates as such.

component of work placement, and this exposure may work against retention because it encourages students to join the labour market and leave school before completing Year 12.

The effects we have found are in the context of most school VET programs being delivered in Year 11 and Year 12. Moreover, the indication is that the effect comes from increased Year 10 to Year 11 retention, offset by a decline in the Year 11 to Year 12 retention. This raises the thought that perhaps VET programs delivered from Year 10 might have a larger impact on school retention. After all, most early school leaving occurs after Year 10, and a (hopefully) positive experience with a VET program at Year 10 would encourage students to continue at school. However, the experience would need to engage students with their schooling, or there may be a risk that the world of work would entice students away from school prematurely.

School VET participation and successful post-school outcomes

In this section we look at successful post-school transition, by year of school completed. We address the question: *Does school VET play a role in successful post-school transition?* By successful post-school transition we mean full-time post-school engagement with employment or learning, or part-time work combined with part-time study.

We focus our post-school outcomes on the Year 2002. For the majority of our Longitudinal Surveys of Australian Youth cohort, this was one year post-school. However, for those who left school before completing Year 12, they could have had up to three years labour market exposure by 2002.

Our analysis focuses on the effects of school VET participation on post-school outcomes, and begins with some simple tables, followed by more complex statistical analysis. We know that pathways for boys and girls are different, and so we model males and females separately.

Tables 6 and 7 describe post-school student outcomes in 2002 by gender, year left school and VET activity in Year 11. Students who are undertaking a part-time combination of work and study are included in the study outcome category (that is, part-time TAFE and work is grouped with full-time TAFE).

Table 6: Post-school outcomes in 2002, by highest school level completed and VET participation, boys

Outcomes in 2002	Year 12, VET in Year 11[1] (n = 658)	Year 12, no VET in Year 11[1] (n = 2286)	Year 11, VET in Year 11[2] (n = 146)	Year 11, no VET in Year 11[2] (n = 175)	Year 10[3] (n = 252)
	%	%	%	%	%
Successful outcomes	87.1	90.6	84.9	85.7	88.5
At school	2.0	1.7	0.0	0.0	0.0
Full-time work	17.5	12.4	15.1	22.3	20.2
University	24.2	50.9	1.4	5.7	0.0
TAFE	22.0	14.8	14.4	20.0	12.3
Apprenticeship/traineeship	21.4	10.9	54.1	37.7	56.0
Unsuccessful outcomes	12.9	9.4	15.1	14.3	11.5
Part-time work only	7.8	4.9	4.1	6.3	5.2
Unemployed	3.5	3.0	6.8	4.0	4.0
NILF	1.7	1.5	4.1	4.0	2.4
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Notes: [1]One year post-school; [2]Two years post-school; [3]Three years post-school.
NILF = Not in the labour force.

In looking at the proportion of boys with successful outcomes we see that Year 12 completers who have not undertaken VET study at school fare the best in 'Year 13'. For Year 11 completers, there is little variation in the proportion of students who have successful outcomes when comparing participation in school vocational education and training, but as for the Year 12 completers, we see more school VET students going on to post-school vocational education and training as apprenticeships and traineeships or TAFE (68.5% with school VET) than those who did no school vocational education and training (57.7%).

The striking feature of table 6 is the relatively high success rate for boys who complete Year 10 only, the majority of which can be attributed to the high uptake of apprenticeships and traineeships for this group (56.0%). However, it needs to be acknowledged that these boys have had three years' exposure to the labour market at the point in time (2002) that we are measuring post-school success.

So, in summary, for boys, those who complete Year 12 without having done vocational education and training at school fare the best, followed by Year 10 leavers, and then those who completed Year 11 only. School VET participation appears to be providing pathways into further VET study, including apprenticeships and traineeships. The high uptake of post-school VET study among early school leavers suggests that post-school VET programs appeal to early school leavers equally as much as it does to those who participated in school VET programs.

Table 7: Post-school outcomes in 2002, by highest school level completed and VET participation, girls

Outcomes in 2002	Year 12, VET in Year 11[1] (n = 766)	Year 12, no VET in Year 11[1] (n = 2574)	Year 11, VET in Year 11[2] (n = 81)	Year 11, no VET in Year 11[2] (n = 155)	Year 10[3] (n = 231)
	%	%	%	%	%
Successful outcomes	85.5	88.7	74.1	71.6	73.2
At school	0.4	1.1	0.0	0.0	0.0
Full-time work	12.5	8.7	17.3	15.5	16.9
University	30.5	57.5	3.7	9.0	1.3
TAFE	27.5	14.2	27.2	23.2	23.4
Apprenticeship/traineeship	14.5	7.3	25.9	23.9	31.6
Unsuccessful outcomes	14.5	11.3	25.9	28.4	26.8
Part-time work only	9.8	6.9	12.3	14.8	6.9
Unemployed	3.3	2.5	6.2	7.7	9.5
NILF	1.4	1.9	7.4	5.8	10.4
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Notes: [1]One year post-school; [2]Two years post-school; [3]Three years post-school.
NILF = Not in the labour force.

For girls, we see a similar pattern for Year 12 completers, with this group having the highest rate of success. Furthermore, as with the boys, Year 12 completers without VET participation mostly (57.5%) go on to university, while a higher proportion of female Year 12 completers with vocational education and training go on to TAFE (27.5%) and to a lesser extent than boys into apprenticeships and traineeships (14.5%).

Aside from the Year 12 completers, we see a very different picture for girls. Girls who leave school after Year 10 lack the post-school success demonstrated by the boys, with one in ten opting out of the labour force three years post-school. Girls who complete Year 11 with school vocational education and training fare better than Year 10 leavers, attributed in part to the high proportion who go on to TAFE and apprenticeships and traineeships (53.8%). Girls who leave at Year 11 and do no school vocational education and training fare the worst, with 15% ending up in part-time work only.

We noted earlier the relative success of boys who leave after Year 10. However, we need to keep in mind that this is three years after leaving school. A year-by-year analysis (table 8) indicates a rocky road for these early school leavers.

Table 8: Post-school outcomes for early school leavers in 2000, 2001 and 2002, by gender

Outcomes	Boys Year 10 completers			Girls Year 10 completers		
	2000[1] (n = 278) %	2001[2] (n = 252) %	2002[3] (n = 252) %	2000[1] (n = 156) %	2001[2] (n = 147) %	2002[3] (n = 231) %
Successful outcomes	69.5	76.8	88.5	48.4	53.8	73.2
At school	0.0	0.0	0.0	0.0	0.0	0.0
Full-time work	22.3	22.6	20.2	20.5	28.9	16.9
University	0.0	0.3	0.0	0.0	0.0	1.3
TAFE	3.8	4.9	12.3	5.3	7.3	23.4
Apprenticeship/traineeship	43.5	49.1	56.0	22.7	17.6	31.6
Unsuccessful outcomes	30.5	23.2	11.5	51.6	46.2	26.8
Part-time work only	9.8	8.2	5.2	20.8	19.4	6.9
Unemployed	0.5	8.5	4.0	1.2	12.1	9.5
NILF	20.3	6.4	2.4	29.5	14.7	10.4
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Notes: [1]One year post-school; [2]Two years post-school; [3]Three years post-school.
NILF = Not in the labour force.

We see for boys and girls who leave school at Year 10 that their post-school success does not come easily. For boys, one year out from Year 10, 20.3% were not in the labour force, and for girls this was 29.5%. For boys, we see a gradual move into VET study, either through apprenticeships and traineeships or TAFE study. However, for girls we see a less smooth transition, with a move into full-time work one year out from Year 12 (28.9%), and then a move back into VET study (TAFE and apprenticeships and traineeships) two years post-school. Over time, for both genders, the proportion of part-time work only recedes and labour force participation increases, but both boys and girls have increased unemployment two years post-school (in 2001). This suggests that many Year 10 leavers have a period outside the labour force.

However, what these simple cross-tabulations do not take into consideration is the interaction of other factors known to contribute to successful student outcomes. In order to take account of these influencing factors, we move on to multivariate analysis.

Statistical modelling

In exploring post-school outcomes further, we again controlled for other factors known to influence successful post-school outcomes, with successful outcomes (as defined in the previous section) as the dependent variable.

We ran statistical models with actual VET participation in Year 11[13] by highest school level completed as the treatment variable. That is, the five treatments are:

- ✧ highest education Year 10
- ✧ highest education Year 11, participated in school VET programs in Year 11
- ✧ highest education Year 11, did not participate in school VET programs in Year 11
- ✧ highest education Year 12, participated in school VET programs in Year 11
- ✧ highest education Year 12, did not participate in school VET programs in Year 11.

[13] School VET participation is measured in the Longitudinal Surveys of Australian Youth in Year 11 and Year 12 only. As we are looking at retention to Year 12, we use participation in Year 11 only. Among longitudinal surveys students, 26.7% participated in school VET programs in Year 11 and 23.7% in Year 12 (these percentages are calculated with the exclusion of missing values).

We look at post-school outcomes in different years; in 2002 (Model E), 2001 (Model F) and 2000 (Model G). Thus models F and G exclude those still at school. Again we use an interaction between gender and participation in school vocational education and training and predict the probability of successful outcomes controlling for other factors known to impact on post-school success. The full details of the model can be found in appendix 3 and results of the regression are presented in appendix 5.

Table 9: Predicted probabilities of successful outcomes in 2002 by gender and highest school level completed

Highest school level completed	Boys		Diff.	Girls		Diff.
	School VET	No school VET		School VET	No school VET	
	%	%	%	%	%	%
Year 12	88.1	90.2	-2.1	87.9	88.9	-1.0
Year 11	91.4	88.6	+2.8	83.6	78.4	+5.2
Year 10	–	92.4		–	81.3	

The analysis presented in this table changes the simplified results we saw in the cross-tabulations of tables 6 and 7 for boys but not for girls. For girls we see the same pattern, with Year 12 girls having the highest predictive success rates (irrespective of whether they participated in school vocational education and training or not), followed by Year 11 completers who participated in school VET programs, Year 10 completers and then Year 11 completers who had not participated in school VET programs. Doing school vocational education and training has a positive 'kick' (of +5.2%) for girls who leave after Year 11.

For boys, doing school vocational education and training has the greatest 'kick' for those who leave school after Year 11 (+2.8%), but not to the extent it had for girls (+5.2%). As for the girls, doing school vocational education and training has a slightly negative impact for Year 12 completers (-2.1% for boys, -1.0% for girls).

So we can conclude from our modelling that vocational education and training can assist those who leave school after completing Year 11, but that the 'kick' from VET participation is greater for girls than it is for boys.

In comparing tables 6 and 7 with our modelling results, we see that the impact of school vocational education and training for boys and girls who leave school after completing Year 11 looks considerably better than when we do not control for other factors known to impact on successful outcomes.

The higher probabilities of success for early school leavers over other students who remain at school past Year 10 is evident for boys more so than girls. However, it should be acknowledged that these Year 10 early school leavers have had three years post-school labour market exposure, compared to one year for those who completed Year 12 and two years for those who have completed Year 11. We also know from tables 6, 7 and 8 that it is not an easy road to success for these early school leavers, with many spending considerable time out of the labour market.

We now turn to look at predicted probabilities of successful outcomes in earlier years, to see if the size of the impact of school VET programs is similar for early school leavers as it is for those who continue further with school. We look at predictive successful post-school outcomes in 2001 for Year 10 and Year 11 completers (Year 12 students are omitted as they were still at school in 2001), and in 2000 (for Year 10 completers only).

This table shows a much stronger positive result for school VET students who leave after Year 11 than in the previous table. Again we see that VET study has a positive 'kick' for these students, with again the 'kick' being greater for girls (+14.8%) than for boys (+11.3%) when viewed in the short-

term. We note that the size of the 'kick' is more than double it was in the previous year (refer table 9: +5.2% for girls, +2.8% for boys), which suggests that participation in school VET programs appears very beneficial for those leaving at Year 11, but the impact is dampened one year later.

Table 10: Predicted probabilities of successful outcomes in 2001 and 2000 by gender and highest school level completed

Highest school level completed	Boys		Diff.	Girls		Diff.
	School VET	No school VET		School VET	No school VET	
	%	%	%	%	%	
2001						
Year 11	78.9	67.6	+11.3	63.7	48.9	+14.8
Year 10	–	76.2		–	55.0	
2000						
Year 10	–	68.0		–	46.7	

We have included the results of those who left school after completing Year 10 for comparative purposes. We now see that those who completed Year 11 and participated in school VET programs have superior outcomes relative to those leaving school after Year 10 (+2.7% for boys, +8.7% for girls). So, again, this analysis reinforces the positive impact of school VET programs for those who do not complete Year 12.

In conclusion, our modelling indicates that successful post-school outcomes are influenced by the time the student has in the labour market. The longer the time, the more diluted the positive effects from participation in school VET programs becomes. We see that participation in school VET programs is certainly beneficial for students who leave school after completing Year 11, particularly for girls, with the effect being stronger one rather than two years from leaving school. However, Year 12 completers, irrespective of their school VET participation, appear to have better immediate (one year) post-school success rates—that is, their post-school transition is smoother. The message from this analysis is that we should be encouraging Year 12 completion, unless a 'seamless' transition can be negotiated. For example, it may well be preferable for a school student to leave school early for an apprenticeship rather than stay to complete Year 12 for the sake of it.

School VET participation and post-school pathways

In the previous sections we argued that school VET participation is beneficial in terms of the transition from school to study or work for students who do not complete Year 12. But what we do not know is whether or not school VET programs are setting students on a post-school VET study path. *Is school VET providing clear and recognised pathways to further vocational education and training?*

We know that students who participate in school VET programs tend to do more post-school VET study than those who are offered, but choose not to participate in, these programs. For students who remain at school past Year 10, we see students following two main post-school study pathways. In an obvious over-simplification, the more academic students go on to university, and the less academic students go on to post-school VET study.

An issue related to post-school VET pathways is the very nature of the school VET programs themselves. We see a high degree of variability in these programs in terms of exposure to the world of work (work placements), the extent to which school VET subjects are accredited as either part of the school curriculum or as industry accepted training (AQTF) qualifications, and whether the programs offered count towards university entrance.

If school vocational education and training is providing pathways into post-school VET study, then we should see a relationship between school and post-school VET participation. If it is merely exposing students to a range of different courses, then we should expect to see weaker links between school and post-school VET participation. It may, in fact, be that school VET programs are acting more as a sorting agent, providing students with exposure to a greater range of career options than guiding specific career pathways.

The approach we take in this section is to explore the relationships between school and post-school vocational education and training. We first look at the extent of post-school VET activity. We then focus on course level data, making use of the NCVER National VET Provider Collection. Courses undertaken by VET in Schools students are compared with their peers studying vocational education and training outside the school environment. A further comparison with 18–19-year-olds gives a picture of the post-school VET world. Finally, we exploit the Longitudinal Surveys of Australian Youth data further by following those students who participated in school VET programs and who continue with VET study post-school. Matching the Longitudinal Surveys of Australian Youth and NCVER data enables us to test the extent to which VET courses studied at school lead on to post-school VET courses in the same field.

Extent of post-school VET activity

Looking back to the analysis of the Longitudinal Surveys of Australian Youth data we conducted on post-school pathways, we included further TAFE or apprenticeships or traineeships as successful outcomes. Table 11 summarises the extent of post-school VET activity for students who did and did not participate in school VET programs, taking into consideration the year a student left school.

Table 11: Proportion in school VET in 2002 by highest school level completed and school VET participation

Pathways in 2002	Year 12[1]		Year 11[2]		Year 10[3]
	School VET	No school VET	School VET	No school VET	No school VET
Girls	n = 766	n = 2574	n = 81	n = 155	n = 231
TAFE	27.5%	14.2%	27.2%	23.2%	23.4%
Apprenticeship/traineeship	14.5%	7.3%	25.9%	23.9%	31.6%
Total post-school VET for girls	**42.0%**	**21.5%**	**53.1%**	**47.1%**	**55.0%**
Boys	n = 658	n = 2286	n = 146	n = 175	n = 252
TAFE	22.0%	14.8%	14.4%	20.0%	12.3%
Apprenticeship/traineeship	21.4%	10.9%	54.1%	37.7%	56.0%
Total post-school VET for boys	**43.4%**	**25.7%**	**68.5%**	**57.7%**	**68.3%**

Notes: [1]One year post-school; [2]Two years post-school; [3]Three years post-school.

Table 11 shows that, for both boys and girls, proportionally more of those who participated in school VET programs went on to do more post-school VET study than students who chose not to participate in these programs. This relationship is particularly noticeable for those who complete Year 12.

However, table 11 also highlights that early school leavers (Year 10 completers) who are not generally exposed to school VET programs go on to post-school VET study at a rate that is comparable to those who stay at school to Year 11, suggesting that there is more to post-school VET pathways than school VET exposure.

School and non-school VET activity

We compare the VET activity of school VET students aged 16–17 years (typically Year 11 students), with the VET activity of students studying outside the school system of a comparable age (typically early school leavers, but could include school students doing extra-curricular VET study), and of those typically one year out of school (aged 18–19 years).

Table 12 illustrates that, irrespective of whether the VET study was undertaken at school or not, there are noticeable gender differences. Boys demonstrate a preference for Engineering and related technologies and Architecture and building, while girls show a preference for Management and commerce and Food, hospitality and personal services. We can also see from this larger dataset that school VET activity is mainly concentrated around certificate II level qualifications. We see equal numbers of boys and girls aged 16–17 years participating in school VET programs (59 235 boys and 58 739 girls in 2003), but that non-school VET activity for vocational education and training studied outside school is slightly more biased towards boys (55% boys, 45% girls).

The comparison of 16–17-year-olds in school vocational education and training with their peers undertaking non-school vocational education and training shows some notable differences. In the school environment, Information technology (boys and girls), Management and commerce (boys), Food, hospitality and personal services (girls) are significantly more prevalent than outside school. Similarly, Engineering and related technology (boys) are under represented at school. Post-school vocational education and training for boys is dominated by Engineering and related technology-type courses, which can have limited provision in school VET programs. By course level, schools focus on certificates I and II, while outside school certificates II and III dominate.

Table 12: Course information in 2003 for a range of VET students

Field of education	Boys			Girls		
	16–17 yrs, school VET (n = 59 235)	16–17 yrs, non-school VET (n = 72 544)	18–19 yrs, post-school VET (n = 108 774)	16–17 yrs, school VET (n = 58 739)	16–17 yrs, non-school VET (n = 58 827)	18–19 yrs, post-school VET (n = 87 568)
	%	%	%	%	%	%
Natural & phy. sciences	0.0	0.2	0.4	0.1	0.3	0.8
Information technology	24.4	6.9	7.4	10.8	2.7	2.0
Engineering & rel. tech.	18.6	30.6	31.6	2.2	2.8	3.3
Architecture & building	10.2	13.1	13.4	0.3	0.5	1.2
Agriculture, env. & rel. studies	4.3	6.7	5.3	3.0	3.3	2.0
Health	0.1	2.3	2.0	0.6	2.2	4.0
Education	0.2	0.7	0.2	0.1	1.8	0.6
Management & commerce	15.8	10.0	14.2	32.8	29.8	37.5
Society & culture	3.9	3.5	3.9	9.3	12.7	15.6
Creative arts	4.1	2.8	3.5	4.0	4.6	5.1
Food, hospitality & pers. services	12.0	9.8	10.2	31.0	24.1	18.1
Mixed field programs	6.3	12.3	6.9	5.7	13.5	8.5
Subject only	0.0	1.2	0.8	0.0	1.8	1.4
Qualification level	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Diploma or higher	0.0	2.7	15.4	0.0	3.5	20.6
Certificate IV	0.3	3.0	9.5	0.3	3.4	11.5
Certificate III	8.1	30.6	42.4	9.3	26.6	31.5
Certificate II	61.2	32.5	15.0	73.3	44.0	18.8
Certificate I	23.6	14.3	4.1	11.6	5.8	2.5
Secondary education	0.0	1.2	1.1	0.0	1.9	1.6
Non-award courses	0.4	3.2	3.0	0.2	2.8	2.8
Other education	6.4	11.3	8.7	5.3	10.2	9.2
Subject only—no qualification	0.0	1.2	0.8	0.0	1.8	1.4
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: National VET Provider Collection 2003 (unpublished), in publication scope and at school (VET in Schools) scope

In comparing the courses and qualification levels of younger and older students in non-school vocational education and training (16–17 years and 18–19 years), there is less variability in the types of courses than between school vocational education and training and non-school vocational education and training for those aged 16–17 years. That is, the nature of VET provision to young people outside school is consistent and we take this to represent what the labour market is demanding. This suggests that the provision of school vocational education and training is influenced by an education view of the world rather than a strictly labour demand view of the world. It is also influenced by the ability of the school to deliver these VET programs. Other research on the topic suggests that schools which are constrained by available resources tend to offer VET courses that are predominantly modifications of the traditional school subjects (for examples see Barnett & Ryan 2004; Polesel et al. 2004).

VET in Schools as a VET pathway

The data in table 12 refer to a series of snapshots. In looking at pathways we turn once more to the Longitudinal Surveys of Australian Youth data. Unfortunately, the longitudinal surveys do not provide detailed course data at this level. However, we are able to match the longitudinal surveys

respondents with the NCVER data, and follow these students through to their post-school VET activity (see appendix 1 for matching methodology). The downside to this approach is that we were able to match only small sub-samples of students. Tables 13 and 14 contain the data. In appendix 7 (tables 36 and 37) we present the full tables showing fields of education both at school and post-school. Here we present school VET activity in Year 11 (2000) and report on how many of these students continued with the same field of education after leaving school in 2002 by gender. However, this sort of simple comparison invites the obvious question. How many students would you expect to continue in the same field? To try to get a handle on this we calculated the number we would expect if the school choice and post-school choice of fields were completely independent. This provides the data for the 'expected' column.

Table 13: Number of male VET students going on with VET, in 2002

Field of education in 2000 (Year 11)	No. doing school VET programs	Expected no. continuing	Actual no. continuing
National and physical science	0	0.00	0
Information technology	2	0.03	1
Engineering and related technologies	11	2.08	7
Architecture and building	1	0.03	1
Agriculture, environment and related studies	3	0.08	1
Health	4	0.27	3
Education	1	0.00	0
Management and commerce	20	4.05	8
Society and culture	8	1.51	4
Creative arts	3	0.16	1
Food, hospitality and personal services	10	1.49	6
Mixed field programs	11	0.89	3
Total	**74**	**10.60**	**35**

Table 14: Number of female VET students going on with VET, in 2002

Field of education in 2000 (Year 11)	No. doing school VET programs	Expected no. continuing	Actual no. continuing
National and physical science	0	0.00	0
Information technology	7	0.82	1
Engineering and related technologies	12	1.19	0
Architecture and building	4	0.29	1
Agriculture, environment and related studies	6	0.38	2
Health	2	0.09	0
Education	0	0.00	0
Management and commerce	46	7.05	2
Society and culture	3	0.35	1
Creative arts	3	0.00	0
Food, hospitality and personal services	17	1.69	0
Mixed field programs	11	0.89	0
Total	**111**	**12.74**	**7**

The results are quite striking. Of the boys, almost half were continuing in the same field (and this is statistically significant, see appendix 7 for more detail). Of the girls, the corresponding number is 7 out of 111, and is less than would be expected by pure chance. That is, girls if anything are choosing different post-school VET study subjects. This adds further weight to the argument that vocational education and training at school, at least for girls, is not really vocationally oriented.

Our analysis demonstrates that many students, but especially girls, go on to VET study which is unrelated to their school VET subjects. This leads us to suspect that school VET study is providing students with options for post-school pathways rather than singular post-school pathways, especially for girls. This finding is supported by the Enterprise and Career Education Foundation report (ECEF 2003) on school leavers who participated in structured workplace learning in 2001, which found more students noted that this kind of learning 'helped them decide they did not want to continue in the same area', rather than 'confirming that they wanted to continue in the same area of study'. The message here is that there is a role for school vocational education and training in getting students to think about post-school pathways.

In conclusion, this section has demonstrated two key points:

- Firstly, students who participate in school VET programs tend to do more post-school VET study than students who stay at school past Year 10 but choose not to participate in these programs. However, students who are not exposed to school VET programs (Year 10 early school leavers) participate in post-school VET study at a comparable rate to Year 11 completers who participated in school VET programs. Clearly, school VET programs are not a prerequisite for post-school VET study.
- Secondly, while we see no bias towards girls or boys in the number of students participating in school VET programs, we do see strong gender variation in the types of school VET programs studied, and the extent of post-school VET study. We demonstrate that boys are more likely to continue on in their school VET studies after leaving school, especially in the areas of engineering and building, which we acknowledge often have limited school VET provision. However, we also note that the types of courses offered at school focusing on business, information technology and hospitality are favoured more so by girls than boys both in school VET courses and post-school VET courses. The fact that fewer girls continue their school VET courses on leaving school suggests that they are using these comparatively shorter school VET courses as pathways to employment rather than further study, or that they are using them as 'tasters' for other post-school VET courses, and not as post-school study pathways. The more defined VET pathways demonstrated by boys may relate more to the nature of the course requiring a longer commitment of study before employment is gained—for example, in the take-up of an apprenticeship in the traditional trades, versus girls moving into an administrative office position.

Conclusions

In this report we set out to answer the seemingly simple question: *Have school VET programs been successful?* In unpacking this question, we looked at outcomes in terms of retention to Year 12, and post-school engagement with learning and employment. Finally, we looked at whether school VET programs are establishing post-school VET pathways. Following are our main findings, in broad terms.

Vocational education and training delivered at school has grown enormously, to the extent that around half of Year 11 and Year 12 students have some exposure to it. However, the proportion of the students in the Longitudinal Surveys of Australian Youth Y98 cohort reporting VET participation at school was significantly less than that obtained from the administrative statistics. This suggests that some VET programs at school are either of very little or such similar substance to the existing school curriculum that they are not acknowledged as vocational education and training.

Vocational education and training at school tends to be attractive to those who are less academically inclined, and who are more inclined to continue with VET courses after school. However, it is by no means the only pathway into post-school vocational education and training. Indeed, those who leave after Year 10 end up doing as much post-school VET study as those who undertook VET study at school.

Our analysis indicates a positive effect on Year 10 to Year 11 retention, but a negative effect on Year 11 to Year 12 retention. The effects are larger for boys than girls. Overall, we estimate a small negative effect on Year 12 retention, although the size of the effect is of no policy significance. Repeating the analysis including the vocational equivalent to Year 12 does not materially alter the conclusion.

However, students who leave after Year 11 have much better outcomes the next year compared to Year 11 leavers who had not participated in school VET programs. This suggests that the reason for the negative effect on Year 11 to Year 12 school retention is tied up with the school VET program aiding the transition to the labour market, perhaps through the work experience component of the program. Vocational education and training in school does not appear to assist those who complete Year 12, at least in terms of the proportion in subsequent study or employment.

A simple comparison of what students are doing in 'Year 13' indicates that early school leavers are not that badly off when success is defined in both labour market and study terms. However, those who leave early have a much tougher ride, and the transition process is much longer than for those who stay to Year 12. As noted above, those who leave after Year 11 clearly benefit from their VET in Schools program. It must also be kept in mind that the cohort studied had the benefit of a reasonably buoyant labour market.

Vocational education and training at school is undoubtedly a clear pathway for some students. In particular, a reasonable number of boys continue in the same field with their post-school vocational studies. However, the fields of education offered at school do not line up particularly well with those offered outside school (that are more likely to reflect labour market demands), and girls tend to shy away from the VET subjects they studied at school. In comparing VET offerings inside and outside school, one note of discord is that the school VET subjects are at a lower level, even for the same age groups. Certificate III is the bread and butter of the VET world and there are very few of these offered at school.

It is beyond the purpose of this paper to spell out policy implications. However, the paper does raise some questions worth addressing:

- ✧ Is the focus of school VET programs in Year 11 and Year 12 appropriate given that many early school leavers do not get to Year 11, and the evidence is that it does not assist Year 11 to Year 12 retention?
- ✧ Do we need to distinguish between those students who are genuinely looking for a VET pathway and those who may have a passing interest in vocational education and training? Perhaps the administrative data on students undertaking VET study at school are not particularly informative since both groups are lumped together.
- ✧ Do school VET programs need to focus more seriously on a VET pathway with a clear labour market aim? That is, do school VET offerings need to be better aligned with those offered outside school, in both field and level, and should more attention be paid to employment prospects rather than thinking about school VET programs within its educational setting? Are there other educational settings that could be integrated into the schooling framework?
- ✧ Alternatively, given that school VET programs do not provide a clear vocational pathway for many VET-inclined students, would it be better to downplay the industrial strength aspects of vocational education and training at school (such as the emphasis on industry competencies and AQF certificates) and emphasise broader vocational education skills? That is, perhaps we should consider school VET study more as pre-vocational preparation. This would certainly lend itself to the school setting.

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Appendix 1: Data

The Longitudinal Surveys of Australian Youth data

The primary source of data for this study is from the Longitudinal Surveys of Australian Youth (LSAY), a survey of young Australians interviewed annually on their school experiences, and post-school education, training and work activity.

In 1998, a nationally representative sample of 14 118 Year 9 students was selected to form the second cohort of the *Longitudinal Surveys of Australian Youth* program. The initial sample was constructed by randomly selecting two to three Year 9 classes from a sample of schools designed to represent state and sector. Smaller states and territories were over-sampled to provide sufficient numbers to provide reliable state estimates on a number of key variables. This sample, termed the Y98 cohort, was surveyed in 1999 with a mail survey and in subsequent years with telephone surveys. In 2000, the sample was rebuilt (by contacting the cohort beyond those that responded to the 1999 survey), and hence the increase in the sample between 1999 and 2000.

Table 15: Longitudinal Surveys of Australian Youth sample, collection methodology and attrition rates

	1998	1999	2000	2001	2002
School year*	Year 9	Year 10	Year 11	Year 12/13	Left school
No. students in the LSAY sample	14 118	9 289	9 548	8 777	7 762
Collection method	Numeracy & literacy tests and in-class interviews	Mail	Telephone	Telephone	Telephone

Note: * For majority of students.

The NCVER data

One of the NCVER Australian vocational education and training statistical collections contains the National VET Provider Collection. This collection of public VET students provides a more detailed picture of student VET activity to compliment the longitudinal surveys data for any given year.

In 2002, Year 11 for our longitudinal surveys students, NCVER reported on the activity of 1.67 million students, 25% of which were aged less than 19 years (NCVER 2003).

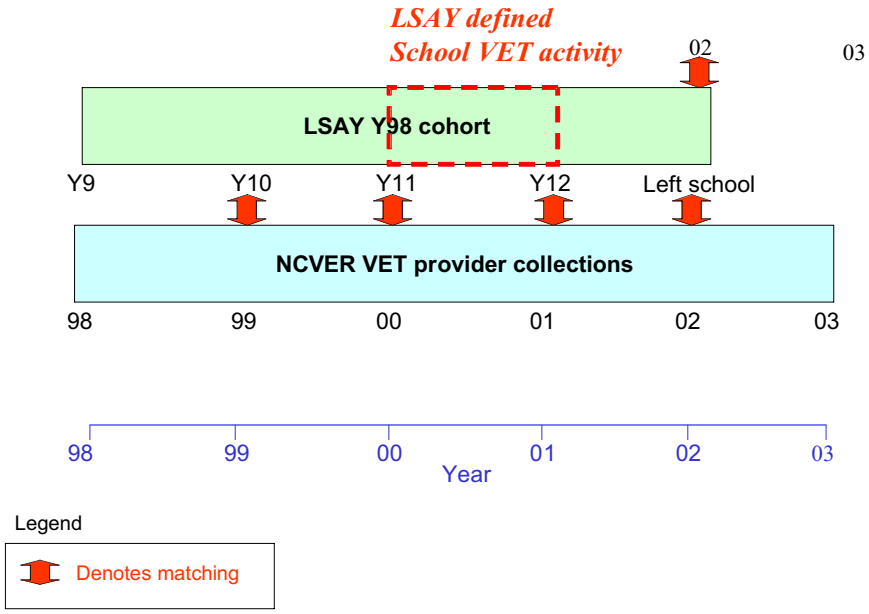
The matching process

NCVER matched the longitudinal surveys data with the National VET Provider Collection for 1998, 1999, 2000, 2001, 2002 and 2003 years. The matching methodology used a combination of surrogate indicators which are most unlikely to occur unless it is the same person in both data sets (NCVER technical notes: Methodology used for monitoring student flows in the VET system 2001

[unpublished]). These included encrypted name, date of birth, sex, Indigenous status, postcode and the state where attended school.

The matching is depicted in figure 3. It should be noted that while we were able to match the NCVER student data from 1998 through to 2003 with the longitudinal surveys data, the longitudinal surveys questionnaire only asked about school VET activity in Year 11 and Year 12 (2000 and 2001). Therefore we are only able to explore school VET activity on the matched NCVER data between 2000 and 2001. For data that matched outside these years, we cannot verify the nature of the school VET activity with the longitudinal surveys data as these questions were not asked.

Figure 3: Data sets involved in the project



In total, 4562 records were matched from the longitudinal surveys data to the NCVER data. In some cases, there were one-to-many matches to the NCVER collections due to students enrolling and dropping a number of courses. These one-to-many matches were cleaned to include only the highest major qualification reported. As a result 3828 matches were achieved. Some 1385, or 36%, of these matches were continuing students, resulting in 2443 unique record matches.

Table 16: Results of NCVER–Longitudinal Surveys of Australian Youth matching

	1998	1999	2000	2001	2002	2003	Total
			School VET activity				
School Year*	Year 9	Year 10	Year 11	Year 12/13	Left school	Left school	
No. students in LSAY sample	14 118	9 289	9 548	8 777	7 762	N/A	**N/A**
LSAY school VET program participants	Not asked	Not asked	2 144	1 603	N/A	N/A	**N/A**
No. LSAY–NCVER matches	3	203	697	963	1 009	953	**3 828**
Continuing students	–	–	70	336	380	599	**1 385**
New students	3	203	627	627	629	354	**2 443**
NCVER VET in Schools	0	1	15	284	14	5	**319**
LSAY school VET program participants **	–	–	2 145	1 671	–	–	**–**

Notes: * For the majority of students; ** 'No' or 'unknown' VET status in original longitudinal surveys sample was updated if these students were reported as NCVER VET in Schools students.

Appendix 2: Factor analysis

Most of the control variables were readily available or could be easily derived from the Longitudinal Surveys of Australian Youth dataset except for *engagement with school*, *perceived attitude of peers* and *self-perceived academic ability*. To derive this information, factor analysis was conducted.

Engagement with school

'Engagement' in the Longitudinal Surveys of Australian Youth data is captured in the questionnaire administered to students while they were in Year 10, which asks about their participation in a range of extracurricular activities:

- Sport
- Music, band or orchestra
- Debating
- Drama, theatre, dance or school play
- Community and support work at school (e.g. peer support, fundraising).

Responses to these items were re-coded from the original categories relating to frequency of participation into a four-point scale; with 0 representing no participation in the activity through to 3 representing participation in the activity on at least a weekly basis. The individual factor loadings for sport, music, debate, drama and support work were 0.425, 0.627, 0.687, 0.656 and 0.639, respectively. Each individual variable was then weighted proportionally by their actual contribution and summed up to give an *engagement with school* score.

Perceived attitude of peers

Perceived attitude of peers is measured in the longitudinal surveys data in Year 10, defined as a student's perception of their classmates in terms of:

- 'Students are eager to learn'
- 'Students make good progress'
- 'Students work hard'
- 'Students are well behaved'.

Responses to these items were re-coded from the original categorical variable to a four-point scale with 0 representing strong disagreement to the statement through to 3 representing strong agreement to the statement. The individual factor loadings for eagerness to learn, making good progress, working hard and well behaved were 0.671, 0.652, 0.673 and 0.663, respectively. Each individual variable was then weighted proportionally by their actual contribution and summed up to give a *perceived attitude of peers* score.

Self-perceived academic ability

Self-perceived academic ability in the longitudinal surveys data is defined in terms of a student's self-rated performance in the following subjects, which were captured in the questionnaire administered to students while they were in Year 10:

- English
- Mathematics
- Science
- Studies of society and environment (SOSE).

Responses to these items were re-coded from the original to a five-point scale, with 0 representing performing very poorly in the subject, through to 4 representing performing very well in the subject. The individual factor loadings for English, mathematics, science and SOSE were: 0.470, 0.474, 0.533 and 0.407, respectively. Each variable was then weighted proportionally by their actual contribution and summed to give a *self-perceived academic ability* score.

Appendix 3: Statistical modelling

The quantitative analysis of the research report comprised of variants on four separate statistical models, described below:

1. Prediction of who will participate in school VET programs in Year 11 (Model A) using the Longitudinal Surveys of Australian Youth data
2. Prediction of apparent retention rates through a cross-sectional time series analysis of ABS apparent retention rates (Year 10 – Year 11 and Year 11 – Year 12) and Ministerial Council on Education, Employment, Training and Youth Affairs VET in Schools participation rates by state (see appendix 4)
3. Prediction of retentions rates using the Longitudinal Surveys of Australian Youth data for:
    a. Year 10 to Year 11 using the estimated school VET 'dosage' in 2000 with and without gender interaction (Model B and B1, respectively)
    b. Year 11 to Year 12 using the actual VET participation in Year 11 (Model C)
    c. Year 11 to Year 12 or other Year 12 equivalent studies using the actual VET participation in Year 11 (Model D)
4. Prediction of successful outcomes using the Longitudinal Surveys of Australian Youth data for:
    a. 2002 for all students (Model E)
    b. 2001 for all students except those who were still at school in 2001 (Model F)
    c. 2000 for all students except those who were still at school in 2000 (Model G).

School VET 'dosage' is defined as the proportion of Longitudinal Surveys of Australian Youth students who self-identified as participating in school vocational education and training in Year 11 (2000) at the school aggregate.

Year 12 equivalent studies include traineeship/apprenticeship, Year 12 at TAFE, TAFE/VET Certificates III and IV, other trade certificates, TAFE diploma, TAFE advanced diploma/associate degree or University diploma.

Successful outcomes are defined as being in full-time employment, at school, in higher education (full-time or part-time), in TAFE (full-time or part-time), in apprenticeships/traineeships, or in part-time employment and studies.

Table 17 summarises the outcome, control and treatment variables used in each of the models noted above in sections 1, 3 and 4. The majority of the variables are categorical unless otherwise stated.

Table 18 describes the characteristics of the Longitudinal Surveys of Australian Youth Y98 cohort.

Please refer to appendix 1 for more detail on the longitudinal surveys data, and to appendix 4 for the cross-sectional time series analysis described in section 2 above.

Table 17: The sample base, outcome, control and treatment variables used in models A–G

	Model A	Model B	Model B1	Model C	Model D	Model E, F, G
Sample base[1]						
All students						✓
Students who did Year 10 in 1999		✓	✓			
Students who did Year 11 in 2000	✓			✓	✓	
Outcome variables						
Student participates in VET or not	✓					
Student participates in Year 11 or not		✓	✓			
Student participates in Year 12 or not				✓		
Student participates in Year 12 or other Year 12 equivalent studies or not					✓	
Student has successful outcomes or not						✓
Control variables						
Gender	✓	✓	✓	✓	✓	✓
School type	✓	✓	✓	✓	✓	✓
State where attended school	✓	✓	✓	✓	✓	✓
Area of residence	✓	✓	✓	✓	✓	✓
Ethnicity	✓	✓	✓	✓	✓	✓
Parental occupation	✓	✓	✓	✓	✓	✓
Parental education	✓	✓	✓	✓	✓	✓
Numeracy and literacy score (continuous)	✓	✓	✓	✓	✓	✓
Aspiration	✓	✓	✓	✓	✓	✓
Engagement with school (continuous)	✓	✓	✓	✓	✓	✓
Perceived attitude of peers (continuous)	✓	✓	✓	✓	✓	✓
Self-perceived academic ability (continuous)	✓	✓	✓	✓	✓	✓
Treatment variables						
Actual VET participation in Year 11				✓		
School VET 'dosage'		✓	✓		✓	
Highest school level completed by actual VET participation in Year 11						✓
Gender interaction with treatment variable used		✓		✓	✓	✓

In conducting the analysis noted in table 17, we used logistic regression modelling. Logistic regression was used because the outcome variables in each model were treated as 0, 1 variables. Each categorical control or treatment variable has a reference group in which the results of the modelling (beta values) can be easily compared to another group within the variable. These reference groups have been selected on the basis of having the highest proportion in the longitudinal surveys sample in each variable. However, the choice of reference characteristic does not change the relative differences in the logistic coefficients or odd ratios between groups. In this analysis, the reference groups are:

- ✧ Male in *gender*
- ✧ Government school in *school type*
- ✧ NSW in *state where attended school*
- ✧ Metropolitan in *area of residence*
- ✧ English-speaking background in *ethnicity*

[1] Missing values in any of the specified variables were excluded from modelling.

- ✧ Manual in *parental occupation*
- ✧ Completed secondary schooling or apprenticeship only in *parental education level*
- ✧ Intended to do Year 12 in *aspiration*
- ✧ Non-VET in *actual VET participation in Year 11*
- ✧ Year 10 in *highest school level completed by actual VET participation in Year 11*

We used the log-likelihood ratio test to determine if a particular student characteristic needed to be included as interaction terms with the treatment variable. As a result, we included gender interaction for models C–G, as gender has a significant impact on student pathways.

Table 18: Longitudinal Surveys of Australian Youth Y98 cohort characteristics (unweighted)

	1998	1999	2000	2001	2002
School year*	Year 9	Year 10	Year 11	Year 12	Left school
Number of students in the LSAY sample	14 118	9 289	9 548	8 777	7 762
Gender* (%)					
Female	48.5	52.4	50.1	50.8	51.2
Male	51.5	47.6	49.9	49.2	48.8
School type* (%)					
Independent	14.9	15.9	15.4	15.6	16.0
Catholic	22.1	22.5	24.0	24.6	24.7
Government	63.0	61.6	60.5	59.7	59.3
Location where attended school* (%)					
ACT	4.0	3.9	4.3	4.4	4.3
NT	3.3	2.9	2.8	2.8	2.8
TAS	5.1	5.9	5.3	5.5	5.8
WA	12.0	11.9	11.9	11.9	11.7
SA	8.8	9.4	9.1	9.1	9.2
QLD	22.0	22.7	22.1	21.9	21.8
VIC	20.9	20.0	20.7	20.5	20.7
NSW	24.0	23.3	23.8	23.8	23.6
Area of residence* (%)					
Rural/remote	18.5	19.7	19.5	19.4	19.3
Regional	23.6	24.4	24.0	23.9	23.9
Metropolitan	57.9	55.9	56.5	56.7	56.8

Table 18: Longitudinal Surveys of Australian Youth Y98 cohort characteristics (unweighted) (continued)

	1998	1999	2000	2001	2002
School year*	Year 9	Year 10	Year 11	Year 12	Left school
Number of students in the LSAY sample	14 118	9 289	9 548	8 777	7 762
Ethnicity* (%)					
Non-English speaking background	9.0	8.1	8.0	7.9	7.7
English-speaking background	91.0	91.9	92.0	92.1	92.3
Parental occupation * (%)					
Professional	31.0	32.4	32.2	32.4	33.1
Managerial	21.5	21.7	21.3	21.4	21.3
Clerical/Personal service	9.9	10.0	10.1	10.2	10.0
Manual	37.5	35.9	36.4	36.1	35.6
Parental education level * (%)					
University	24.6	25.6	25.5	25.8	26.5
TAFE	7.8	7.9	7.7	7.6	7.6
Secondary school or apprenticeship	46.2	45.4	46.2	45.9	45.5
Did not complete secondary school	21.4	21.1	20.7	20.6	20.4
Aspiration (as asked in Year 10) * (%)					
Intended to leave before Year 12	n/a	20.0	20.7	19.8	18.8
Intended to do Year 12	n/a	80.0	79.3	80.2	81.2
Highest school level achieved * (%)					
Year 10	n/a	n/a	n/a	n/a	6.6
Year 11 and did VET	n/a	n/a	n/a	n/a	3.1
Year 11 but did not do VET	n/a	n/a	n/a	n/a	4.5
Year 12 and did VET in Year 11	n/a	n/a	n/a	n/a	19.4
Year 12 but did not do VET in Year 11	n/a	n/a	n/a	n/a	66.4
Assessed achievement score (average)	49.64	50.73	50.62	50.88	51.20
**Engagement with school (average) ** **	0.89	0.89	0.89	0.89	0.89
**Perceived attitude of peers (average) ** **	1.67	1.67	1.67	1.68	1.68
**Self-perceived academic ability (average) ** **	3.50	3.50	3.52	3.53	3.55
Probability of doing VET in Year 11 (average)	n/a	0.27	n/a	n/a	n/a

Notes: * Exclude missing values; ** Refer to appendix 2 for further information on these variables.

Appendix 4: Time series analysis

This appendix describes the time series analysis as outlined in item 2 in the previous appendix. It predicts the apparent retention rates through a cross-sectional time series analysis of ABS apparent retention rates (Year 10 – Year 11 and Year 11 – Year 12) and Ministerial Council on Education, Employment, Training and Youth Affairs VET in Schools participation rates by state.

We used simple linear regression through the origin to conduct a cross-sectional time series analysis on:

- ABS Year 10 – Year 11 apparent retention rates by state from 1997–2003 with:
  - both VET in Schools participation rates and time trend (Model 1)
  - time trend only (Model 2)
  - VET in Schools participation rates only (Model 3)
- ABS Year 11 – Year 12 apparent retention rates by state from 1997–2003 with:
  - both VET in Schools participation rates and time trend (Model 4)
  - time trend only (Model 5)
  - VET in Schools participation rates only (Model 6).

The 1996 data was excluded from the analysis because the number of VET in Schools students was not attainable by state breakdown. ACT and NT were also excluded due to the very small bases. The apparent Year 12 retention rates are also problematic in ACT because of flows of NSW students to the ACT system.

We used data sourced from the ABS for the apparent retention rates, and from Ministerial Council on Education, Employment, Training and Youth Affairs for the VET in Schools participation rates for this analysis.

Table 19: Year 10 – Year 11 apparent retention rates by state, 1996–2003

State	1996	1997	1998	1999	2000	2001	2002	2003
	%	%	%	%	%	%	%	%
NSW	81.6	82.0	81.6	82.1	80.8	82.8	83.8	84.7
VIC	92.2	92.7	92.8	93.3	93.7	94.3	94.3	95.5
QLD	86.4	86.9	87.6	89.2	89.3	90.2	91.1	91.6
SA	92.1	92.1	91.7	92.7	91.0	93.9	93.6	94.9
WA	86.5	87.4	86.3	88.3	86.4	87.9	88.9	89.1
TAS	71.3	76.0	78.2	84.6	83.7	84.3	81.9	81.9
NT	78.6	98.9	87.6	84.4	91.0	88.9	97.8	103.5
ACT	103.4	105.5	103.1	103.0	104.7	101.5	104.0	103.2
Australia	86.5	87.3	87.1	88.1	87.5	88.9	89.5	90.3

Source: ABS 1996–2003, *Schools, Australia,* cat. no.4221.0

Table 20: Year 11 – Year 12 apparent retention rates by state, 1996–2003

State	1996	1997	1998	1999	2000	2001	2002	2003
	%	%	%	%	%	%	%	%
NSW	86.4	86.0	85.2	85.8	85.0	87.0	87.5	86.7
VIC	86.0	86.7	85.3	84.8	85.5	87.2	87.9	87.9
QLD	89.6	90.2	89.4	89.4	88.2	89.3	89.9	89.5
SA	77.7	77.1	77.3	78.0	74.9	76.5	75.1	75.6
WA	83.7	84.2	82.1	82.9	81.0	83.3	84.0	79.4
TAS	77.5	85.1	84.5	88.2	84.7	84.3	88.9	93.3
NT	68.2	79.9	61.0	73.9	73.7	71.3	74.4	70.3
ACT	89.0	88.9	87.7	89.7	86.2	89.1	88.5	86.9
Australia	85.7	86.1	84.9	85.4	84.5	86.1	86.7	85.9

Source: ABS 1996–2003, *Schools*, *Australia,* cat.no.4221.0

Table 21: VET in Schools participation rates, 1996–2003

State	1996	1997	1998	1999	2000	2001	2002	2003
	%	%	%	%	%	%	%	%
NSW	n/a	35.8	38.5	39.3	39.8	44.6	50.6	52.3
VIC	n/a	10.3	12.8	13.8	19.0	21.4	24.6	27.8
QLD	n/a	41.4	41.1	49.4	53.6	57.0	58.6	69.0
SA	n/a	15.0	46.5	61.0	74.8	72.5	70.3	75.2
WA	n/a	5.8	12.5	20.8	21.3	29.6	30.2	31.0
TAS	n/a	16.8	21.5	24.5	30.5	23.7	29.3	31.8
NT	n/a	14.2	43.2	55.5	46.0	50.7	56.3	59.6
ACT	n/a	22.0	36.3	48.1	45.2	43.7	43.6	42.2
Australia	16.2	24.7	29.9	34.6	38.0	41.3	44.3	48.3

Source: Ministerial Council on Education, Employment, Training and Youth Affairs (2004)

The equation for Model 1 is:

$$Y10\text{-}11_{i,t} = b_1NSW + b_2VIC + b_3QLD + b_4SA + b_5WA + b_6TAS + b_7Y10\text{-}11_{i,t-1} + b_8VET_{i,t} + b_9t$$

where $Y10\text{-}11_{i,t}$ = Year 10 – Year 11 apparent retention rate for state *i* at time *t*

$$\begin{cases} NSW = 1 \text{ if } i = NSW \\ \qquad\quad = 0 \text{ otherwise} \end{cases}$$

$$\begin{cases} VIC = 1 \text{ if } i = VIC \\ \qquad\quad = 0 \text{ otherwise} \end{cases}$$

$$\vdots$$

$$\begin{cases} TAS = 1 \text{ if } i = TAS \\ \qquad\quad = 0 \text{ otherwise} \end{cases}$$

$Y10\text{-}11_{i,t-1}$ = Year 10 – Year 11 apparent retention rate for state *i* at time *t-1*

$VET_{i,t}$ = VET in Schools participation rate for state *i* at time *t*

i = NSW, VIC, QLD, SA, WA, TAS

t = 0, 1, 2, ... 6 (for 1997, 1998, ..., 2003 respectively)

Table 22: Regression results for Model 1

Control variables		Unstandardised coefficients		Standardised coefficients	t	Sig.
		Value	Std. error	Value		
b_1	NSW	0.510	0.091	0.236	5.628	0.000
b_2	VIC	0.580	0.101	0.269	5.754	0.000
b_3	QLD	0.554	0.099	0.257	5.616	0.000
b_4	SA	0.574	0.103	0.266	5.555	0.000
b_5	WA	0.542	0.095	0.251	5.732	0.000
b_6	TAS	0.507	0.087	0.235	5.845	0.000
b_7	$Y10\text{-}11_{i,t-1}$	0.373	0.110	0.370	3.393	0.002
b_8	$VET_{i,t}$	0.000	0.029	0.000	0.003	0.997
b_9	*t*	0.003	0.002	0.013	1.830	0.076

ANOVA

	Sum of squares	df	Mean square	F	Sig.
Regression	32.605	9	3.623	26352.234	0.000
Residual	0.005	33	0.000		
Total	**32.609**	**42**			

The equation for Model 2 is:

$$Y10\text{-}11_{i,t} = b_1NSW + b_2VIC + b_3QLD + b_4SA + b_5WA + b_6TAS + b_7Y10\text{-}11_{i,t-1} + b_8t$$

where $Y10\text{-}11_{i,t}$ = Year 10 – Year 11 apparent retention rate for state *i* at time *t*

$$\begin{cases} NSW = 1 \text{ if } i = NSW \\ \qquad\quad = 0 \text{ otherwise} \end{cases}$$

$$\begin{cases} VIC = 1 \text{ if } i = VIC \\ \qquad\quad = 0 \text{ otherwise} \end{cases}$$

$$\vdots$$

$$\begin{cases} TAS = 1 \text{ if } i = TAS \\ \qquad\quad = 0 \text{ otherwise} \end{cases}$$

$Y10\text{-}11_{i,t-1}$ = Year 10 – Year 11 apparent retention rate for state *i* at time *t-1*

i = NSW, VIC, QLD, SA, WA, TAS

t = 0, 1, 2, ... 6 (for 1997, 1998, ..., 2003 respectively)

Table 23: Regression results for Model 2

Control variables		Unstandardised coefficients		Standardised coefficients	t	Sig.
		Value	Std. error	Value		
b_1	NSW	0.510	0.085	0.236	6.020	0.000
b_2	VIC	0.580	0.096	0.269	6.018	0.000
b_3	QLD	0.554	0.092	0.257	6.050	0.000
b_4	SA	0.574	0.096	0.266	6.010	0.000
b_5	WA	0.542	0.090	0.251	6.010	0.000
b_6	TAS	0.507	0.082	0.235	6.153	0.000
b_7	$Y10\text{-}11_{i,t-1}$	0.373	0.105	0.370	3.534	0.001
b_8	*t*	0.003	0.001	0.013	2.903	0.006

ANOVA

	Sum of squares	df	Mean square	F	Sig.
Regression	32.605	8	4.076	30544.625	0.000
Residual	0.005	34	0.000		
Total	**32.609**	**42**			

The equation for Model 3 is:

$$Y10\text{-}11_{i,t} = b_1NSW + b_2VIC + b_3QLD + b_4SA + b_5WA + b_6TAS + b_7Y10\text{-}11_{i,t-1} + b_8VET_{i,t}$$

where $Y10\text{-}11_{i,t}$ = Year 10 – Year 11 apparent retention rate for state *i* at time *t*

$$\begin{cases} NSW = 1 \text{ if } i = NSW \\ \qquad\quad = 0 \text{ otherwise} \end{cases}$$

$$\begin{cases} VIC = 1 \text{ if } i = VIC \\ \qquad\quad = 0 \text{ otherwise} \end{cases}$$

$$\vdots$$

$$\begin{cases} TAS = 1 \text{ if } i = TAS \\ \qquad\quad = 0 \text{ otherwise} \end{cases}$$

$Y10\text{-}11_{i,t-1}$ = Year 10 – Year 11 apparent retention rate for state *i* at time *t-1*

$VET_{i,t}$ = VET in Schools participation rate for state *i* at time *t*

i = NSW, VIC, QLD, SA, WA, TAS

t = 0, 1, 2, ... 6 (for 1997, 1998, ..., 2003 respectively)

Table 24: Regression results for Model 3

Control variables		Unstandardised coefficients		Standardised coefficients	t	Sig.
		Value	Std. error	Value		
b_1	NSW	0.411	0.075	0.190	5.469	0.000
b_2	VIC	0.479	0.087	0.222	5.499	0.000
b_3	QLD	0.444	0.081	0.206	5.496	0.000
b_4	SA	0.457	0.084	0.212	5.445	0.000
b_5	WA	0.446	0.081	0.207	5.485	0.000
b_6	TAS	0.418	0.074	0.193	5.637	0.000
b_7	$Y10\text{-}11_{i,t-1}$	0.484	0.095	0.480	5.119	0.000
b_8	$VET_{i,t}$	0.040	0.019	0.019	2.126	0.041

ANOVA

	Sum of squares	df	Mean square	F	Sig.
Regression	32.604	8	4.076	27731.08	0.000
Residual	0.005	34	0.000		
Total	**32.609**	**42**			

The equation for Model 4 is:

$Y11\text{-}12_{i,t} = b_1NSW + b_2VIC + b_3QLD + b_4SA + b_5WA + b_6TAS + b_7Y10\text{-}11_{i,t-1} + b8Y11\text{-}12_{i,t-} + b_9VET_{i,t} + b_{10}t$

where $Y11\text{-}12_{i,t}$ = Year 11 – Year 12 apparent retention rate for state *i* at time *t*

NSW = 1 if *i* = NSW
= 0 otherwise

VIC = 1 if *i* = VIC
= 0 otherwise

⋮

TAS = 1 if *i* = TAS
= 0 otherwise

$Y10\text{-}11_{i,t-1}$ = Year 10 – Year 11 apparent retention rate for state *i* at time *t-1*

$Y11\text{-}12_{i,t-1}$ = Year 11 – Year 12 apparent retention rate for state *i* at time *t-1*

$VET_{i,t}$ = VET in Schools participation rate for state *i* at time *t*

i = NSW, VIC, QLD, SA, WA, TAS

t = 0, 1, 2, ... 6 (for 1997, 1998, ..., 2003 respectively)

Table 25: Regression results for Model 4

Control variables		Unstandardised coefficients		Standardised coefficients	t	Sig.
		Value	Std. error	Value		
b_1	NSW	0.763	0.147	0.368	5.208	0.000
b_2	VIC	0.794	0.152	0.382	5.212	0.000
b_3	QLD	0.810	0.156	0.390	5.207	0.000
b_4	SA	0.760	0.149	0.366	5.087	0.000
b_5	WA	0.748	0.145	0.360	5.162	0.000
b_6	TAS	0.760	0.142	0.366	5.361	0.000
b_7	$Y10\text{-}11_{i,t-1}$	-0.379	0.194	-0.391	-1.949	0.060
b_8	$Y11\text{-}12_{i,t-1}$	0.485	0.204	0.483	2.383	0.023
b_9	$VET_{i,t}$	-0.060	0.040	-0.029	-1.509	0.141
b_{10}	*t*	0.006	0.002	0.025	2.331	0.026

ANOVA

	Sum of squares	df	Mean square	F	Sig.
Regression	30.163	10	3.016	11589.81	0.000
Residual	0.008	32	0.000		
Total	**30.172**	**42**			

The equation for Model 5 is:

$$Y11\text{-}12_{i,t} = b_1NSW + b_2VIC + b_3QLD + b_4SA + b_5WA + b_6TAS + b_7Y10\text{-}11_{i,t-1} + b8Y11\text{-}12_{i,t-} + b_9t$$

where $Y11\text{-}12_{i,t}$ = Year 11 – Year 12 apparent retention rate for state *i* at time *t*

$$\begin{cases} NSW = 1 \text{ if } i = NSW \\ \qquad\quad = 0 \text{ otherwise} \end{cases}$$

$$\begin{cases} VIC = 1 \text{ if } i = VIC \\ \qquad\quad = 0 \text{ otherwise} \end{cases}$$

$$\vdots$$

$$\begin{cases} TAS = 1 \text{ if } i = TAS \\ \qquad\quad = 0 \text{ otherwise} \end{cases}$$

$Y10\text{-}11_{i,t-1}$ = Year 10 – Year 11 apparent retention rate for state *i* at time *t-1*

$Y11\text{-}12_{i,t-1}$ = Year 11 – Year 12 apparent retention rate for state *i* at time *t-1*

i = NSW, VIC, QLD, SA, WA, TAS

t = 0, 1, 2, ... 6 (for 1997, 1998, ..., 2003 respectively)

Table 26: Regression results for Model 5

Control variables		Unstandardised coefficients		Standardised coefficients	t	Sig.
		Value	Std. Error	Value		
b_1	NSW	0.694	0.142	0.334	4.893	0.000
b_2	VIC	0.735	0.150	0.354	4.898	0.000
b_3	QLD	0.732	0.150	0.353	4.895	0.000
b_4	SA	0.680	0.142	0.328	4.777	0.000
b_5	WA	0.691	0.143	0.333	4.847	0.000
b_6	TAS	0.702	0.139	0.338	5.048	0.000
b_7	$Y10\text{-}11_{i,t-1}$	-0.344	0.197	-0.355	-1.749	0.090
b_8	$Y11\text{-}12_{i,t-1}$	0.512	0.207	0.510	2.478	0.018
b_9	*t*	0.003	0.002	0.013	1.779	0.084

ANOVA

	Sum of squares	df	Mean square	F	Sig.
Regression	30.163	9	3.351	12397.977	0.000
Residual	0.009	33	0.000		
Total	**30.172**	**42**			

The equation for Model 6 is:

$Y11\text{-}12_{i,t} = b_1NSW + b_2VIC + b_3QLD + b_4SA + b_5WA + b_6TAS + b_7Y10\text{-}11_{i,t-1} + b8Y11\text{-}12_{i,t-} + b_9VET_{i,t}$

where $Y11\text{-}12_{i,t}$ = Year 11 – Year 12 apparent retention rate for state *i* at time *t*

NSW = 1 if *i* = NSW
= 0 otherwise

VIC = 1 if *i* = VIC
= 0 otherwise

⋮

TAS = 1 if *i* = TAS
= 0 otherwise

$Y10\text{-}11_{i,t-1}$ = Year 10 – Year 11 apparent retention rate for state *i* at time *t-1*

$Y11\text{-}12_{i,t-1}$ = Year 11 – Year 12 apparent retention rate for state *i* at time *t-1*

$VET_{i,t}$ = VET in Schools participation rate for state *i* at time *t*

i = NSW, VIC, QLD, SA, WA, TAS

t = 0, 1, 2, ... 6 (for 1997, 1998, ..., 2003 respectively)

Table 27: Regression results for Model 6

	Control variables	Unstandardised coefficients		Standardised coefficients	t	Sig.
		Value	Std. error	Value		
b_1	NSW	0.613	0.140	0.295	4.373	0.000
b_2	VIC	0.635	0.145	0.306	4.376	0.000
b_3	QLD	0.640	0.146	0.308	4.373	0.000
b_4	SA	0.569	0.133	0.274	4.276	0.000
b_5	WA	0.598	0.138	0.288	4.325	0.000
b_6	TAS	0.625	0.138	0.301	4.535	0.000
b_7	$Y10\text{-}11_{i,t-1}$	-0.151	0.179	-0.156	-0.845	0.404
b_8	$Y11\text{-}12_{i,t-1}$	0.429	0.215	0.427	1.992	0.055
b_9	$VET_{i,t}$	0.009	0.028	0.005	0.337	0.738

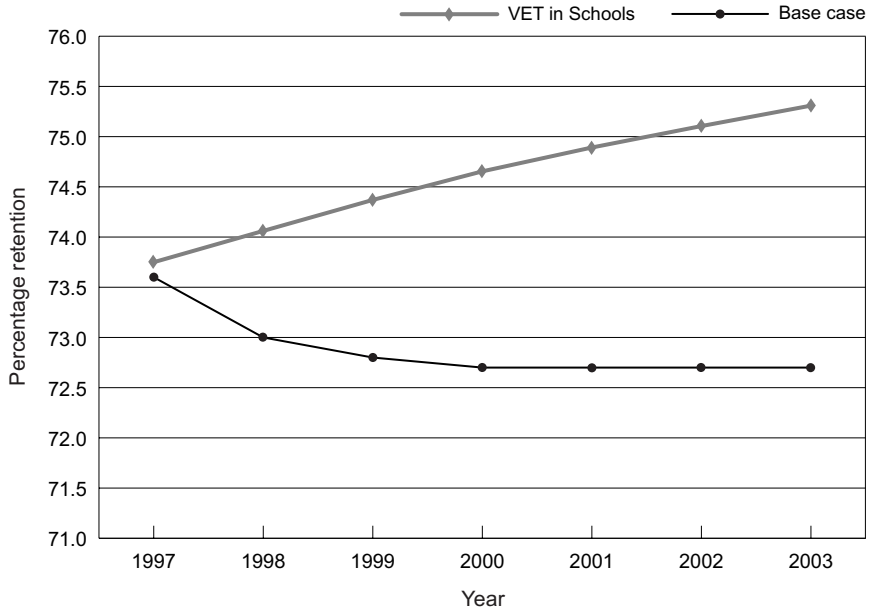
ANOVA

	Sum of squares	df	Mean square	F	Sig.
Regression	30.162	9	3.351	11351.504	0.000
Residual	0.010	33	0.000		
Total	**30.172**	**42**			

Dynamic simulation

The dynamic simulation takes models 3 and 6 and models two scenarios based on actual data for the base period and predictions for the retention rates in subsequent periods. In the base case zero VET in Schools is assumed. By way of contrast, the VET in Schools scenario predicts retention rates after the base period, but this time using the actual VET in Schools proportions for Australia (that is the last row in table 21). The difference between the two scenarios gives the impact of VET in Schools, according to models 3 and 6.

Figure 4: Dynamic simulation on Year 12 retention rate



Appendix 5: Logistic regression results

This section contains the regression results for Models A–G. Please refer to appendix 3, table 17, for details on the data used in each model. The following summarises the definition of each output measure:

- b – These are the estimated beta coefficient for the logistic regression equation for predicting the dependent variable from the independent variables. The prediction equation is

$$p = 1/(1+ \exp^{-z})$$

$$\text{where } z = b_0 + b_1*x_1 + b_2*x_2 + ... + b_n*x_n$$

- S.E. – These are the standard errors associated with the coefficients.
- Wald and Sig. – These columns provide the Wald Chi-Square value and the 2-tailed p-value used in testing whether the coefficient is significantly different from 0.
- df – This column lists the degrees of freedom for testing the coefficients.
- Odds ratio – These are the odds ratios for predictors. They are the exponentiation of the coefficients.

Table 28: Model A—Regression results for predicting VET participation in Year 11

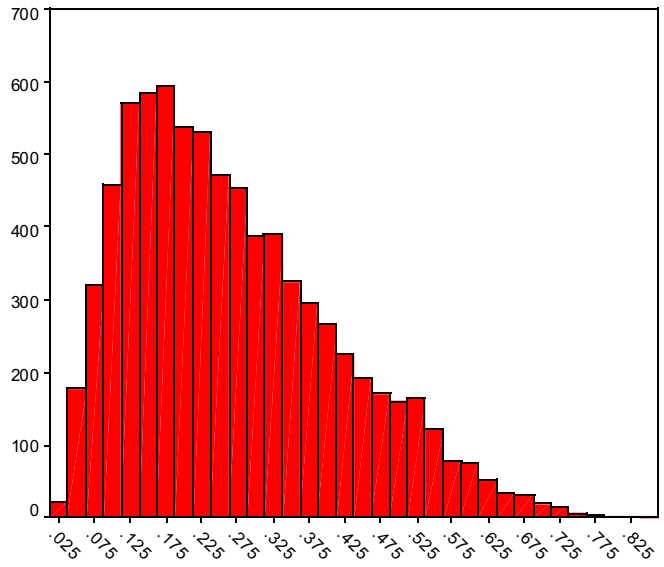
	b	S.E.	Wald	df	Sig.	Odds ratio
Gender						
Male	0	–	–	–	–	–
Female	-0.121	0.065	3.509	1	0.061	0.886
School type			6.713	2	0.035	
Government	0	–	–	–	–	–
Catholic	-0.259	0.1	6.693	1	0.01	0.771
Independent	-0.044	0.078	0.327	1	0.568	0.957
State where attended school			45.37	7	0	
NSW	0	–	–	–	–	–
VIC	-0.541	0.099	29.849	1	0	0.582
QLD	-0.2	0.093	4.665	1	0.031	0.819
SA	-0.179	0.119	2.256	1	0.133	0.836
WA	-0.405	0.114	12.557	1	0	0.667
TAS	-0.71	0.16	19.77	1	0	0.492
NT	-0.164	0.349	0.221	1	0.638	0.849
ACT	-0.472	0.187	6.361	1	0.012	0.624
Area of residence			11.301	2	0.004	
Metropolitan	0	–	–	–	–	–
Non-metropolitan	0.229	0.068	11.248	1	0.001	1.258
Unknown residence	0.198	0.31	0.408	1	0.523	1.219
Ethnicity			29.767	2	0	
ESB	0	–	–	–	–	–
NESB	0.229	0.068	11.248	1	0.001	1.258
Unknown ethnicity	0.198	0.31	0.408	1	0.523	1.219

Table 28: Model A—Regression results for predicting VET participation in Year 11 (continued)

	b	S.E.	Wald	df	Sig.	Odds ratio
Parental occupation			29.767	2	0	
Manual	0	–	–	–	–	–
Clerical	-0.135	0.113	1.435	1	0.231	0.874
Managerial	-0.172	0.091	3.594	1	0.058	0.842
Professional	-0.224	0.084	7.063	1	0.008	0.799
Unknown parental occupation	0.056	0.146	0.149	1	0.7	1.058
Parental education			21.992	4	0	
Completed sec. school/apprenticeship	0	–	–	–	–	–
Did not complete secondary school	0.067	0.088	0.58	1	0.446	1.069
TAFE	0.002	0.127	0	1	0.985	1.002
University	-0.382	0.093	16.792	1	0	0.683
Unknown parental education	0.049	0.102	0.233	1	0.629	1.051
Assessed achievement score	-0.04	0.004	87.134	1	0	0.96
Engagement with school	-0.104	0.069	2.27	1	0.132	0.901
Aspiration (asked in Year 10)			19.059	2	0	
Intended to do Year 12	0	–	–	–	–	–
Intended to leave before Year 12	0.37	0.087	17.963	1	0	1.448
Unknown aspiration	-0.236	0.33	0.511	1	0.475	0.79
Perceived attitude of peers	-0.006	0.074	0.006	1	0.938	0.994
Self-perceived academic ability	-0.388	0.05	61.314	1	0	0.679
Constant	2.867	0.277	107.47	1	0	17.585

In using the regression model, we get a resultant distribution of the probability of participating in school VET that is skewed to non-participation, as is illustrated in figure 5.

Figure 5: Distribution of probability of participating in school VET programs in Year 11



The predicted probability of doing VET has a minimum value of 0.02 and a maximum value of 0.85. The standard deviation is 0.15, the mean value is 0.27, and the median value is 0.24. So, for our predicted probability of doing VET, the average probability is 27%, which is consistent with our actual VET participation, with 26.7% of Longitudinal Surveys of Australian Youth students indicating that they had participated in school VET programs in Year 11.

Table 29: Model B—Regression results for predicting the Year 10 to Year 11 retention rates—using estimated school VET 'dosage' in 2000

	b	S.E.	Wald	df	Sig.	Odds ratio
Gender						
Male	0	–	–	–	–	–
Female	0.222	0.193	1.325	1	0.25	1.248
School type			17.946	2	0	
Government	0	–	–	–	–	–
Catholic	0.444	0.131	11.524	1	0.001	1.56
Independent	0.568	0.183	9.604	1	0.002	1.765
State where attended school			84.16	7	0	
NSW	0	–	–	–	–	–
VIC	1.161	0.155	56.003	1	0	3.193
QLD	0.8	0.137	33.846	1	0	2.225
SA	1.218	0.205	35.222	1	0	3.381
WA	0.703	0.165	18.265	1	0	2.021
TAS	0.442	0.196	5.071	1	0.024	1.555
NT	0.516	0.482	1.145	1	0.285	1.675
ACT	0.957	0.314	9.285	1	0.002	2.603
Area of residence			14.097	2	0.001	
Metropolitan	0	–	–	–	–	–
Non-metropolitan	-0.395	0.106	13.96	1	0	0.674
Unknown residence	-0.399	0.418	0.914	1	0.339	0.671
Ethnicity			15.764	2	0	
ESB	0	–	–	–	–	–
NESB	0.903	0.249	13.161	1	0	2.468
Unknown ethnicity	-0.311	0.231	1.811	1	0.178	0.733
Parental occupation			13.374	4	0.01	
Manual	0	–	–	–	–	–
Clerical	0.268	0.182	2.163	1	0.141	1.307
Managerial	-0.108	0.129	0.709	1	0.4	0.897
Professional	0.333	0.14	5.635	1	0.018	1.395
Unknown parental occupation	-0.25	0.182	1.891	1	0.169	0.779
Parental education			13.131	4	0.011	
Completed sec. school/apprenticeship	0	–	–	–	–	–
Did not complete secondary school	-0.111	0.126	0.774	1	0.379	0.895
TAFE	0.145	0.21	0.477	1	0.49	1.156
University	0.541	0.171	9.973	1	0.002	1.718
Unknown parental education	-0.021	0.142	0.021	1	0.884	0.979
Assessed achievement score	0.038	0.006	35.428	1	0	1.039
Engagement with school	0.041	0.108	0.143	1	0.706	1.041
Aspiration			230.286	2	0	
Intended to do Year 12	0	–	–	–	–	–
Intended to leave before Year 12	-1.491	0.1	222.717	1	0	0.225
Unknown aspiration	0.377	0.44	0.734	1	0.391	1.458
Perceived attitude of peers	0.404	0.107	14.338	1	0	1.498
Self-perceived academic ability	0.618	0.077	64.97	1	0	1.855
School VET 'dosage'	0.211	0.412	0.261	1	0.609	1.235
Female by school VET 'dosage'	0.503	0.58	0.753	1	0.386	1.654
Constant	-2.822	0.425	44.01	1	0	0.059

Table 30: Model B1—Regression results for predicting the Year 10 to Year 11 retention rates without gender interaction—using estimated school VET 'dosage' in 2000

	b	S.E.	Wald	df	Sig.	Odds ratio
Gender						
Male	0	–	–	–	–	–
Female	0.366	0.098	13.923	1	0	1.442
School type			18.246	2	0	
Government	0	–	–	–	–	–
Catholic	0.448	0.131	11.706	1	0.001	1.565
Independent	0.573	0.183	9.77	1	0.002	1.774
State where attended school			83.894	7	0	
NSW	0	–	–	–	–	–
VIC	1.159	0.155	55.83	1	0	3.185
QLD	0.797	0.137	33.629	1	0	2.218
SA	1.216	0.205	35.166	1	0	3.374
WA	0.702	0.165	18.169	1	0	2.017
TAS	0.438	0.196	4.995	1	0.025	1.55
NT	0.521	0.483	1.166	1	0.28	1.684
ACT	0.95	0.314	9.161	1	0.002	2.586
Area of residence			14.191	2	0.001	
Metropolitan	0	–	–	–	–	–
Non-metropolitan	-0.396	0.106	14.029	1	0	0.673
Unknown residence	-0.412	0.418	0.975	1	0.323	0.662
Ethnicity			15.931	2	0	
ESB	0	–	–	–	–	–
NESB	0.909	0.249	13.349	1	0	2.481
Unknown ethnicity	-0.309	0.231	1.791	1	0.181	0.734
Parental occupation			13.337	4	0.01	
Manual	0	–	–	–	–	–
Clerical	0.263	0.182	2.09	1	0.148	1.301
Managerial	-0.111	0.129	0.751	1	0.386	0.895
Professional	0.331	0.14	5.57	1	0.018	1.392
Unknown parental occupation	-0.252	0.182	1.919	1	0.166	0.777
Parental education			13.181	4	0.01	
Completed sec. school/apprenticeship	0	–	–	–	–	–
Did not complete secondary school	-0.109	0.126	0.752	1	0.386	0.897
TAFE	0.144	0.21	0.469	1	0.493	1.155
University	0.543	0.171	10.063	1	0.002	1.722
Unknown parental education	-0.021	0.142	0.022	1	0.882	0.979
Assessed achievement score	0.038	0.006	35.378	1	0	1.039
Engagement with school	0.039	0.108	0.134	1	0.714	1.04
Aspiration			231.109	2	0	
Intended to do Year 12	0	–	–	–	–	–
Intended to leave before Year 12	-1.493	0.1	223.585	1	0	0.225
Unknown aspiration	0.374	0.441	0.722	1	0.396	1.454
Perceived attitude of peers	0.401	0.107	14.164	1	0	1.494
Self-perceived academic ability	0.618	0.077	64.938	1	0	1.854
School VET 'dosage'	0.443	0.315	1.971	1	0.16	1.557
Female by school VET 'dosage'	0	–	–	–	–	–
Constant	-2.875	0.42	46.763	1	0	0.056

Table 31: Model C—Regression results for predicting the Year 11 to Year 12 retention rates for males and females—using actual VET participation in Year 11

Males	b	S.E.	Wald	df	Sig.	Odds ratio
School type			9.061	2	0.011	
Government	0	–	–	–	–	–
Catholic	0.583	0.2	8.499	1	0.004	1.64
Independent	0.336	0.241	1.938	1	0.164	1.399
State where attended school			33.302	7	0	
NSW	0	–	–	–	–	–
VIC	-0.003	0.257	0	1	0.992	0.997
QLD	0.388	0.264	2.163	1	0.141	1.474
SA	-0.907	0.261	12.033	1	0.001	0.404
WA	-0.568	0.269	4.442	1	0.035	0.567
TAS	-0.542	0.325	2.776	1	0.096	0.582
NT	-1.016	0.698	2.123	1	0.145	0.362
ACT	-0.349	0.449	0.603	1	0.437	0.705
Area of residence			0.194	2	0.908	
Metropolitan	0	–	–	–	–	–
Non-metropolitan	-0.058	0.166	0.124	1	0.725	0.943
Unknown residence	0.123	0.588	0.044	1	0.834	1.131
Ethnicity			1.151	2	0.563	
ESB	0	–	–	–	–	–
NESB	0.292	0.308	0.901	1	0.342	1.339
Unknown ethnicity	-0.152	0.379	0.161	1	0.688	0.859
Parental occupation			3.47	4	0.482	
Manual	0	-	-	-	-	-
Clerical	-0.112	0.261	0.185	1	0.667	0.894
Managerial	0.157	0.217	0.521	1	0.47	1.17
Professional	0.337	0.214	2.473	1	0.116	1.401
Unknown parental occupation	0.056	0.296	0.036	1	0.85	1.058
Parental education			5.303	4	0.258	
Completed sec. school/apprenticeship	0	–	–	–	–	–
Did not complete secondary school	-0.12	0.208	0.331	1	0.565	0.887
TAFE	-0.086	0.324	0.07	1	0.792	0.918
University	0.382	0.245	2.435	1	0.119	1.465
Unknown parental education	-0.268	0.234	1.32	1	0.251	0.765
Assessed achievement score	0.036	0.01	12.957	1	0	1.037
Engagement with school	0.134	0.182	0.545	1	0.46	1.144
Aspiration			15.729	2	0	
Intended to do Year 12	0	–	–	–	–	–
Intended to leave before Year 12	-0.672	0.17	15.726	1	0	0.51
Unknown aspiration	-0.332	0.596	0.31	1	0.578	0.717
Perceived attitude of peers	0.367	0.17	4.645	1	0.031	1.443
Self-perceived academic ability	0.718	0.121	35.149	1	0	2.05
Participated in VET in Year 11	-0.34	0.16	4.489	1	0.034	0.712
Constant	-2.371	0.654	13.144	1	0	0.093

Table 31: Model C—Regression results for predicting the Year 11 to Year 12 retention rates for males and females—using actual VET participation in Year 11 (continued)

Females	b	S.E.	Wald	df	Sig.	Odds ratio
School type			4.666	2	0.097	
Government	0	–	–	–	–	–
Catholic	0.405	0.221	3.348	1	0.067	1.499
Independent	0.391	0.276	2.001	1	0.157	1.478
State where attended school			40.961	7	0	
NSW	0	–	–	–	–	–
VIC	0.013	0.263	0.002	1	0.962	1.013
QLD	0.682	0.306	4.958	1	0.026	1.979
SA	-0.648	0.283	5.226	1	0.022	0.523
WA	-0.445	0.277	2.585	1	0.108	0.641
TAS	-1.065	0.308	11.98	1	0.001	0.345
NT	-2.297	0.775	8.775	1	0.003	0.101
ACT	-0.032	0.477	0.004	1	0.947	0.969
Area of residence			2.071	2	0.355	
Metropolitan	0	–	–	–	–	–
Non-metropolitan	-0.215	0.177	1.475	1	0.225	0.807
Unknown residence	0.412	0.768	0.287	1	0.592	1.51
ETHNICITY			3.053	2	0.217	
ESB	0	–	–	–	–	–
NESB	0.63	0.398	2.511	1	0.113	1.878
Unknown ethnicity	0.485	0.597	0.659	1	0.417	1.624
Parental occupation			9.689	4	0.046	
Manual	0	–	–	–	–	–
Clerical	-0.036	0.259	0.019	1	0.891	0.965
Managerial	0.558	0.244	5.206	1	0.023	1.747
Professional	0.311	0.219	2.009	1	0.156	1.365
Unknown parental occupation	-0.397	0.314	1.6	1	0.206	0.672
Parental education			2.942	4	0.568	
Completed sec. school/apprenticeship	0	–	–	–	–	–
Did not complete secondary school	0.088	0.217	0.162	1	0.687	1.091
TAFE	-0.051	0.304	0.028	1	0.868	0.951
University	0.404	0.271	2.216	1	0.137	1.498
Unknown parental education	-0.084	0.231	0.132	1	0.717	0.92
Assessed achievement score	0.041	0.011	13.929	1	0	1.042
Engagement with school	0.324	0.178	3.308	1	0.069	1.383
Aspiration			12.888	2	0.002	
Intended to do Year 12	0	–	–	–	–	–
Intended to leave before Year 12	-0.689	0.192	12.861	1	0	0.502
Unknown aspiration	-0.115	0.843	0.019	1	0.891	0.891
Perceived attitude of peers	0.346	0.179	3.754	1	0.053	1.414
Self-perceived academic ability	0.305	0.122	6.204	1	0.013	1.356
Participated in VET in year 11	-0.165	0.174	0.899	1	0.343	0.848
Constant	-1.118	0.701	2.545	1	0.111	0.327

Table 32: Model D—Regression results for predicting the Year 11 to Year 12 equivalent retention* rates for males and females—using the actual VET participation in Year 11

Males	b	S.E.	Wald	df	Sig.	Odds ratio
School type			9.009	2	0.011	
Government	0	–	–	–	–	–
Catholic	0.573	0.21	7.468	1	0.006	1.774
Independent	0.469	0.26	3.251	1	0.071	1.599
State where attended school			29.327	7	0	
NSW	0	–	–	–	–	–
VIC	-0.135	0.27	0.25	1	0.617	0.874
QLD	0.356	0.282	1.599	1	0.206	1.428
SA	-0.958	0.276	12.028	1	0.001	0.384
WA	-0.556	0.289	3.712	1	0.054	0.573
TAS	-0.575	0.344	2.785	1	0.095	0.563
NT	-0.917	0.73	1.578	1	0.209	0.4
ACT	-0.518	0.456	1.29	1	0.256	0.596
Area of residence			0.019	2	0.991	
Metropolitan	0	–	–	–	–	–
Non-metropolitan	-0.019	0.174	0.012	1	0.911	0.981
Unknown residence	0.039	0.606	0.004	1	0.949	1.039
Ethnicity			1.429	2	0.489	
ESB	0	–	–	–	–	–
NESB	0.375	0.328	1.311	1	0.252	1.455
Unknown ethnicity	0.193	0.433	0.199	1	0.656	1.213
Parental occupation			2.491	4	0.646	
Manual	0	–	–	–	–	–
Clerical	-0.038	0.276	0.019	1	0.892	0.963
Managerial	0.212	0.231	0.842	1	0.359	1.236
Professional	0.304	0.224	1.841	1	0.175	1.356
Unknown parental occupation	0.102	0.307	0.111	1	0.739	1.108
Parental education			6.873	4	0.143	
Completed sec. school/apprenticeship	0	–	–	–	–	–
Did not complete secondary school	-0.166	0.218	0.579	1	0.447	0.847
TAFE	0.145	0.376	0.148	1	0.7	1.156
University	0.337	0.258	1.704	1	0.192	1.401
Unknown parental education	-0.421	0.239	3.091	1	0.079	0.657
Assessed achievement score	0.039	0.01	14.041	1	0	1.04
Engagement with school	0.116	0.191	0.372	1	0.542	1.123
Aspiration			17.607	2	0	
Intended to do Year 12	0	–	–	–	–	–
Intended to leave before Year 12	-0.732	0.176	17.3	1	0	0.481
Unknown aspiration	-0.672	0.62	1.175	1	0.278	0.51
Perceived attitude of peers	0.364	0.178	4.188	1	0.041	1.439
Self-perceived academic ability	0.7	0.127	30.602	1	0	2.014
Participated in VET in Year 11	-0.331	0.168	3.888	1	0.049	0.718
Constant	-2.277	0.686	11.008	1	0.001	0.103

Table 32: Model D—Regression results for predicting the Year 11 to Year 12 equivalent retention* rates for males and females—using the actual VET participation in Year 11 (continued)

Females	b	S.E.	Wald	df	Sig.	Odds ratio
School type			3.187	2	0.203	
Government	0	–	–	–	–	–
Catholic	0.416	0.241	2.986	1	0.084	1.516
Independent	0.204	0.284	0.517	1	0.472	1.226
State where attended school			38.077	7	0	
NSW	0	–	–	–	–	–
VIC	-0.026	0.285	0.008	1	0.928	0.975
QLD	0.593	0.329	3.251	1	0.071	1.81
SA	-0.632	0.307	4.232	1	0.04	0.532
WA	-0.333	0.31	1.152	1	0.283	0.717
TAS	-1.22	0.323	14.291	1	0	0.295
NT	-2.18	0.805	7.341	1	0.007	0.113
ACT	0.219	0.564	0.151	1	0.698	1.245
Area of residence			1.832	2	0.4	
Metropolitan	0	–	–	–	–	–
Non-metropolitan	-0.206	0.189	1.188	1	0.276	0.814
Unknown residence	0.462	0.8	0.334	1	0.563	1.588
Ethnicity			4.893	2	0.087	
ESB	0	–	–	–	–	–
NESB	1.164	0.535	4.729	1	0.03	3.203
Unknown ethnicity	0.295	0.596	0.244	1	0.621	1.343
Parental occupation			12.159	4	0.016	
Manual	0	–	–	–	–	–
Clerical	-0.082	0.27	0.092	1	0.761	0.921
Managerial	0.928	0.297	9.73	1	0.002	2.529
Professional	0.23	0.231	0.996	1	0.318	1.259
Unknown parental occupation	-0.235	0.345	0.465	1	0.495	0.791
Parental education			2.923	4	0.571	
Completed sec. school/apprenticeship	0	–	–	–	–	–
Did not complete secondary school	0.004	0.232	0	1	0.985	1.004
TAFE	0.067	0.346	0.038	1	0.846	1.07
University	0.426	0.293	2.111	1	0.146	1.531
Unknown parental education	-0.136	0.247	0.304	1	0.581	0.873
Assessed achievement score	0.037	0.012	9.552	1	0.002	1.038
Engagement with school	0.419	0.195	4.599	1	0.032	1.521
Aspiration			8.142	2	0.017	
Intended to do Year 12	0	–	–	–	–	–
Intended to leave before Year 12	-0.595	0.209	8.142	1	0.004	0.551
Unknown aspiration	-0.23	0.851	0.073	1	0.787	0.795
Perceived attitude of peers	0.294	0.193	2.319	1	0.128	1.341
Self-perceived academic ability	0.291	0.132	4.855	1	0.028	1.338
Participated in VET in Year 11	-0.029	0.191	0.024	1	0.878	0.971
Constant	-0.737	0.755	0.951	1	0.329	0.479

Note: * Equivalent studies include traineeship/apprenticeship, Year 12 at TAFE, TAFE/VET Certificates III-IV, other trade certificates, TAFE diploma, TAFE advanced diploma/associate degree and University diploma.

Table 33: Model E—Regression results for predicting the successful outcomes in 2002

	b	S.E.	Wald	df	Sig.	Odds ratio
Gender						
Male	0	–	–	–	–	–
Female	-1.027	0.280	13.406	1	0	0.358
School type			10.364	2	0.006	
Government	0	–	–	–	–	–
Catholic	0.353	0.111	10.137	1	0.001	1.423
Independent	0.165	0.133	1.539	1	0.215	1.179
State where attended school			10.841	7	0.146	
NSW	0	–	–	–	–	–
VIC	-0.046	0.132	0.121	1	0.728	0.955
QLD	0.051	0.132	0.149	1	0.700	1.052
SA	-0.157	0.161	0.959	1	0.327	0.854
WA	-0.251	0.146	2.950	1	0.086	0.778
TAS	-0.159	0.189	0.704	1	0.401	0.853
NT	-0.684	0.474	2.088	1	0.148	0.504
ACT	-0.473	0.220	4.626	1	0.031	0.623
Residence			3.038	2	0.219	
Metropolitan	0	–	–	–	–	–
Non-metropolitan	-0.147	0.092	2.573	1	0.109	0.863
Unknown residence	0.207	0.440	0.222	1	0.638	1.231
Ethnicity			0.986	2	0.611	
ESB	0	–	–	–	–	–
NESB	0.061	0.174	0.123	1	0.725	1.063
Unknown ethnicity	0.250	0.264	0.902	1	0.342	1.284
Parental occupation			8.990	4	0.061	
Manual	0	–	–	–	–	–
Clerical	-0.144	0.146	0.975	1	0.323	0.866
Managerial	0.251	0.125	4.008	1	0.045	1.285
Professional	-0.039	0.112	0.119	1	0.730	0.962
Unknown parental occupation	-0.210	0.185	1.291	1	0.256	0.811
Parental education			11.784	4	0.019	
Completed sec. school/apprenticeship	0	–	–	–	–	–
Did not complete secondary school	0.176	0.117	2.275	1	0.131	1.193
TAFE	0.345	0.185	3.477	1	0.062	1.412
University	0.388	0.125	9.692	1	0.002	1.474
Unknown parental education	0.142	0.136	1.096	1	0.295	1.153
Assessed achievement score	0.023	0.006	16.445	1	0	1.024
Engagement with school	0.157	0.093	2.844	1	0.092	1.171
Aspiration (asked in Year 10)			0.013	2	0.994	
Intended to do Year 12	0	–	–	–	–	–
Intended to leave before Year 12	0.006	0.114	0.003	1	0.960	1.006
Unknown aspiration	-0.041	0.424	0.009	1	0.922	0.960
Perceived attitude of peers	0.113	0.096	1.386	1	0.239	1.120
Self-perceived ability	0.239	0.066	13.275	1	0	1.270
Highest school level completed			4.478	5	0.483	
Year 10	0	–	–	–	–	–
Year 11, no VET in Year 11	-0.443	0.352	1.584	1	0.208	0.642
Year 11, did VET in Year 11	-0.140	0.410	0.117	1	0.732	0.869
Year 12, no VET in Year 11	-0.280	0.250	1.259	1	0.262	0.756
Year 12, VET in Year 11	-0.499	0.265	3.549	1	0.060	0.607
Unknown highest school level completed	-0.356	0.447	0.633	1	0.426	0.701

Table 33: Model E—Regression results for predicting the successful outcomes in 2002 (continued)

	b	S.E.	Wald	df	Sig.	Odds ratio
Gender by highest school level completed						
Female and Year 10	0	–	–	–	–	–
Female and Year 11 with no VET in Year 11	0.264	0.444	0.353	1	0.553	1.302
Female and Year 11 with VET in Year 11	0.300	0.548	0.300	1	0.584	1.350
Female and Year 12 with no VET in Year 11	0.888	0.302	8.650	1	0.003	2.430
Female and Year 12 with VET in Year 11	1.008	0.332	9.210	1	0.002	2.739
Female and unknown highest school level completed	0.233	0.577	0.163	1	0.687	1.262
Constant	-0.015	0.410	0.001	1	0.971	0.985

Table 34: Model F—Regression results for predicting the successful outcomes in 2001 excluding those who were still at school in 2001

	b	S.E.	Wald	df	Sig.	Odds ratio
Gender						
Male	0	–	–	–	–	–
Female	-0.963	0.202	22.802	1	0	0.382
School type			0.625	2	0.732	
Government	0	0	0	0	0	0
Catholic	-0.086	0.197	0.191	1	0.662	0.917
Independent	0.144	0.255	0.321	1	0.571	1.155
State where attended school			2.752	7	0.907	
NSW	0	–	–	–	–	–
VIC	0.213	0.237	0.806	1	0.369	1.237
QLD	-0.143	0.223	0.414	1	0.520	0.866
SA	-0.064	0.257	0.062	1	0.803	0.938
WA	-0.124	0.236	0.277	1	0.599	0.883
TAS	0.046	0.280	0.026	1	0.871	1.047
NT	0.224	0.746	0.090	1	0.764	1.250
ACT	0.194	0.455	0.182	1	0.670	1.214
Residence			0.791	2	0.673	
Metropolitan	0	–	–	–	–	–
Non-metropolitan	0.132	0.156	0.715	1	0.398	1.141
Unknown residence	0.276	0.694	0.158	1	0.691	1.317
Ethnicity			0.970	2	0.616	
ESB	0	–	–	–	–	–
NESB	0.088	0.341	0.066	1	0.797	1.092
Unknown ethnicity	0.371	0.383	0.937	1	0.333	1.449
Parental occupation			2.032	4	0.730	
Manual	0	–	–	–	–	–
Clerical	0.196	0.263	0.554	1	0.457	1.217
Managerial	0.110	0.199	0.307	1	0.579	1.116
Professional	-0.104	0.205	0.256	1	0.613	0.902
Unknown parental occupation	-0.166	0.266	0.389	1	0.533	0.847
Parental education			4.172	4	0.383	
Completed sec. school/apprenticeship	0	–	–	–	–	–
Did not complete secondary school	-0.321	0.187	2.936	1	0.087	0.726
TAFE	0.008	0.323	0.001	1	0.981	1.008
University	-0.228	0.242	0.887	1	0.346	0.796
Unknown parental education	0.044	0.213	0.043	1	0.836	1.045
Assessed achievement score	0.005	0.009	0.266	1	0.606	1.005
Engagement with school	0.002	0.160	0	1	0.991	1.002
Aspiration (asked in Year 10)			9.558	2	0.008	
Intended to do Year 12	0	–	–	–	–	–
Intended to leave before Year 12	0.467	0.155	9.074	1	0.003	1.595
Unknown aspiration	-0.241	0.638	0.143	1	0.705	0.785
Perceived attitude of peers	0.349	0.155	5.092	1	0.024	1.418
Self-perceived ability	0.196	0.112	3.049	1	0.081	1.216
Highest school level completed			12.823	3	0.005	
Year 10	0	–	–	–	–	–
Year 11, no VET in Year 11	-0.427	0.249	2.930	1	0.087	0.653
Year 11, did VET in Year 11	0.156	0.296	0.279	1	0.597	1.169
Unknown highest school level completed	1.056	0.414	6.491	1	0.011	2.874

Table 34: Model F—Regression results for predicting the successful outcomes in 2001 excluding those who were still at school in 2001 (continued)

	b	S.E.	Wald	df	Sig.	Odds ratio
Gender by highest school level completed						
Female and Year 10	0	–	–	–	–	–
Female and Year 11 with no VET in Year 11	0.182	0.334	0.295	1	0.587	1.199
Female and Year 11 with VET in Year 11	0.207	0.416	0.248	1	0.619	1.230
Female and unknown highest school level completed	0.962	0.589	2.662	1	0.103	2.616
Constant	-0.470	0.602	0.609	1	0.435	0.625

Table 35: Model G—Regression results for predicting the successful outcomes in 2000 excluding those who were still at school in 2000

	b	S.E.	Wald	df	Sig.	Odds ratio
Gender						
Male	0	–	–	–	–	–
Female	-0.888	0.181	24.064	1	0	0.412
School type			0.198	2	0.906	
Government	0	–	–	–	–	–
Catholic	0.103	0.239	0.185	1	0.667	1.108
Independent	0.058	0.327	0.031	1	0.860	1.059
State where attended school			7.783	7	0.352	
NSW	0	–	–	–	–	–
VIC	0.361	0.285	1.597	1	0.206	1.434
QLD	-0.183	0.240	0.577	1	0.447	0.833
SA	-0.635	0.354	3.209	1	0.073	0.530
WA	0.042	0.285	0.021	1	0.884	1.043
TAS	0.057	0.345	0.027	1	0.869	1.059
NT	-0.523	0.963	0.295	1	0.587	0.593
ACT	-0.443	0.553	0.640	1	0.424	0.642
Residence			0.220	2	0.896	
Metropolitan	0	–	–	–	–	–
Non-metropolitan	-0.089	0.189	0.220	1	0.639	0.915
Unknown residence	-0.071	0.846	0.007	1	0.933	0.931
Ethnicity			1.255	2	0.534	
ESB	0	–	–	–	–	–
NESB	-0.442	0.430	1.053	1	0.305	0.643
Unknown ethnicity	0.147	0.399	0.135	1	0.713	1.158
Parental occupation			9.260	4	0.055	
Manual	0	–	–	–	–	–
Clerical	-0.812	0.324	6.297	1	0.012	0.444
Managerial	-0.130	0.226	0.329	1	0.566	0.878
Professional	-0.521	0.249	4.365	1	0.037	0.594
Unknown parental occupation	-0.409	0.308	1.764	1	0.184	0.664
Parental education			2.523	4	0.641	
Completed sec. school/apprenticeship	0	–	–	–	–	–
Did not complete secondary school	-0.017	0.226	0.005	1	0.941	0.984
TAFE	-0.249	0.380	0.429	1	0.512	0.780
University	-0.141	0.304	0.215	1	0.643	0.868
Unknown parental education	-0.348	0.240	2.107	1	0.147	0.706
Assessed achievement score	0.021	0.011	3.481	1	0.062	1.022
Engagement with school	0.091	0.181	0.253	1	0.615	1.095
Aspiration (asked in Year 10)			2.632	2	0.268	
Intended to do Year 12	0	–	–	–	–	–
Intended to leave before Year 12	0.291	0.181	2.603	1	0.107	1.338
Unknown aspiration	0.009	0.796	0	1	0.991	1.009
Perceived attitude of peers	0.041	0.183	0.050	1	0.824	1.042
Self-perceived ability	0.100	0.135	0.553	1	0.457	1.106

Table 35: Model G—Regression results for predicting the successful outcomes in 2000 excluding those who were still at school in 2000 (continued)

	b	S.E.	Wald	df	Sig.	Odds ratio
Highest school level completed						
Year 10	0	–	–	–	–	–
Unknown highest school level completed	2.911	0.418	48.468	1	0	18.377
Gender by highest school level completed						
Female and Year 10	0	–	–	–	–	–
Female and unknown highest school level completed	0.925	0.597	2.399	1	0.121	2.521
Constant	-0.365	0.694	0.277	1	0.599	0.694

Appendix 6: Overall impact on Year 12 retention (mind experiment)

This appendix describes the mind experiment (following table 4) conducted by looking at the overall impact on Year 10 to Year 12 retention for those students whom we observe undertaking school VET programs at Year 11, split by gender. We start with the actual number of Year 11 students and divide them into those who did and did not participate in school VET programs.

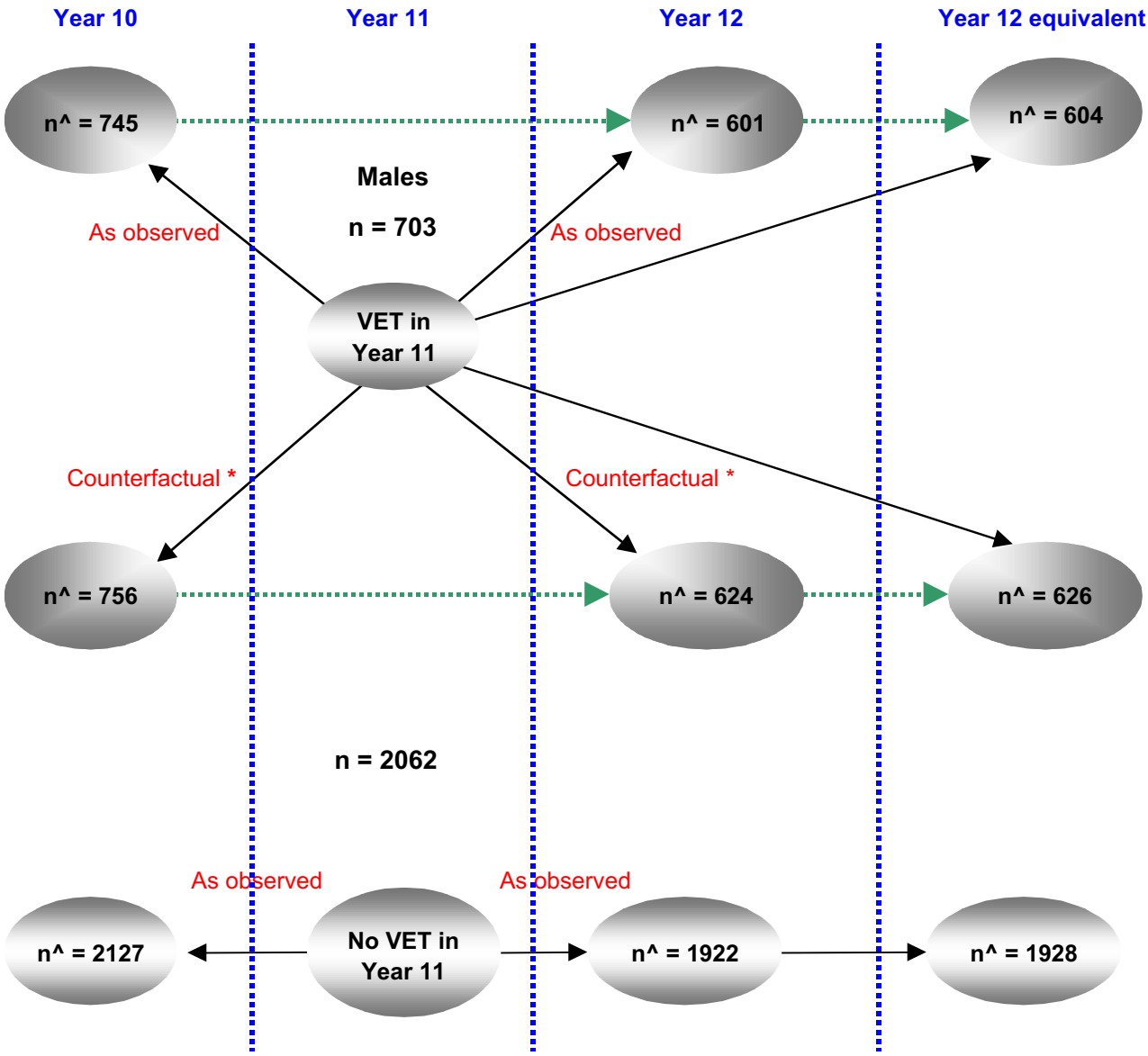
Estimated number of students in Year 10

For those who participated in school VET programs, we consider the i^{th} student in the sample of Year 11 and calculate the probability p_i that a student with the same personal characteristics moves from Year 10 to Year 11 using model B_1. For this exercise, we use a 'school dosage' of vocational education and training set at the national participation rate for 2003 (48%). For each student i in Year 11, we calculate that there would have $1/p_i$ students in Year 10. So we estimate that the observed sample in Year 11 has come from $\sum(1/p_i)$ students in Year 10. We then repeat this for the counterfactual and for non-VET students, with the 'school dosage' set at zero for both groups.

Estimated number of students in Year 12

For those who participated in school vocational education and training, we consider the i^{th} student in the sample of Year 11 and calculate the probability p_i that a student with the same personal characteristics moves from Year 11 to Year 12 using model C. For the VET treatment we use actual VET participation. We use zero again for the counterfactual and non-VET students. For each student i in Year 11, we calculate that the student has a probability p_i of making it to Year 12. So we estimate the sample in Year 12 as $\sum p_i$ students. We then repeat this for the counterfactual and for non-VET students, with the 'school dosage' set at zero for both groups.

Figure 6: Overall impact on Year 12 retention for males

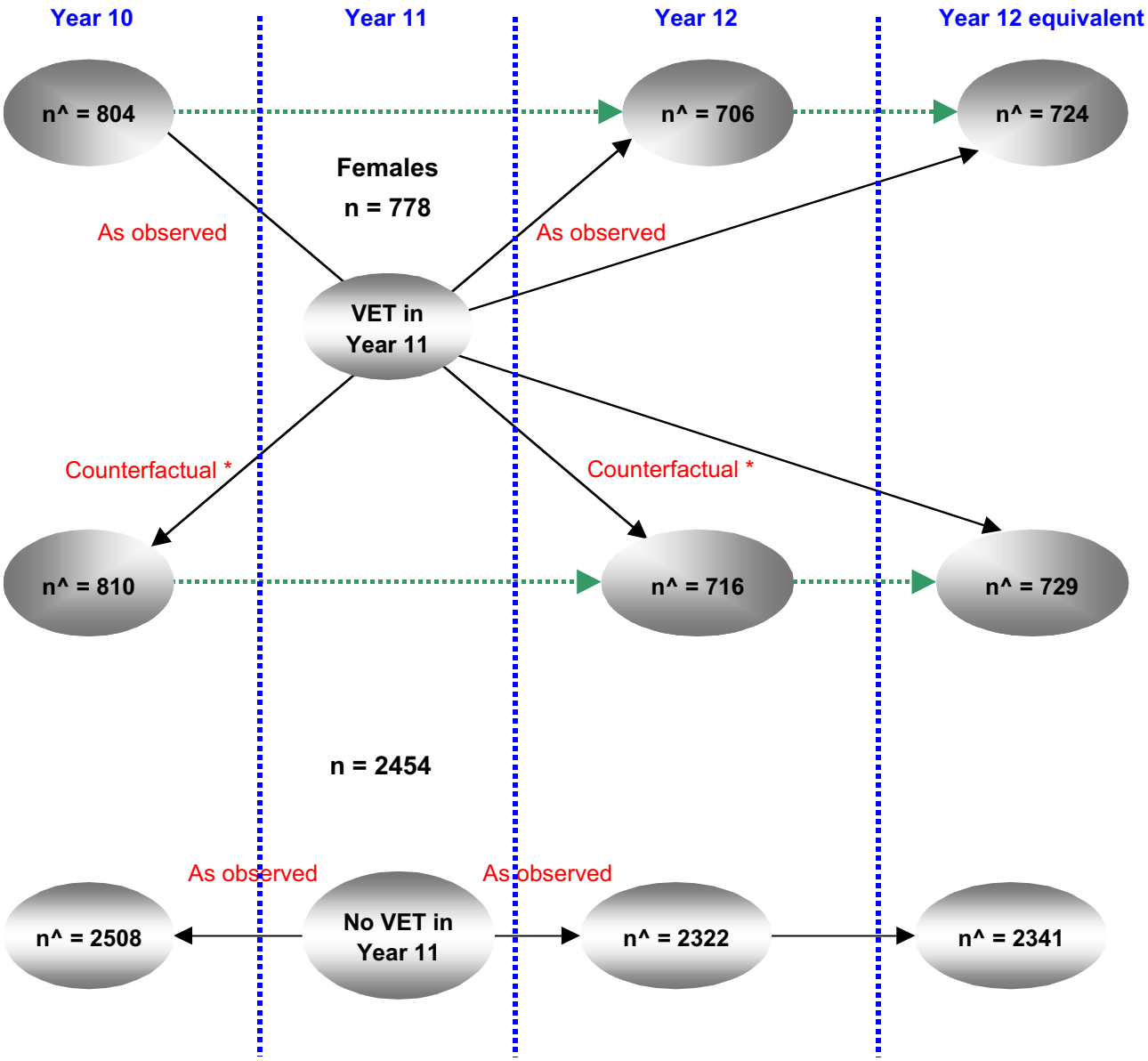


* Assumes no VET was offered in Year 11

n represents actual number

n^ represents estimated number

Figure 7: Overall impact on Year 12 retention for females



* Assumes no VET was offered in Year 11

n represents actual number

n^ represents estimated number

Appendix 7: Chi-Square analysis

In this section, we tested the null hypothesis that there is no relationship between courses students were studying in Year 11 and courses they were studying one-year post-school. To test this, we used the Chi-Square contingency table test for independence between the field of education studied in 2000[2] and the field of education studied in 2002 for those Longitudinal Surveys of Australian Youth students who were matched to the NCVER provider collection.

Our observed values (O) are the numbers of students who participated in courses in 2000 and 2002 (see tables 12 and 13). We contrasted this with our expected values (E), split by gender. Our expected values are derived from the distribution of VET activity in 2000 and 2002 for all our matched students. Our null hypothesis is that there is no relationship between student VET courses in 2000 and 2002.

This test was conducted separately for males and females.

The test statistic is $Q = \sum \sum [(O - E)^2]/E$

where

O = Observed value

E = Expected value

[2] Field of education was approximated from field of study due to category change in 2001.

Table 36: Observed and expected number of male students in field of education studied, 2000 and 2002

Field of education in 2000		Field of education in 2002										
		Information technology	Engineering & related technologies	Architecture & building	Agriculture, environment & related studies	Health	Management & commerce	Society & culture	Creative arts	Food, hospitality & personal services	Mixed field programmes	**Total**
Information technology	**O**	1	0	0	0	0	0	0	0	0	1	**2**
	E	0.027	0.378	0.054	0.054	0.135	0.405	0.378	0.108	0.297	0.162	
Engineering & related technologies	**O**	0	7	1	0	0	0	1	2	0	0	**11**
	E	0.149	2.081	0.297	0.297	0.743	2.230	2.081	0.595	1.635	0.892	
Architecture & building	**O**	0	0	1	0	0	0	0	0	0	0	**1**
	E	0.014	0.189	0.027	0.027	0.068	0.203	0.189	0.054	0.149	0.081	
Agriculture, environment & related studies	**O**	0	2	0	1	0	0	0	0	0	0	**3**
	E	0.041	0.568	0.081	0.081	0.203	0.608	0.568	0.162	0.446	0.243	
Health	**O**	0	0	0	0	3	1	0	0	0	0	**4**
	E	0.054	0.757	0.108	0.108	0.270	0.811	0.757	0.216	0.595	0.324	
Education	**O**	0	0	0	0	0	0	0	0	0	1	**1**
	E	0.014	0.189	0.027	0.027	0.068	0.203	0.189	0.054	0.149	0.081	
Management & commerce	**O**	0	5	0	0	2	8	3	0	2	0	**20**
	E	0.270	3.784	0.541	0.541	1.351	4.054	3.784	1.081	2.973	1.622	
Society & culture	**O**	0	0	0	0	0	3	4	0	1	0	**8**
	E	0.108	1.514	0.216	0.216	0.541	1.622	1.514	0.432	1.189	0.649	
Creative arts	**O**	0	0	0	0	0	0	1	1	1	0	**3**
	E	0.041	0.568	0.081	0.081	0.203	0.608	0.568	0.162	0.446	0.243	
Food, hospitality & personal services	**O**	0	0	0	0	0	1	2	0	6	1	**10**
	E	0.135	1.892	0.270	0.270	0.676	2.027	1.892	0.541	1.486	0.811	
Mixed field programmes	**O**	0	0	0	1	0	2	3	1	1	3	**11**
	E	0.149	2.081	0.297	0.297	0.743	2.230	2.081	0.595	1.635	0.892	
Total		**1**	**14**	**2**	**2**	**5**	**15**	**14**	**4**	**11**	**6**	**74**

Null hypothesis:	There is no relationship between field of education in 2000 and field of education in 2002 for male students
Alternative hypothesis:	There is a relationship between field of education in 2000 and field of education in 2002 for male students
Significance level:	0.05 (5%)
Test statistic:	Q = 212.688 (follows a Chi-Square distribution with 90 degrees of freedom)
Therefore:	P-value < 0.0001
Decision rule:	Reject null hypothesis if P-value < 0.05
Outcome:	Reject null hypothesis

In conclusion, there is enough evidence to suggest that there is a relationship between what male students were doing in school in Year 11 (2000) and what they were doing one-year post-school in 2002.

Table 37: Observed and expected number of female students in field of education studied, 2000 and 2002

Field of education in 2000		Field of education in 2002											
		Natural & physical sciences	Information technology	Engineering & related technologies	Architecture & building	Agriculture, environmental & related studies	Health	Education	Management & commerce	Society & culture	Food, hospitality & personal services	Mixed field programmes	**Total**
Information technology	**O**	0	1	2	0	1	0	0	3	0	0	0	**7**
	E	0.315	0.820	0.694	0.505	0.441	0.315	0.757	1.072	0.820	0.694	0.568	
Engineering & related technologies	**O**	0	3	0	1	0	0	0	2	0	4	2	**12**
	E	0.541	1.405	1.189	0.865	0.757	0.541	1.297	1.838	1.405	1.189	0.973	
Architecture & building	**O**	0	0	0	1	1	0	0	2	0	0	0	**4**
	E	0.180	0.468	0.396	0.288	0.252	0.180	0.432	0.613	0.468	0.396	0.324	
Agriculture, environmental & related studies	**O**	0	0	1	0	2	0	0	2	0	0	1	**6**
	E	0.270	0.703	0.595	0.432	0.378	0.270	0.649	0.919	0.703	0.595	0.486	
Health	**O**	0	0	0	0	1	0	0	0	1	0	0	**2**
	E	0.090	0.234	0.198	0.144	0.126	0.090	0.216	0.306	0.234	0.198	0.162	
Management & commerce	**O**	2	7	4	3	0	3	8	2	9	5	3	**46**
	E	2.072	5.387	4.559	3.315	2.901	2.072	4.973	7.045	5.387	4.559	3.730	
Society & culture	**O**	0	0	0	1	0	0	0	1	1	0	0	**3**
	E	0.135	0.351	0.297	0.216	0.189	0.135	0.324	0.459	0.351	0.297	0.243	
Creative arts	**O**	1	0	0	0	0	0	0	1	0	1	0	**3**
	E	0.135	0.351	0.297	0.216	0.189	0.135	0.324	0.459	0.351	0.297	0.243	
Food, hospitality & personal services	**O**	1	2	1	2	1	1	3	1	2	0	3	**17**
	E	0.766	1.991	1.685	1.225	1.072	0.766	1.838	2.604	1.991	1.685	1.378	
Mixed field programmes	**O**	1	0	3	0	1	1	1	3	0	1	0	**11**
	E	0.495	1.288	1.090	0.793	0.694	0.495	1.189	1.685	1.288	1.090	0.892	
Total		**5**	**13**	**11**	**8**	**7**	**5**	**12**	**17**	**13**	**11**	**9**	**111**

Null hypothesis:	There is no relationship between field of education in 2000 and field of education in 2002 for female students
Alternative hypothesis:	There is a relationship between field of education in 2000 and field of education in 2002 for female students
Significance level:	0.05 (5%)
Test statistic:	Q = 103.388 (follows a Chi-Square distribution with 90 degrees of freedom)
Therefore:	P-value = 0.1583
Decision rule:	Reject null hypothesis if P-value < 0.05
Outcome:	Null hypothesis cannot be rejected

In conclusion, there is insufficient evidence to suggest that there is a relationship between what female students were doing in school in Year 11 (2000) and what they were doing one-year post-school in 2002.

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National Centre for Vocational Education Research Ltd

Level 11, 33 King William Street
Adelaide SA 5000

PO Box 8288 Station Arcade
Adelaide SA 5000

Phone +61 8 8230 8400
Fax +61 8 8212 3436
Email ncver@ncver.edu.au

www.ncver.edu.au