Student flows through Australian TAFE courses

John Foyster

Hon Kok Fai

Chandra Shah

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John Foyster
Hon Kok Fai
National Centre for Vocational Education Research

Chandra Shah
Monash University–ACER Centre for the Economics of Education and Training

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Preface

The work in this report was supported through a National Research and Evaluation Committee (NREC) research grant and we appreciate that support. The project was a collaborative activity between the National Centre for Vocational Educational Research (NCVER) and the Monash University–ACER Centre for the Economics of Education and Training (CEET). We wish to thank our colleagues from NCVER and CEET for their assistance and advice. In addition, we wish to acknowledge the helpful discussions we have had on several issues raised in this project with officials of Technical and Further Education (TAFE) authorities in various States and Territories. An NREC reviewer provided helpful feedback on earlier drafts of the report.

John Foyster and Hon Kok Fai were responsible for extracting and validating data in a form suitable for estimating the models. Chandra Shah developed and estimated the models. Shah and Foyster did the analysis and interpretation of the results. Foyster prepared the first draft of the report, and Shah produced the subsequent drafts and the final report.

Executive summary

The Australian National Training Authority's (ANTA) *Annual National Report 1998* reports the average pass rate for modules taken in vocational education and training (VET) in Australia in 1998 to be about 80 per cent. This current study aims to supplement such core data on outcomes with estimates of various types of enrolment outcome. The estimates indicate that over three-quarters of course enrolments result in outcomes that can be considered successful.

The report develops and applies a methodology to analyse the flows of students through TAFE courses at the national level.

An important consideration in studying flows of students through TAFE courses is that not all those who enrol in one intend to complete it. Unlike in the higher education sector where most students enrol in a course with the intention of obtaining a qualification, in the VET sector many students intend to only complete some modules of the course. These students are primarily interested in acquiring specific skills. However, they are enrolled in the whole course as a matter of administrative convenience by the VET system. The number of students who fall within this group is difficult to quantify without further research into student motivation.

It is therefore inappropriate to consider only those who complete the whole course as having achieved a successful outcome. It is similarly inappropriate to consider as an indicator of the success *rate* of a course, the proportion of commencers who complete the whole course. Many of the commencers—the denominator in the calculation of the *rate*—may have had no intention of completing the whole course.

There is no way to distinguish students who enrolled in order to complete the whole course from those who enrolled only to complete some modules. Further research on student intentions is required. It is therefore necessary at this stage to consider both those who complete the whole course and those who complete some modules but not complete the whole course as having obtained a successful outcome.

Hence the report analyses three possible outcomes for a student enrolling in a course:

- completion of the whole course;
- partial completion (successful completion of all modules enrolled in) and withdrawing from the course; or
- non-completion (failing some part of the course and withdrawing).

This report is based on an analysis of all students who enrolled in TAFE courses in 1994 excluding those who enrolled in courses that involved only one module. The course enrolments analysed include those leading to a recognised qualification and also those leading to non-recognised qualifications such as a Certificate of Proficiency or a Statement of Attainment. Many students do not enrol in recognised courses.[1]

Concepts and definitions

A TAFE course is defined as a structured vocational education and training sequence, normally made up of VET modules, that leads to the acquisition of identified competencies and, if submitted for accreditation, may lead to a qualification. A module is a unit of training in which a student may enrol and be formally assessed. It has a number of specified curriculum hours attached to it. A course, too, has a minimum number of curriculum hours specified for its completion. In general, students enrol for a course, whether or not they intend to attempt all the modules required for completing that course. If they successfully complete the required modules for the course, then they are deemed to have satisfied the requirements for finishing the course.

Official VET statistics include data on module enrolments, module outcomes and course enrolments. Course completion data, even though they are compiled in some State jurisdictions, are not reported in the official VET statistics. The Australian Vocational Education and Training Management Information Statistical Standard (AVETMISS) data elements include assigned quanta of time for courses and modules that are referred to in this report as *curriculum hours*. Curriculum hours are hours of supervised learning or training deemed necessary in order to adequately present the educational material contained in the course or module.

In this report, definitions of course completion, partial completion and non-completion are based on the aggregated curriculum hours and results of modules that make up the course.

Students are deemed to have:

- *completed* a course if the sum of the specified curriculum hours for all modules they successfully completed is equal to, or greater than, the specified curriculum hours for that course;
- *partially completed* a course if, before leaving the course, they did not complete the course as defined above but successfully completed, at the first attempt, at least one module they enrolled for and did not fail any other modules; and
- *not completed* a course if they do not fall into one of the two above categories.

The above definition of course completion includes all students who are eligible, in terms of curriculum hours, for whatever certification is associated with a completed course.

There are no official statistics on the length of time in years taken by students to complete courses. Our initial analysis of data showed wide variation in student progress

[1] In 1998, 27 per cent of all course enrolments were for programs not leading to a recognised qualification.

through courses that were almost identical in terms of the curriculum hours specified for their completion. For this reason a course was categorised in terms of the modal period of time it took students to complete it. By classifying courses in the manner suggested here, different behaviour patterns for categories of courses may become evident, patterns which might otherwise be averaged out.
Since TAFE data are only compiled on an annual basis, the actual period of enrolment can only be indicated on a whole-year basis, though it is acknowledged that students may complete a course in some fraction of a year or years. The three categories were nevertheless defined as *one-*, *two-* and *three-year* courses. For example, if in a given course most students who completed it did so in one year (or less), then this course was classified as a one-year course. Analysing course enrolments on this basis indicated that 70 per cent of courses could be considered as one-year.

Many of the courses, which are classified as one-year in this report, would be courses for which the specified module hours are less than 200 hours. Such courses made up 37 per cent of all course enrolments but only 10 per cent of contact hours in 1994. It is important to remember that some are very short courses (although courses of just one module in length are not included in the analysis in this report).

The number of hours students enrol for in a single calendar year can range from under 20 hours to over 720 hours. The actual time taken by students to complete a course can vary because of the mode of enrolment or mode of delivery. A very large proportion of enrolment is on a part-time basis (that is, less than 540 specified curriculum hours per year).

The model

The model used in this report to analyse student flows is based on tracing the proportions of students who move through various stages of a course. A stage is defined by reference to the completion of a certain proportion of course hours. The model includes three outcomes for students enrolling in a course—course completion, partial completion and non-completion as defined earlier. On the basis of past data on student flows through various stages of a course, the model estimates the probabilities of achieving the three outcomes for various categories of students. The model is different from those used in analysing student flows through the higher education sector where usually only two outcomes of course enrolment are considered—completion and dropout.

Scope of the study

The model was estimated with national VET data collected for the period 1994 to 1996. These data are held by NCVER. We only consider the progress of TAFE institute-based students, aged 16 and over, who commenced a course in 1994. Enrolments in recreational and leisure courses (stream 1000) and single module courses are excluded from the analyses. Furthermore, the study excludes any enrolment that relied upon recognition of prior learning (RPL) or credit transfer. After these exclusions, about 680,000 commencing course enrolments in 1994 fell within the scope of this study. A student may be associated with more than one course enrolment.

It can be noted that some of those who do not complete a course may recommence the same or a different course at a later date. Re-commencements are not considered in this study.

Key results

The model provides, for the first time, national estimates of the probabilities of completion, partial completion and non-completion of a TAFE course. Although the rate of successful outcomes is high for courses as a whole, the results show considerable variation by age and sex of students, fields of study and streams of study.

Most students leave with a positive outcome
Completion and partial completion of a course, the two satisfactory outcomes from most students' perspective, are found to be the most likely results. Over 76 per cent of enrolments are expected to result in these two outcomes, with 49 per cent in partial completions and 27 per cent in full course completions. The very high rate of partial completion means that the true skill level of the Australian workforce could be higher than the level suggested by qualifications data alone. Student success rates, as opposed to the course success rates reported here, are likely to be higher especially if re-commencers are included in the calculation.

The significance of successful module completion
The results indicate partial completion to be a very significant outcome of a TAFE course enrolment. Almost half of all course enrolments are expected to result in partial completion, which is twice the proportion of completions. This suggests a significant degree of flexibility in the TAFE system to accommodate those students who wish to acquire skills or competencies as they need them, rather than qualifications. For example, in the rapidly changing information technology area, the shelf life of a skill could be quite short, and students may wish to update only those specific skills of immediate application. Ignoring or not measuring partial completions of courses would be a gross underestimation of the true output of the TAFE system.

The pattern of success varies by length of course
The probability of completion or partial completion are substantially higher for one- and three-year courses (0.80 and 0.78) than they are for two-year courses (0.64). Perhaps not surprisingly, longer courses have higher probabilities of partial completion and lower probabilities of course completion than do shorter courses. Of the successful outcomes in one-, two- and three-year courses, 58, 84 and 79 per cent, respectively, are partial completions.

Overall there are very small gender differences in success rates
On average, there are little differences between the rates at which males and females complete, or partially complete, a course, though males have a slightly higher chance of completing a course and females a slightly higher chance of partially completing a course.

Age makes a difference, but the pattern is complex
The variation in the results by the age of students was found to be more substantial. The probability of completion either increases with age or decreases depending on whether it

is a one-, two- or three-year course. Although the variation in the probabilities for other course outcomes, partial completion and non-completion is also substantial, the patterns in these cases are more complex.

Success rates vary substantially by streams of study
There is a large variation in success rates across streams of study. Students taking Courses subsequent to an initial vocational course—at a skilled level (stream 4200) have a 0.93 probability of success (two-thirds of which is in the form of full-course completion), the highest for any stream. In contrast, those taking Para-professional/ technician courses (stream 3400) have 0.51 probability of success (almost nine-tenths of which is in the form of partial completion).

Success rates vary substantially by fields of study
The variability of probability of success across fields of study is less than that across streams of study. It varies from 0.60 (of which seven-tenths is partial completion) for Law and legal studies (field 08) up to 0.85 (of which just under two-thirds is partial completion) for TAFE multi-field education.

Further research and development

The model developed in this report has provided for the first time detailed estimates for the flow of students through TAFE courses in Australia. It focused on national data, but can be readily adapted to analyse data at the State level. Although the reduced amount of data available at the State level may prevent estimation of models for all the groups of courses identified in this report, useful information could nevertheless be obtained.

The results suggest that partial completion is a very significant course enrolment outcome in TAFE. For students, full-course completion certainly appears to be of less significance than the completion of some modules. However, in order to develop sound policy on this issue, the reasons for partial completion of courses need to be determined. Further research could also disaggregate partial completions into different types. It would also be interesting to determine if certain types of modules of a course are more common for partial completers to enrol in than other types. Surveys of students who partially complete courses may help to shed further light on these important issues.

Given the significance of partial-course completion in TAFE as demonstrated in this report, one could argue that completed qualifications underestimate the stock of skills in the workforce.

Research on the labour market consequences of partially completing a course is another important area that requires further investigation. It is possible that the students who partially complete courses are reflecting the imperatives of the labour market. Some skills tend to become obsolete in a relatively short time due to rapid technological and organisational change. Such skills need to be constantly upgraded, but with a minimum of disruption to production. Therefore, students, and perhaps their employers, may focus on acquiring skills as they are needed, rather than on investing resources in complete courses, parts of which may have little relevance to their immediate needs.

The causes of the substantial variation in the results across streams (or fields) of study and age of students need further investigation. Could differences in standards of assessment, quality of teaching or student aptitude and motivation be some of the factors that explain the variation? The answer to this question needs further research using alternative data sources.

The research reported here has raised a number of questions about outcomes of a student's enrolment in a TAFE course. It has provided statistical backing to some generally held views regarding the importance of partial completion as a course outcome in the TAFE system. The results from this study can assist policy development in important areas such as resource allocation, quality assurance, student support services, and the development of appropriate output measures to use in the TAFE system.

1 Introduction

This report develops a methodology for analysing the flow of students through the Technical and Further Education (TAFE) system in Australia and reports on its application to data on students who enrolled in a course for the first time in 1994. The funding for the project was obtained from the National Research and Evaluation Committee (NREC). The research on which this report is based was undertaken jointly at the National Centre for Vocational Education Research (NCVER) and the Monash University–ACER Centre for the Economics of Education and Training (CEET).

The student flow rates through an education system are important indicators of its efficiency. The number of students graduating depends on the number commencing, the probability of course completion and the average time to course completion. Booth and Satchell (1996) canvass the use of this type of indicator in assessing efficiency in the higher education sector. The measures are also important and relevant for modelling the supply of qualified persons for the labour force.

There has been little research on student flows through TAFE courses in Australia. One of the earliest studies is Naylor and Naylor (1982), in which attrition from a selected number of courses is explained by characteristics of the students. Other studies on attrition are Parkinson et al. (1987) and Duball and Baker (1990). Guthrie and Loveder (1990) carried out a study of multiple entry and exit points for some associate diploma courses in South Australia, and included some student flow statistics in their report. Macdonald (1984) recommended a nationwide study but noted the need to overcome data problems before this could be carried out.

More recently Robertson (1994) studied the flow of students through veterinary nursing courses in Victoria. This study was quite brief, only covered students doing the course in distance mode and was mainly concerned with particular student characteristics associated with attrition.

Traineeships were introduced in Australia in 1985. They provide a combination of employment and approved training leading to an entry-level qualification. Their completion rates are reported in Grey et al. (1999), a report prepared for the Research and Evaluation Branch of the Department of Education, Training and Youth Affairs (DETYA). The report concludes that the proportion of trainees not completing their traineeships averaged 40 per cent between 1985 and 1996, with the proportion rising to 44 per cent in 1996. Traineeships are only a small proportion of total vocational education and training (VET) enrolments in VET and entrants are predominantly young.

In a parallel project, Ray et al. (2000) looked at apprenticeships that were commenced between July 1994 and June 1996. Unlike the study on traineeships that looked at completions, this study considered *attrition*. Attrition was deemed to have occurred when an apprentice withdrew from an apprenticeship contract prior to completion and did not recommence within a two-year period in the same occupation. Although for some purposes such a definition may be appropriate, it may not be so when one wants to look at efficiency. For example, it does not account for the inefficiency that may occur as a result of a mismatch of an individual to the workplace where training is to occur. Quite high set up costs are involved if mismatches occur, apart from the extra time for the completion of the apprenticeship itself. The report estimates an attrition rate of 40 per cent four years after commencement of an apprenticeship. The authors, however, stress that their estimates are only preliminary because of time lags involved in data collection. They conclude that final data on those who commenced in 1994–95 will not be known until the end of 2003. A shortcoming of the study is the lack of information on actual completions.

The NCVER annual publication, *Australian Vocational Education and Training Statistics*, reports on, among other things, results of module enrolments in the TAFE system. A sequence of modules makes up a course. For example, NCVER (1999) reports 64 per cent of all module enrolments resulted in a successful completion in 1998. For various reasons, course completion data are as yet unavailable for inclusion in these publications, even though course enrolment data are reported. Ball (1998) looked at student demographic factors affecting module completion. Course completion was not considered in her study.

The module results form the basis of a key performance measure of the effectiveness of the training system. Each State and Territory uses the Module Load Completion Rate (MLCR) measure to report output of their training system. It is basically a weighted module completion rate where the weights are the curriculum hours for the module. The overall Victorian MLCR in 1995 was 72 per cent (OTFE 1997), while that for NSW in 1997 was 81 per cent (NSWBVET 1999). However, there was a deal of variability in the measure across fields of study and demographic groups. For 1998, the national average MLCR was 80 per cent, with lowest rate of 74 per cent in the Northern Territory and the highest rate of 90 per cent in Tasmania, but the rate for New South Wales and Victoria near the national average (ANTA 1999).

Module completion rates and MLCR, though important, do not provide a complete picture of student flows through TAFE courses. To obtain a more complete view it is important to supplement such core data on outcomes with additional data on other enrolment outcomes. After all, only successful completion of a course may lead to the award of a recognised qualification.

The review of the literature shows little research had been done to study and quantify the extent and nature of student flows through TAFE in Australia. The work that has been done is patchy, some is dated and the more recent work focuses only on particular sub-groups. No study to date has taken a comprehensive look at the system as a whole. There are two main reasons for the lack of such a study.

First, until recently, few data on student progress through TAFE courses were collected. The data collected were non-standard and varied in quality and extent across State and Territory jurisdictions. This is less true since 1993, when Commonwealth and State Ministers decided to adopt a common data standard, the Australian Vocational Education and Training Management Information Statistical Standard (AVETMISS) for the national reporting. This standard was intended to improve the consistency and quality of VET data, and, although there are still some problems to overcome, including wider access to them for public research, the data collected since 1994 are comprehensive and rich in information.

Second, a major complicating factor in studying flows of students through TAFE is that not all students who enrol in a course intend to complete that course. Unlike the higher education sector, in which most students enrol in a course with the intention of obtaining a qualification, in the VET sector many students intend to complete only some modules of the course. These students are primarily interested in acquiring specific skills. However, they are enrolled in the whole course as a matter of administrative convenience by the TAFE colleges. The students who fall within this group are not identified in student data collections, and, hence, it is difficult to quantify their numbers without further research into student motivation.

It is inappropriate, therefore, to consider only those students who complete the whole course as having achieved a successful outcome. It is similarly inappropriate to consider as an indicator of the success *rate* of a course the proportion of commencers who complete the whole course. Many of the commencers—the denominator in the calculation of the *rate*—may have had no intention of completing the whole course.

There is no direct way to distinguish students who intended to complete the whole course from those who intended only to complete some modules. Some simplifying assumptions are required. In this study, if a student successfully completes the modules in which they enrolled and then withdraws from the course (not having completed it), then the student is deemed to have *partially succeeded*. Prior intention to undertake only some modules is one possible reason for withdrawal from the course. Thus, successful outcomes include both whole-course completion and partial-course completion (module completion).

Hence the report analyses three possible outcomes for a student enrolling in a course:

- completion of the whole course;
- partial completion (successful completion of all modules enrolled in) and withdrawing from the course; and
- non-completion (failing some part of the course and withdrawing).

A Markov chain model is developed concentrating on the above three outcomes. The model traces the proportions of students who move through various stages of a course. A stage is defined by reference to the completion of a certain proportion of course hours. On the basis of past data on student flows through various stages of a course, the model estimates the probabilities of achieving the three outcomes for various categories of students. The model is different from those used in analysing student flows through the higher education sector where usually only two outcomes of course enrolment are considered—completion and dropout (Shah & Burke 1999).

National VET data, collected for the period 1994 to 1996, are used to estimate the model. We only consider the progress of TAFE institute-based students, aged 16 and over, who commenced a course in 1994. Enrolments in recreational and leisure courses (stream 1000) and single module courses are excluded from the analyses. Furthermore, the study excludes any enrolment that relied upon recognition of prior learning (RPL) or credit transfer. After these exclusions, about 680,000 commencing course enrolments in 1994 fell within the scope of this study. A student may be associated with more than one course enrolment.

The analyses we report are comprehensive. They cover the whole range of courses and demographic groups. It is expected that they will provide another, but very important, dimension for assessing outcomes in VET and fill a void in the knowledge in this area. Using this model analyses at the State/Territory or institution level are possible, although in this first study the focus is national.

The remainder of the report discusses:

- concepts and definitions necessary to model student flows through TAFE courses (Chapter 2);
- the Markov chain model used to analyse the student flows through these courses (Chapter 3);
- initial data analyses and construction of appropriate data matrices to estimate the Markov chain model (Chapter 4);
- the results of estimating the model using data on course enrolments that commenced in 1994 (Chapter 5); and
- the conclusions that follow from doing this research (Chapter 6).

The appendices contain tables with more detailed results.

2 Data issues, concepts and definitions

2.1 Introduction

In this report we introduce a number of new concepts in order to develop a model to study the flow of students through TAFE in Australia. New concepts are necessary for two reasons. First, VET official administrative records do not deal adequately with issues of course completions. Second, a TAFE course enrolment can result in successful outcomes other than completion of the whole course. This results in an unconventional concept of non-completion of a course. We define these concepts in terms of the type of data available in order to estimate parameters for the models of student flows.

The data upon which this study is based are the administrative data collected by VET institutions throughout Australia and submitted to NCVER. Data submitted to NCVER must conform to AVETMISS, and Release 1.0 (November 1993) is the operational version for this study, which includes data related to enrolments in 1994, 1995 and 1996. The data include students' demographic characteristics and their academic progress in TAFE institutes.

Full specifications of the data items included in the study are therefore to be found in the AVETMISS reference volumes. Use of data in this study depends upon interpretation of the specifications. As stated above, data submitted to NCVER under AVETMISS are collected for administrative purposes, rather than research purposes, and, accordingly, researchers are not always able to draw out information which would suit their needs. The research conducted here has been defined to operate within the limitations of the data available through AVETMISS.

In the next section we discuss some limitations in the data. These limitations have to be spelled out because they have an impact on the study. The sections that follow contain a discussion of the concepts of course outcomes in TAFE and rigorous definition of these using existing AVETMISS data items.

2.2 Limitations in the data

Local data are collected by VET institutions or groups of institutions (in AVETMISS referred to as 'training organisation') and organised into databases according to specifications developed before AVETMISS and evolving according to local needs. For these historical reasons there is no exact match, in many cases, between the data specifications used at the local level and the data specifications in AVETMISS.

As a result the data held by training organisations require translation to the AVETMISS specifications. This is done by the training organisations on the basis of their understandings of the AVETMISS specifications. Since most of the training organisations were involved in the establishment of AVETMISS, it can be assumed that these understandings will produce high-quality translations between the local data specifications and the AVETMISS specifications. However, it can *not* be assumed that all translations are without problems. It must therefore be understood that variations in translation will have occurred, leading to the files submitted under the AVETMISS specifications not necessarily being entirely consistent between training organisations.

The following limitations must be considered when working with AVETMISS data as they affect research here:

- The AVETMISS specifications do not include names or addresses of individuals, but rather alternative forms of identification are used to link different activities of a single individual together. Any research study must be able to accommodate these alternative forms.
- The AVETMISS specifications apply for a single collection (ie usually a single calendar year). As a result, a training organisation that is improving its data collection may use different systems, including different translations to AVETMISS, in different years. Accordingly, any study covering a number of years cannot rely upon the operation of a single consistent set of rules over time.
- Although course completion data are included in the AVETMISS specifications, it is widely understood that they are incomplete, and, therefore, in some cases it may not be possible to trace an individual's history directly.

As a consequence of the above limitations, a given individual may be identified in different ways in different years. These limitations imply that data collected under the AVETMISS specifications need to be used and interpreted with caution. The procedures followed may generate artefacts that could mistakenly be thought to be real-world phenomena. Careful editing of the data files was therefore needed before any analysis.

2.3 Concepts of course enrolment outcomes in TAFE

As indicated in Chapter 1, the possible outcomes of an enrolment in a TAFE course are more complex than the outcomes from a higher education enrolment. The AVETMISS standard defined outcomes for modules, but there is no existing system for defining outcomes for courses, perhaps because it is generally believed that no such classification system is needed. For the purpose of this research study, a classification system was nevertheless required

Not all students who enrol in a TAFE course intend to complete it. The TAFE sector differs from both the schools and university sectors in that students enrolling in a TAFE course are much less likely to wish to study all the elements of that course. The extent to which this is true has not previously been investigated, but one outcome of the present research study is an estimate of the extent to which students behave in this way. Thus while it is possible to describe some students as 'completing' a TAFE course, it is unsafe to classify all of those who fail to complete all course requirements into one category.

To reflect course outcomes in a more realistic way we therefore propose the use of the following three categories:

- course completion;
- partial course completion; and
- non-completion of course.

Course completion

A TAFE course is defined as a structured vocational education and training sequence, normally made up of VET modules, that leads to the acquisition of identified competencies and, if submitted for accreditation, may lead to a qualification. A module is a unit of training in which a student may enrol and be formally assessed. It has a number of specified *curriculum hours* attached to it. Curriculum hours are hours of supervised learning or training deemed necessary in order to adequately present the educational material contained in the course or module. A course, too, has a minimum number of curriculum hours specified for its completion. If students successfully complete the required modules for the course, then they are deemed to have satisfied the requirements for finishing the course.

Partial course completion

In the VET sector, many students who enrol in a course intend to complete only some modules of that course. These students are primarily interested in acquiring specific skills.

Students' reasons for only partially completing a course in TAFE could be varied. For some students only certain modules of the course may be related to their current employment. Others may have already completed a course but now wish to update their skills and knowledge in an area that is going through rapid technical change. This can be achieved most expeditiously by doing only the relevant modules instead of the whole course.

Other students may not finish their course because of personal difficulties such as illness. Nevertheless, they may have passed all the modules in which they enrolled. Still other students may only partially complete because they decide that the course was not what they expected.

Ideally, one would like to be able to distinguish between the various types of partial completion, but this is impossible with the information currently available. Therefore, in this study, partial completers are students who successfully completed all the modules in which they enrolled but did not complete the whole course. Partial completion is considered as a second outcome of a course enrolment.

Course non-completion

All other course outcomes, excluding whole and partial course completions, are considered non-completions.

2.4 Defining outcomes of course enrolment

Course outcomes have to be operationally defined so that the data collected under the AVETMISS specification can be utilised for analyses. To simplify analyses, for the purposes of this preliminary study, students who receive credit through either RPL or credit transfer are excluded. The definitions are in the context of data collected in the 1994–96 period on students who commenced their course in 1994. Only data for these three years were available at the commencement of this study.

The definitions of the three course outcomes are based on aggregated curriculum hours and results of modules that make up the course. Before they are defined in terms of current AVETMISS data items, we briefly describe some of the items that will be used for this purpose.

Under the AVETMISS agreement, each year, data are collected on student demographics and course and module enrolment and completion. They include data on module enrolments, module outcomes and course enrolments. For administrative convenience all students are enrolled in courses, even though some of them do not intend to complete the whole course. Course completion data, even though they are collected in some States and Territories, are not reported in the official VET statistics because the AVETMISS standard does not have a system for defining outcomes for courses. The main accounting unit of student activity, and the one that is most reliable and consistent across different jurisdictions, is that of a module.

The following is part of the list of items collected in respect of each module a student enrols for:

- curriculum hours;
- associated course identifier; and
- module outcome.

The module outcome is recorded as one of the following:

- passed (01);
- failed (02);
- result withheld (03);
- satisfactory completion of class hours (04);
- studies not yet completed (05);
- credit granted through RPL (06);
- credit granted through credit transfer (09);
- withdrew – without failure (10);
- withdrew – failed (11);
- withdrew – transferred (12); and
- not stated (90).

The course details that are collected are:

- course identifier; and
- specified curriculum hours.

Definition of course completion

Given that data on course completion are not collected, we infer course completion by reference to the aggregate hours of the modules that have been successfully completed. More precisely, a student is deemed to have completed a course if the aggregate of the specified curriculum hours of the modules the student has successfully completed (module outcomes '01' or '04') is equal to or exceeds the specified course curriculum hours. The definition allows module failure, but the hours for such modules are not counted in the aggregate. It should be noted that the *actual* hours a student takes to complete a course might not be the same as the specified curriculum hours.

Definition of partial course completion

A student is considered to have partially completed a course if he or she has not completed the course in the manner described above, but has met all of the following criteria:

- has achieved a pass result (module outcome '01') in at least one module;
- has not failed (module outcomes '02' or '03' or '11') any modules; and
- has discontinued from the course.

The above definition is quite strict and narrow in its application. Only students who have an unblemished academic record are included as partial completers. In contrast, a student can complete a course in spite of having failed one or more modules as long as he/she satisfies the course completion requirements defined above.

Definition of non-completion of a course

Outcomes that are not whole or partial course completions are non-completions. This ensures that a course enrolment results in just one, and only one, of the three course outcomes.

2.5 Grouping courses by completion time

There are no official statistics on the length of time, in years, taken by students to complete courses. An initial analysis of time to complete a course was carried out for a modest set of demographic variables (sex and age) and also by course type. For 1994 data using the AVETMISS specifications this meant identifying courses by field of study and stream of study (where stream of study conveys some idea of 'level').

This initial analysis showed wide variation in student progress through courses that were almost identical in terms of the curriculum hours specified for their completion. Therefore, curriculum hours are not a good indicator of the *actual* time for course completion.

Several alternative approaches were investigated and the advice of State/Territory experts was sought. Categorisation in terms of particular values (eg 200 hours) was considered and some trial runs carried out. However, in the end, a different strategy had

to be followed because of variations between the States and Territories and variations in student behaviour.

What was therefore used was a normative strategy, based on student behaviour, in which courses were categorised on the basis of the most frequent elapsed time it took any student to meet all the requirements of the course (measured in years). Using the definition of course completion defined in section 2.4, a course was categorised in terms of the modal period of time it took students to complete it. Courses were classified as *one-year, two-year* or *three-year* on the basis of this analysis. This means that if 27 students completed a course in one year, 28 completed it in two years, and 26 completed it in three years, then the course was classified as a two-year course. If the course is such that no student completed it by the end of 1996, it was excluded from the study. By classifying courses in the manner suggested here distinct behaviour patterns may become evident, patterns which might otherwise be averaged out. Since TAFE data are only compiled on an annual basis, the actual period of enrolment can only be indicated on a whole-year basis. It is acknowledged, though, that students may complete a course in some fraction of a year or years.

Even though categorising courses by the modal time taken for their completion may be a better indicator of the actual time taken for their completion than specified curriculum hours, the method is still fraught with difficulties because of lack of accurate data to determine the actual time. In particular, the results in relation to time to completion should be interpreted with extreme caution.

3 Methodology

3.1 Introduction

A Markov chain model traces the proportion of members of a population who move through various states of a system. On the basis of past data on flows through the system, the model produces estimates of the probabilities of reaching the various states of the system and the average time taken to reach those states.

Most of the literature on the application of Markov chain models in education and health economics appeared for the first time in the 1960s and 1970s (Stone 1971, 1972). Gani (1963) used this type of model to project enrolments and Bachelor degree completions in Australian universities. Both Johnstone and Philp (1973) and Nicholls (1982) modelled State school education systems using Markov chains. The model has also been used to study the supply of secondary school teachers (Burke 1976). In a more recent application of Markov chain models, Shah and Burke (1999) undertook a comprehensive study of student flows in the higher education sector in Australia. Shah and Burke provide estimates of the probability of completion and the time to completion for undergraduate courses by the age and gender of students and by broad fields of study. Bartholomew et al. (1991) provide a theoretical treatment together with numerous applications of Markov chain models.

In the next section, we define the states of the Markov chain that can be used to study student flows through TAFE courses. We then provide a mathematical formulation of the model. It is possible for a reader to skip the mathematical formulation and still understand the last section that contains a stylised, illustrative example of an application of the methodology.

3.2 States of the Markov chain

In general, a Markov chain has two types of states. A state is either transient or absorbing depending on whether movement out of the state is possible or not. Obviously, once an absorbing state is entered movement terminates.

In the context of the application in this study, the states are the various stages of a TAFE course a student goes through from one year to the next. One year has been chosen as the unit of time for a transition to occur from one state of the system to another because current data only provide information on student progress through a course once a year. In this respect the model estimates of the average time to completion will be indicative. To obtain more precise estimates would require data collection at more frequent intervals, or the recording of the date when each student completes each stage of a course.

For the model developed here, the following four transient states are defined:
1. 0 per cent of the course completed (commencing or stage 0);
2. between 0 and 30 per cent of the course completed (stage 1);
3. between 30 and 60 per cent of the course completed (stage 2); and
4. between 60 and 100 per cent of the course completed (stage 3).

Furthermore, the following three absorbing states are defined:
1. course completion;
2. partial course completion; and
3. non-completion of course.

Stage 1 is the initial state that all students enter on enrolment in a course. From this initial state, in the following year a student may move to any of the other transient states, including remaining in the initial state, or move to one of the absorbing states. Similarly, movements are possible from other transient states, except that one cannot move back into a state that has already been visited before, and there is no movement out of an absorbing state. It should be noted that stage 3 is a transient state because less than 100 per cent of the course has been completed. The definition of the three absorbing states are as given in the previous chapter.

3.3 Mathematical formulation

This section contains development of output from a Markov chain model in matrix notation. Its understanding is unnecessary for the understanding of the rest of the chapter.

The usual Markov chain model can be represented in matrix notation as:

$$\mathbf{n}(t) = \mathbf{Z}(t)\mathbf{1} + \mathbf{D}(t)\mathbf{1}, \qquad (1)$$

where $\mathbf{n}(t)$ is a k-dimensional column vector whose i^{th} element represents the number of students in state i at time t, $\mathbf{Z}(t)$ is a ($k \leftrightarrow k$) square matrix whose ij^{th} element represents the number of students who were in state i at time t but are in state j at time t+1, $\mathbf{D}(t)$ is a ($k \leftrightarrow 3$) matrix whose ij^{th} element represents the number of students leaving the i^{th} transient state into the j^{th} absorbing state, $\mathbf{1}$ is a vector of ones, and k is the number of transient states in the model. Equation (1) tells us that the number of students at the beginning of a year is made up of those who will survive and stay in the system the following year plus those who will leave the system during the year.

From (1) the matrix of transition probabilities can be calculated as:

$$\mathbf{Q}(t) = \tilde{\mathbf{n}}^{-1}(t)\mathbf{Z}(t), \qquad (2)$$

where $\mathbf{Q}(t)$ is a ($k \leftrightarrow k$) matrix whose ij^{th} element represents the probability of a student making a transition from state i at time t to state j at time t+1 and $\tilde{\mathbf{n}}(t)$ is a diagonal matrix whose diagonal elements are the elements of $\mathbf{n}(t)$. The matrix of absorption probabilities is given by

$$\mathbf{R}(t) = \tilde{\mathbf{n}}^{-1}(t)\mathbf{D}(t), \qquad (3)$$

where $\mathbf{R}(t)$ is a ($k \leftrightarrow 3$) matrix whose ij^{th} element represents the probability of a student who is in state i at time t departing into an absorbing state j at time t+1.

If it can be assumed that **Q** and **R** are constant in time then the matrix

$$\mathbf{N} = (\mathbf{I} - \mathbf{Q})^{-1}, \quad (4)$$

gives the mean times to progress from one state to another. In (4) **I** is the identity matrix. The ij^{th} element of **N** represents the mean time (in years) that a student, starting in state *i*, is in state *j* before departing the system. Hence the mean time to progress from a transient state *i* into one of the absorbing states—that is, depart from the system—is given by the i^{th} element of the matrix

$$\mathbf{T} = \mathbf{N1}. \quad (5)$$

The probability of a student moving into an absorbing state *j*, given that they started in the transient state *i*, is given by the ij^{th} element of the matrix

$$\mathbf{B} = \mathbf{NR}. \quad (6)$$

Finally, the mean time to progress to a specific absorption state can be obtained by considering the *reduced* form of the system. The reduced system is formed by replacing **D**(*t*) in the above formulation by $\mathbf{D}^*(t)$ and $\mathbf{n}^*(t)$. $\mathbf{D}^*(t)$ consists of just one column, and the elements that make up the column are the same as those in the column representing the specific absorption state in **D**(*t*). The i^{th} element of $\mathbf{n}^*(t)$ element is constructed as follows:

$$n_i^* = n_i - \sum_{j \neq l} d_{ij}, \quad (7)$$

where n_i is the i element of **n**(*t*) and d_{ij} the ij element of **D**(*t*). A new **Q** and **N** can now be calculated. Then using (5) the matrix of the expected times to absorption in the specific absorption state can be calculated.

The above formulation assumes the matrix of transition probabilities is *regular*. A regular Markov chain is one in which it is possible to be in any state after some fixed number of years.

3.4 An illustrative example

In this section, we present an example to illustrate the construction of a matrix of student flows through a hypothetical course and the estimation of a Markov chain model for it. Only estimates of probabilities to different absorption states are presented.

Table 3.1 shows the development of a matrix of aggregate student flows from enrolment data collected in the period 1994–96 of students who commenced the course in 1994. The first section of the table is constructed from student enrolment files for 1994 and 1995. For example, it shows that by the end of 1994, of the 100 commencing students, 40 had completed up to 30 per cent of the specified curriculum hours for the course; 15 had completed 30 to 60 per cent of the hours; and 5 had completed 60 to 100 per cent of the hours. Forty students left the system by the end of the year; that is, they did not re-enrol in 1995. Of these, five had completed the course, 32 had partially completed and three had not completed.

The second section of the table is constructed from the 1995 and 1996 enrolment files and charts the progress of the 60 students who continued the course in 1995. For

example, it shows that of the 15 students, who had completed between 30 and 60 per cent of course hours in 1994, three remained in the same state at the end of 1995, five finished between 60 and 100 per cent of course hours, and seven departed the system. Two of the seven who left the system did so because they had completed the course hours, four did so because they had partially completed and one left without completing.

The third section of the table is constructed from the 1996 enrolment file and includes the progress of 47 students who continued the course in 1996. Since 1997 data were unavailable, it was not possible to determine if a student who had not completed the course in 1996 was going to re-enrol in 1997 or not. For the purposes of this study, we assumed all such students re-enrolled.

Table 3.1 Construction of matrix of student flows through a course: An illustrative example

	Stages of course completion (end of year)							
Stages of course completion (beginning of year)	1 0%	2 0-30%	3 30-60%	4 60-100%	Completion	Partial completion	Non-completion	Total
	Student flows in 1994 (inferred from 1994 and 1995 data)							
1. 0%	0	40	15	5	5	32	3	100
2. 0-30%	0	0	0	0	0	0	0	0
3. 30-60%	0	0	0	0	0	0	0	0
4. 60-100%	0	0	0	0	0	0	0	0
Total	0	40	15	5	5	32	3	100
	Student flows in 1995 (inferred from 1995 and 1996 data)							
1. 0%	0	0	0	0	0	0	0	0
2. 0-30%	0	5	27	1	2	4	1	40
3. 30-60%	0	0	3	5	2	4	1	15
4. 60-100%	0	0	0	2	1	1	1	5
Total	0	5	30	8	5	9	3	60
	Student flows in 1996 (inferred from 1996 data)							
1. 0%	0	0	0	0	0	0	0	0
2. 0-30%	0	1	0	2	1	1	0	5
3. 30-60%	0	0	2	23	2	3	0	30
4. 60-100%	0	0	0	1	2	5	0	8
Total	0	1	2	26	5	9	0	43

Table 3.2 shows the aggregation of student flows between 1994 and 1996. For example, it shows that altogether 28 student made the transition from stage 3 (30–60% completion) to stage 4 (60–100% completion).

Table 3.2 Aggregate student flows through a course: An illustrative example

Stages of course completion (beginning of year)	Stages of course completion (end of year)							
	1 0%	2 0-30%	3 30-60%	4 60-100%	Completion	Partial completion	Non-completion	Total
	All student flows between 1994 and 1996							
1. 0%	0	40	15	5	5	32	3	100
2. 0-30%	0	6	27	3	3	5	1	45
3. 30-60%	0	0	5	28	4	7	1	45
4. 60-100%	0	0	0	3	3	6	1	13
Total	0	46	47	39	15	50	6	203

From the aggregated student flows, the matrix of transition proportions is calculated using equation (2). This is given in Table 3.3. It shows, for example, 40 per cent of students completed up to 30 per cent of the course in the year after commencement.

Table 3.3 Matrix of transition proportions: An illustrative example

Stages of course completion (beginning of year)	Stages of course completion (end of year)						
	1. 0%	1. 0-30%	1. 30-60%	1. 60-100%	Full	Partial	Non-completion
1. 0%	0.00	0.40	0.15	0.05	0.05	0.32	0.03
2. 0-30%	0.00	0.13	0.60	0.07	0.07	0.11	0.02
3. 30-60%	0.00	0.00	0.11	0.62	0.09	0.16	0.02
4. 60-100%	0.00	0.00	0.00	0.23	0.23	0.46	0.08

Note: Row sums may not add to one due to rounding errors

Equation (6) can now be used to estimate the probability of progressing to any of the three absorption states. These probabilities are given in Table 3.4. For example, the estimated probability of completing the course by a student who is about to commence is 24 per cent. If a student has already completed between 30 and 60 per cent of the course, then their chances of completion increases to 31 per cent.

Table 3.4 Estimated probabilities of progressing to absorption states from different transition states: An illustrative example

Stages of course completion	Estimated probability of		
	Completion	Partial completion	Non-completion
1. 0%	0.24	0.67	0.09
2. 0-30%	0.31	0.59	0.10
3. 30-60%	0.31	0.60	0.10
4. 60-100%	0.30	0.60	0.10

4 Initial data analysis and construction of student flow matrices

4.1 Introduction

The education literature suggests that the progress of a student through an education or training course is likely to vary with the student's age and sex, and the field of study. Shah and Burke (1999) provide evidence of this type of variation in the higher education sector. Progress may also depend on whether the enrolment is full- or part-time.

This chapter describes the construction of student flow matrices for different sub-groups of the population. The sub-groups are firstly characterised by the age and sex of the students and secondly by the nature of the course, which can be by its length (as defined in Chapter 2) and the stream or field of study. We could not differentiate between full- and part-time enrolment status because the requisite data were unavailable. Notwithstanding the data problem, a far more complex model would be required because students often change their enrolment status while doing the same course.

4.2 Construction of student flow matrices

Scope of the study

The model was estimated with national VET data collected for the period 1994 to 1996. We only consider the progress of TAFE institute-based students, aged 16 and over, who commenced a course in 1994. Enrolments in recreational and leisure courses (stream 1000) and single module courses are excluded from the analyses and so are courses that had more than 3,000 specified curriculum hours. Furthermore, our study excludes enrolments based on RPL or credit transfer. Student records with missing data were also excluded. About 680,000 commencing course enrolments in 1994 fell within the scope of this study. A student may be associated with more than one course enrolment.

Some of those who do not complete a course may recommence the same or a different course at a later date. The data did not permit re-commencements to be considered in this study.

Student progress through a course, 1994 to 1996

Mapping student progress through a course requires that the same student's record can be identified in the data file for each year they are enrolled in the course. Either the identification number of the student or their encrypted name that is attached to their enrolment record can be used as the link for this purpose. Unfortunately, student

identification numbers were not always consistent from one year to the next. Similarly, student names are not necessarily a unique identifier within a given TAFE institute.

Hence identification numbers and the encrypted name may not be sufficient to identify the same student from one year to the next. We therefore used the following variables to link student records from one year to the next:

- sex;
- date of birth;
- home postcode;
- course; and
- either their identification number or encrypted name.

The linked records were then used to determine the annual progress of each student through the course. Progress was measured in terms of the proportion of total specified course hours completed in each year of enrolment.

4.3 Initial data analysis

About 680,000 course enrolments commenced in 1994 fell within the scope of this study. Fifty-four per cent of these were male enrolments. Table 4.1 shows that 71 per cent of the enrolments were in one-year courses and that only 5 per cent were in three-year courses. The proportion of male enrolments increases with the length of the course. Nearly four out of every five three-year course enrolments were by males.

Table 4.1 Course enrolments commenced in 1994 by sex and length of course

Length of course	Male	Female	Total
One-year	249,066 (52%)	232,340 (48%)	481,406 (100%)
Two-year	92,319 (57%)	70,554 (43%)	162,873 (100%)
Three-year	26,447 (78%)	7,381 (22%)	33,828 (100%)
All courses	367,832 (54%)	310,275 (46%)	678,107 (100%)

The age profiles of students enrolled in one-, two- and three-year courses are shown in Figures 4.1 to 4.3. The figures show very clear differences in the age profiles in the three types of courses. In the one-year courses, the age distributions of males and females are almost the same, except for a slightly higher representation of the older age students (30 and over) in the female distribution but a lower representation in the case of the male distribution. About half the students are under 25 years old, with students of ages 16 to 19 in roughly even proportions.

The age distributions of males and females are similar in two-year courses as well, including the slightly higher representation of older age students among females. The distributions are, however, more symmetrical.

In contrast, the age distributions of males and females in three-year courses are quite distinct. Whilst the male distribution is reasonably symmetrical, the female distribution is skewed, with a high proportion of older age students. Nearly half the female students are 25 years of age or older compared to just 30 per cent of male students.

Figure 4.1 Age distribution of commencing students in one-year courses by sex, 1994

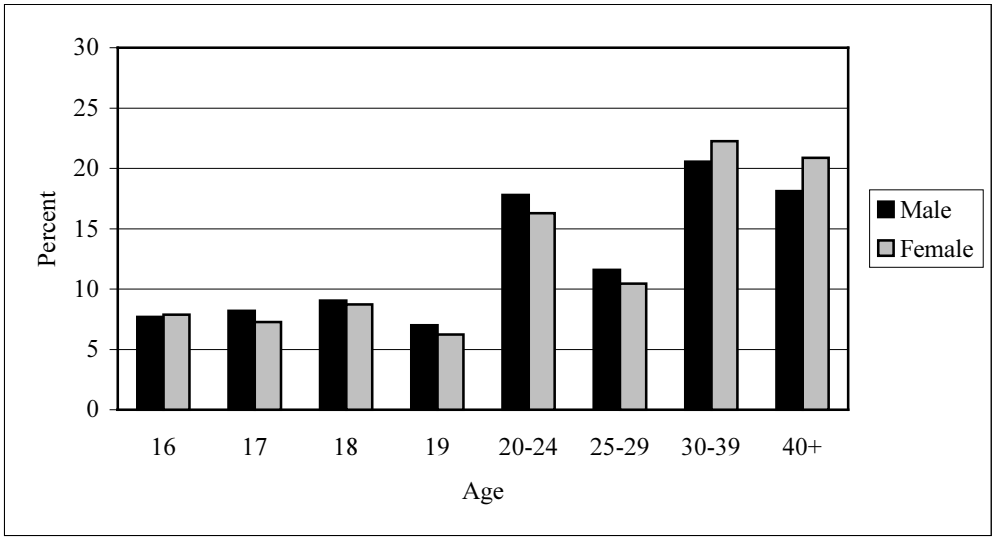


Figure 4.2 Age distribution of commencing students in two-year courses by sex, 1994

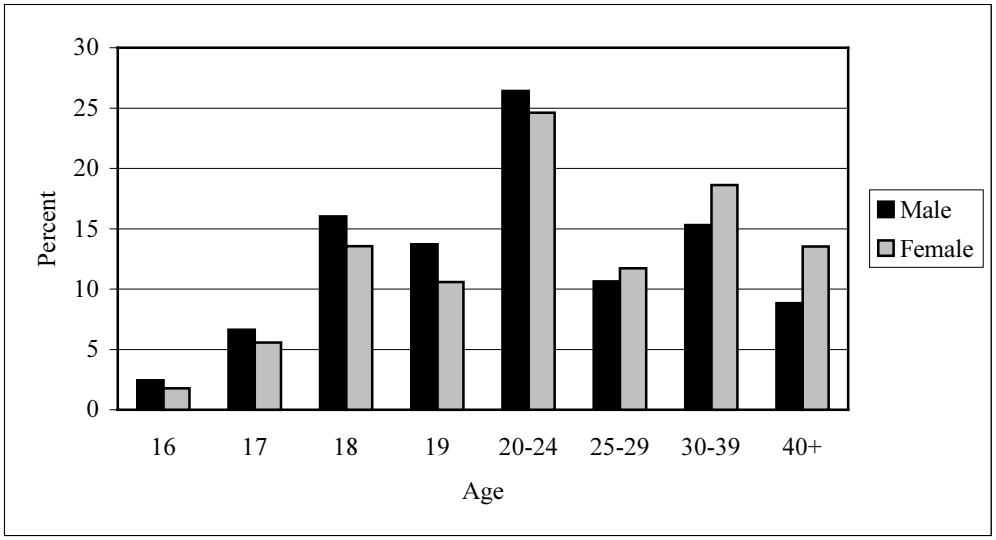


Figure 4.3 Age distribution of commencing students in three-year courses by sex, 1994

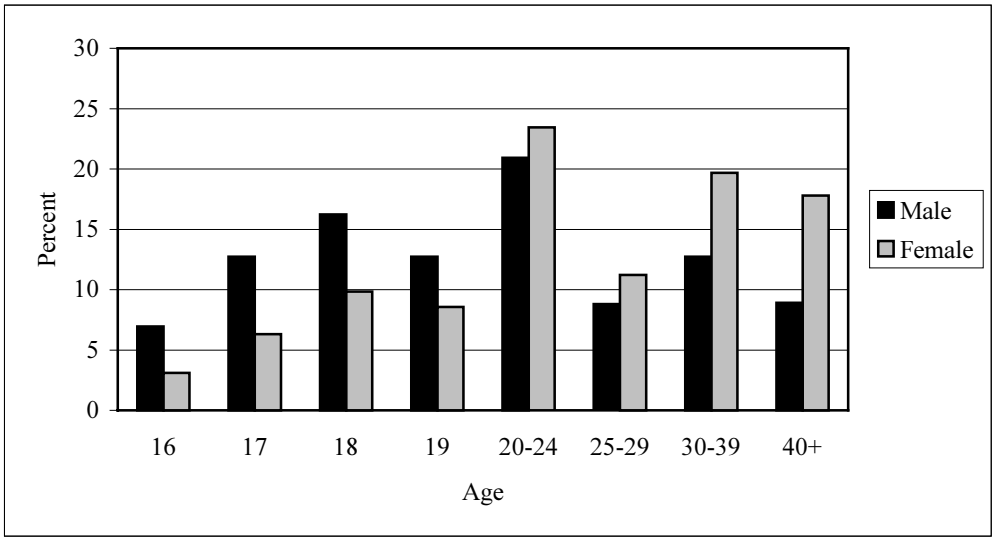


Table 4.2 shows the distributions of enrolment by length of course in each stream of study. For example, about 17 per cent of all students enrolled in *Initial vocational courses* (stream 3100), of whom 95 per cent were in one-year courses and the rest in two-year courses. Over 80 per cent of enrolments were in less than half the streams. The following four streams had 56 per cent of all enrolments:

- *Basic education and employment skills* (2100) – 12 per cent;
- *Initial vocational courses—operatives* (3100) – 17 per cent;
- *Complete trade courses* (3212) – 11 per cent; and
- *Para-professional/higher technician* (3500) – 16 per cent.

Although in most streams enrolments were predominantly in one-year courses, the following have a substantial proportion of enrolments in two-year courses:

- *Complete trade courses* (3212) – 49 per cent;
- *Para-professional/technician* (3400) – 36 per cent;
- *Para-professional/higher technician* (3500) – 90 per cent; and
- *Professional* (3600) – 56 per cent.

The only stream with a substantial proportion of enrolments in three-year courses is *Para-professional/technician* (3400) – 54 per cent.

Table 4.2 Distribution of commencing student enrolments by length of course and sex in each stream of study, 1994

Stream of study	Per cent of enrolments						Total	Per cent of enrolments
	One-year courses		Two-year courses		Three-year courses			
	Male	Female	Male	Female	Male	Female		
Basic education and employment skills (2100)	42	54	1	1	1	1	100	12.2
Education preparation (2200)	52	48	0	0	0	0	100	8.6
Initial vocational courses—operatives(3100)	41	54	2	3	0	0	100	16.9
Courses which grant partial exemption to recognised trade courses (3211)	84	12	1	2	1	1	100	3.1
Complete trade courses (3212)	27	2	41	8	21	2	100	11.2
Courses which grant partial exemption to other skills courses (3221)	38	56	1	1	1	3	100	6.3
Complete other skills courses (3222)	40	47	4	5	3	1	100	8.7
Trade technician/trade supervisory (3300)	35	46	12	6	1	1	100	8.2
Para-professional/technician (3400)	4	6	12	24	42	12	100	1.0
Para-professional/higher technician (3500)	3	5	43	47	1	1	100	16.1
Professional (3600)	38	7	29	27	0	0	100	0.4
Courses subsequent to an initial vocational course—at operative level (4100)	47	44	5	1	3	1	100	1.3
Courses subsequent to an initial vocational course—at a skilled level (4200)	75	17	6	2	0	0	100	4.6
Courses subsequent to an initial vocational course—at a trade level (4300)	84	16	0	0	0	0	100	1.1
Courses subsequent to an initial vocational course—at a para-professional/technical level (4400)	96	4	0	0	0	0	100	0.2
Courses subsequent to an initial vocational course—at a para-professional/higher technician level (4500)	66	32	1	1	0	0	100	0.2
Total	37	34	14	10	4	1	100	100.0

The distributions of enrolment by length of course in each field of study are given in Table 4.3. Enrolments in just five fields make up 80 per cent of the total. The three most popular fields with aggregate enrolment of 63 per cent are:

- *Business, administration and economics* (04) – 25 per cent;
- *Engineering and surveying* (06) – 17 per cent; and
- *TAFE multi-field education* (12) – 21 per cent.

There are only two fields, *Education* (05) and *Veterinary science and animal care* (10) that have less than half the enrolments in one-year courses. While *Architecture and*

building (02) and *Engineering and surveying* (06) have predominantly male enrolments, *Education* (05), *Health and community services* (07) and *Veterinary science and animal care* (10) have predominantly female enrolments.

Table 4.3 Distribution of commencing student enrolments by length of course and sex in each field of study, 1994

	Per cent of enrolments							
	One-year courses		Two-year courses		Three-year courses			Per cent of
Field of study	Male	Female	Male	Female	Male	Female	Total	enrolments
Land and marine resources, animal husbandry (01)	51	21	9	8	8	3	100	3.3
Architecture, building (02)	54	2	23	3	16	1	100	7.3
Arts, humanities and social sciences (03)	16	44	9	21	3	6	100	5.3
Business, administration, economics (04)	21	43	16	19	1	0	100	24.9
Education (05)	19	28	1	50	0	1	100	1.8
Engineering, surveying (06)	52	4	33	2	9	0	100	16.8
Health, community services (07)	14	59	3	16	7	2	100	4.6
Law, legal studies (08)	51	32	4	14	0	0	100	0.5
Science (09)	38	43	10	9	0	0	100	4.4
Veterinary science, animal care (10)	3	35	4	18	1	39	100	0.2
Services, hospitality, transportation (11)	31	42	9	15	2	1	100	10.0
TAFE multi-field education (12)	49	48	0	1	1	1	100	21.0
Total	37	34	14	10	4	1	100	100.0

Finally, Table 4.4 shows the course enrolment outcomes that could be determined from the data for 1994–96. Only 23 per cent of enrolments in 1994 resulted in a course completion by the end of 1996, 41 per cent resulted in partial completion and 20 per cent in non-completion. The rest, 16 per cent, are assumed to re-enrol in 1997 in order to continue with the course. As expected, there are more continuing enrolments in two- and three-year courses than one. However, the proportion of two- and three-year course enrolments resulting in completions is very low.

Table 4.4 Course enrolment outcomes as at end of 1996 for students who commenced in 1994 by length of course

	Course outcome as at end of 1996				
Course length	Completion	Partial completion	Non-completion	Assumed continuing in 1997	Total
One-year	148,429 (31%)	202,313 (42%)	90,296 (19%)	40,368 (8%)	481,406 (100%)
Two-year	5,961 (4%)	63,208 (39%)	41,640 (26%)	52,064 (32%)	162,873 (100%)
Three-year	1,368 (4%)	13,517 (40%)	4,914 (15%)	14,029 (41%)	33,828 (100%)
All	155,758 (23%)	279,038 (41%)	136,850 (20%)	106,461 (16%)	678,107 (100%)

5 Results

5.1 Introduction

In this chapter we provide national estimates of the probabilities of completion, partial completion and non-completion of TAFE courses. Although the overall rate of successful outcomes is high, the results show considerable variation by the age and sex of students and the field and stream of study of their courses. For some small sub-groups there were insufficient data to estimate the probabilities of the different outcomes. As a general rule, caution should be exercised in interpreting results from models estimated with data on fewer than 25 enrolments.

We also provide national estimates of the mean time to reach each outcome. As already discussed in Chapter 2, because data on student progress are collected only annually, and actual times are not recorded, we assume that the time for movement between any two states of the model is a year. As this may be an overestimate of the actual time, our estimates of the average time to reaching the three course outcomes are likely to be biased upwards. Since the extent of the bias is unknown, one needs to take care in interpreting any results for the average times. Therefore, although the estimates for average times are included in the tables in the appendices, they are not discussed in this chapter. This deficiency in the data, however, does not affect our estimates of the probabilities of course outcomes.

In the next section, we present aggregate results by length of course. Summary results by streams and fields of study are given in subsequent sections. Detailed results for each are included in the appendices. In all tables a blank entry indicates the estimate is unavailable because of lack of data. In the following discussion, both completion and partial completion are treated as a successful outcome of a course. In some instances, aggregate results were obtained by taking a weighted average of components where the weights are the number of enrolments.

5.2 Aggregate results by length of course

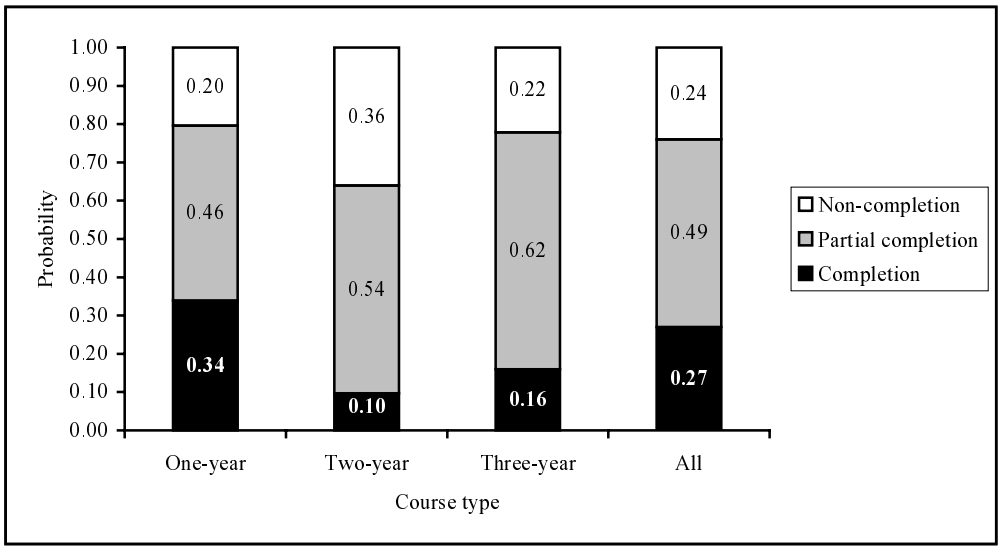
Figure 5.1 shows that completion and partial completion of a course, the two satisfactory outcomes from most students' perspective, are the most likely results. Over 76 per cent of enrolments are expected to result in these two outcomes, with 49 per cent in partial completions and 27 per cent in full-course completions. The very high rate of partial completion means that the true skill level of the Australian workforce could be much higher than the level suggested by qualifications data alone.

The results indicate partial completion to be a very significant outcome of a TAFE course enrolment. Almost half of all course enrolments are expected to result in partial completion, which is twice the proportion of course completions. The TAFE system therefore exhibits a degree of flexibility that accommodates those students who wish to acquire specific skills or competencies, rather than complete qualifications. For example, in the rapidly changing information technology area, the shelf life of a skill could be quite short, and students may wish to update only those specific skills of immediate application. Ignoring or not measuring partial completions of courses would be a gross underestimation of the true output of the TAFE system.

The probabilities of completion or partial completion are substantially higher for one- and three-year courses (0.80 and 0.78) than they are for two-year courses (0.64). Perhaps not surprisingly, longer courses have higher probabilities of partial completion, and lower probabilities of course completion than do shorter courses. Of the successful outcomes in one-, two- and three-year courses, 58, 84 and 79 per cent, respectively, are partial completions.

On average, there is little difference between the rates at which males and females complete or partially complete a course, though males have a slightly higher chance of completing a course and females a slightly higher chance of partially completing it.

Figure 5.1 Probabilities of completion, partial completion and non-completion in one-, two- and three-year courses



All probabilities are weighted averages.

One-year courses

In general, results for one-year courses are more robust than for two- and three-year courses. This is because estimates for one-year courses are based on a larger sample and outcomes for 92 per cent of enrolments were already known.

Table 5.1 shows the outcomes of one-year courses for students of different ages and sex. Figures 5.2 and 5.3 showing the same results for males and females separately makes it easier to assess the probability of a successful outcome by age. First, males and females of the same age have almost the same chance of a successful outcome, but males have a slightly higher chance of course completion. Second, the probability of a successful outcome (and completion) increases with the age of the student. Those 40 years of age and over have nearly twice the probability of completing a course compared to 16-year-olds.

Table 5.1 Estimated probabilities of completion, partial completion and non-completion in one-year courses by age and sex

		Probability of course outcome		
Sex	Age	Completion	Partial completion	Non-completion
Female	16	.19	.50	.31
	17	.25	.47	.29
	18	.33	.39	.28
	19	.33	.40	.26
	20-24	.32	.46	.22
	25-29	.34	.49	.18
	30-39	.37	.49	.14
	40+	.36	.50	.14
Male	16	.22	.45	.33
	17	.26	.43	.31
	18	.31	.41	.28
	19	.32	.43	.25
	20-24	.34	.45	.21
	25-29	.37	.45	.17
	30-39	.40	.45	.15
	40+	.42	.44	.13

Figure 5.2 Probabilities of completion, partial completion and non-completion for male students in one-year courses by age

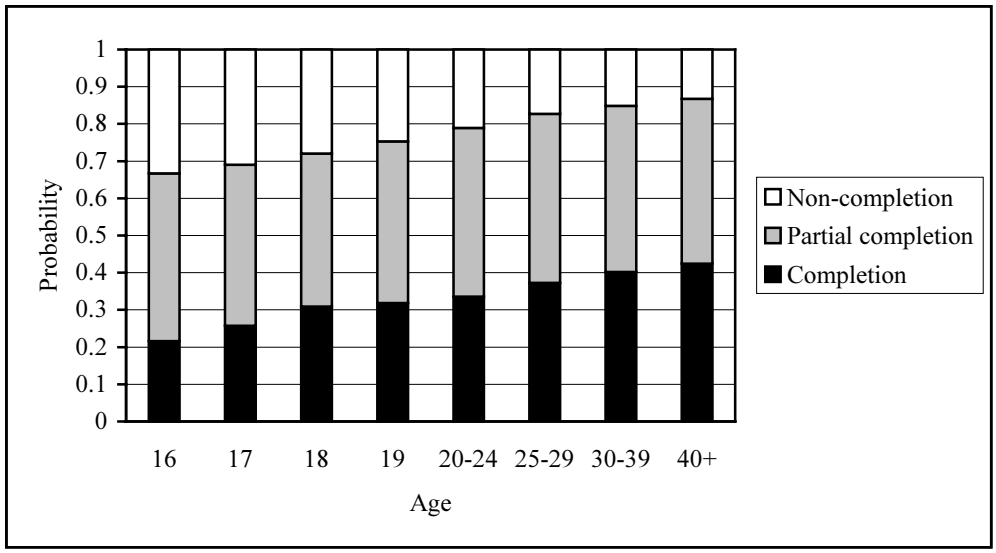
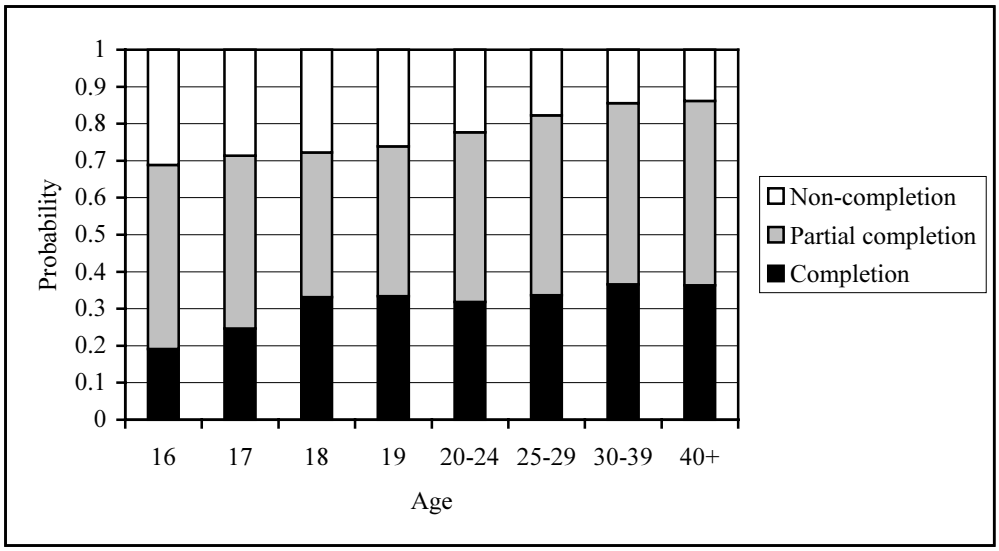


Figure 5.3 Probabilities of completion, partial completion and non-completion for female students in one-year courses by age



Two-year courses

The corresponding results for two-year courses are shown in Table 5.2 and Figures 5.4 and 5.5. There is clearly a different pattern of course completion and partial completion for students in one- and two-year courses. For both males and females, the distribution by age of the probability of a successful outcome from enrolment in a two-year course is U-shaped, with those aged 18 having the lowest chance of a successful outcome. For males, the probability of a successful outcome varies from 57 to 76 per cent, compared to a range of 52 to 84 per cent for females.

A male's chance of completing a course declines with age, while a female's chance increases until age 18 and then declines. Younger males (less than 25 years of age) have a higher rate of completion than females of the same age.

Table 5.2 Estimated probabilities of completion, partial completion and non-completion in two-year courses by age and sex

		Probability of course outcome		
Sex	Age	Completion	Partial completion	Non-completion
Female	16	.06	.78	.16
	17	.10	.46	.43
	18	.12	.41	.48
	19	.09	.47	.44
	20-24	.06	.54	.39
	25-29	.05	.62	.33
	30-39	.05	.67	.28
	40+	.05	.68	.27
Male	16	.23	.53	.24
	17	.23	.41	.36
	18	.18	.39	.43
	19	.15	.45	.40
	20-24	.10	.53	.37
	25-29	.07	.58	.35
	30-39	.06	.64	.30
	40+	.04	.68	.28

Figure 5.4 Probabilities of completion, partial completion and non-completion for male students in two-year courses by age

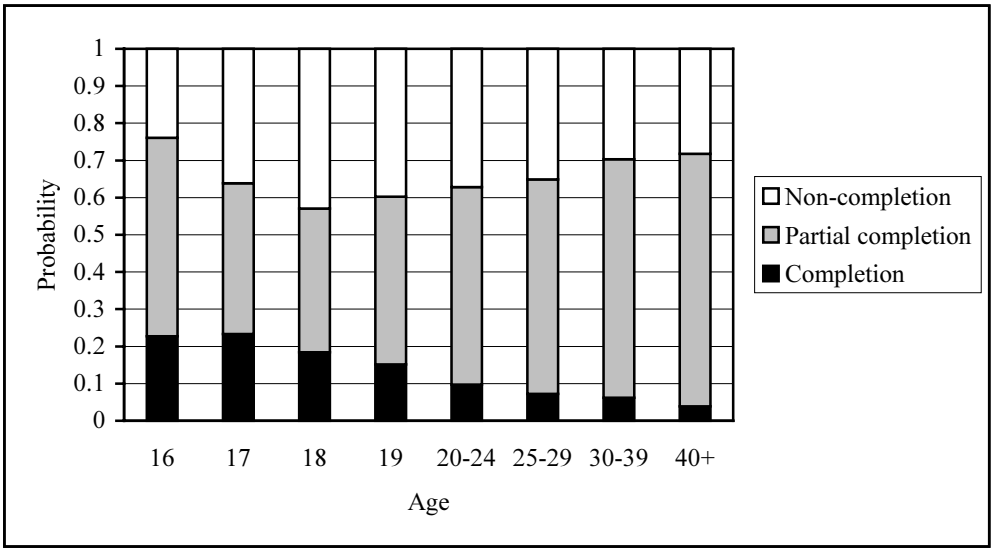
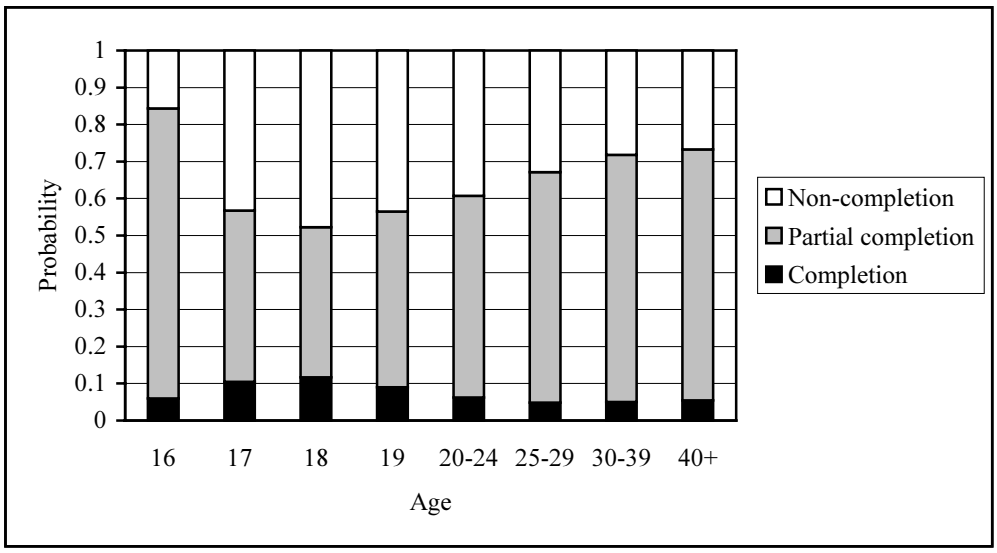


Figure 5.5 Probabilities of completion, partial completion and non-completion for female students in two-year courses by age



Three-year courses

Table 5.3 and Figures 5.6 and 5.7 display the estimates for three-year courses. The distribution of the probability of a successful outcome by age for females is once again U-shaped, but for males there is little variation by age. In general, younger males are more likely to complete three-year courses than females of the same age.

Table 5.3 Estimated probabilities of completion, partial completion and non-completion in three-year courses by age and sex

		Probability of course outcome		
Sex	Age	Completion	Partial completion	Non-completion
Female	16	.16	.70	.14
	17	.17	.68	.15
	18	.21	.51	.27
	19	.16	.59	.25
	20-24	.10	.62	.28
	25-29	.09	.68	.23
	30-39	.09	.71	.20
	40+	.12	.66	.22
Male	16	.29	.49	.23
	17	.33	.48	.19
	18	.23	.56	.21
	19	.17	.62	.21
	20-24	.12	.65	.24
	25-29	.09	.67	.24
	30-39	.08	.69	.22
	40+	.07	.72	.21

Figure 5.6 Probabilities of completion, partial completion and non-completion for male students in three-year courses by age

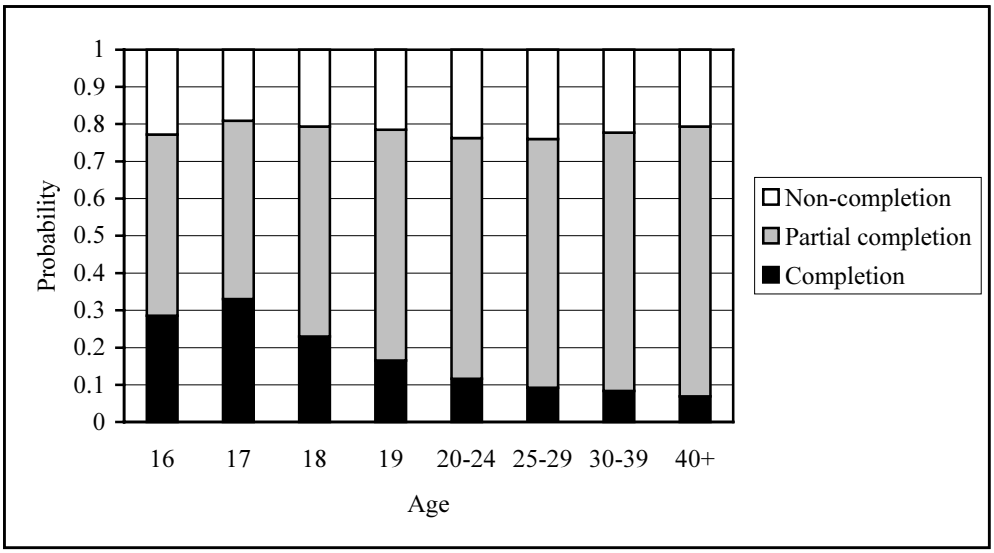
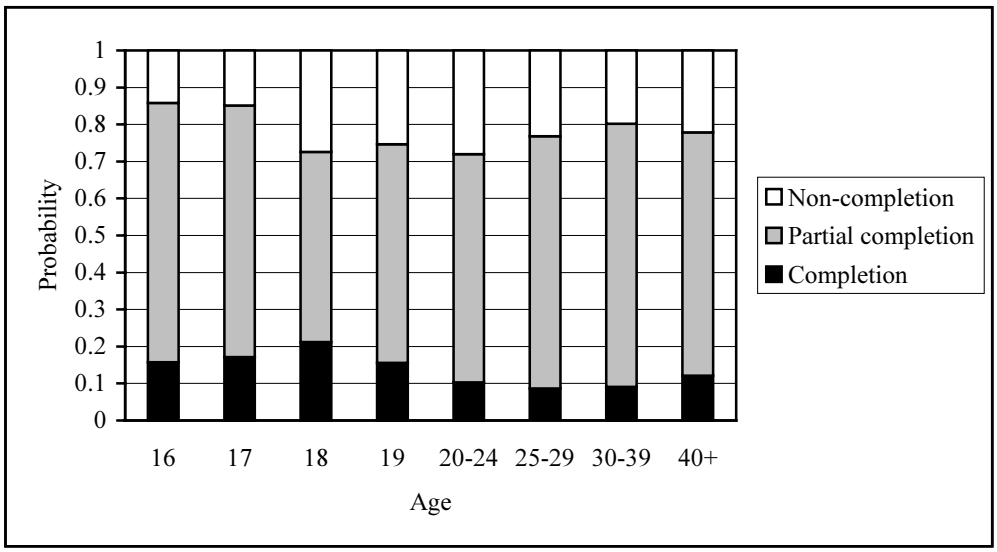


Figure 5.7 Probabilities of completion, partial completion and non-completion for female students in three-year courses by age



5.3 Results by streams of study

In this section, we provide national estimates of the probabilities of completion, partial completion and non-completion of TAFE courses by the stream of study and gender. More detailed tables that display these estimates separately for courses of different length are included in Appendix A.

Table 5.4 shows the probabilities of course enrolment outcomes in different streams of study for both males and females. Differences in the success rates between males and

females, in general, are small in most streams of study. Most differences are less than 5 percentage points, with the highest difference of 12 percentage points for the stream containing *Courses subsequent to an initial vocational course at the operative level* (stream 4100). The completion rate differences, however, are larger. In particular, females have a higher probability of completing *Courses subsequent to an initial vocational course* (streams 4100, 4200 and 4300), with a difference of 17 percentage points for streams 4200 and 4300.

Table 5.4 Probabilities of completion, partial completion and non-completion of a course by sex of student and stream of study

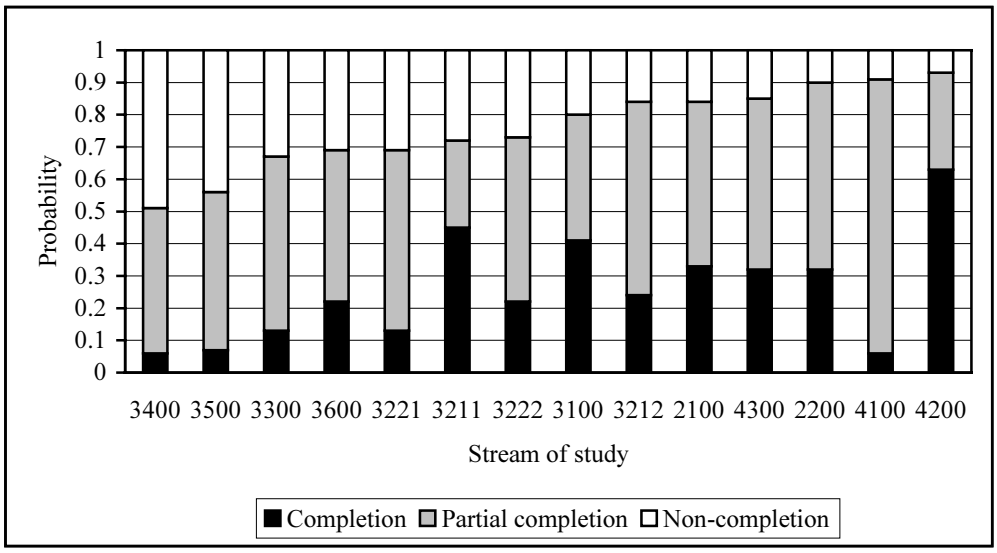
	Probability of course outcome								
	Completion			Partial completion			Non-completion		
Stream of study	Male	Female	All	Male	Female	All	Male	Female	All
Basic education and employment skills (2100)	.32	.33	.33	.49	.52	.51	.19	.15	.16
Education preparation (2200)	.32	.33	.32	.60	.56	.58	.08	.11	.10
Initial vocational courses—operatives(3100)	.40	.42	.41	.38	.39	.38	.21	.19	.20
Courses which grant partial exemption to recognised trade courses (3211)	.45	.33	.45	.27	.35	.27	.28	.32	.28
Complete trade courses (3212)	.24	.19	.24	.59	.71	.61	.16	.10	.16
Courses which grant partial exemption to other skills courses (3221)	.10	.15	.13	.56	.55	.56	.33	.30	.31
Complete other skills courses (3222)	.21	.24	.22	.52	.50	.51	.28	.26	.27
Trade technician/trade supervisory (3300)	.11	.16	.13	.53	.54	.53	.37	.30	.33
Para-professional/technician (3400)	.06	.05	.06	.38	.47	.45	.56	.47	.49
Para-professional/higher technician (3500)	.07	.07	.07	.46	.52	.49	.47	.41	.44
Professional (3600)	.27	.19	.22	.42	.50	.47	.31	.31	.31
Courses subsequent to an initial vocational course—at operative level (4100)	.03	.20	.06	.89	.60	.85	.07	.20	.09
Courses subsequent to an initial vocational course—at a skilled level (4200)	.62	.67	.63	.31	.28	.30	.07	.05	.07
Courses subsequent to an initial vocational course—at a trade level (4300)	.30	.47	.32	.54	.42	.53	.15	.11	.15
All	.28	.26	.27	.48	.50	.49	.25	.24	.24

There were insufficient data to estimate models for courses in streams 4400 and 4500.
All probabilities are weighted averages.

Next, we compare the overall results obtained by aggregating over gender groups. Figure 5.8 shows the probabilities for the three course outcomes in a stacked bar graph with streams ordered by increasing success rates. Success rates for streams containing *Courses subsequent to an initial vocational course* (streams 4100, 4200 and 4300) are some of the highest (both streams 4200 and 4300 have success rates of over 90 per cent). On the other hand, the success rate for the stream containing *Para-professional/technician courses* (stream 3400) is barely 50 per cent.

Despite the fact that the three streams 4100, 4200 and 4300 have success rates that are very close to each other, the course completion rates for them are very different. In stream 4200 (containing skilled level courses), the probability of completion is 63 per cent, while in streams 4300 (containing trade level courses) and 4100 (containing operative level courses) it is 32 and 6 per cent, respectively. Those streams containing *Courses which grant partial exemption to recognised trade courses* (stream 3211) and *Initial vocational courses for operatives* (stream 3100) also have above average completion rates.

Figure 5.8 Probabilities of completion, partial completion and non-completion in courses sorted by streams of study



All probabilities are weighted averages.

5.4 Results for fields of study

This section presents estimates of the probabilities of completion, partial completion and non-completion by field of study and gender. Results by course length are included in Appendix B. Table 5.5 contains probabilities of course enrolment outcomes in different fields of study for both males and females. Unlike the results for streams of study, the differences in success rates for males and females in the same field of study are often quite large. The average difference across fields is 9 percentage points. Males have substantially higher success rates (at least 10 percentage points higher) in *Architecture and building* (field 02) and *Education* (field 05), while females hold an advantage in *Arts, humanities and social sciences* (field 03), *Science* (field 09) and *Veterinary science and animal care* (field 10).

The course completion rate differences between males and females, however, are more modest, except in *Education* (field 05) where males have an 80 per cent chance of completing compared to only 23 per cent for females. A close examination of the results for this field (see Tables B5 and B16 in Appendix B) shows, firstly, the estimates are only available for one- and two-year courses; and secondly, completion probabilities for

the former are a lot higher than for the latter. Since more female students enrolled in two-year courses than one-year courses, the weighted average of the probabilities of completion is biased towards the completion probability for two-year courses. On the other hand, in the case of males, the bias is towards the completion probability for one-year courses because more male students enrolled in one-year courses than in two-year courses.

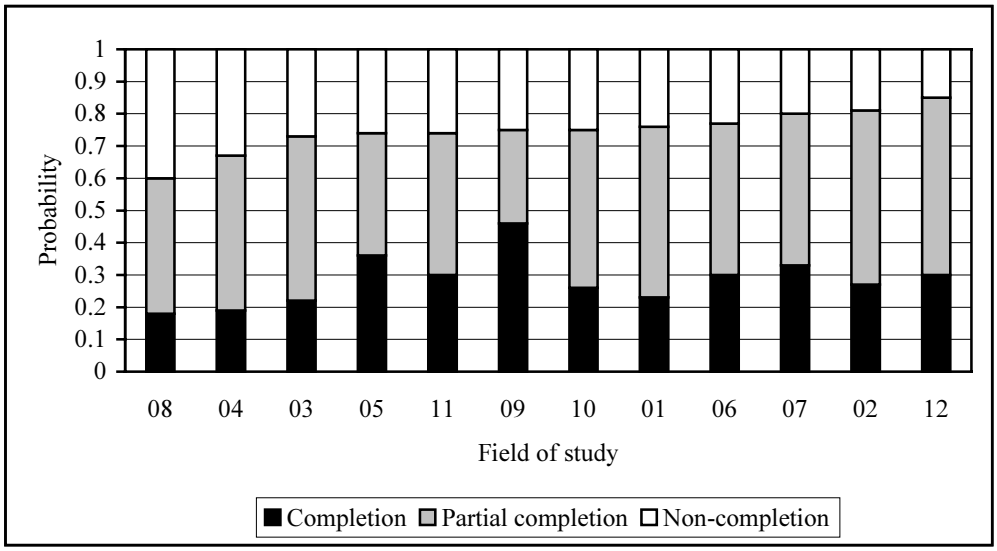
The results for data aggregated across gender groups show the probability of success varies from 60 per cent in *Law and legal studies* (field 08) to 85 per cent in *TAFE multi-field education* (field 12), see Figure 5.9. The highest probability of course completion (46 per cent) is in *Science* (field 09).

Table 5.5 Probabilities of completion, partial completion and non-completion of a course by sex of student and field of study

	Probability of course outcome								
	Completion			Partial completion			Non-completion		
Field of study	Male	Female	All	Male	Female	All	Male	Female	All
Land and marine resources, animal husbandry (01)	.24	.20	.23	.50	.60	.53	.26	.20	.24
Architecture, building (02)	.27	.17	.27	.55	.50	.55	.18	.33	.19
Arts, humanities and social sciences (03)	.19	.23	.22	.46	.53	.51	.35	.24	.27
Business, administration, economics (04)	.17	.21	.19	.47	.49	.48	.36	.31	.33
Education (05)	.80	.27	.36	.10	.44	.38	.11	.29	.26
Engineering, surveying (06)	.30	.18	.30	.47	.54	.47	.23	.28	.23
Health, community services (07)	.31	.34	.33	.48	.46	.46	.20	.20	.20
Law, legal studies (08)	.16	.20	.18	.45	.39	.42	.39	.41	.40
Science (09)	.41	.51	.46	.29	.29	.29	.30	.20	.25
Veterinary science, animal care (10)	.33	.26	.26	.17	.50	.49	.50	.25	.25
Services, hospitality, transportation (11)	.38	.25	.30	.37	.48	.44	.25	.27	.26
TAFE multi-field education (12)	.29	.31	.30	.54	.56	.55	.17	.13	.15
All	.28	.26	.27	.48	.50	.49	.25	.24	.24

All probabilities are weighted averages.

Figure 5.9 Probabilities of completion, partial completion and non-completion in courses sorted by fields of study



All probabilities are weighted averages.

5.5 Concluding comments

The results suggest that partial completion is a very significant outcome of enrolment in a TAFE course. Almost half of all course enrolments are expected to result in partial completion, which is twice the proportion of completions. For students, full-course completion certainly appears to be of less significance than the completion of some modules.

The success rates vary considerably by length of course, age, stream of study and field of study. Although, at the aggregate level differences between males and females are often small, there can be substantial differences between males and females when other factors such as age are taken into account.

6 Conclusions

The model developed in this report has provided for the first time detailed estimates for the flow of students through TAFE courses in Australia. It focused on national data, but can be readily adapted to analyse data at the State level. Although the reduced amount of data available at the State level may prevent estimation of models for all the groups of courses identified in this report, useful information could nevertheless be obtained.

National VET data, collected for the period 1994 to 1996, were used to estimate the model. More accurate results, especially for two- and three-year courses, can no doubt be obtained with the inclusion of data for later periods.

The results suggest that partial completion is a very significant course enrolment outcome in TAFE. For students, full-course completion certainly appears to be of less significance than the completion of some modules. However, in order to develop sound policy on this issue, the reasons for partial completion of courses need to be determined. Further research could also disaggregate partial completions into different types. It would also be interesting to determine if partial completers more commonly enrolled in some types of modules rather than in other types. Surveys of students who partially complete courses may help to shed further light on these important issues.

Given the significance of partial-course completion in TAFE as demonstrated in this report, one could argue that completed qualifications underestimate the stock of skills in the workforce.

Research on the labour market consequences of partially completing a course is another important area that requires further investigation. It is possible that the students who partially complete courses are reflecting the imperatives of the labour market. Some skills tend to become obsolete in a relatively short time due to rapid technological and organisational change. Such skills need to be constantly upgraded, but with a minimum of disruption to production. Therefore students, and perhaps their employers, may focus on acquiring skills as they are needed, rather than on investing resources in complete courses, parts of which may have little relevance to their immediate needs.

The causes of the substantial variation in the results across streams (and fields) of study and the age of students need further investigation. Could differences in standards of assessment, quality of teaching or student aptitude and motivation be some of the factors that explain the variation, or are there other causes? The answer to this question needs further research using alternative data sources.

The research reported here has raised a number of questions about outcomes of a student's enrolment in a TAFE course. It has provided statistical backing to some generally held views regarding the importance of partial completion as a course outcome in the TAFE system. The results from this study can assist policy development in important areas such as resource allocation, quality assurance, student support services, and the development of appropriate output measures to use in the TAFE system.

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Appendix A—Streams of study

This appendix contains results of modelling student flows through TAFE courses organised by streams of study. A blank cell indicates the estimate could not be obtained because of deficiency in, or non-existence of, appropriate data. An asterisk (*) next to the age label indicates the results for that age group should be interpreted with caution because the model from which the results were obtained was estimated with data for less than 25 students.

A.1 One-year courses

Results for the following streams are unavailable:

- Para-professional/technician courses (stream 3400);
- Courses subsequent to an initial vocational course—at operative level (stream 4100); and
- Courses subsequent to an initial vocational course—at a para-professional/higher technician level (stream 4500).

Table A1 Results of one-year courses in Basic education and employment skills (stream 2100) by age and sex

		Probability of course outcome			Mean time to course outcome	
Sex	Age	Completion	Partial Completion	Non-completion	Completion	Partial Completion
Male	16	.25	.49	.26	1.1	1.1
	17	.31	.46	.23	1.0	
	18	.37	.43	.21	1.1	1.0
	19	.41	.41	.18	1.0	1.0
	20-24	.36	.44	.20	1.1	1.1
	25-29	.29	.52	.19	1.2	1.1
	30-39	.30	.53	.17	1.2	1.1
	40+	.34	.51	.15	1.2	1.2
Female	16	.20	.63	.17	1.1	1.0
	17	.21	.61	.18	1.1	1.0
	18	.27	.54	.19	1.1	1.0
	19	.34	.48	.17	1.1	
	20-24	.33	.50	.17	1.2	1.1
	25-29	.35	.50	.15	1.2	1.1
	30-39	.36	.51	.13	1.2	1.1
	40+	.37	.50	.13	1.2	1.2

Table A2 Results of one-year courses in Education preparation (stream 2200) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16	.43	.41	.16	1.3	
	17	.34	.56	.10	1.4	1.2
	18	.32	.61	.07	1.5	1.3
	19	.31	.63	.06	1.5	1.3
	20-24	.27	.66	.07	1.4	1.2
	25-29	.29	.61	.10	1.2	
	30-39	.33	.59	.07	1.2	1.1
	40+	.34	.58	.08	1.2	1.1
Female	16	.40	.39	.21	1.2	1.2
	17	.32	.53	.15	1.2	1.1
	18	.30	.60	.10	1.2	
	19	.29	.61	.10	1.2	1.1
	20-24	.29	.61	.10	1.2	1.1
	25-29	.29	.59	.11	1.2	1.1
	30-39	.36	.54	.10	1.2	1.1
	40+	.36	.55	.09	1.2	1.1

Table A3 Results of one-year Initial vocational courses—operatives (stream 3100) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16	.23	.39	.38	1.6	1.2
	17	.27	.34	.40	1.1	1.1
	18	.38	.29	.32	1.0	1.1
	19	.38	.30	.32	1.1	
	20-24	.42	.36	.22	1.1	1.1
	25-29	.44	.39	.16	1.1	1.1
	30-39	.49	.36	.14	1.1	1.1
	40+	.50	.38	.13	1.3	1.2
Female	16	.19	.48	.33	1.5	
	17	.27	.42	.30	1.1	1.0
	18	.46	.28	.26	1.0	1.0
	19	.46	.30	.24	1.0	1.0
	20-24	.45	.35	.20	1.1	
	25-29	.48	.37	.14	1.1	
	30-39	.52	.36	.12	1.1	1.2
	40+	.50	.39	.12	1.3	1.3

Table A4 Results of one-year Courses which grant partial exemption to recognised trade courses (stream 3211) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16	.21	.40	.39	1.6	1.3
	17	.25	.36	.38	1.1	1.1
	18	.35	.30	.35	1.1	1.1
	19	.48	.24	.29	1.0	1.1
	20-24	.69	.16	.15		1.1
	25-29	.79	.10	.10		1.1
	30-39	.81	.09	.10		
	40+					
Female	16					
	17					
	18	.46	.20	.34	1.1	1.2
	19					
	20-24					
	25-29					
	30-39					
	40+					

Table A5 Results of one-year Complete trade courses (stream 3212) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16	.21	.56	.23	3.7	10.6
	17	.26	.53	.21	3.6	17.6
	18	.29	.54	.17	3.6	9.2
	19	.28	.58	.14	3.4	4.8
	20-24	.22	.65	.14	3.3	4.4
	25-29	.14	.72	.13	3.5	1.9
	30-39	.10	.73	.17	3.5	1.5
	40+	.11	.70	.19	3.6	
Female	16	.24	.67	.09	2.8	
	17	.30	.66	.04	2.7	
	18	.22	.74	.04	2.3	
	19	.22	.75	.03	2.6	1.9
	20-24	.28	.69	.03	2.4	
	25-29	.20	.60	.20	2.9	
	30-39	.15	.74	.10	2.7	
	40+ *					

Table A6 Results of one-year Courses which grant partial exemption to other skills courses (stream 3221) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16	.05	.48	.47	3.6	
	17	.09	.46	.45	1.5	
	18	.14	.48	.38	2.1	
	19	.17	.48	.35	1.3	1.1
	20-24	.13	.57	.30	1.9	1.1
	25-29	.10	.64	.26	2.1	1.1
	30-39	.10	.66	.24	2.3	1.2
	40+	.11	.67	.21	1.9	1.1
Female	16	.10	.53	.37	2.2	
	17	.16	.48	.36	1.6	1.2
	18	.23	.40	.37	1.4	1.2
	19	.21	.44	.35	1.4	1.2
	20-24	.19	.50	.31	2.1	1.2
	25-29	.15	.57	.28	2.7	1.2
	30-39	.14	.65	.22	3.5	1.3
	40+	.12	.68	.20	2.9	1.3

Table A7 Results of one-year Complete other skills courses (stream 3222) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16	.18	.50	.31	1.6	
	17	.28	.37	.35	1.3	
	18	.26	.34	.40	1.4	1.3
	19	.24	.39	.37	1.5	1.3
	20-24	.22	.45	.33	1.8	1.3
	25-29	.21	.53	.27	2.0	1.3
	30-39	.21	.56	.22	2.0	1.4
	40+	.21	.57	.22	2.0	1.3
Female	16	.22	.47	.31	1.5	1.2
	17	.28	.40	.32	1.3	1.2
	18	.37	.34	.29	1.2	1.2
	19	.36	.35	.29	1.2	1.2
	20-24	.27	.43	.30	1.3	1.2
	25-29	.23	.51	.26	1.6	1.2
	30-39	.23	.56	.21	1.7	1.2
	40+	.19	.58	.23	1.9	1.3

Table A8 Results of one-year Trade technician/trade supervisory courses (stream 3300) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16					
	17	.09	.45	.47	1.6	
	18	.20	.23	.57	1.9	2.4
	19	.15	.33	.52	2.4	1.9
	20-24	.13	.45	.42	2.5	1.7
	25-29	.12	.58	.30	3.0	1.6
	30-39	.12	.62	.27	2.8	1.4
	40+	.10	.68	.22	3.5	1.5
Female	16					
	17	.17	.43	.40	1.3	1.2
	18	.24	.36	.40	1.4	1.6
	19	.21	.39	.41	1.8	1.7
	20-24	.17	.50	.33	2.3	1.5
	25-29	.13	.61	.26	2.8	1.5
	30-39	.15	.63	.21	2.5	1.4
	40+	.14	.69	.17	2.7	1.4

Table A9 Results of one-year Para-professional/higher technician courses (stream 3500) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16					
	17	.12	.49	.39	3.1	
	18	.07	.31	.62	2.9	
	19	.16	.27	.56	3.0	
	20-24	.07	.42	.51	4.3	3.0
	25-29	.06	.53	.41	5.7	
	30-39	.10	.56	.34	3.8	
	40+	.09	.60	.31	4.1	1.8
Female	16 *					
	17	.06	.44	.50		
	18	.14	.37	.48	2.7	
	19	.19	.36	.45	3.2	3.2
	20-24	.12	.46	.42	3.9	3.5
	25-29	.09	.56	.35	4.9	
	30-39	.10	.55	.35	4.4	2.2
	40+	.10	.61	.29	5.1	1.9

Table A10 Results of one-year Professional courses (stream 3600) by age and sex

		Probability of course outcome			Mean time to course outcome	
Sex	Age	Completion	Partial Completion	Non-completion	Completion	Partial Completion
Male	16					
	17					
	18					
	19					
	20-24	.58	.40	.03	1.4	
	25-29					
	30-39	.59	.41	.00	1.4	
	40+					
Female	16					
	17					
	18					
	19					
	20-24 *					
	25-29 *					
	30-39 *					
	40+					

Table A11 Results of one-year Courses subsequent to an initial vocational course—at a skilled level (stream 4200) by age and sex

		Probability of course outcome			Mean time to course outcome	
Sex	Age	Completion	Partial Completion	Non-completion	Completion	Partial Completion
Male	16	.30	.65	.05		
	17					
	18	.60	.31	.09		1.1
	19	.57	.31	.12	1.2	
	20-24	.60	.30	.10	1.2	1.3
	25-29	.65	.28	.07	1.2	1.3
	30-39	.67	.27	.06	1.2	1.4
	40+	.68	.27	.05	1.2	1.4
Female	16					
	17					
	18					
	19					
	20-24	.61	.32	.07		
	25-29					
	30-39					
	40+	.70	.26	.04	1.0	

Table A12 Results of one-year Courses subsequent to an initial vocational course—at a trade level (stream 4300) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16					
	17					
	18					
	19	.18	.58	.24		
	20-24	.26	.53	.21	1.3	1.2
	25-29	.31	.54	.15	1.3	1.2
	30-39	.33	.52	.15	1.3	1.2
	40+	.31	.57	.12	1.3	1.2
Female	16 *					
	17					
	18					
	19					
	20-24					
	25-29					
	30-39	.52	.36	.12	1.1	
	40+	.44	.46	.10	1.1	

A.2 Two-year courses

Results for the following streams are unavailable:

- Courses which grant partial exemption to other skills courses (stream 3221); and
- Professional courses (stream 3600).

Table A13 Results of two-year courses in Basic education and employment skills (stream 2100) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16					
	17					
	18					
	19					
	20-24	.01	.64	.35		
	25-29	.02	.71	.26		
	30-39	.02	.82	.17	2.7	
	40+					
Female	16					
	17	.09	.53	.38		
	18					
	19					
	20-24	.01	.75	.25		
	25-29	.05	.73	.22	5.0	
	30-39	.03	.77	.21	2.5	
	40+	.04	.81	.15		

Table A14 Results of two-year courses in Education preparation (stream 2200) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16	.07	.20	.73		
	17					
	18					
	19					
	20-24					
	25-29					
	30-39					
	40+					
Female	16 *					
	17					
	18					
	19					
	20-24 *					
	25-29 *					
	30-39					
	40+ *					

Table A15 Results of two-year Initial vocational courses—operatives (stream 3100) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16					
	17	.03	.69	.28	2.5	
	18	.06	.59	.35		
	19					
	20-24	.06	.73	.21	2.4	
	25-29	.06	.81	.13	2.1	1.1
	30-39	.06	.79	.14	2.4	
	40+	.04	.83	.13	2.1	1.1
Female	16					
	17					
	18					
	19	.06	.66	.28		
	20-24	.03	.70	.26	2.7	
	25-29	.03	.77	.19	2.8	1.1
	30-39	.06	.75	.19	2.4	1.2
	40+	.08	.73	.19	2.2	

Table A16 Results of two-year Courses which grant partial exemption to recognised trade courses (stream 3211) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16					
	17					
	18					
	19					
	20-24					
	25-29					
	30-39					
	40+					
Female	16	.02	.69	.29		
	17					
	18					
	19					
	20-24 *					
	25-29					
	30-39					
	40+					

Table A17 Results of two-year Complete trade courses (stream 3212) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16	.28	.52	.20	3.6	16.9
	17	.35	.48	.17	3.8	29.0
	18	.33	.53	.14	3.9	14.2
	19	.26	.59	.15	3.9	18.4
	20-24	.17	.67	.16	3.9	5.4
	25-29	.18	.65	.17	3.9	
	30-39	.12	.71	.17	3.7	2.9
	40+	.06	.78	.16	4.0	
Female	16	.15	.80	.05	2.9	
	17	.22	.67	.11	3.1	
	18	.21	.69	.10	3.3	7.3
	19	.16	.72	.13	3.5	
	20-24	.15	.74	.11	3.4	3.5
	25-29	.13	.68	.20	2.9	
	30-39	.10	.71	.19	3.4	
	40+	.12	.61	.27	2.6	

Table A18 Results of two-year Complete other skills courses (stream 3222) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16					
	17	.00	.39	.61		
	18	.09	.45	.46	2.6	
	19	.07	.66	.28	3.6	
	20-24	.08	.58	.34	2.8	1.5
	25-29	.09	.66	.25	3.2	1.6
	30-39	.10	.72	.18	3.1	1.9
	40+	.08	.74	.18	3.5	1.5
Female	16 *					
	17					
	18					
	19					
	20-24	.04	.62	.34	3.6	1.2
	25-29	.07	.65	.28	3.6	1.5
	30-39	.09	.72	.19	3.0	
	40+	.09	.72	.18	3.4	1.6

Table A19 Results of two-year Trade technician/trade supervisory courses (stream 3300) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16					
	17	.09	.35	.56	3.1	2.1
	18	.06	.38	.56	3.1	1.8
	19	.06	.38	.56	4.0	2.2
	20-24	.06	.52	.42	4.1	1.9
	25-29	.06	.59	.35	4.1	
	30-39	.06	.64	.30	4.4	2.0
	40+	.04	.71	.25	6.0	1.7
Female	16 *					
	17	.12	.36	.52		
	18	.09	.40	.52	3.2	
	19	.05	.48	.47	4.6	1.8
	20-24	.07	.52	.41	3.9	2.3
	25-29	.08	.58	.34	4.4	
	30-39	.07	.69	.23	4.5	2.0
	40+	.06	.73	.21	5.1	

Table A20 Results of two-year Para-professional/technician courses (stream 3400) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16					
	17					
	18					
	19					
	20-24	.04	.30	.66	5.8	
	25-29	.02	.43	.55		1.9
	30-39					
	40+					
Female	16					
	17	.08	.27	.64	8.6	5.0
	18	.10	.30	.60	4.5	4.1
	19					
	20-24	.03	.45	.52	8.2	
	25-29	.00	.53	.47		1.9
	30-39	.03	.66	.32	6.1	1.8
	40+	.05	.59	.37	7.9	

Table A21 Results of two-year Para-professional/higher technician courses (stream 3500) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16					
	17	.08	.24	.68	4.7	5.3
	18	.10	.27	.63	3.9	5.2
	19	.08	.31	.61	4.6	4.3
	20-24	.06	.41	.53	4.9	3.3
	25-29	.06	.52	.42	5.6	2.6
	30-39	.05	.58	.37	6.1	2.5
	40+	.03	.61	.36	6.4	2.2
Female	16					
	17	.08	.31	.61	3.8	3.3
	18	.11	.34	.55	3.2	2.8
	19	.09	.42	.50	3.6	2.4
	20-24	.06	.50	.44	4.4	2.1
	25-29	.04	.61	.35	5.3	2.0
	30-39	.04	.65	.31	6.1	2.1
	40+	.04	.66	.30	6.4	2.1

Table A22 Results of two-year Courses subsequent to an initial vocational course—at an operative level (stream 4100) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16					
	17					
	18					
	19					
	20-24	.03	.83	.14		1.1
	25-29	.03	.81	.16		
	30-39	.04	.93	.04	2.7	
	40+	.04	.94	.02	1.7	
Female	16					
	17					
	18					
	19					
	20-24					
	25-29	.23	.54	.23	2.9	
	30-39	.16	.67	.17	3.8	
	40+ *					

Table A23 Results of two-year Courses subsequent to an initial vocational course—at a skilled level (stream 4200) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16					
	17					
	18					
	19	.04	.85	.11	3.4	
	20-24					
	25-29	.05	.77	.18		
	30-39	.06	.81	.13	2.1	
	40+	.03	.82	.14	1.8	
Female	16					
	17					
	18					
	19					
	20-24					
	25-29					
	30-39					
	40+					

A.3 Three-year courses

Results for Courses which grant partial exemption to other skills courses (stream 3211) are unavailable.

Table A24 Results of three-year courses in Basic education and employment skills (stream 2100) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16					
	17					
	18					
	19					
	20-24					
	25-29					
	30-39					
	40+					
Female	16 *					
	17 *					
	18 *					
	19 *					
	20-24					
	25-29					
	30-39	.04	.81	.14	6.6	
	40+	.05	.86	.09	9.4	

Table A25 Results of three-year Initial vocational courses—operatives (stream 3100) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16					
	17					
	18					
	19					
	20-24					
	25-29					
	30-39	.06	.62	.32	3.2	
	40+					
Female	16					
	17					
	18					
	19					
	20-24					
	25-29					
	30-39					
	40+					

Table A26 Results of three-year Complete trade courses (stream 3212) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16	.30	.48	.22	4.0	
	17	.36	.49	.15	3.9	18.4
	18	.24	.61	.15	3.8	12.3
	19	.19	.66	.16	4.0	
	20-24	.15	.68	.17	3.8	6.0
	25-29	.13	.64	.23	3.9	4.3
	30-39	.10	.72	.18	3.6	2.1
	40+	.07	.78	.15	5.0	
Female	16	.48	.45	.07	9.6	
	17	.26	.68	.06	5.0	6.3
	18	.23	.64	.13	4.3	
	19	.20	.76	.04	4.0	
	20-24	.21	.68	.11	4.1	5.2
	25-29					
	30-39	.05	.81	.14	3.0	
	40+					

Table A27 Results of three-year Complete other skills courses (stream 3222) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16					
	17					
	18					
	19					
	20-24					
	25-29	.08	.52	.40	4.7	
	30-39	.18	.46	.36	4.6	
	40+	.12	.58	.30	5.4	
Female	16					
	17	.07	.82	.11	3.7	
	18	.17	.59	.24	3.7	
	19	.28	.51	.21		
	20-24	.13	.64	.23	3.7	2.3
	25-29	.14	.63	.23	4.0	
	30-39	.08	.75	.17	4.6	1.9
	40+	.10	.69	.21	4.2	1.9

Table A28 Results of three-year Trade technician/trade supervisory courses (stream 3300) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16					
	17					
	18					
	19	.02	.65	.34	3.5	
	20-24	.02	.66	.32	6.3	
	25-29	.05	.69	.26	7.7	
	30-39	.08	.63	.29	4.0	1.9
	40+	.17	.58	.25	2.7	
Female	16					
	17					
	18 *	.00	.17	.83		
	19					
	20-24	.03	.65	.32		1.2
	25-29					
	30-39	.14	.67	.19	7.3	
	40+	.11	.62	.28	4.1	

Table A29 Results of three-year Para-professional/technician courses (stream 3400) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16					
	17					
	18					
	19					
	20-24					
	25-29					
	30-39	.15	.44	.41	6.5	
	40+	.10	.53	.37	5.9	
Female	16					
	17 *					
	18	.20	.57	.23	7.1	
	19 *					
	20-24					
	25-29 *					
	30-39	.14	.59	.27	5.9	
	40+					

Table A30 Results of three-year Para-professional/higher technician courses (stream 3500) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16					
	17	.27	.15	.58	4.3	
	18	.16	.21	.63	5.4	
	19	.16	.33	.51	7.3	
	20-24	.07	.54	.39	7.7	4.2
	25-29	.09	.67	.24	7.6	4.8
	30-39	.05	.71	.24	10.7	
	40+	.02	.78	.21	12.0	2.7
Female	16 *					
	17	.24	.38	.38		
	18					
	19	.14	.43	.43	4.2	
	20-24	.12	.57	.31	7.6	
	25-29	.11	.70	.19	7.1	
	30-39	.14	.63	.23	8.1	
	40+	.22	.52	.26	12.2	

Table A31 Results of three-year Professional courses (stream 3600) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16					
	17	.15	.27	.58	5.8	
	18	.40	.32	.28	4.3	
	19	.20	.40	.40	4.9	
	20-24	.15	.47	.38	4.5	
	25-29					
	30-39	.12	.48	.40	3.3	
	40+	.16	.63	.22	6.1	
Female	16					
	17	.38	.41	.21	6.0	
	18	.35	.36	.29	4.3	
	19	.16	.53	.32	5.8	
	20-24	.10	.49	.41	5.8	
	25-29	.10	.57	.32	6.3	
	30-39					
	40+	.15	.66	.19	6.2	

Table A32 Results of three-year Courses subsequent to an initial vocational course—at a skilled level (stream 4200) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16					
	17					
	18					
	19					
	20-24					
	25-29	.04	.89	.07		
	30-39	.08	.80	.13	3.6	
	40+	.20	.56	.24	2.0	
Female	16					
	17					
	18					
	19					
	20-24					
	25-29					
	30-39					
	40+					

Table A33 Results of three-year Courses subsequent to an initial vocational course—at a trade level (stream 4300) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16					
	17					
	18					
	19					
	20-24					
	25-29					
	30-39					
	40+	.06	.89	.06		
Female	16					
	17					
	18 *					
	19					
	20-24 *					
	25-29 *					
	30-39 *					
	40+ *					

Appendix B—Fields of study

This appendix contains results of modelling student flows through TAFE courses organised by fields of study. A blank cell indicates the estimate could not be obtained because of deficiency in, or non-existence of, appropriate data. An asterisk (*) next to the age label indicates the results for that age group should be interpreted with caution because the model from which the results were obtained was estimated with data for less than 25 students.

B.1 One-year courses

Results for Veterinary science and animal care (field 10) are unavailable.

Table B1 Results of one-year courses in Land and marine resources and animal husbandry (field 01) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16	.22	.44	.33	1.6	
	17	.24	.36	.40	1.5	
	18	.31	.34	.35	1.4	
	19	.33	.31	.36	1.3	
	20-24	.30	.40	.30	1.3	
	25-29	.29	.50	.21	1.4	1.2
	30-39	.29	.52	.19	1.6	1.2
	40+	.30	.58	.12	1.4	1.1
Female	16	.20	.50	.30		1.2
	17	.23	.38	.39		
	18	.33	.37	.30	1.4	
	19	.37	.38	.25	1.1	1.1
	20-24	.32	.46	.23	1.3	
	25-29	.27	.56	.17	1.7	1.3
	30-39	.25	.57	.18	1.9	1.3
	40+	.21	.67	.11	2.4	1.2

Table B2 Results of one-year courses in Architecture and building (field 02) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16	.27	.48	.25	2.4	4.0
	17	.30	.48	.22	2.3	2.9
	18	.35	.48	.16	2.5	4.1
	19	.30	.53	.17	2.7	2.9
	20-24	.30	.57	.14	2.0	1.8
	25-29	.32	.57	.12	1.6	1.3
	30-39	.35	.54	.11	1.5	1.3
	40+	.36	.55	.09	1.6	1.4
Female	16					
	17					
	18					
	19	.44	.35	.21		1.3
	20-24	.33	.50	.18	1.2	
	25-29	.34	.48	.18	1.2	
	30-39					
	40+					

Table B3 Results of one-year courses in Arts, humanities and social sciences (field 03) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16	.06	.53	.42	3.6	1.4
	17	.10	.47	.42	1.7	
	18	.26	.30	.44	1.3	
	19	.31	.27	.42	1.4	1.3
	20-24	.32	.31	.37	1.2	1.2
	25-29	.30	.39	.30	1.7	1.4
	30-39	.34	.44	.22	1.5	1.3
	40+	.34	.48	.19	1.8	1.5
Female	16	.05	.63	.32	2.5	1.2
	17	.13	.54	.33	1.5	1.1
	18	.35	.31	.34	1.1	
	19	.38	.33	.30	1.1	1.1
	20-24	.32	.39	.29	1.3	1.2
	25-29	.31	.47	.21	1.4	
	30-39	.33	.52	.15	1.4	1.2
	40+	.33	.54	.13	1.5	1.5

Table B4 Results of one-year courses in Business, administration and economics by age and sex (field 04) by age and sex

		Probability of course outcome			Mean time to course outcome	
Sex	Age	Completion	Partial Completion	Non-completion	Completion	Partial Completion
Male	16	.07	.51	.42		
	17	.11	.43	.46		
	18	.21	.33	.45	1.4	1.4
	19	.21	.35	.43	1.5	1.4
	20-24	.25	.42	.33	1.4	1.4
	25-29	.31	.48	.22	1.4	1.2
	30-39	.33	.49	.18	1.5	1.2
	40+	.34	.51	.15	1.5	1.2
Female	16	.21	.47	.33	1.2	1.1
	17	.26	.41	.33	1.1	1.1
	18	.30	.38	.32	1.2	1.3
	19	.31	.39	.30	1.3	1.4
	20-24	.28	.46	.26	1.4	1.2
	25-29	.30	.49	.21	1.4	1.2
	30-39	.30	.52	.18	1.5	1.2
	40+	.29	.54	.17	1.6	1.2

Table B5 Results of one-year courses in Education (field 05) by age and sex

		Probability of course outcome			Mean time to course outcome	
Sex	Age	Completion	Partial Completion	Non-completion	Completion	Partial Completion
Male	16					
	17					
	18					
	19					
	20-24					
	25-29					
	30-39	.87	.06	.07		1.2
	40+	.83	.07	.11	1.1	
Female	16					
	17					
	18					
	19					
	20-24	.75	.06	.18		
	25-29	.72	.07	.21	1.1	
	30-39	.74	.11	.16	1.1	1.5
	40+	.68	.13	.19	1.1	1.7

Table B6 Results of one-year courses in Engineering and surveying (field 06) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16	.32	.41	.28	1.8	2.4
	17	.32	.40	.28	2.0	4.4
	18	.32	.42	.26	2.1	4.3
	19	.34	.43	.23	2.0	3.1
	20-24	.41	.40	.19	1.5	1.6
	25-29	.44	.39	.16	1.3	1.3
	30-39	.46	.39	.15	1.3	1.3
	40+	.49	.37	.15	1.3	1.3
Female	16					
	17	.21	.44	.35	1.5	
	18	.22	.43	.36		
	19	.28	.39	.32	2.4	
	20-24	.27	.49	.25	1.9	1.4
	25-29	.25	.52	.22	2.8	1.3
	30-39	.22	.56	.21	3.1	1.5
	40+	.18	.62	.20	3.4	1.5

Table B7 Results of one-year courses in Health and community services (field 07) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16					
	17					
	18	.47	.20	.33		
	19	.37	.32	.31		
	20-24	.40	.32	.28	1.2	1.2
	25-29	.43	.32	.25	1.3	
	30-39	.52	.28	.19	1.2	1.3
	40+	.59	.27	.15	1.1	1.3
Female	16	.26	.48	.26	1.9	
	17	.30	.43	.27	1.6	1.3
	18	.43	.30	.27	1.2	1.2
	19	.42	.31	.27	1.3	1.3
	20-24	.39	.39	.23	1.4	1.3
	25-29	.39	.42	.19	1.7	1.4
	30-39	.43	.44	.13	1.7	1.4
	40+	.44	.45	.11	1.5	1.4

Table B8 Results of one-year courses in Law and legal studies (field 08) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16					
	17 *	.11	.41	.48	3.6	
	18	.11	.27	.62		
	19	.17	.35	.48	3.4	
	20-24	.16	.50	.33	4.7	
	25-29					
	30-39					
	40+					
Female	16					
	17	.18	.33	.49		
	18	.22	.35	.43	3.0	
	19	.36	.36	.28	2.9	
	20-24	.15	.51	.34	4.3	
	25-29					
	30-39					
	40+					

Table B9 Results of one-year courses in Science (field 09) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16					
	17	.37	.22	.41		
	18	.35	.16	.49	1.4	2.0
	19	.37	.23	.40	1.6	
	20-24	.44	.24	.31	1.2	
	25-29	.52	.28	.20	1.3	
	30-39	.55	.25	.19	1.1	1.3
	40+	.57	.27	.16	1.1	1.2
Female	16					
	17					
	18	.51	.17	.33		2.2
	19	.50	.22	.28		
	20-24	.55	.24	.21	1.2	1.3
	25-29	.56	.27	.17	1.2	
	30-39	.62	.26	.12	1.1	1.1
	40+	.61	.26	.13	1.1	

Table B10 Results of one-year courses in Services, hospitality and transportation (field 11) by age and sex

3

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16	.22	.37	.41	2.0	1.4
	17	.22	.37	.42	1.5	1.2
	18	.34	.26	.39	1.3	1.4
	19	.35	.28	.37	1.4	1.5
	20-24	.40	.32	.28	1.2	1.3
	25-29	.56	.29	.16	1.1	1.1
	30-39	.62	.27	.11	1.1	1.1
	40+	.63	.28	.09	1.1	
Female	16	.14	.48	.38	2.3	
	17	.21	.45	.34	1.5	1.2
	18	.38	.29	.33	1.2	1.3
	19	.34	.33	.33	1.4	1.4
	20-24	.32	.38	.30	1.5	1.4
	25-29	.35	.45	.20	1.3	1.2
	30-39	.37	.47	.16	1.2	1.2
	40+	.34	.50	.16	1.1	1.1

Table B11 Results of one-year courses in TAFE multi-field (field 12) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16	.21	.48	.31	1.6	
	17	.26	.48	.25	1.2	1.1
	18	.31	.51	.18	1.3	1.2
	19	.33	.54	.13	1.3	1.2
	20-24	.29	.57	.14	1.3	1.2
	25-29	.28	.57	.16	1.2	1.1
	30-39	.30	.56	.14	1.2	1.1
	40+	.31	.56	.13	1.4	1.2
Female	16	.24	.55	.21	1.2	1.1
	17	.25	.58	.17	1.2	1.1
	18	.27	.59	.14	1.2	1.1
	19	.30	.58	.13	1.1	1.1
	20-24	.29	.57	.14	1.2	1.1
	25-29	.31	.56	.13	1.2	1.1
	30-39	.34	.54	.12	1.2	1.1
	40+	.34	.54	.12	1.3	1.2

B.2 Two-year courses

Table B12 Results of two-year courses in Land and marine resources and animal husbandry (field 01) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16					
	17	.16	.42	.43	4.5	
	18	.18	.42	.40	3.4	3.5
	19					
	20-24	.10	.55	.35	3.6	
	25-29	.07	.66	.27	7.3	
	30-39	.06	.67	.26	4.4	2.0
	40+	.02	.81	.17		1.4
Female	16 *					
	17	.16	.55	.30	4.6	
	18	.16	.48	.35	2.9	
	19	.22	.44	.34	4.7	
	20-24	.04	.63	.33	5.9	1.9
	25-29					
	30-39	.04	.82	.14	3.7	
	40+	.03	.82	.15	3.8	1.3

Table B13 Results of two-year courses in Architecture and building (field 02) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16	.33	.53	.14	3.6	6.4
	17	.31	.49	.20	3.9	8.6
	18	.28	.48	.24	3.7	9.9
	19	.24	.52	.24	3.7	7.4
	20-24	.17	.58	.25	4.0	4.9
	25-29	.13	.54	.33	4.0	
	30-39	.09	.62	.29	4.2	2.8
	40+	.04	.70	.26	6.0	
Female	16 *					
	17	.16	.40	.44		
	18	.20	.38	.42	2.9	
	19	.15	.41	.45	3.1	
	20-24	.09	.47	.43	3.7	
	25-29	.07	.58	.35	4.2	
	30-39	.13	.60	.27	4.4	2.3
	40+	.11	.60	.29	4.1	

Table B14 Results of two-year courses in Arts, humanities and social sciences (field 03) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16					
	17	.05	.62	.33	2.3	
	18	.09	.44	.47	2.2	
	19	.06	.49	.45	2.2	
	20-24	.06	.51	.43	2.8	1.4
	25-29	.08	.57	.35	3.0	1.5
	30-39	.08	.62	.30	3.6	
	40+	.09	.65	.26	4.4	
Female	16					
	17	.07	.63	.30	2.7	1.5
	18	.12	.53	.35	2.5	1.6
	19	.10	.60	.30	2.6	1.5
	20-24	.09	.55	.36	3.1	2.1
	25-29	.10	.61	.30	3.9	2.7
	30-39	.10	.67	.23	4.2	2.7
	40+	.11	.69	.20	4.3	2.7

Table B15 Results of two-year courses in Business, administration and economics (field 04) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16					
	17	.09	.24	.68	4.5	
	18	.09	.24	.67	3.9	5.2
	19	.07	.30	.64	4.6	6.8
	20-24	.05	.43	.52	4.7	2.5
	25-29	.04	.56	.40	5.6	2.1
	30-39	.04	.63	.33	6.1	2.3
	40+	.03	.64	.33	6.1	
Female	16					
	17	.08	.26	.66	4.4	
	18	.09	.28	.63	3.6	5.3
	19	.05	.37	.58	4.1	3.1
	20-24	.03	.50	.47	4.9	2.0
	25-29	.04	.61	.35	5.8	2.0
	30-39	.03	.65	.32	6.5	2.1
	40+	.03	.66	.31	6.3	2.0

Table B16 Results of two-year courses in Education (field 05) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16					
	17 *	.13	.25	.63		
	18 *					
	19 *					
	20-24	.03	.58	.39		1.5
	25-29 *	.14	.57	.29		
	30-39	.09	.67	.24		2.5
	40+					
Female	16 *					
	17	.12	.46	.43		2.3
	18	.10	.50	.40	5.7	2.4
	19	.06	.54	.41	6.3	2.5
	20-24	.03	.61	.36	7.5	2.0
	25-29	.03	.61	.36	7.5	2.2
	30-39	.02	.70	.28	12.9	2.3
	40+	.04	.71	.25	11.1	2.6

Table B17 Results of two-year courses in Engineering and surveying (field 06) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16	.25	.50	.25	3.8	
	17	.32	.41	.26	3.8	14.8
	18	.24	.41	.35	4.0	10.0
	19	.19	.50	.31	4.1	7.0
	20-24	.12	.58	.30	4.2	4.3
	25-29	.09	.61	.29	4.4	2.5
	30-39	.09	.67	.24	4.4	2.1
	40+	.05	.74	.21	4.9	1.5
Female	16 *					
	17	.14	.56	.31		
	18	.09	.36	.55	3.7	2.4
	19	.13	.48	.39	3.1	2.2
	20-24	.10	.51	.40	4.5	3.4
	25-29	.06	.64	.30	3.2	
	30-39	.07	.65	.28	5.8	
	40+	.05	.70	.25	5.7	

Table B18 Results of two-year courses in Health and community services (field 07) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16					
	17 *					
	18	.09	.59	.33	2.8	
	19	.03	.46	.51		
	20-24	.11	.60	.29	2.6	1.5
	25-29	.07	.54	.39		1.4
	30-39	.07	.59	.34	2.9	1.4
	40+	.11	.54	.35	2.4	1.5
Female	16					
	17	.02	.80	.18	3.4	1.2
	18	.21	.47	.32	2.6	1.8
	19	.14	.50	.36	2.8	1.9
	20-24	.10	.62	.28	2.8	1.5
	25-29	.06	.73	.21	3.6	1.4
	30-39	.10	.67	.23	2.9	1.4
	40+	.09	.70	.20	2.9	1.4

Table B19 Results of two-year courses in Law and legal studies (field 08) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16					
	17					
	18 *					
	19					
	20-24 *					
	25-29 *					
	30-39					
	40+ *	.19	.56	.25	6.1	
Female	16					
	17					
	18	.29	.13	.58	5.6	
	19	.25	.14	.60	3.3	
	20-24	.18	.42	.39	4.2	2.5
	25-29	.13	.41	.46	4.4	
	30-39	.15	.40	.45	8.3	
	40+					

Table B20 Results of two-year courses in Science (field 09) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16					
	17	.08	.30	.62	3.9	2.6
	18	.09	.24	.67	4.4	
	19	.05	.28	.67	4.9	3.9
	20-24	.04	.40	.56	4.7	2.5
	25-29	.04	.52	.45	3.1	
	30-39	.03	.59	.38	3.9	1.4
	40+	.03	.61	.36	3.7	1.2
Female	16 *					
	17	.16	.27	.57	5.0	
	18	.15	.29	.56	4.3	
	19	.12	.33	.55	3.8	3.4
	20-24	.07	.45	.48	4.5	2.4
	25-29	.04	.60	.37	3.9	1.3
	30-39	.07	.70	.23	3.4	
	40+	.07	.66	.27	3.4	

Table B21 Results of two-year courses in Veterinary science and animal care (field 10) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16					
	17 *					
	18 *					
	19					
	20-24 *	.33	.17	.50		
	25-29					
	30-39 *					
	40+ *					
Female	16					
	17 *					
	18 *	.43	.43	.14		
	19 *	.68	.00	.32	3.1	
	20-24	.17	.44	.39	3.7	
	25-29	.25	.42	.33	3.0	
	30-39	.21	.46	.33	2.7	
	40+ *					

Table B22 Results of two-year courses in Services, hospitality and transportation (field 11) by age and sex

		Probability of course outcome			Mean time to course outcome	
Sex	Age	Completion	Partial completion	Non-completion	Completion	Partial Completion
Male	16	.18	.58	.24	3.0	
	17	.20	.52	.28	3.6	3.4
	18	.17	.57	.26	3.7	3.3
	19	.14	.58	.28	3.8	2.8
	20-24	.10	.63	.26	3.9	2.6
	25-29	.06	.59	.35	5.5	2.3
	30-39	.09	.55	.36	3.3	2.0
	40+	.05	.61	.34	4.4	
Female	16	.14	.82	.05	2.8	1.6
	17	.19	.62	.20	3.2	2.5
	18	.14	.60	.26	3.4	2.3
	19	.12	.63	.25	3.5	2.2
	20-24	.12	.64	.24	3.6	2.4
	25-29	.09	.61	.30	4.5	2.1
	30-39	.13	.61	.26	4.3	2.9
	40+	.12	.57	.31	3.7	2.0

Table B23 Results of two-year courses in TAFE multi-field (field 12) by age and sex

		Probability of course outcome			Mean time to course outcome	
Sex	Age	Completion	Partial Completion	Non-completion	Completion	Partial Completion
Male	16	.03	.54	.43		
	17	.00	.49	.51		
	18	.04	.52	.44		
	19					
	20-24					
	25-29					
	30-39	.01	.49	.49		
	40+	.03	.63	.33		
Female	16					
	17					
	18					
	19					
	20-24	.01	.57	.42		
	25-29	.07	.58	.36	4.4	
	30-39					
	40+					

B.3 Three-year courses

Results for Education (field 05) are unavailable.

Table B24 Results of three-year courses in Land and marine resources and animal husbandry (field 01) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16	.10	.48	.42	6.1	
	17	.19	.52	.29	5.4	
	18	.13	.47	.39	4.5	
	19	.20	.52	.28	4.1	
	20-24	.10	.56	.34	4.0	
	25-29	.05	.60	.36	6.2	
	30-39	.09	.68	.23	3.6	1.6
	40+	.09	.72	.19	4.3	
Female	16 *					
	17					
	18	.13	.50	.38	4.5	
	19	.21	.61	.19	4.1	
	20-24	.09	.67	.24	4.7	2.0
	25-29	.05	.84	.11	6.0	
	30-39	.06	.82	.13	4.6	1.6
	40+	.04	.81	.15	3.7	1.5

Table B25 Results of three-year courses in Architecture and building (field 02) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16	.34	.43	.23	3.7	
	17	.37	.45	.18	3.6	
	18	.25	.58	.17	3.6	6.0
	19	.15	.64	.21	4.0	
	20-24	.12	.67	.21	4.3	
	25-29	.09	.69	.22	5.7	
	30-39	.10	.70	.20	6.3	
	40+	.09	.74	.17	6.6	
Female	16					
	17 *					
	18					
	19 *					
	20-24					
	25-29	.03	.77	.20		
	30-39					
	40+					

Table B26 Results of three-year courses in Arts, humanities and social sciences (field 03) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16					
	17	.17	.24	.59	5.6	
	18	.39	.28	.33	4.4	
	19	.18	.38	.44	4.7	
	20-24	.16	.42	.42	5.1	
	25-29	.18	.47	.35	6.3	
	30-39	.09	.44	.47	5.3	
	40+	.13	.60	.26	7.8	4.0
Female	16					
	17	.41	.42	.16	6.6	
	18	.38	.33	.29	4.7	
	19	.21	.47	.33	6.0	
	20-24	.13	.47	.41	8.2	
	25-29	.14	.53	.33	6.2	
	30-39	.15	.59	.25	8.1	
	40+	.23	.51	.26	6.7	

Table B27 Results of three-year courses in Business, administration and economics (field 04) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16					
	17 *					
	18					
	19	.10	.30	.59	6.1	
	20-24	.02	.56	.42	6.4	1.8
	25-29					
	30-39	.06	.55	.39	7.1	2.8
	40+	.06	.57	.37	5.3	2.4
Female	16 *					
	17 *					
	18 *	.00	.26	.74		
	19					
	20-24	.01	.55	.44		1.5
	25-29					
	30-39	.11	.59	.30	6.9	
	40+	.09	.53	.38	5.3	

Table B28 Results of three-year courses in Engineering and surveying (field 06) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16	.31	.52	.18	4.2	
	17	.36	.50	.14	4.3	10.1
	18	.24	.58	.18	4.1	
	19	.16	.67	.17	4.6	
	20-24	.12	.67	.21	4.5	3.8
	25-29	.14	.59	.27	4.7	5.0
	30-39	.12	.63	.26	4.5	
	40+	.08	.66	.25	6.3	
Female	16					
	17	.13	.73	.14	4.7	
	18	.13	.71	.15	4.4	
	19	.12	.79	.09		
	20-24	.10	.68	.22	4.0	
	25-29 *					
	30-39	.03	.82	.15		
	40+ *					

Table B29 Results of three-year courses in Health and community services (field 07) by age and sex

		Probability of course outcome			Mean time to course outcome	
			Partial			Partial
Sex	Age	Completion	Completion	Non-completion	Completion	Completion
Male	16					
	17 *					
	18					
	19 *	.35	.47	.18		
	20-24	.10	.77	.12	5.9	
	25-29	.03	.89	.08	8.3	1.8
	30-39	.05	.86	.10	10.1	
	40+	.04	.86	.10	8.5	
Female	16					
	17 *					
	18	.17	.70	.14	7.2	
	19	.11	.70	.19	5.0	
	20-24	.12	.75	.13	4.8	2.4
	25-29					
	30-39	.08	.82	.11	5.3	1.9
	40+	.20	.60	.20	4.8	

Table B30 Results of two-year courses in Veterinary science and animal care (field 10) by age and sex

		Probability of course outcome			Mean time to course outcome	
Sex	Age	Completion	Partial Completion	Non-completion	Completion	Partial Completion
Male	16					
	17					
	18					
	19					
	20-24 *					
	25-29 *					
	30-39 *					
	40+					
Female	16 *					
	17 *	.40	.40	.20	3.5	
	18	.32	.40	.29	3.8	
	19	.38	.46	.15		
	20-24	.19	.57	.24	3.5	
	25-29					
	30-39	.12	.75	.13		
	40+ *					

Table B31 Results of three-year courses in Services, hospitality and transportation (field 11) by age and sex

		Probability of course outcome			Mean time to course outcome	
Sex	Age	Completion	Partial Completion	Non-completion	Completion	Partial Completion
Male	16					
	17					
	18					
	19					
	20-24					
	25-29					
	30-39					
	40+					
Female	16					
	17	.40	.40	.20	3.5	
	18	.32	.40	.29	3.8	
	19	.38	.46	.15		
	20-24	.19	.57	.24	3.5	
	25-29 *					
	30-39	.12	.75	.13		
	40+					

Table B32 Results of three-year courses in TAFE multi-field (field 12) by age and sex

		Probability of course outcome			Mean time to course outcome	
Sex	Age	Completion	Partial Completion	Non-completion	Completion	Partial Completion
Male	16					
	17					
	18					
	19					
	20-24					
	25-29					
	30-39					
	40+					
Female	16 *					
	17 *					
	18					
	19 *					
	20-24					
	25-29					
	30-39	.04	.80	.16	6.6	
	40+	.05	.85	.10	9.4	

Appendix C—The dataset

C.1 Limiting the scope of the study

In order to simplify what could easily become an unnecessarily complex process, the researchers have limited their analysis to a subset of the available data.

First, only data from one major VET provider in each State or Territory has been included in the analysis. These are what are generally thought of as TAFE providers. The reason for doing this is to minimise differences in treatment so as to be able to focus on the key variables.

Second, data relating to 'stream 1000'—described in the AVETMISS system as 'Recreational and leisure courses'—have not been included in the analysis. Most of these courses are single-module courses, and progress through a course is there replaced by the notion of progress through a single module.

Third, other broad exclusions have been carried out as documented in the next section.

C.2 Data winnowing procedures

The following describes in detail the data-editing that took place in preparation for the conduct of this research. The steps described are applied to the whole dataset for the eight major VET providers in Australia. As a result, some students and their performances are excluded from the study; while the reasons for exclusion are related to the integrity of the study, it should be noted that while most exclusions will be unbiased, some may introduce bias. At the end of the section describing phase 1, the implied exclusions and their possible impact are discussed.

Phase 1: Reducing the dataset

Reduce the dataset for 1994 to those activities in which a student commenced a course in that year. [2]

Reduce the dataset for 1994 further by excluding all cases in which the sex of the student is not recorded unambiguously (e.g. by being omitted).

Reduce the dataset for 1994 further by excluding all cases in which the student's birthdate is not recorded unambiguously (explicitly, this means, for example, excluding those cases in which the student recorded the current year as the year of birth).

Reduce the dataset for 1994 further by excluding all cases in which the student's course cannot be unambiguously identified.

Reduce the dataset for 1994 by removing all activity associated with stream 1000

Reduce the dataset for 1994 by removing all activity associated with courses whose length is given as 0 hours or 1 hour.[3]

[2] Not all students commencing a course in 1994 will be identified in this way because of human error in the training organisations (or elsewhere) in recognising that a student has commenced a course.

[3] A course will be given these lengths by a training organisation only as a dummy value until an approved length is obtained. Sometimes these dummy values find their way into AVETMISS files.

Reduce the dataset for 1994 by removing all activity associated with courses whose length is given as more than 3000 hours. [4]
Reduce the dataset for 1994 by removing all activity associated with single-module courses.
Reduce the dataset for 1994 by removing courses for which there is no enrolment.
Reduce the dataset for 1994 by removing courses for which the average enrolled hours is more than double the average course length. [5]
For 1995 and 1996, ensure that courses continue to operate as in 1994 by restricting course hours to those operating in 1994.
Remove all activity by students younger than 16 in 1994.

Summary of inclusions after the above reductions
Activity is included only for:

students who
were identified as having commenced a course in 1994,
were over 15 and
consistently and completely reported date of birth and sex;

and for courses which
were not stream 1000,
had a reported length greater than 1 hour but not more than 3000 hours,
were enrolled in by students for no more than double the claimed length in hours, and
consisted of more than one module.

Other exclusions
The methodology used above (and further editing below) entails exclusions which may not be immediately obvious. These are:
When the methodology excludes 'all cases in which the sex of the student is not recorded unambiguously (e.g. by being omitted)' or 'all cases in which the student's birthdate is not recorded unambiguously' it may exclude students whose performance is below average; the available anecdotal evidence is that students who fail to provide data are less successful.
When the methodology excludes 'all cases in which the student's course cannot be unambiguously identified' it may introduce a bias against successful students who transfer between courses and received credit for their earlier studies (But the methodology excludes recognition of prior learning in any case.)
When the methodology below excludes cases in which an apparent individual has different postcodes in different years it may lead to an overestimation of success rates by excluding persons who drop out of courses as a result of changes of home address.

Phase 2: Link student histories
The performance of students identified as commencing a course in 1994 must be linked to the performances (if any) of the same students in the same courses in 1995 and 1996. As indicated earlier, the data records do not include wholly consistent identifications of students.
The AVETMISS files include two data items intended to provide some way of identifying a student (in the statistical sense of being able to identify two or more events as happening to the same person without any specific identification of the person): a 'client ID' and an 'encrypted ID'.

[4] Courses are also sometimes given lengths that seem unreasonably large. This reduction is the first winnowing only.
[5] While it is possible for students to enrol in more than the number of subjects required to complete the hours, it is desirable to remove cases that raise serious questions about the accuracy of the reported course length. This rule removes only the extreme cases, however.

The ‘client ID’ is an ID (consisting of a mixture of the alphabet and the digits 0–9) which a training organisation uses for internal administrative purposes; a student/client will usually (but not always) have the same client ID at least while studying a particular course. [6]
The ‘encrypted ID’ is an encryption of the student’s name. Students with the same name will, of course, have the same encryption, so not all records with the same encrypted ID can be regarded as belonging to the same student; more evidence about identity is needed.

A conservative approach—one that has been followed in this research—requires stricter rules to establish a set of records as belonging to a single individual. For the present research, the following rules for identification of individuals have been followed:

two records can be linked if and only if
client sex is the same
client date of birth is the same
client home postcode is the same, and
either client ID (four training organisations) or encrypted ID (four training organisations) are the same.

In addition, for this study, the course needs to be the same across all records.
The first two conditions are basic requirements for any identification, while the third is added to confirm the first two. The final dot-point condition reflects the difficulties of research in this area; neither client ID nor encrypted ID may safely be used across all eight of the major VET training organisations. ‘Client ID’ was the preferred matching data item for this research, but it was not possible to use this for all training organisations. The AVETMISS specification does not *require* consistent use of identification across years. The result of extensive considerations is shown exhibited above; different approaches were needed for different State/Territories. [7]
At the conclusion of this process a series of files had been prepared with firm links between individual students for 1994, 1995 and 1996.

Phase 3: Final file preparation
Further steps were needed before analysis could commence. This was to ensure that the proposed final analysis could be carried out in the detail and to the level required, and involved bringing the 1995 and 1996 files to the standard and system of exclusions and inclusions laid out for 1994 files.
Analysis of progress was planned to be carried out for a modest set of demographic variables (sex and age) but also by course type. For 1994 data using the AVETMISS specifications, this meant identifying courses by field of study and stream of study (where stream of study conveys some idea of ‘level’—full details are given in the AVETMISS specifications).
A preliminary analysis was conducted on this basis. It became clear in the analysis that more precision was needed, as the variations in course length within a stream were great, and estimation of the time to completion therefore had to range across too much variation.
The views of State/Territory experts were sought on a way forward. It was suggested that courses could be categorised by length and progress analysed separately for each category. Categorisation in terms of particular values (e.g. 200 hours) was initially considered, but in the end a different strategy had to be followed because of variations between the States and Territories. This was a normative strategy, in which courses were categorised on the basis of the most appropriate elapsed time it took any student to meet all the requirements of the course (measured in years). The method followed is described in a series of two steps.

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[6] It is the word ‘usually’ which creates problems for the researcher. The exceptional cases, which could be quite numerous, require attention.
[7] In seeking to establish the best ID data item we did discover a single individual who had been given four different client IDs in the three years 1994–1996. It is possible that other individuals acquired even more.

Step 1: Consider 1994, 1995, and 1996 results for students and remove (later) duplicate successful outcomes. As a result, a student may have only one successful outcome in a module; different successful outcomes are ranked so that a ‘pass’ is preferred to other successful outcomes.
Step 2: For each course, identify the length of time it takes students to complete the course, relying upon the two results ‘pass’ and ‘satisfactory completion of hours’, where completion is defined as ‘the sum of the hours associated with the modules for which the outcomes were “pass” or “satisfactory completion of hours” is equal to or greater than the stated length of the course in hours’. Now categorise each course as ‘one-year’, ‘two-year’ or ‘three-year’ on the basis of this analysis, using the modal category to define the course length; if the course is such that no student completed it in three or fewer years, discard the course from the research study.