

THE COMMON UNIT PROGRAM 2005–2006

TRENDS, RISK FACTORS AND MARKET SEGMENTS

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ABBREVIATIONS

ALLSP	Academic Language and Learning Support
CAESL	Centre for Access and English as a Second Language
CDU	Charles Darwin University
CU	Common Units
CUC	Common Unit Committee
DVC	Deputy Vice Chancellor
ESL	English as a Second Language
GPA	Grade Point Average
HE	Higher Education
IASU	Indigenous Academic Support Unit
ICT	Information Communication Technology
LOTE	Languages Other Than English
NESB	Non English Speaking Background
PVC	Pro Vice Chancellor
SELT	Student Experience of Teaching and Learning
TEP	Tertiary Enabling Program
TER	Tertiary Entrance Rating
TLDG	Teaching and Learning Development Group
VET	Vocational Education and Training

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EXECUTIVE SUMMARY

This is the third report presented to the Common Units Management Group of analyses of the trends, risk factors and market segments in the Common Unit program from its inception in 1998 to the recent phase covering the years 2005–6. This project has so far assembled an impressive continuous database of almost 16,000 individual enrolment records and provides essential monitoring services, not only to the Common Units Management Group, but to other University bodies responsible for marketing and recruitment, and first year student attrition, retention and progress.

The *terms of reference* of the present phase of the project were to carry out:

An investigation into the performance of the Common Units by extending existing monitoring methodology into (a) an update of relevant research literature and program development and (b) continuing the analysis of Student Outcomes in the Common Unit Program into the years 2005–6. As for the two previous reports, this analysis will include exploration of trends and patterns of student survival and of predictors of student withdrawal, satisfaction and academic success from the whole period of monitoring, 1999–2006.

A comparative evaluation of the Common Units outcomes against those of a selected number of large first year units for years 2005–6 (designated as “Core” Units). At the suggestion of the Vice Chancellor, this section was expanded to include an estimation of the effects of admission categories on all the first year units included, both Common and Core.

The analysis of student outcomes was based on a generic predictive model which estimates the individual effects of both student admission and situational variables on attrition outcomes. Segmentation analysis was also used for capturing the unique combinations of values across these variables. The full database of Common Unit enrolments for 1999–2006 (including early withdrawals) numbered 15,895, of which 4306 were for the years 2005–6.

Summary of results 1999–2006

Total enrolments (including early withdrawals) settled down to a more or less stable pattern, at just over 2,000 enrolments per year, after some initial swings, especially between those for 2002 and those for 2003.

Withdrawal rates (before census date) have fallen substantially in recent years, from about 30% in 2003–4 to just 22% in 2005–6. This fall further confirms the possibility that the program has gained greater acceptance among incoming students.

Pass rate trends showed a continuing recovery from 64% in 2003 to a consistent rate of 69% in 2005–6. When combined with the early withdrawals this still represented a combined attrition rate of 47% from total initial enrolments (a fall from a high of 56% for the students enrolling in 2003–4). However, this figure reflects changes of enrolment from one Common Unit to another, withdrawal from course and changes in status from full-time to part-time study rather than being an indicator of students’ experience of the Common Units.

The diversity of intake proved to be a major change in the two most recent years, evidenced by the falloff of over twenty percent in the proportion of part-time enrolments, particularly between 2004–5, with a small recovery in 2006. At the same time the proportion of external enrolments has increased apace, marked by a tripling from 20% of the intake in 1999 to 60% in 2006 (with only a slight fall and subsequent recovery in 2005).

There was a decline in the proportion of NT Home Residence enrolments, from over 80% in 1999 to 60% in 2006, as well as a decreasing proportion from students aged under 25 years. Indigenous enrolments also declined in recent years, while Non English Speaking Background enrolments rose by about 50% from a low base (from 10% in 2004) to 15 % in 2006. The Gender ratio remained relatively stable with females representing about two-thirds of the total, while First Year of Studies continued to fluctuate around 70%, though declining slightly in recent years.

Equity groups and early withdrawals indicate a general decline in withdrawal from all groups, with a slight increase in 2006. The exception here is the steep increase in withdrawals in both Part-time and Overseas Citizenship enrolments in the middle period of observation, 2003–4, both of whom rejoined the general downward trend in the years 2005–6. This “spike” in Part-time enrolments in 2003–4 appears to have disappeared, accompanied by a significant decline in rates of early withdrawal. However, despite the overall decline, the increase in the proportion of *early withdrawals of Indigenous students* (about 10% increase in the rate between 2005 to 2006) deserves further attention and explanation.

Trends in pass rates of equity groups 1999–2006 reveal remarkable stability in both (a) the rates of equity group representation and (b) in their rank order of average success. Two exceptions here were the completion rates for Overseas Citizenship and Indigenous enrolments which showed contrasting rates of increase and decline respectively in 2003–4, before returning to trend levels in 2005–6. The recent decline in the rate of Indigenous completions to below 40% (from about 45% in the previous period) represents an historic low for this category. The improvement in the rate of *male representation* over recent years is encouraging, but still shows a gap of about 5% below the female rate (down from about 9% for the first period 1999–2002).

Combined trends in diversity, early withdrawal and completion rates indicated that, except for a low point in the pass rate of 2003, the Common Units have absorbed the twin “shocks” of increased diversity and unit restructuring. Not only has the early withdrawal rate been “normalised” to a rate of just above 20% (from past average rate of over 30%), it has been accompanied by a notable increase in completions (see above).

Equity and Outcomes: Predicting Attrition in the Common Units 1999–2006

Logistic regression models yielded the following estimates of the independent effect of each of nine predictors on the two attrition outcomes over the whole observation period. The predictors were: *Part-time status*, *External Mode of Study*, *First Year of Studies*, *NT Home Residence*, *Overseas Citizenship*, *Age under 25 years*, *English as a Second Language*, *Indigenous identity* and *Male Gender* together with a “dummy” variable scored 1 indicating an enrolment in the period 2005–6 and 0 for the previous years 1999–2004.

Only three of the nine equity predictors reached statistical significance. Part-time status stood out as the most powerful predictor of the likelihood of early withdrawal, with a ratio of almost three times that of the average odds of withdrawing early. External Mode of Study had a negative effect on Part-time status, indicating that this enrolment was 2.5 times *less likely* than the average to result in early withdrawal. The odds for withdrawal for First Year of Studies was slightly higher than the average, while the odds for NT Home Residence is just below the average and just exceeds statistical significance of .05. The odds of withdrawal, for the current period of observation 2005–6, had a significantly low ratio, reflecting the much lower rate of withdrawals for the period of observation, 2005–6.

There was a significant positive effect for passing in 2005–6, as against that for previous years (i.e. 1999–2004). The recent period identifier showed a positive influence on overall retention rates with a significant odds ratio of 1.67 (where 1 is the sample average).

Over the entire period 1999–2006, four of the nine equity group categories had significant negative effects on completing or passing a Common Unit. When all the other effects are controlled for, Indigenous identifier has the greatest (negative) effect, followed by negative effects for External Mode, Male Gender and Age under 25 years. The only positive effect observed (other than that for the 2005–6 period), was for Overseas Citizenship, which has about a two thirds improvement in the odds ratio.

Segments or “Fault Lines”? Difference and Survival: Common Units 1999–2006

An important component for understanding student withdrawal is how a combination of factors affect students’ ability to succeed. Any combination of the significant factors isolated in the demographic data is likely to compound students’ ability to succeed or not. These factors are: NT Residence, Mode of Study, Full-time/Part-time status, Indigeneity and First Year of Study. A segmentation technique known as CHAID (chi-squared automatic interaction detection) was applied to explore the “hidden” combinations in the student market that do not show up in normal regression procedures.

Early Withdrawals: Although all eight enrolment predictors were included in the original model for the whole sample of enrolments ($n=15,895$), only five met the default criterion probability $p<.05$ for making a statistically significant “split”—NT Residence, Mode of Study, Full-time/Part-time status, Indigeneity and First Year of Study. The common factor in the highest three segments of withdrawal was Part-time status. The segment with the highest levels of risk of early withdrawal, with a 72.5% rate was Non-NT resident, Internal, Part-time; the second highest at 45.5% was NT Residence, Internal, Part-time. The third highest withdrawal segment was First Year, External, Part-time at 28.2%

Unit Completions: As for the regression analysis, it was the individual characteristics of students rather than their study or course situation that defined the “market” segments.

The most students with the highest success rate for Unit completion were Internal, 35+ years, Non-Indigenous with 83.6%, Overseas Citizenship, 20–24 years with 81.2 % and Internal, 17–19 years, Non-Indigenous with 74.4%. At the other end of the spectrum, Indigenous students studying externally and male Indigenous students in internal mode appear to be most at risk of failure, with pass rates well below 40%.

A major feature of the unit completions data was the large “gap” between the top five segments averaging a pass rate of 77% (most frequently occurring enrolments here were Internal, Female and Non-Indigenous aged between 17 and 34 years) and the bottom six, averaging a 50% pass rate (most populous category was Australian or NZ Citizenship, 20–24 years, Non-Indigenous). Between these two groups, one averaged 8% over the mean pass rate of 69%, the latter had a pass rate almost 20% below it. Although the segmentation analysis classified only half the total sample of continuing enrolments, this wide gap could be seen as something of a “fault line” dividing the segments of continuing enrolments, similar to that observed between the top two and the bottom six among the segments of early withdrawals.

Common and Core Units Compared: Admissions, Situations and Attrition 2005–6

In this section we examined the relative performance of the two classes of larger intake units in terms of outcomes in Common and Core first year units (drawn from the more popular courses, in Nursing, Teaching, Business, Law and Natural Sciences and Engineering) in the most recent period of observation, 2005–6.

Total enrolments for both types of unit were subject to considerable attrition from enrolment to completion. After *withdrawals* before census date, the initial n of 6,591 was reduced to a continuing enrolments n of 5,107, with very similar rates of attrition (22%) across all first year units. Of this

remaining 5,107 only 3,509 went on to complete (i.e. achieve a passing grade) giving an overall attrition rate across all units of 53%.

In general terms, the average *pass rates* of the three Common Units are comparable with those of the other larger or Core Units. The exceptions here were the Common Unit CUC106 (Design and Innovation), which demonstrated an exceptionally high pass rate of over 90%, contrasting with HIT111 (Programming Concepts), which had a mean pass rate in the mid-forties. Despite this diversity within unit types, the between-unit type mean difference of 2.5% , based on aggregated rates, just fails to reach the accepted test of statistical level ($p < .07$) and may indicate a small, though important “gap” in survival rate between the pass rates of the two unit types (Common and Core).

Common Units, although they may have had a lower pass rate, had a significantly higher *average of awarded grades* than the eight larger Core Units. The gap in average grade was quite wide, representing an average of mid-Credit as against a high Pass/borderline Credit average for the Core Units. Common Units also showed a greater homogeneity of marking, as indicated by a smaller standard deviation. The disjunction between a lower pass rate of Common Units and a higher average grade awarded suggests that the main barrier in survival in the Common Units is that of completing the assessment tasks, rather than the difficulty of content.

Admission Category, Study Situation and Outcomes: Common and Core 2005–6

Admission category, unit type and early withdrawal: An analysis of variance test indicated the significant effects of admission category appeared to be direct, based on the independent influence of each of the three main admission categories, unmediated by unit type. The relative performance of Common and Core units against admission category, unit type and student situation indicated that there was a statistically significant variation in rates of early withdrawals across the range of admission categories. Admission through *Secondary Education* had the lowest withdrawal percentage, at 17.5%, while *Higher Education course admission* and *VET course admission* (completed and uncompleted) had the highest rate of withdrawal at 28% and 25% respectively.

Admission categories and pass rates: Analysis showed considerable disparity was observed between extreme groups for example from 60% for Tertiary Enabling Program and Mature Age to 74% for Secondary Education admissions. Both VET and Higher Education admissions were found to be roughly comparable, close to the overall average of 69.8%. All three admission categories had significant positive effects in a multivariate analysis, while unit type just failed to reach statistical significance as a negative effect.

Admissions, student situations and attrition: The introduction of student situation variables (Part-time status and External Mode of Study) into the prediction equation had a marked impact on the explanation of the overall pattern of attrition. For early withdrawals, controlling for student situation variables and Higher Education admission for Common Unit enrolments, increased the probability of withdrawal. On the other hand, it appeared that the slightly negative effect of unit type on pass rates (e.g. the observed gap of 2.5% in favour of Core Units) may have been largely due to its association with External Mode of Study for Common Units.

Tertiary Entrance Ratings and Academic Outcomes: Common and Core 2005–6

Tertiary Entrance Rating (TER) admissions accounted for 2254 (or 44.1% of the 5107 continuing enrolments in the full 2005–6 sample of Common and Core enrolments. TER scores were banded in ten-point intervals, and association was estimated by the chi-square based Contingency Coefficient (varies from 0 to 1).

For Core Units, there was a weak statistical association between TER scores and unit completion, but a moderate association with average grade awarded. For the Common Units, the size of the

association with TER bands was much more even across both outcomes, but still weak/moderate for both outcomes. All coefficients of association were significant at .05 level.

There was found to be generally an increase in average grade awarded for every ten-point increase in TER range, particularly in the lower TER ranges (30 to 59 points) for both types of unit. One notable exception was the higher mean grade awarded to the 30–39 TER band for the Common Units than for the 40–49 TER band. This suggests that the Common Units seem to be particularly effective for helping this marginal group in making the transition to university life.

Beyond first year: recommendations for monitoring 2007–8

In its supporting role to the program, the Common Units monitoring project should strike out into new directions, develop new themes of enquiry and build on its established base in enriching decision-making throughout the undergraduate academic program at Charles Darwin University.

We recommend the following actions for the next phase of the monitoring project:

- (1) Extension and maintenance of the enrolment database, 1999–2008
- (2) Evaluation of long-term effects of exposure to the Common Units (longitudinal study comparing students' later survival and success against those who have been granted exemptions (especially in designated courses in Business, Law and Environmental Science).
- (3) Updating and revision of the literature review on the relation of Common or Core Units to the first year university experience, with particular attention to distance learning and flexible modes of delivery.
- (4) Establishment of focus groups and development of qualitative evidence of student satisfaction.
- (5) Continuation of Common Unit workshops with the Common Unit Management Group, including the regular reporting and application of recent monitoring findings.
- (6) Detailed research on Indigenous students in relation to progress rates in Common and Core Units.
- (7) Further monitoring of effects of unit restructuring and development on rates of attrition.
- (8) Development of publication program (articles/monographs) reviewing the Common Unit experience at CDU over a ten-year period of observation, 1999–2008.

Conclusion

The new directions opened up by the comparative and course entry provisions in this phase have enormously expanded the potential of the Common Units project to inform teaching and learning strategies at Charles Darwin University. Not only has the monitoring project developed a unique cumulative database for interrogation on matters of diversity, attrition and equity in the Common Units, it has also provided a framework for a rigorous analytical approach to course and student performance across the first year of University and beyond. The proposals for the next phase will see the culmination of a ten-year evaluation project whose potential for providing informed insights into undergraduate teaching and learning in diverse student populations has yet to be fully exploited.

1. COMMON UNITS AND THE FIRST YEAR OF UNIVERSITY AT CDU

1.1 Background: New Directions in Program Monitoring

In 2005 the scope of the monitoring program of the Common Units (see reports Tyler, 2003; Tyler and Rolls, 2007) was broadened to include comparisons with other large first year Core Units in those courses with the highest loads such as Nursing, Teaching and Learning, Business, Law, natural and physical Science, and Engineering. This broadening of scope was to be an extension, rather than a replacement, of the analysis of trends in enrolments, withdrawal and pass rates as well as the estimation of equity group effects on these patterns and outcomes. The program also included extension and maintenance of the enrolment database over eight years: 1999–2006. The terms of reference for this change in direction of the monitoring program therefore implements the first of the Recommendations of the second report in this series, namely to ‘broaden scope to compare attrition in large core first year units in Nursing, Education, Business and Law.’ (Tyler and Rolls, 2007, p.5).

As for previous phases, this expansion of scope of the monitoring program was to be supported by frequent workshops and presentations to the Management Group, as well as developmental and other exercises that feed into the planning and delivery of the program as results became available. During the first half of 2007, the results for this phase attracted the interest of the Vice Chancellor’s Management Group and a further dimension to the comparisons across first year outcomes was added via an investigation into the effects of admission categories on student success in both the Common Units and Core Units of the larger and more popular undergraduate degree programs. This exercise resulted in a separate research paper now included as a section in this report.

As a result of this extensive empirical analysis, sections covering the review of the literature and some of the qualitative research of the previous reports will be reduced to updates on recent developments in particular fields, such as the evaluation of the effects of online learning and the special needs of Non English Speaking Background (NESB) students. The review section will also include developments in program structure and availability, as well as continuities and changes in the management and governance of the program, as the Common Units were relocated under the restructuring arrangements during the years in question.

This volume therefore represents the first intensive attempt to place the Common Unit program in the broader context of the first year university experience at CDU, as well as continuing the analysis of trends in performance and equity over a period of eight years of its full availability. The comparison with the Core first year units will in turn provide a platform for the next phase of this ten-year study, namely the ongoing effects of exposure to the program on later stages of the student cycle into the advanced levels of the parent course. In the foreshadowed phase for years 2007–8, the second Recommendation from the previous report (Tyler and Rolls, 2007, p. 84) to “correlate entry mode with exemption (or not) with success rate”, will be based on the later course outcomes for students whose first year experience is examined in this and previous phases.

In order to see these directions in the context of the development of the monitoring program, we will first provide a short overview of its history and major findings. We will then outline the major research questions addressed and the analytic strategy adopted in the following sections.

1.2 First Year Success and Survival: the Common Unit Context

This broadening of the scope of the Common Units to embrace comparison with other large unit outcomes by equity and performance criteria is consistent with the mission of the program to provide an introduction to university study through a well-structured transition program, with the anticipated

effect of reduction in the relatively high rates of attrition at the end of the first year. This broader interest is supported by the recommendation of the Australian University Quality Agency “that CDU ensure that the intended outcomes of the Common Unit Program are achieved and that it is catering for different ability levels and knowledge of different students.” (AUQA Report, 2005). Given the increased diversity in background and study situation of student intake investigated in some detail in the previous report (Tyler and Rolls, 2007), a comparative study of the rates of success in the Common Units with other large units seems appropriate.

Some questions to consider, for example, are (a) Does the Common Unit program compare groups favourably or unfavourably with the selected large Core Units in rates of student success across equity? (b) Are rates of success or failure in the Common Unit program affected by student admission category and how might these compare with the effects of admission categories on student outcomes in other units? (c) Does exposure to the Common Unit program enhance the chances of later success of students in the second and further years of their course cycle? The third question must attend the release of further data on student outcomes from the present cohort as the students progress to later years of study. However, the exploration of the first two questions for the years 2005–6 will provide a solid basis for evaluating the relative success of the program in addressing the issues raised by the AUQA report: student diversity and its effects on student retention and progress.

If, as suggested in the previous report, that diversity may be defined as *difference expressed in context*, this report will address what is perhaps the most important context of the student experience; namely, the differences in retention rates within the field of study of the parent course to which the Common Units are to be related and with which they may be compared. In other words, in addition to the range of factors which generate the particular “mix” within the student body of a particular undergraduate course, there is the important dimension of the between-course effects. While these effects have been shown to have effects on the student outcomes in the Common Units, they have not been taken as points of comparison in their own right, given the complexity of the course offerings at CDU and the task of developing a data base of cognate units with large, diverse intakes.

One other factor inhibiting comparisons with mainstream course units has been the focus of the monitoring activity on the Common Units as an experimental program that had yet to establish its place within such a wide variety of parent course contexts. The final reduction of the program to three main units since 2004 has made relevance to parent courses much more evident and defensible in offering (a) the development of basic skills of academic literacy (Academic Literacies CUC100) and (b) an introduction to the cultural and physical aspects of the environment of Northern Australia (Northern Perspectives CUC107), with the option of an alternative unit with a regional focus (Technology and Environment CUC106). The effect of this simplification in unit offerings has been discussed in detail in the previous report, covering the years 2003–4 (Tyler and Rolls, 2007). However, the effect of this reduction on the relative performance of the restructured Common Unit program *vis-a-vis* that of the parent course which it was supporting was not the subject of investigation.

1.3 The Monitoring Program: Problems, Approaches and Findings

In order to establish the directions of the present report, as well as to consolidate and extend the strategies of previous phases of the monitoring project, we will summarise the main findings of the years 1999–2004. This will be done by (a) outlining the problem of high rates of attrition (early withdrawal and failure rates) in the Common Units, as a function of student background and student situation (b) describing the methodology employed in identifying the patterns, trends and predictors of student attrition and (c) briefly summarising the main findings of the two stages of monitoring over these years (1999–2002; 2003–4).

1.3.1 The problem of student attrition in the Common Units

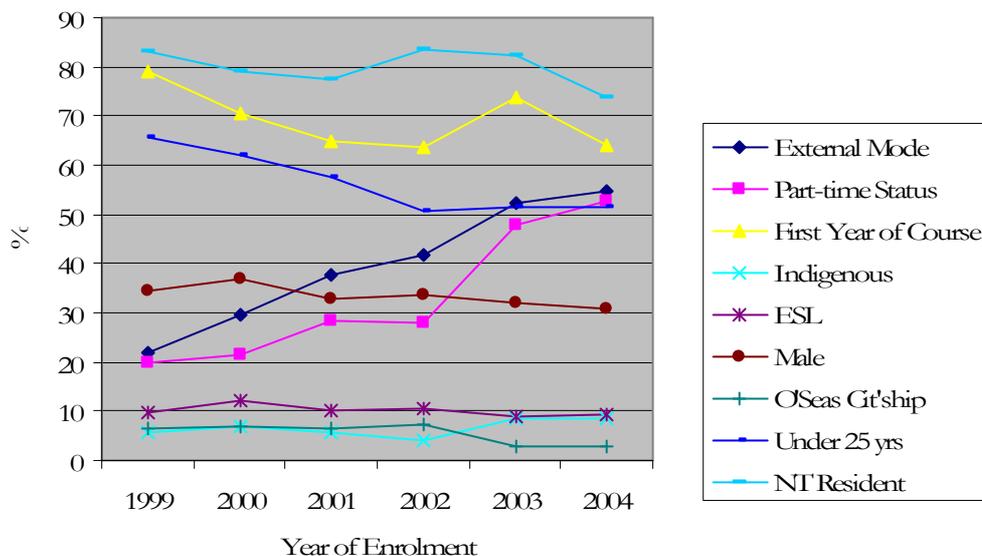
In response to the disproportional rate of failure in externally-delivered units in the second semester of 2001 (43% against 35% for internals), the (then) Common Units Committee initiated a monitoring project that would examine the general problem of “attrition”. Because of the generally high rates of early withdrawal (i.e. before census dates) in the program as a whole, the definition of attrition encompassed both of these undesirable outcomes (failure and early withdrawal). For comparative and developmental purposes, the study also looked at the risk factors behind both types of attrition across a range of demographic and situational variables throughout all the units in the program, including the effects of modes of delivery.

Diversity, Attrition and Program Restructuring

The years 2003–4 presented other challenges to the development of the Common Units as the diversity of intake increased, particularly in the exponential growth of the proportions of external and part-time enrolments (see Fig. 1.1 repeated from Tyler and Rolls, 2007). Since these were typically the students most at risk of either early withdrawals or failure, the challenges of delivery and retention were amplified.

Fig. 1.1

Fig. 1.1 Enrolment Trends in Common Units
1999-2004 (incl. early withdrawals n=11448)



In response to these and to the earlier recommendations of other external evaluations (Baldwin and McInnes, 2000), under the initiative of the Vice Chancellor, the Common Units Committee undertook a major simplification of program offerings. The new units were aimed at skills acquisition and an interdisciplinary introduction to the University’s region. As a result the five major units were reduced to two, with a third, the more specialised unit in Technology and Environment (CUC106), in the pipeline. The two principal offerings were Academic Literacies (CUC 100) and Northern Perspectives (CUC107). These were to be normally taken by the bulk of students sequentially in the first and second semesters respectively. In certain circumstances and in a restricted number of courses, students should be eligible to claim exemption on the basis of demonstrated competence. The first of these units, Academic Literacies, was offered in the first semester of 2003, while the second unit was introduced in the second semester of 2004, combining regional perspectives from the

social sciences and environmental studies. The third unit, CUC106, was introduced in 2006 and has proven to be of more general interest than originally envisaged. By the end of 2005, therefore, the two principal objectives of the Common Unit program were being addressed by more focused, though internally differentiated, units offered in both external and internal modes.

1.3.2 Identifying Patterns, Trends and Predictors of Attrition

For each phase of observation, 1999–2002 and 2003–4, an integrated database was assembled from the student administration and reporting records of enrolments—held by the University, combining (anonymously) results in all Common Units offered with a range of situational factors (mode of study, year of course, field of education, parent course), demographic factors (age, gender, place of residence during term), and personal factors (Indigenous status, country of birth, English as a second language, overseas citizenship). The main dependent variable was either early withdrawal from a common unit or success (pass/fail) in a completed unit. For all analyses, unit enrolments rather than individual students were taken as the base or primary unit of analysis. The same student therefore, could generate a number of enrolments either in the same unit, or across two or more units. This sampling yielded 7,535 enrolments (i.e. including early withdrawals) for the first period and 4,034 for the second, with 3147 and 2,791 completions.

For the identification of causal or explanatory factors, a combination of logistic regression (which shows the effect of each predictor when all of the others are held constant) and data mining techniques (showing the unique combinations of predictors that predict withdrawal or passing a unit) were applied to this comprehensive database. The changing effect of each predictor over the six year period could then be compared across each observation sample, and the combined effect estimated. The data mining method, which allowed for “segmentations” in the same manner in which market research identifies targeted groups which do not fall neatly into class or ethnic categories was innovative at the time, anticipating the recommendations of a recent report of a United Kingdom House of Commons Committee that “(Universities) should use market research techniques such as customer segmentation to help them provide teaching and support services which appropriately reflect students’ different cultural, social and economic backgrounds” (House of Commons Public Accounts Committee, 2008).

1.3.3 Principal findings 1999–2004

The monitoring program has evolved since its inception in 2001–2 apace with the development of the Common Unit program and the changing nature of the student intake and modes of course and unit delivery. Within this changing focus, however, the explanation of attrition through multivariate methods and techniques has been its defining objective. A brief survey of the findings of the project will provide an account of the interplay between these contrasting strands of core orientation and specific focus on the contingent issues of program development.

Findings of the First Phase 1999–2002

It was found that the two dependent variables, rates of early withdrawal of student attrition and rates of success/failure in the Common Units have different causal backgrounds, each with its own unique and often contrasting pattern of prediction. While failure rates for the non-withdrawals was predicted by Indigenous identity, external mode of delivery, male gender, being under 25 years and enrolment in a social or cultural studies field, early withdrawal was predicted with an internal mode of delivery, full-time status and an age over 25 years at time of enrolment in the unit. There did not appear to be an explanatory link between tendency to ‘stay on’ to receive a Failed Absent grade (which could have been avoided by early withdrawal) and student background, except in Indigenous enrolments where there appeared to be a strong link between a lower withdrawal rate and a higher failure rate. Enrolments from a Health Science field of study had both a lower rate of failure and a lower rate of withdrawal; while overseas citizenship, perhaps counter-intuitively, was associated with a *lower* (though

not statistically significant) rate of failure. English as a Second Language (ESL) was found to have a slight (and non-significant association) with a lower pass rate and a lower rate of withdrawal. However, ESL or a non-English speaking background was not a statistically significant factor (this predictor was broken down for domestic and overseas students in the second phase—see next section).

Compounding Disadvantage: Segmentation Analysis

When the various factors were combined, a segmentation analysis of factors leading to failure in the Common Units revealed wide discrepancies in the pass rates of fifteen subgroups segmented by unique combinations of age, gender, mode of delivery and Indigenous status. Some of the most salient gaps in pass rates found in combinations of predictors were: (i) a 38% gap between non-Indigenous (higher) and Indigenous enrolments in the over 35 years age group, (ii) a 25% gap between internal (higher) and external enrolments in the 17–19 years age group and (iii) a 17.5 % difference between female (higher) and male enrolments in the 25–35 years age group. One interesting finding from this procedure was that while Indigenous enrolments showed the widest gap overall on the basis of background factors (almost 30%), for the immediate school-leaver in the 17–19 years age group, the differences were quite narrow, averaging only a few percentage points. The segmentation analysis therefore demonstrated the compounding effects of mixing equity characteristics within the student body in ways which can often elude the single dimensional thinking of educational interventions (e.g. those based on gender, ethnicity or age as universal categories of disadvantage).

The Second Phase 2003–4

The findings from the first study demonstrated that the techniques of multivariate analysis applied can reveal important, if unexpected, differences within the student population that can inform program planning, unit delivery and background support services. These findings were supported by a comprehensive survey of relevant literature and by the evidence that was emerging from student evaluation of the program. If outcomes entrench disadvantage and restrict opportunity, it was seen then these must be understood and addressed as the program evolved. As a result, the second phase of program monitoring for the years 2003–4 explored the effects of a dramatic rise in the proportion of external and part-time students, coupled with those of the radical restructuring of unit offerings described above. In response to these findings and challenges, the second phase addressed the following issues:

- a. changes in rates of attrition (early withdrawals, unit failures) in the Common Units for 2003–4 compared to those examined in the report (1999–2002)
- b. the relations between rates of attrition and patterns and trends in student background characteristics, as well as in student study situation
- c. the effect, if any, the introduction of the restructured program may have had on either rates of attrition in the Common Units or the prediction of student outcomes by equity and situational factors
- d. whether the findings of the monitoring program had informed the development of the Common Units.

Because of the compatibility of the data base from 1999, both first and second phases were merged in order to estimate the long-term trends in attrition, and for comparing predictive powers of student background and situational factors.

An analysis of trends in attrition outcomes in the Program over the six year period showed a significant decline in the rate of early withdrawals combined with a fluctuating trend in the pass rate.

The latter outcome first peaked in 2002 but apparently declined by about 9% in 2003, the year in which the restructured program was rolled out. However, the following year, 2004 saw a recovery of the pass rate to its pre-restructuring level, accompanied by only a slight rise in the rate of withdrawals. Regression and data-mining methods were then used to explore the relationships between student background, study situation and attrition. These showed that the most powerful predictor of passing was overseas citizenship, while failure was most strongly predicted by Indigenouness which appeared to increase over the two periods of observation, 1999–2002 to 2003–2004.

In general, however, the predictor profile over the two periods remained fairly stable, with the negative prediction on pass rates persisting at about the same levels for enrolments with values for male gender, under 25 years of age, external mode of study and the parent course falling in a social and cultural field. A more detailed study of the link between overseas enrolments and ESL revealed that the pass rate for overseas enrolments with ESL backgrounds was significantly higher than for domestic students with ESL. The grades for overseas/ESL enrolments were also found to have clustered abnormally around the pass grade while for domestic ESL enrolments, the distribution conformed to that of the general population. This pattern suggested that there may have been a tendency for markers of examiners to be more lenient with this group, allowing them a minimum grade to get “over the line”.

In order to estimate the impact of program restructuring on equity groups on attrition rates (early withdrawals and pass rates), a cluster analysis was carried out which identified four clusters based on contrasting trends between withdrawals and passes. The effect of the period of observation (a proxy for the 2003 break between the two unit organisation regimes) on each of the two measures of attrition revealed a contrasting pattern of prediction. While the introduction of the new program was associated with a statistically significant reduction in the rate of withdrawal (in both its main effect and in combination with the relevant equity group), no significant effect was found for the prediction of the pass rate when scores were adjusted for equity or student disadvantage factors. The absence of any changes explainable by equity group effects suggested that the main cause of the significant drop in the pass rate (down to only 58% from 1999–2002 average level of 67%) may have been the decline in the increased rate of withdrawals themselves, as a higher proportion of students in “at risk” categories continued their enrolments, only to receive a fail grade. However, as reported above, the pass rate recovered significantly in the following year.

A further analysis comparing course withdrawal rates with common unit withdrawal rate was conducted to explore this possibility. This analysis found that up to 45% of early withdrawals in Common Units 2003–2004 were course-withdrawal related. It is therefore possible, though this was not empirically established, that the increased rate of failure in the Common Units may have been linked to the diversification of course intake at this time (particularly in external enrolments in nursing courses) associated with an increased reluctance for general withdrawal.

These two phases of the monitoring program have therefore established (a) a strong and expanding data base for almost all first year students at CDU over a six year period (b) a descriptive evidentiary framework for analysing the patterns and trends in attrition in the Common Units in terms of numbers and composition by age, gender and range of equity factors as well as of parent course origin (c) a methodology based on epidemiological models for isolating the predictive impact of each of the explanatory factors in both withdrawal and pass rates (d) a classificatory framework for going beyond single effect prediction to the identification of “market segments” that uniquely combine values across a range of explanatory factors (e) a process whereby, through consultation, discussion and workshops with the Common Units Committee, program planners and managers, as well as with lecturers and tutors, the findings and recommendations of monitoring have informed the planning, development and delivery of the program. The challenge that lies ahead was therefore to build on these strengths as the Common Units became an established feature of first year University life.

1.4 Expanding the Monitoring Focus

As has been well documented in previous reports, the principal objective of the Common Units program has been to address the difficulties in the transition to tertiary study at the earliest point of the University experience and to develop strategies by which these can be successfully addressed. The monitoring program has supported this objective with detailed evaluation of the extent to which it is being achieved; through dissemination of its findings in hard and electronic form by distributing these amongst the senior management bodies of the University; and by its initiation of several workshops based around the problems identified by analysis, explanation and interpretation. The task for the third wave of the monitoring project, was therefore seen by the Common Units Committee in 2005 in terms of consolidating and continuing these core functions of attrition research supported by the management and development of the enrolments data base. However, the Committee also perceived an opportunity for this stage to extend its evaluative focus by comparing the performance of the Common Units with that of other large Core Units, as mentioned above. In this light, the terms of reference of the present phase of the project were to carry out:

- (1) an investigation which will extend the existing research into the analysis of student outcomes in the Common Unit Program to the years 2005–6, focusing on trends and patterns of student survival and of predictors of student withdrawal, satisfaction and academic success
- (2) a comparative analysis of the Common Units outcomes against those of a selected number of large first year units for years 2005–6. In operational terms, this would involve:
 - a. applying the analytic methodology developed in the two previous phases to an investigation of the success and withdrawal rates in a number of core degree units in parent programs for years 2005–6
 - b. devising a comparative framework for interpreting the results of this analysis
 - c. developing a strategy for bench-marking indicators of student first-year experience at CDU, based on the effects of variations of unit and student background characteristics on patterns of student satisfaction, retention and success.

In July 2007, in connection with a related research proposal, the Vice Chancellor passed on a specific request that this phase of the monitoring project include an investigation into the effect of admission categories on first year student outcomes for both the Common and the Core units selected for this phase. This request added a third element to the investigation, namely,

- (3) to explore and compare the relationship between the basis of course admission and performance in the Common Units and selected Core or typical large first year units at CDU 2005–6 in relation to result awarded and early withdrawal as these may be affected by student situation (mode of study, part-time status and parent course membership), as well as by the specific predictive effects of TER scores on students entering by that route. The results of this investigation, as mentioned earlier, were the subject of a research paper submitted to the Vice Chancellor's Management Group in July 2007 and constitute a special section in this volume.

The Vice Chancellor's intervention in this phase was welcomed, since the admission category of a student has been an important, though hitherto neglected element in the predictive background to the understanding of attrition within this and other first year University studies. This category has a particularly importance in understanding the efficacy of Common Units, since admission category not only determines to some extent a students existing academic literacy and confidence but also determines whether they are eligible to be exempt from completing one or both common units. If

they have successfully completed the Tertiary Enabling Program), or entered their degree via a VET feeder course or some other degree they are generally granted a credit transfer for the common units. Feeder courses are most common in IT, Business and Science degrees. The Nursing and Education degrees also have feeder courses but have chosen to adjust the “TR from Common Units” rule to insist their students complete the literacies common unit.

The extension of this phase into the effect of admission category makes an interesting counterpoint to the comparative study of the Common and Core Units: situating the individual student level experience against the institutional cross-sectional background. These two dimensions, the vertical (or temporal) and the horizontal (or spatial) will provide a basis on which the monitoring program may be systematically expanded for later investigations.

1.5 Plan of the Report

Section 1: Common Units and the First Year of University—principal findings of previous phases and problems and new directions in the monitoring program.

Section 2: Developments and Updates—a summary of the developmental aspects of the Program, unit and curricula changes, evaluation exercises including workshops and presentations, and administrative changes in the location and management of the Program; updates on research literature relevant to first year experience and student progress with an emphasis on areas of concern identified in 2003–4 report, such as performance of students in external modes of study and performance of students with Indigenous and ESL and overseas citizenship

Section 3: Research Design, Data and Variables—outline of the research strategy and recapitulation of ongoing methodology with re-specification of the analytical model from previous studies to include effects of admission categories on student outcomes; a description of data and variables for years 2005–6 and comparisons with previous phases.

Section 4: Trends in Performance and Equity in the Common Units 1999–2006—an analysis of the trends in student outcomes in the Common Units from 1999–2006, with an emphasis on a follow-up to the evidence of increasing diversity and maintenance of success rates following the major overhaul of offerings in 2003.

Section 5: A Multivariate Analysis of Equity and Performance in the Common Units 1999–2006—a report of results of independent effects of student background and situation on outcomes from regression and data-mining procedures established in previous reports, in addition to comparisons with previous results and comment on trends over the past eight years.

Section 6: Comparing Core and Common Units, Outcomes and Effects 2005–6—a descriptive and multivariate investigation in depth of the relative performance of the two classes of large intake units in terms of withdrawal and academic result in both types of units. This will be based on a comparative analysis of the relative performance of Common Units in terms of pass rates with a range of selected large Core first year units in the more popular courses in fields of Education, Nursing, Law, Business Studies and selected Science and Engineering units.

Section 7: Comparing Core and Common Units 2005–6—The Effect of Admission Categories—a further analysis of the variation in relative performance of Common and Core Units when admission categories are introduced into the predictive mix; exploration of equity issues in terms of student background and situation with special attention to the effect of Tertiary Entrance Rating (TER) on first year performance.

Section 8: Summary and Recommendations 2005–6—summary of main findings of the previous sections, highlighting issues in areas of program development, trends in enrolments, equity and

performance; reflection on the maturation of the Common Units and a review of the benefit of the extended focus of the monitoring program; projecting analysis to trends and predictor effects in years 2007–8 and evaluation of the effects of Common Unit participation/exemption on student progress in later years of their main courses.

1.5 Conclusion

The framework outlined above will therefore not only carry forward the monitoring program from a six-year to an eight-year continuous perspective (the program was commenced in 1998 for which data are not available). This will be built upon a data base of over 15,500 unit enrolments. Included will be the specific study of the comparisons with the Core units and admission categories for all students enrolled in the Common Units for 2005–6. This will enable the monitoring process to probe into specific trends over this latter period. For example, will the changes in the socio-demographic and situational profile of students in the Common Unit program observed in 2003-4 be sustained?

When compared with the first four or five years of the Common Unit program, will the average enrolment be from students who are older, more likely to be female than male, less likely to be foreign born and less likely to come from a non-English speaking background? Will the dramatic shift towards external mode of delivery, part-time status and interstate residence be sustained? If so, then how has the Common Units program met the radical changes in the student situation observed in 2003–4 in terms of unit delivery and support, design and content? What has been the impact of all these and any later changes in intake composition on rates of attrition? How do the Common Units compare with other large units across a range of fields of study in terms of their rates of early withdrawal and academic success and how might the admission categories of students affect these outcomes? These are the issues that we shall be exploring in this report, informed by the developments in both the Common Units program and the research into the first year of university reviewed in the following section.

2. RESEARCH, REVIEW AND DEVELOPMENT: PROGRESS IN THE COMMON UNITS AND THE LITERATURE—NICOLA ROLLS

This section presents a summary of the developmental aspects of the Common Unit program including structure, management and unit curricula. It also summarises evaluation and policy exercises, including workshops, and presentations by Common Units and university management. Finally, it provides updates on research literature relevant to first year experience and student progress with an emphasis on areas of concern identified in the 2003–4 report, relating to the *students' backgrounds* (literacy, socio economic status, culture, LOTE, location), *student situation* (motivation, ability to integrate, outside forces), and *teaching and learning* factors (learning approach, assessment, online learning).

2.1 Development of the Program

2.1.1 From two to three Common Units

In second semester 2006, a new “literacy” Common Unit to complement the existing one, CUC100 Academic Literacies, was introduced. In considering the proposal from the then School of Engineering for this new unit, the management group agreed that there could be merit in developing a literacies unit focussed more specifically on the written genres and literacies skills commonly required by students in technically oriented disciplines like Engineering, Science, IT and Business. It was also felt that the group innovative design project incorporated into the curriculum design to augment the development of students literacy would capture the interest and improve the engagement of students from these disciplines in common units. The incorporation of “real life” design projects from countries in the region (under the auspices of *Engineers Without Borders*) gives CUC106 an authenticity and strong focus on the graduate attributes of citizenship and world view.

Thus although students still need to complete two common units, they are given the following guidelines: **All** students commencing a Bachelor's Degree, Associate Degree or Advanced Diploma must complete **two** common units in their first year of study as follows:

The **core unit** dealing with Regional and Cultural Issues

CUC107 Northern Perspectives

And

Either one of the following Academic Communication Units:

CUC100 Academic Literacies

(For Humanities/Social Sciences students)

Or

CUC106 Design & Innovation: Communicating Technology

(For Technology/Science/IT students)

A summary of the new program is available online <<http://learnline.cdu.edu.au/commonunits/>>.

2.1.2 Changes in the Location and Management of the Program

At the end of 2006 the Common Unit program was moved from the portfolio of the DVC Teaching and learning to the portfolio of the PVC Community and Access and placed within a newly created entity LearnLink which included all the access and enabling programs offered by the university (except the Indigenous support arm). This move did not particularly affect operations of the program as the DVC T&L remained chair of the management group and the operational management of units was not changed. At the beginning of 2008 LearnLink (including Common Units) was placed under the DVC T & L portfolio. This move also marked a new configuration of LearnLink, with a portfolio focussed entirely on Academic Enabling and encompassing the Common Units Program, Tertiary Enabling Program and Academic Language and Learning Support (ALLSP).

This adjustment, although in its infancy, serves to build a profile and area of expertise in academic enabling for effective first year transition, an increasingly important area of university business. Recruitment for a suitable “Leader” (at the level of Associate Professor) to build the capacity of LearnLink should be finalised by the end of 2008.

2.2 Responding to Findings from the Attrition Project 2003–2004: Common Unit Management Group Workshop, November 2005

The preliminary findings of the 2003–2004 investigation into student outcomes in Common Units was presented in a workshop forum which allowed participants to digest the findings and discuss them extensively in a broader institutional context before arriving at key considerations and actions to respond to the report findings and actively promote improved retention. The formalisation of the workshop actions by the management group is evidence of an ongoing commitment by Common Units to showcase best practise in teaching and learning. Because they include close liaison with the university’s Teaching and Learning Development Group and Student Support Divisions the outcomes of this study and workshop will have positive effects at an institutional level.

In examining the factors for attrition it was reassuring to find that most of these factors are already addressed to a more or lesser extent within the Common Unit program, however, the forum gave the management group the opportunity to identify where further action and input was required. It was also an opportunity for people to share ideas and innovations to enhance the existing program.

It appears the area needing the most attention is liaison with support areas within the university and with the faculty schools and the extension of existing interventionist measures for at-risk students, particularly external students. The key actions for all areas are listed below. The full report of this workshop and outcomes is available online at <<http://learnline.cdu.edu.au/commonunits/>>.

2.2.1 Key actions identified to improve retention

The key actions for meeting retention improvement goals were dealt with under the core areas addressed in the report: Governance, Trends and Patterns, Equity and Student Outcomes, Teaching and Learning. The suggested key actions for each are:

Governance

- Integration of CU teaching with staff promotion. For example as a way of building staff teaching portfolios
- Changing the psychology of the process of recruiting staff—more carrot less stick
- Include challenge testing as an optional way of gaining exemption as well as clearly disseminating options for recognition of prior learning

- Involving students through the “informal study group” within TLDG
- Using TLDG networks to promote CUs
- Checking Carrick institute ideas for dissemination
- Seek schools input on CU assessments re their relevance to: individual disciplines and graduate attributes
- Develop charts mapping common units with graduate attributes

Trends and Patterns

Expand the project and funding to:

- Develop focus groups of students and tutors
- Allocate budget for interventionist measures
- Experiment with segregated groups as listed in goals
- Examine effect of different gender tutors on student experience
- Include gender research on M/F response to teaching modes tablet PC vs. traditional tutorial

Equity and Student Outcomes

- Liaise with CUC tutors to ensure at-risk students are identified and referred to support tutorials early in the semester
- Liaise with Indigenous support area, CAESL (LearnLink) and Access and Equity
- Develop scaffolding in CUC materials for external at-risk students
- Look at options for providing an intensive program pre semester common unit program for at risk students
- Look at a range of strategies for confidence building through improving accessibility of materials and other social support strategies
- Identify initial withdrawals in Indigenous cohort and ensure withdrawal paperwork is completed
- Ensure IASU, Common Unit, International and Study Skills tutors are given scaffolding literacy training

Teaching and Learning

- Review the existing levels of flexible learning in CUs and increase if required/appropriate
- Ensure External tutors are providing adequate support by:
 - communicating regularly with students (personal emails/phone calls)
 - providing rapid and comprehensive feedback to assignments

- Introduce Tablet PC for CUC107 internal students
- Explore options for video streaming
- Ensure the relevance and context of common units in relation to students general course and graduate attributes is imbedded as part of the learning in each unit

2.2.2 Actions achieved so far

In terms of the *teaching and learning* the points listed above have all been actioned. Some like the video streaming of face to face teaching sessions are ongoing projects. Since the workshop, this particular “audio visual” project has been formally proposed and funded (\$10,000) as a first year experience incentive under the auspices of TLDG.

The actions identified under *governance* have been integrated to some extent with management practice for the program but promoting common units to staff and students is an ongoing project and the engaging of staff for teaching and input into the program remains a challenge mainly because staff suffer information overload and are time poor. However, the incentives identified for governance continue to provide a framework for ongoing work in this area.

Actions regarding *trends and patterns* from a gender perspective have not yet been integrated formally into qualitative research design but these will be for the next phase of the project.

A number of the actions for *equity and access* are related to ensuring teaching methods and materials integrate sufficient scaffolding so that all students have adequate support for learning. In 2007 in CUC100 an additional online resource, a weekly study guide, has been developed which “talks” students through the weekly learning materials and previews and scaffolds the weekly readings. CUC107 has also introduced a more explicit explanation and encouragement to approach each weeks reading metacognitively.

Although these units have integrated the first level of scaffolding into its online study guides, more detailed scaffolding of the readings is the next stage to be completed. Eventually this approach will be integrated into all the materials. The completion of this project, is contingent on there being sufficient time for those staff with the expertise to develop a comprehensive set of scaffolded materials. It is also contingent on the willingness of teaching staff to take on new approaches. An alternative funding source for training and material development is being sought through a joint Carrick application.

2.3 Evaluation and Policy Incentives by Management

It is important to view the preoccupations of this attrition project and the directions of the Common Unit program in the context of the priorities and directions of the university as a whole. These are reflected in two key frameworks: The Futures Framework and the Teaching and Learning Operational Priorities Plan.

2.3.1 Futures framework

The university’s *Futures Framework 2007 to 2016*, “*1st in 5 in 10 Strategy*”, identifies five focus areas for development:

- *Indigenous participation and relevance (IPR)*
- *Pathways for learning (PFL)*
- *Professional, globally orientated education and training (PGOET)*
- *Knowledge to solve complex problems of importance in the communities of our regions (KCPICR)*

- *Expand our capacity through partnerships (ECTP)*

The Common Unit program continues to respond to the first four points in both streams of the program, academic literacies and regional knowledge. By providing academic literacy skills the program ensures all students make successful transition into HE learning and develop the awareness and skills of the necessary graduate attributes. The literacies unit, CUC106, has a strong focus on global community engagement through its affiliation with Engineers Without Borders. CUC107 provides students with contextual knowledge for their study and professional practice by providing the opportunity to gain an understanding of the complexities of our region with a careful examination of Indigenous perspectives.

2.3.2 Teaching and Learning Operational Priorities Plan 2007–2008

To facilitate the goals of the university's futures framework the core business area for teaching and learning has been summarised as being: *“To provide a mission-focussed range of high quality education programs and pathways providing innovative, flexible and stakeholder centred learning experiences that produce highly employable graduates with a world view and citizenship skills.”*

The Teaching and Learning Operational Priorities Plan 2007–2008, outlines the priorities of management for teaching and learning and confirms a strong emphasis on enhancing the first year experience. Further, results from student experience surveys, presented as context for the operational plan, show that what is happening in Common Units as far as unit experience is concerned is a microcosm of student experience across all units in terms of dissatisfaction with assessment presentation and feedback being one of students' primary concerns.

The Teaching and Learning Operational Priorities Plan reports little variation in 2007 and 2006 scores for students satisfaction with the lowest scoring item “promptness of feedback”. Thus, “assessment standards” and “assessment expectations and feedback” were identified as a priority for improvement. Interestingly, students views expressed through these evaluations are also mirrored in evaluations from universities at a national and international level (House of Commons 2008, Krause et al 2005, Scott 2008). Figures for attrition also reflect those gathered for this report with attrition across all disciplines ranging from 20–31% in students' first year.

The current Teaching and Learning Operational Plan for 2008–2009 identifies the following areas as most urgently in need of improvement:

- Monitoring and improving student retention and progress
- Monitoring and improving client satisfaction with their experience of teaching and learning at CDU
- Enhanced provision of targeted professional development.

The Teaching and Learning *enabling objectives* identified are:

- (1) To have an increased commitment to learner-centred approaches to education and to further engage with the professional community in the development and delivery of programs
- (2) To ensure completing students acquire the University's identified set of graduate attributes and employability skills

- (3) To establish and maintain comprehensive, bi-directional articulation pathways between Vocational Education and Training (VET) and Higher Education (HE)
- (4) To increase the use of more innovative, flexible, resource-based and technology mediated approaches to teaching and learning
- (5) To achieve improved and globally orientated teaching and learning practice through staff recruitment, induction and ongoing professional development and support
- (6) To use an evidence-based approach for the adoption of strategies to improve teaching and learning and to implement a comprehensive evaluative framework for the teaching and learning enterprise.

Again, Common Units are actively engaged in responding to all of these objectives, although the Common Unit participation in assisting the realisation of objective three has been ironically stymied by the existence of a rule allowing exemption from common units for articulation VET students. However, increasingly the view from teaching staff is that this group often require academic literacies and as a result some courses have adjusted their course rules to insist on completion of the literacies unit. So far this has been adjusted for Bachelor of Nursing and Bachelor of Teaching and Learning students.

To help us establish the positive effect of common units on academic literacy and confirm whether this exemption rule for VET feeder courses should be removed altogether, the next phase of this attrition study includes a comparison of the success of students who were exempted from Common Units (via a VET pathway or by other means) and those who had to complete them.

2.4 Common Unit Review: Dr Gabrielle Baldwin

A central source of objective, qualitative commentary on the Common Units comes from a review of the program (available online at <<http://learnline.cdu.edu.au/commonunits/>>) conducted in May 2008 by Dr Gabrielle Baldwin, Principal Research Fellow, Centre for the Study of Higher Education, The University of Melbourne.

Baldwin's findings are significant in our analysis of trends and risk factors for the program because they help to highlight the areas for improvement that may reduce the risk factors and confirm the areas where we have achieved sufficient levels of best practice. Interestingly, rather than the details relating to teaching and learning needing attention, it is *governance*, the "umbrella" of good practice that is highlighted for improvement. She recommends we further promote: clear expectations of Common Units and a uniform, systematic approach to continued quality assurance, through appropriate teaching staff and regular formalised planning and review processes.

The terms of reference provided for the review were:

- The previous external review of the Common Unit Program, Baldwin and McInnis (2000)
- The 1999–2004 and 2005–2006 reports on Common Unit Success
- Student Experience of Learning and Teaching (SELT) in Common Units data
- Current staff and student's perceptions of the program through focus groups and interview.

- The Universities Strategic Directions (Futures Framework, Graduate Attributes, Teaching and Learning Operational Priorities)
- The awards achieved by the program for excellence in teaching and learning—Vice Chancellor’s Award 2007 and Carrick Citation 2007
- The criteria for proposed application for a Carrick Award for Programs that Enhance Learning 2008
- Other university approaches to common core and graduate skills.

Thus, Dr. Baldwin’s conclusions were based on interviews and focus groups with staff and students in all three Common Units as well extensive scrutiny of unit materials, the Common Unit website and other related documentation listed in the terms of reference. Her conclusions about the program were extremely positive particularly in relation to its design, structure, management, quality assurance mechanisms and organisation. She suggested that the program structure as a whole deserved a period of stability and that apart from the usual practice of adjusting assessments and refining aspects of the program’s delivery and governance, “the program is sufficiently established for change to be incremental”. These views are summarised in the executive summary of the report (p.1) below:

- The Common Units Program has been intensively scrutinised since its inception, with a range of external reviews and ongoing internal analyses. The University has responded energetically and constructively to recommendations, and demonstrates a strong, genuine commitment to continuous improvement.
- The structure of the Program is now clear and coherent, and the ‘two stream’ framework seems to be successful.
- On paper, the Units represent excellent models of structured courses of study which have been well planned and soundly conceptualised.
- In practice, there are still a few gaps, but student and staff responses indicate acceptable levels of satisfaction with the course experience and outcomes, while suggesting several areas for improvement.
- The quality assurance mechanisms which have been put in place are extensive and rigorous, and still being enhanced.
- The organisation of the program has improved considerably,
- Acceptance of the importance of the Program in the University community seems to have increased, but there is still some resistance and criticism.
- The main areas in which further work is required are:
 - Standards (ensuring the achievement of baseline levels of the academic literacies which will be adequate for students’ future study)
 - Understanding of the Program among academic staff and students (its goals, curricula and procedures)
 - The greater formalisation of some of the procedures for planning and review (to an appropriate, not overly bureaucratic extent)

- Staffing (achieving the optimal balance of faculty-based and specialist staff/core and casual staff)

2.5 Awards for Teaching and Learning Excellence

Further evidence of the commitment and quality of the design and delivery of Common Units was provided by the receipt of two awards in 2007:

- Carrick award for: Enhancing the Quality and Success of our Students' Learning Journey through Best Practice in Curricula, Teaching, Assessment, Support and Research
- Vice Chancellor's award

The full applications for these awards are presented online and may be of interest as a comprehensive summary of the design and delivery of the program (<<http://learnline.cdu.edu.au/commonunits/>>).

As Baldwin notes in her 2008 review, on paper the program is extremely carefully thought through and gets full marks for innovation and excellence in course design, and approaches to delivery. The challenge continues to be uniform quality assurance across large numbers of tutors and employing sufficient resources to respond adequately to the diverse needs of our student body.

2.6 Geoff Scott Report May 2008: Improving Student Retention and Success at Charles Darwin University

Another guiding document comes out of a review conducted for management by Professor Geoff Scott in May 2008 on improving student retention and success (Attachment E). His review aimed to:

- (1) [Provide] key practical steps the University can undertake to improve student retention which align with the broader research base on effective approaches in this area;
- (2) [Suggest] what might best be done at the University and local level to ensure these retention strategies are successfully implemented and sustained;
- (3) [Identify] what tracking and improvement system for learning and teaching to assist this process.

The report posits two key reasons for improving retention: moral and financial. The moral reason appeals to our desire to improve the lives of our students and the financial to our desire to maintain the viability of the university and thus our jobs. He advocates the importance of the following key “mutually reinforcing” elements for retention of students:

- a sound, responsive, flexible learning design that is relevant, feasible and engaging;
- which is delivered by accessible, responsive, committed, competent and effective teaching and associated staff;
- supported by consistently responsive and aligned library, IT, administration, staff and learning assistance systems.

He recommends the implementation of a teaching and learning framework “rated class A” developed out of a national study of comments about their university experience made by 92,000 students from 14 Australian universities on the “best aspect” and “needs improvement”.

The study suggests that to engage students in productive learning and attract high satisfaction ratings and retention the course should be:

- R Relevant to the needs of the student and the profession/discipline
- A Uses Active learning and the right selection of 60 proven learning and teaching methods
- T Makes consistent Theory – practice links
- E Manages student Expectations from the outset
- D Has a clear, logical Direction

- C Focuses in both assessment & learning on the Capabilities that count for successful subsequent disciplinary or professional performance
- L Provides Learning pathways that are flexible
- A Provides clear grading systems and Assessment tasks that are clear, relevant and fairly marked; and ensures that feedback on these tasks is both prompt and constructive
- S Uses Staff who are skilled, up to date, can teach, and are committed and responsive
- S Has Support systems that are in alignment with self-teaching guides and other learning experiences and resources that help students learn productively and complete assessment efficiently and effectively.”
- A Ensures that student Access is as convenient as possible, including provision of electronic access via high speed broadband.

Again, the Common Unit program has led the way with implementation of a framework for their design and delivery that addresses each of the points in the “Rated class A list”. However, Scott’s recommendation reminds us of the importance of maintaining and continuing to improve on each feature of the framework.

2.7 Updates on Research Literature

The first two stages of this project, the 1999–2002 and 2003–2004 reports, included extensive reviews of the literature in relation to student outcomes in first year university. While the quantitative data for student success in Common Units and other first year units have inevitably changed each year, the qualitative issues relating to student success have not.

Thus, the updates to the literature are integrated under the headings drawn for the previous report which looked at the effects on attrition of: *students’ background*, *student situation* and *teaching and learning*. These factors are naturally interconnected, so that in most cases findings regarding student background affect student situation which in turn affects teaching and learning implications. The publications reviewed for this report are drawn from a number of important summative reports made available in 2008:

- House of Commons Committee of Public Accounts (2008), *Staying the course: the retention of students on higher education courses*, 10th Report of Session 2007–08, House of Commons, London, UK. [19th February 2008].
- Centre For The Study Of Higher Education (2008), *Participation And Equity: A Review Of The Participation In Higher Education Of People From Low Socioeconomic Backgrounds And Indigenous People*, prepared for Universities Australia, University Of Melbourne, March 2008
- Kerri-Lee Krause, Robyn Hartley, Richard James And Craig Mcinnis (2005), *The First Year Experience In Australian Universities: Findings From A Decade Of National Studies*, Centre For The Study Of Higher Education, University Of Melbourne, Final Report, January 2005.
- Scott, G (2006): *Accessing the Student Voice: Using CEQuery to identify what retains students and promotes engagement in productive learning in Australian higher education*, DEEWR, Canberra.

This literature serves to confirm original findings: that first year attrition rates of 20–35% are commonplace in western universities and that there are myriad factors which cause these, including the impact of the *diversity of students' backgrounds* (literacy, socio economic status, culture, LOTE, location), *student situation* (motivation, ability to integrate, outside forces), and *teaching and learning factors* (learning approach, assessment, online learning). The House of Commons (2008) report acknowledges these various factors for attrition in their suggestion that universities use “market research techniques such as customer segmentation to help them provide teaching and support services which appropriately reflect students’ different cultural, social and economic backgrounds”.

Further, of particular interest for the CDU context, an examination of the percentage rates of first-year students expected to graduate shows that universities with the highest success rates are largely those that are the most academically eminent. Without exception, however, those universities with the lowest success rate are the least academically selective, undertake little research and have expanded fastest to meet the UK Government’s aim of “widening participation” (Guardian, 2005).

A recent study of attrition rates in Australian Universities (Macnamara, 2007) placed CDU ninth from the bottom with a retention rate of 79.16%. Interestingly, University of Technology, Sydney and University of Melbourne had the lowest attrition rates of 10 and 18% respectively and in both cases this was attributed to their well established and funded student support infrastructure. However, the article did conclude that causes of attrition are complex and wide ranging and often related to a number of social factors outside of students’ experience at university. The fact that attrition is not necessarily attributed to students’ experience at university does not let us off the hook. If our students are experiencing significant outside factors (financial, personal and social pressures) that impact on their ability to study, we need to be thinking of ways we can help them cope with these pressures while they study. This includes helping them make realistic choices about their study load.

2.7.1 Overview of factors for attrition

The literature highlights the need for an integrated approach to first year transition that recruits the combined energy and awareness of tutors, coordinators, discipline areas, student services and management. Students need support and assistance from their first point of contact with the university, across all areas of their engagement with the university and the best, most highly motivated staff, so that they make informed choices about what and how to study and receive the required academic and pastoral assistance from the beginning of their academic experience. Although it is widely acknowledged that reasons for withdrawal are multiple and interconnected, in many cases making it difficult to lay the blame at any particular factor and equally difficult to address the problem.

These issues are beginning to be addressed through the Teaching and Learning Development Groups (TLDG), *learning support* and *assessment projects*, as well as various mentoring and tutor support

incentives operating in different sections of the university. However, as Longden (2004) and Scott (2006) suggests, an organised, integrated and pro-active approach is essential if we are to successfully address student attrition. This might be effectively augmented by an effective central data base of information about individual student needs and staff committed to building helpful relationships with students (Shaik, 2005).

In terms of online learning, the literature reminds us of the importance of training for online teaching staff and recognition by management that online teaching requires double the contact hours with students. Evidence also suggests that, before they commence any other online study, students should receive assistance in establishing their suitability for studying online and should complete an orientation (CUC100). Further, the suggestion is that students who are inexperienced and lacking in confidence with distance and ICT learning should be advised to attempt no more than two online units in their first semester. A practical interpretation of these recommendations would be to suggest that *external online* students consider completing CUC100 first (potentially in the first semester of the year of commencement) or a maximum of CUC100 and CUC107 in their first semester of study.

It seems Common Units at present embody many of the principles of good practice espoused by the current literature but there is a need for Common Units to work more closely with discipline areas to ensure that good practice, skills and support are consistently provided by teaching staff within each discipline to ensure that in their first year students receive a seamless, comprehensive and consistent learning experience.

Commonly cited causes of first year attrition in universities can be summarised as:

- Financial problems
- Pastoral/cultural problems
- Family commitments
- Problems with teaching quality
- Insufficient support from teachers
- Lack of interest in course content
- Lack of academic orientation
- Literacy levels
- Insufficient English language (for overseas students).

(McInnis & James 1995, Baldwin & McInnis 2000, Mariani 1997, Barthel 2000, Mackie 2001)

More recently Longden (2004) cites UK studies from Yorke (1999) which report the following reasons for why students leave:

- “wrong choice of field
- academic difficulties
- financial problems
- poor quality of student experience
- unhappiness with the social environment
- dissatisfaction with institutional provision”

And Davies and Elias (2003)

- “wrong choice of course
- financial problems
- personal problems

- academic difficulties
- wrong choice of institution”.

These issues can be usefully categorised and understood through Tinto’s (1975) seminal model for interpreting student retention. His interactionist model maps the students’ experience of transition to university as:

Phase 1 *Separation*: Student Entry

Phase 2 *Transition*: Academic Integration & Social Integration

Phase 3 *Integration*: Persistence (Tinto, 1975 in Tinto 1982)

2.7.2 Teaching and learning implications

Overview

Scott, in his 2006 review based on a Course Experience Questionnaire (CEQ) survey of 94,000 students across Australian universities, provides us with a useful national context of retention and his findings about what matters to students bring no surprises in that they confirm the importance of course design, particularly learning methods and assessments, and staff support and accessibility.

SELT for Common Units and across all units indicate assignment feedback is consistently an area of concern for students. Anecdotal experience suggests supportive staff (especially for external students) is an important factor in students’ experience. As one unsolicited comment sent by email to a tutor from a 2008 CUC100 student reflects:

“Many thanks ... [a] most enjoyable but challenging [sic] subject ...thanks for all your support and, I have written VERY favourable comments on my subject assessment form sent to me by the university this week and now posted back.. Quite a contrast to another subject I have just completed where I and my peers have not received any grades or any feedback about any of our work...and we finish next week.... so many submissions but I have no idea of how I am progressing ..if I am progressing [sic] ,or what standards I have achieved?”

The report outlines a quality management framework for learning and teaching in higher education (tested through national and international benchmarking projects over the past five years) which suggests that if:

- **learning design** is soundly constructed (i.e. a relevant, flexible, responsive, assessment-focused, accessible, learner-centred, feasible and clearly understood) and is
- **implemented** by consistently capable, accessible and responsive staff using an appropriate combination of interactive, practice-oriented, problem-based learning methods; and if this is
- **supported** (consistently) by directly relevant, responsive, value-adding and appropriate support from key enabling areas like IT, the library, learning support groups and a positive social and university environment, then
- **productive learning occurs** (improved retention and a positive change in student capabilities) (p.14).

In this report, Scott (p.7) posits that it is the “total experience” that affects students’ experience and judgement of quality, their engagement in learning and ultimately their retention. He provides, as an example of this range of necessary factors, a list from the CEQ sub-domains, ranked in order of importance to students:

Course Design: learning methods	(14.2% share of the 285,000 hits)
Staff: quality and attitude	(10.8%)
Staff: accessibility	(8.2%)
Course Design: flexibility & responsiveness	(8.2%)
Course Design: structure & expectations	(6.7%)
Course Design: practical theory links	(5.9%)
Course Design: relevance	(5.6%)
Staff: teaching skills	(5.4%)
Support: social affinity	(3.8%)
Outcomes: knowledge/skills	(3.8%)
Support: learning resources	(3.5%)
Support: infrastructure and learning environment	(3.4%)

In his conclusions he suggests the “hot spots” for dissatisfaction amongst students are: “*Assessment* (standards, marking, expectations, management and feedback); *Student Administration and Support*; and *Course Structure and Expectations*”. Finally he summarises key implications for improving student engagement and retention as understanding student engagement as a “total experience” and learning as “a profoundly social experience”. He reminds us that “learning is not teaching”, that learning methods should be varied and emphasis active, practice oriented learning. He suggests that areas identified for improvement represent opportunities for improved practice and benchmarking that should be utilised.

These are useful guidelines to integrate (where we have not already) in our models for best practice in Common Units. Student evaluation and the Baldwin (2008) review highlight *Assessment Feedback* and *Expectations and Course Expectations* as being the two areas where there are gaps in the Common Unit program. The other “hotspots” identified by Scott are well in hand in Common Units as confirmed by the Baldwin (2008) review.

Assessment feedback

Assessment feedback has proven to be a difficult area in which to ensure consistent practice. Despite clearly articulated guidelines (verbal and in writing) about the timing and nature of feedback, and close policing of this by coordinators, because of the large number of tutoring staff it seems inevitably each semester at least one staff member lets the team down (often for quite legitimate reasons like sickness). One recent strategy is to ask tutors to anticipate delays in marking and ask for assistance before they fall behind.

Another interesting point for reflection regarding timing of feedback is the potential for varying levels of expectations and whether students have realistic expectations. It has been suggested by the Teaching and Learning Development Group that students may have their own idea of what feedback is or should be and that they don’t necessarily know that feedback constitutes comments provided on Learnline in grade-book and on the assignments re-attached therein.

In terms of their expectations of timing, one would imagine students would prefer feedback in 48 hours but we hope they understand this would be impossible for teaching staff to accomplish. Perhaps we need to present students with explicit guidelines about what they should expect in their unit information guides?

Quality of teaching

In a survey of first year undergraduates at Griffith University, Zimitat (2006) found significant differences between the views of males and females, disciplines, and passing and failing students with regard to those aspects of teaching considered most important. However four aspects of good teaching which were consistent across these groups were: “(i) being good at explaining things, (ii) being approachable, (iii) having enthusiasm for the subject matter, and (iv) providing helpful feedback. The next most important aspects were: making expectations clear, making subject matter interesting and using assessment strategies that did not reward memorisation”.

These findings support Ramsden’s (1991) six principles of good university teaching: interest and explanation; concern and respect for students and student learning; appropriate assessment and feedback; clear goals and intellectual challenge; independence, control and active engagement; and learning from students.

The report on first year learning (Krause, 2005) suggested that although first year students were more satisfied with their first year of study and the teaching quality than previous surveys indicated, over half were still dissatisfied with teaching staff’s availability and accessibility for providing academic support, encouragement and feedback. The importance of this kind of support is a guaranteed feature of any literature on student success and is raised in all of the recent literature reviewed for this report. Undoubtedly, pressures on staff time, because of reduced university funding, have some impact on staff member’s ability to provide this essential component of good pedagogy; but this does not abdicate our responsibility to find ways to ensure this individualised support is offered.

2.7.3 Application of online learning in Common Units

In the current iteration of the Common Unit program, the compulsory Common Unit CUC107 *Northern Perspectives* is principally an online course to the extent that, for internal students, tutorials are augmented by the online materials and conducted in the tablet PC lab. The internal modes of the two literacy units, CUC100 and CUC106, are less reliant on online technology and, apart from the online information literacy workshop, it is used mainly to introduce students to online learning skills and as a tool for communication, discussion and sharing of ideas.

However, the external students in CUC100 and CUC106 are expected to engage with online learning much more comprehensively. In CUC100 students’ learning activities each week are guided by an online study guide, they participate in a weekly discussion forum and they submit their assignments online. CUC106 external students are expected to design and construct an item and present a written and verbal/visual report in small groups. So online communication and interactive tools are used extensively. It is only its second semester of offering but feedback so far suggests such an ambitious form of virtual group assessment is possible.

The increasing use of online learning technologies, as exemplified in the Common Units, necessitates investigation as to how online learning may enhance or detract from students’ experience of first year HE. This investigation has not thus far isolated a trend for an increase in withdrawal from external students; however, this may be due to external students’ lack of awareness about withdrawal formalities, so that where they have “dropped out” but not formally withdrawn they will show up as F (fail). Literature does indicate that online learning introduces another layer of complexity and challenge to both staff and students that in some cases may outweigh the advantages of this technology.

Online attrition rates

Online attrition rates across universities vary from 70% to 20%. Regardless of where the truth lies along this continuum there is considerable consensus that attrition is higher for online learners than

non traditional ones (Tyler-Smith 2006). Simpson (2004 in Tyler-Smith 2006), claims: “that 35% or more of eLearners withdraw before submitting their first assignment (p. 83)” in UK Open University.

McVay Lynch (2001), in her examination of high dropout rates at a small, private, urban university of approximately 5000 students (a high proportion with an average age of 33), found drop-out rates for online students were between 35% to 50% compared with 14% for on campus students. Related issues were excessive time spent by staff trouble shooting technological issues and students’ feeling of social isolation with regard to completing assignments. For many of the students online learning was new and many lacked fundamental computer skills. Consequently the students had difficulty integrating technology with human interaction, necessary functions for online learning. Many reported that without human interaction they “quickly felt disconnected from the campus, their motivation dwindled and they appeared unable to initiate any self direction in learning”.

Causes of online attrition

The challenges faced by e-learners are easy to underestimate by the champions of this learning mode who necessarily are already accomplished users of the medium. Whipp and Chiarelli, (2004 in Tyler-Smith 2006) list a range of challenges which may severely impact new students’ confidence and success in e-learning as: “... technical access, asynchronicity, text-based discussions, multiple conversations, information overload and isolation.” Eshet-Alkai (2004 in Tyler-Smith 2006), confirms this by suggesting: “Digital literacy involves more than the ability to use software or operate a digital device; it includes a large variety of complex cognitive, motor, sociological and emotional skills, which users need in order to function effectively in digital environments.” (p.93)

Terry (2001 in Turner and Crews, 2005) also corroborates McVay Lynch’s (2001) findings that students had difficulty adjusting to studying independently in an unfamiliar mode. He also cites faculties’ inexperience with online teaching as part of the problem.

Where students are mature eLearners new pressures arise since they are often employed full-time and tend to do their learning in their personal time somewhere in between work and family commitments. Studying in personal time can have a harmful effect on an employee’s home life and family and may contribute to attrition statistics (Thalheimer, 2004 in Tyler-Smith 2006). This is particularly so if feedback and institutional support is slow or inadequate, thus exacerbating their feelings of isolation and frustration.

Krause et al (2005) indicate that while ICTs have played a significant role in changing the face of teaching, learning, the proportion of students using online discussion opportunities remains in the minority. This may be an indication that an important potential means of reducing students’ feelings of isolation is not being utilised comprehensively or effectively.

2.7.4 Effect of student background

It is important in understanding attrition levels at regional universities such as CDU to acknowledge that our students are drawn from diverse and *non-traditional* backgrounds. This phenomenon is not unique to CDU as the massification of university education has occurred both in Australia and at other western universities. As more students from under-represented groups are attracted to university the likelihood of higher withdrawal rate increases, as does the need for providing support (both academic and pastoral).

Despite a recognition of student background and situation being important factors in attrition, there continues to be a gap in the literature about the personal reasons for withdrawal. The House of Commons (2008) suggest there are problems with incomplete and inconsistent personal data on withdrawal and a lack of detail on the extent to which various personal problems impact student retention, for example the extent to which mental or physical illness or domestic circumstances contribute to withdrawal (James et al, 2007).

The CDU student demographic in 2006 confirms the significant numbers who fit into equity categories and the need for an effective strategy for assisting these students to “stay the course”: External mode 60%; Part-time 32%; Indigenous 5%; NESB 15%; Male 33%; overseas citizenship 6%; under 25 years 46%; mature age 54%; resident beyond the NT 39%.

Mature age students

Krause et al (2005) found in their study of the first year student experience that mature age students appear to be a highly satisfied group on the whole. They tend to achieve high marks and express higher levels of satisfaction with the university experience. This may be connected with their other finding that mature age students tend to “have strong clarity of purpose and are more likely to seek assistance from staff”. An aspect of this purposefulness is their tendency to keep to themselves and not become involved in extra curricular activities.

Low Socio Economic Status (SES) and Remote Status

SES is an important consideration for this investigation since a large number of our students fit into this category and Low SES has been found to impact students’ retention and success. This is thought to be related to student’s motivation, which may be affected by financial stress and a lack of support from parents and peers in their home environment.

The literature suggests students’ success is partly determined by motivational forces (Tinto, 1982, Mackie 2001, Rau and Durand 2000). James et al in their 2004 study suggest a student’s socio economic status closely correlates with their belief in “the importance, attainability and relevance of high education”. Not surprisingly students from low SES were less likely to hold these beliefs.

Despite this finding, the 2004 study found that although this belief affected students’ choices about attending university, once students enrolled the differences in SES did not significantly affect success and retention. However, if a student is both from a remote area and of low SES the rate of retention is between seven and ten percentage points lower than for students from urban backgrounds.

James et al (2007) do acknowledge that retention rates are marginally higher (7%) in students whose parents had a degree or a diploma (12 %), Long et al. (2006) using a combination of SES definitions, including parental education and occupation and students’ geographical background did find some differences between attrition rates for low and high SES students, although they were not statistically significant. They also found attrition rates higher for students living in more inaccessible areas. Not surprisingly another factor likely to compound low SES attrition was the increased financial pressures they were found to suffer.

Indigeneity

Findings for this study that indicate Indigenous students as being the highest risk category are confirmed by the literature, most recently by the report (2007) by James et al. Equally there are no surprises in the literature about why these attrition rates are high. Unfortunately this knowledge is yet to lead to any easy solutions, instead it emphasises the need to address attrition holistically at an institutional level to ensure all support mechanisms work in unison.

James and Devlin (2006 in James et al 2007) found attrition to be particularly high for Indigenous students in the first year of study: in 2000–03 attrition rates were around 35–39 % compared to a 22–23 % for other domestic students. This study also found that Indigenous students had a lower completion rate influenced by a higher rate of attrition in early years and a higher failure rate of individual subjects (that is, lower success rates).

Reasons for high attrition in Indigenous students relate to the complex and interconnected challenges faced by many Indigenous students (particularly in the NT) which put them simultaneously in every equity and at-risk category, namely educational disadvantage, rural and regional disadvantage, low SES

disadvantage and cultural isolation and prejudice, ESOL, mode of study, and age (James and Devlin, 2005).

In their review of the issues James et al (2007) cite Craven's (2005) finding that Indigenous students often lack the staying power and adaptive strategies to move beyond challenges to their progress. This can be logically linked back to vulnerabilities exacerbated by the students' backgrounds listed previously, especially those which affect students' educational and literacy levels and those which affect self esteem and self efficacy. To further exacerbate the experience of Indigenous students is the suggestion that teaching staffs' low expectations of Indigenous students' academic potential and education prospects may compound the student's low aspirations (Craven *et al.* 2005; Ferrari 2006 in James 2007)

Family pressure is another factor Indigenous students often have to contend with. Not only through cultural obligations which may prevent attendance but also related to these students being older on average than other Australian students (29 years old compared with 22 years old) and therefore often having family and financial commitments related to child rearing (James and Devlin, 2005 in James et al 2007). Hillman (2005) confirms that this conflict between family and study tends to be more acutely felt with Indigenous students.

2.7.5 Effect of Student Situation

Student expectations

In their survey of first year experience, Krause et al (2007) found first year students to have an increased sense of purpose and focus on career aspirations. They also suggest an overall increase (since a 1994 survey) in the number of students satisfied that university is meeting their needs, although there are some subgroup differences, especially International students who tend to be less satisfied.

Krause et al's (2007) report suggests students are spending less time engaging in class and campus activities. Their findings suggest that over the last ten years full-time students have spent progressively less time on campus, reduced hours in class and an increased commitment to paid employment. Economic realities have no doubt had an impact on these trends, especially in the NT where cost of living is high. However, Hillman (2005) suggests students are also more consumer minded.

An aspect of this increased consumer orientation is students' tendency to increasingly seek choice in subjects, delivery mode and assessment and in time spent on campus (Hillman 2005). Australian Universities Teaching Committee (James and McInnis, 2001) reveal a strong perception from university staff that this increased consumerist attitude to study strongly correlates with the increase in the cost of education to students. Interestingly, staff report that an alarming aspect of this new attitude is students' expectation that they should play a more passive role in their education. Hillman further reports a belief by staff that: "a growing proportion of students are predominantly instrumental in their outlook, avoiding intellectual challenge and adopting narrowly reproductive approaches to assessment".

External forces (work/financial/family/P/T status)

McInnis & James, (1995) and McInnis, James & Hartley (2000) studies of first year students across a five-year period (1994 to 1999) reveal that the proportion of students studying full-time and working part-time has increased by nine per cent. They also report that the number of part-time hours worked has increased considerably compared with 1994. This corroborates the aforementioned claims by staff that increasingly students look for a less intense engagement with university study to make room for the extensive commitments in other parts of their lives (McInnis, 2001).

Anecdotal evidence of students at CDU suggests a number of students enrol in full-time external study while working full-time in the mistaken belief that distance mode study requires less time. Understandably these students are a high risk for failure and/or withdrawal especially where they are mature students with families to care for as well. Figures for 2006 indicate a continuation of high part time withdrawals/non completion at over 30% compared with an overall improvement from common unit attrition to 24%.

Evidence from a survey of early withdrawals from units conducted by the CDU Academic Quality group in 2007 corroborates the above findings regarding the increasing outside pressures on students, particularly economic. Students' reasons for withdrawal from units at CDU were often personal rather than course experience. This obviously requires more careful examination and analysis, as it could be argued that had these students received adequate advice and academic and pastoral support in this transition to higher learning they might have maintained their focus on university as their priority.

This high rate for part-time failure is corroborated by findings for the same group in the UK, where it was reported that only half of part-time students obtain a qualification in six years (The House of Commons, 2008). They also express concern at the lack of clear frameworks to respond to the high non completion rate of part-timers.

Ability to integrate with university culture

Mackie (2001) proposes an “interplay of forces, *personal, institutional and contextual/external*”, affecting student withdrawal which can also be correlated with the three stages of Tinto's model, “*Separation: Student Entry; Transition: Academic Integration & Social Integration; Integration: Persistence*” as a way of understanding the *forces* that enable or disable Tinto's *stages*. Her study of first year students in the Business School of a new university reveals a complex interplay of these forces lead up to the decision by a student to leave or to stay. She found commitment to the university experience, homesickness, levels of perceived control over events and alienation played a role in the decision to withdraw. She suggests that “all students arrive with some level of commitment and an intention to complete their course of study, it is the concern that by the beginning of the second term we succeed, for some, in turning this ‘expectant hope’ into ‘fears realized’ and may have failed to exploit the potential within that initial commitment.”

Motivation

Rau and Durand's (2000) have found the effect of students' motivation to learn or “academic ethic” has a significant effect on attrition. Rau and Durand's research suggests present study effort, as defined by study hours and reduced alcohol consumption, and a proxy for past effort (at high school) and high school percentile rank, account for most of the explained variance in grade point average (GPA). They conclude that the ability of colleges to graduate learned, individuated, and ethical human beings may depend on the commitment students make to their own education - i.e. they believe members of the “academic oriented” subculture make this commitment; members of the “party oriented” subculture do not.

2.7.6 Importance of a whole institutional approach

Clearly, the complexity of responding in a coordinated and effective manner to the range of forces at play in affecting student retention call for a cohesive and coherent leadership at the institutional level. The House of Commons (2008) report proposes that university management ensures there are systems in place for good quality management information, which includes reasons for leaving, and the provision of additional academic support for students (in maths and literacy) and pastoral support as one of its principle recommendations for improving retention. In his 2008 review for CDU on improving retention, Scott also cites tracking systems as being an important management tool, as well as “consistently responsive and aligned *library, IT, administration, staff and learning assistance systems*”.

Longden in his 2004 report, *Student Retention and Success: from Macro to Micro Analysis*, integrates the institutional characteristics that deliver student success from research by Bean (1980); Tinto (1993); Braxton et al (1995). He suggests the best retention programs from the US have the following general characteristics.

At a managerial level:

- **Whole institutional commitment.** Acknowledgement that there is a problem
- **A proactive approach.** Institution responsible for creating a success structure
- **Extended intensive contact with individual students:** student-centred focus central to success.
- **Interlock program with all other services:** seamless integration of services—‘one-stop shop’ concept.

At the level of teaching and learning:

- **A strategy of engagement that ensures staff take the initiative.** Avoid passive engagement
- **Quality staff chosen to engage with first year:** select the best, gregarious and social first year tutors
- **Promote and acknowledge “effective teaching”:** shape classroom behaviour to achieve success
- **Focus on how students are coping:** is the risk associated with transition period acknowledged?

Most importantly he suggests the establishment of a task force that has authority from the top and a plan of action that moves beyond more detailed analysis of reasons for poor retention and more towards detailed analysis of student exit comments. He urges us to turn the data from student surveys into action, not through “fuzzy pilot projects”, but through a unified integrated approach that includes the provision of dedicated service-minded staff and a good physical or virtual environment. In this way, management can increase the likelihood that the first year experience will be a successful and productive stage in students learning journey.

2.8 Conclusions

The literature continues to confirm that first year attrition rates of 20% and above are commonplace in western universities and that there are myriad factors which cause these, including the impact of the *diversity of students’ backgrounds* (literacy, socio economic status, culture, LOTE, location), *situation* (motivation, ability to integrate, outside forces), and *teaching and learning* factors (learning approach, assessment, online learning).

Progress in the common unit program since the last report has been considerable, with a new structure to the program, achievement of two best practice awards, completion of an outside review and a decrease in attrition rates from a high in 2000 of 36% to a 2006 rate of 24%. The program continues to be run by a committed group of teaching staff and overall the profile and perceptions of the program have improved considerably. A number of new initiatives have been put into place in response to the findings and associated actions from the previous report, including improved support for external students, scaffolding of learning materials, and strategies for improving assignment turn around. Areas identified as an ongoing project include promotion of common units to the broader university community, continued development of a scaffolded approach to teaching and designing learning materials, and continued development of online technologies that engage all learners.

Students need support and assistance from their first point of contact with the university, across all areas of their engagement with the university and the best, most highly motivated staff, so that they

make informed choices about what and how to study and receive the required academic and pastoral assistance from the beginning of their academic experience.

In terms of online learning, the literature reminds us of the importance of training for online teaching staff and recognition by management that online teaching requires double the contact hours with students. Evidence also suggests that, before they commence any other online study, students should receive assistance in establishing their suitability for studying online and, if they are undergraduate, they should complete an orientation (CUC100). Further, the suggestion is students who are inexperienced and lacking in confidence with distance and ICT learning should be advised to attempt no more than two online units in their first semester. A practical interpretation of these recommendations would be to suggest that *external online* students consider completing CUC100/106 first (potentially in the first semester of the year of commencement) or a maximum of CUC100 and CUC107 in their first semester of study.

The realities of our broad demographic with high numbers of part-time, external and first in family students continue to affect our attrition rate and our response to affecting this attrition needs further development at an institutional level. The Office of the DVC Teaching and Learning is addressing this need for a more integrated and coherent, whole university response through its operational plan and outside review on retention, as well as the formation of other working parties. In the next phase of this project the rich body of knowledge and experience gained through the Common Units research and practice needs to be integrated at a whole university level, in order to help close the loop and support first year students sufficiently so that they stay the course.

3. EXTENDING THE DESIGN: MODEL, DATA AND VARIABLES

How might the two components of this phase, continuing the established monitoring of the Common Units on the one hand and comparing their performance with other large units on the other, be combined into a single evaluative design? Any approach to this problem should first of all exploit the cumulative strength of the monitoring project by carrying the trend analyses into the two extra years now added to the data base. Given the addition of the Core unit data, as well as those for admissions for the academic years 2005–6, the research design should also allow for a specific study of these effects for this period alone. The design task may be addressed by building on the methodology of the previous phases, while adjusting its focus to account for the additional variables. In each case, the research design will combine descriptive, analytical and comparative approaches as appropriate to each of the two component tasks as set out in the first section.

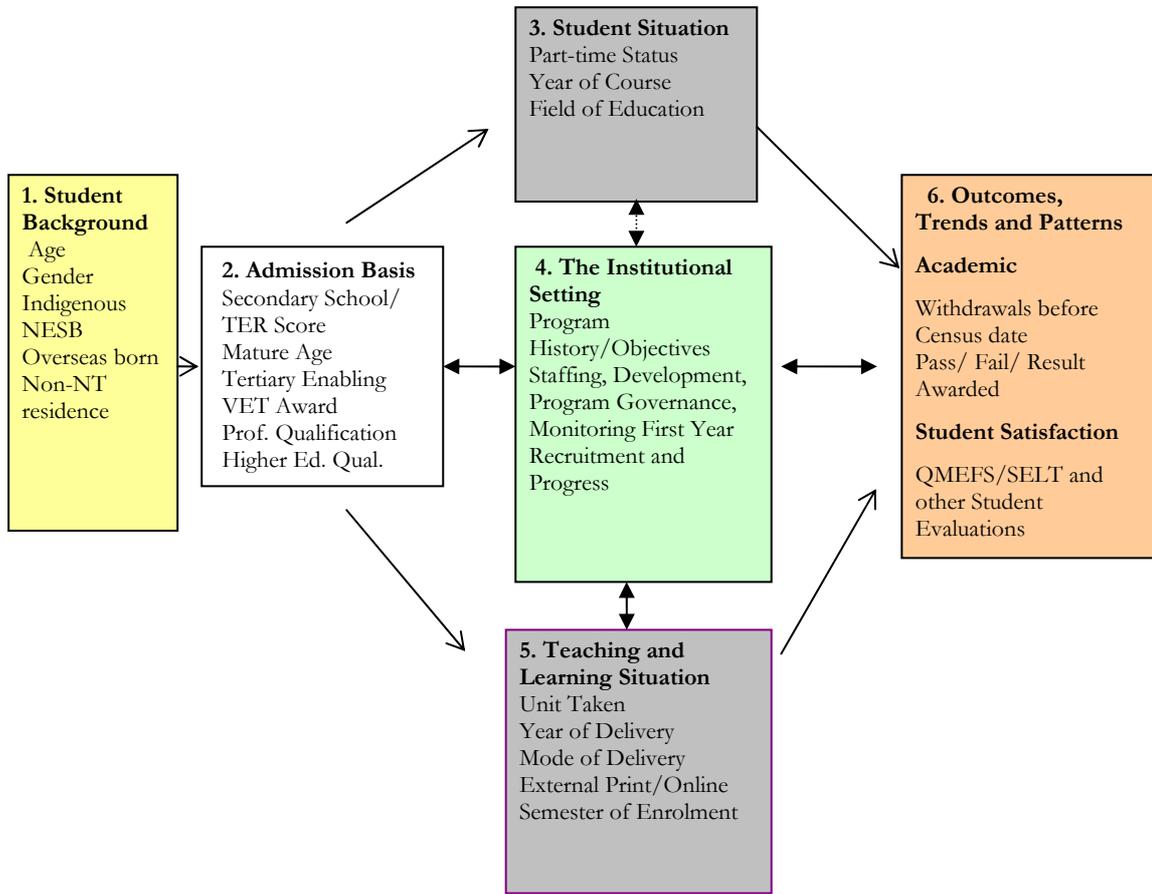
3.1 Methodology

Descriptive procedures have already been developed and successfully applied by the methodology adopted in the previous two reports in this series (Tyler, 2003; Tyler and Rolls, 2007). First of all, the description will simply entail the extension of trend analyses to over the whole period 1999–2006 of enrolments, withdrawals and pass rates, as well as of the changing composition of student intake (as an extension of Fig. 1.1).

This descriptive stage would also include definition of the individual predictor variables, as well as some information on their distributions. This variable definition and data description will be included at the end of this section for the Common Units only. Similar description for the Core Units will be left to a later section, in juxtaposition with the more detailed analysis for the years 2005–6 alone. The univariate (outcomes, intake and enrolment) trend analyses over years 1999–2006 for the Common Units will be the subject of the next section (Section 4), while the exploration of the relationships between the predictor variables and the two main measures of attrition in the Common Units will follow in Section 5. The comparative analysis of Common and Core units data for 2005–6, including some descriptions on the introduced variables, will be the subject of Sections 6 and 7.

The **predictive** model employed in the 1999–2002 study (Tyler, 2003, Fig. 7.1, p. 53) may be expanded to include the effects of admission categories (Fig. 3.1 below). This is a generic, recursive model which implies a predictive relationship between student background characteristics such as age, sex, and ethnicity, and individual outcomes such as early withdrawal (i.e. before the census date, normally without penalty) and passing or failing the relevant unit, or levels of student satisfaction as indicated in the results of student evaluation surveys.

Fig. 3.1 Predicting Attrition Rates: Generic Model (incl. Basis of Admission)



The relationship between student characteristics and program outcomes may then be seen to be mediated by (a) course admission categories or classes and (b) situational variables, both unit and background or parent course-related. Common Unit-specific variables refer to the student’s mode of study, mode of delivery (print/lecture/online/face-to-face), as well as unit content (e.g. skill- or general education-oriented), while course-related variables refer to a student’s part-time or full-time status and year of study. For the purposes of this analysis, however, and since admission category data were only available for the years 2005–6, admission effects will be introduced only into the comparative section of Core and Common Units (Sections 6 and 7, see Table 3.1 below).

This model is flexible enough to be used not only to estimate the individual effects of both student, admission and situational variables on their chances of withdrawing early or passing a unit, but also the unique combinations of values across these variables which may elude an additive model which assumes a uniform effect for each variable. Instead of estimating the independent effect of each predictor in a multivariate equation, it is possible with this technique to use a “step-by-step” procedure, sequentially dividing the enrolments into “segments”, based on unique combinations of values among the predictor variables according to their relative rates of passing, or withdrawing from, a unit.

This data-mining technique (segmentation analysis, often used in market research) was used effectively in the previous studies of the Common Unit outcomes. It was found to be particularly effective in disaggregating effects such as those of age, gender and Indigeneity across the whole student body, so that the hidden non-linear effects could be explored (e.g. does Indigeneity have the

same effect for school leavers studying internally as it might have for external mature age students? And do these effects remain constant across genders?). As pointed out in the first section, this is a method highly recommended by the House of Common Public Accounts Committee with the aim of responding adequately in teaching and support services to “student’s different cultural, social and economic backgrounds” (2008, p.5). It is expected that this technique will continue to provide valuable results for the additional years included in the cumulative data base.

(3) **Comparative** analysis of the Core and Common Units (Sections 6 and 7) which included an estimation of admission category effects, will be based on a simplified version of the generic model (Fig. 3.1). Because of the complexity that student background characteristics would introduce into the analytical procedure for the immediate purposes, these variables were excluded from the predictive model. The focus was therefore on the comparisons based on rates of withdrawal, pass and result awarded rates, as well as on the relative effects of admission categories and student situation (e.g. mode of study) in a multivariate predictive model. The generic model was therefore adopted for the purposes of comparing the patterns of prediction between Core and Common Units, with the single exception that the block of student background effects was omitted, in the expectation that this would be included in a more comprehensive study at a later stage.

Table 3.1 Analytical Strategy: Description, Prediction and Comparison

<i>Evaluative Orientation</i>	<i>Common Units</i>	<i>Common & Core Units</i>
Period of Observation	1999–2006	2005–6
Sections of this Report	Sections 3, 4 & 5	Sections 6 and 7
Analytical Method	Description, Trend Analysis (Graphs), Prediction, Segmentation	Description, Prediction, Comparative Analysis
Units Included	All Common Units: CUC100 – CUC107	<i>Common Units:</i> CUC100, CUC106, CUC107 <i>Core Units</i> ¹ : EDB101, ENG151, HIT111, LWZ002, MAN101, NUR111, SBI106, STA101

3.2 Common units 1999–2006: Three Observation Periods

It therefore remains to provide a description of (a) the sources of data for the student progress analysis for the new years of the Common Units 2005–6 and (b) the characteristics of the 2005–6

¹ The exact title of these Core units is provided in Section 6 below

sample, set against the background of the previous phases and of the entire sample which will include all the individual variables included in the trend and regression analysis to follow. Descriptions of the Core Units, as mentioned above, will be placed closer to the comparative analysis in Sections 6 and 7.

3.2.1 Data Collection and Quality

As for the previous phases, the data for this study were drawn from Common Unit enrolments gathered across databases, though taking CALLISTA as the main source, held by that section and provided by Mr Michael Kyr for the data release 2003–4 and by Ms Casey McKenzie for years 2005–6. Both predictor and outcome variables were scored as dichotomies, with 1 for a positive recorded value (e.g. passing the unit, having an NT home postcode, having an Indigenous identification) and 0 for the reverse. Mean values were therefore directly convertible to percentages. Counts and percentage values for both types of variable for each period of observation and for all years observed are displayed in Table 3.2.

Table 3.2 Counts and Percentages: Outcome and Predictor Variables 1999–2006

Period of Observation	1999–2002	2003–2004	2005–2006	Total 1999–2006
<i>Total Enrolments</i>				
<i>Outcome Variables</i>				
Total Valid N	7,535	4,034	4,326	15,895
% Withdrew Before Census Date	33.83	30.79	22.63	30.01
<i>Continuing Enrolments</i>				
Total Valid N	4,719	2,548	3,295	10,562
% Passed Unit	66.7	64.2	68.9	66.8
<i>Predictor Variables</i>				
% External Mode	34.12	53.60	55.39	44.85
% Indigenous	5.40	8.75	5.94	6.39
% English as Second Language	10.70	9.12	13.48	11.05
% Male	34.17	31.26	33.77	33.32
% Not Australian or NZ Citizen	6.78	2.75	6.22	5.61
% Age under 25 yrs	57.70	51.39	46.86	53.15
% First Year of Studies	68.24	68.39	69.21	68.54
% NT Home Resident	85.64	77.53	64.45	77.60
% Part time	30.00	50.42	32.19	36.36

Data Description 2005–6

This procedure for the current observation phase yielded a total of 4326 valid enrolments including early withdrawals of 22.6% of the total: a significant reduction on that for previous years. For the continuing enrolments “Passed Unit” referred to all grades ranging from PC, PA, PT and PU to HD. Accordingly, the results recorded variously as Fail (F, n=351), Withdrawal Fail (WF, n=n=76), and Failed Absent (FA, n=595) were all coded as “Failed Unit”. Early withdrawals therefore referred only to those enrolments withdrawn before census date, where no penalty was applied. The Withdrawal

without Penalty (WW, n=50) and Incomplete (I, n=1) referred to continuing enrolments in the following semester(s) and were coded as missing. The single Not Applicable (NA, n=1) was also coded as missing. To summarise, out of 4326 enrolments in 2005-6, 979 were withdrawals before the census date, 52 were either WW or I or NA, leaving a total of 3295 continuing enrolments of which 1022 failed the unit and 2273 passed. There were only two missing cases (for age) in all the predictor and outcome variables, yielding a likewise count of 3293.

As for the previous periods, all data were anonymously collected, the only identifier being the student number. These data were processed under the strict provisions for guaranteeing both the privacy and confidentiality of individual students as specified by the University's Human Ethics policy. Though the term "sample" is used to describe the base for data-collection and analysis, the data closely represent an enumerated population for the students taking Common Units over the years 1999–2006. This is actually a census-method for collecting data from a population, rather than a probe or polling exercise. When the 2005–6 data is pooled with the cumulative database of the 1999–2002 study and that for 2003–4, the total valid enrolments now sum to 15,895. Even before the Core units data are added, the size, quality and comprehensiveness of the Common Unit data base for this study provides a unique basis for the analysis of the performance and equity across the first year of enrolment at CDU².

Having described the data for the observation period 2005–6, we turn to analyse in more detail the trends that this addition to the cumulative data base may represent in terms of performance outcomes and of equity group effects.

² Although the Common Unit program was actually introduced in 1998, the data for this inaugural year was not included due to quality problems.

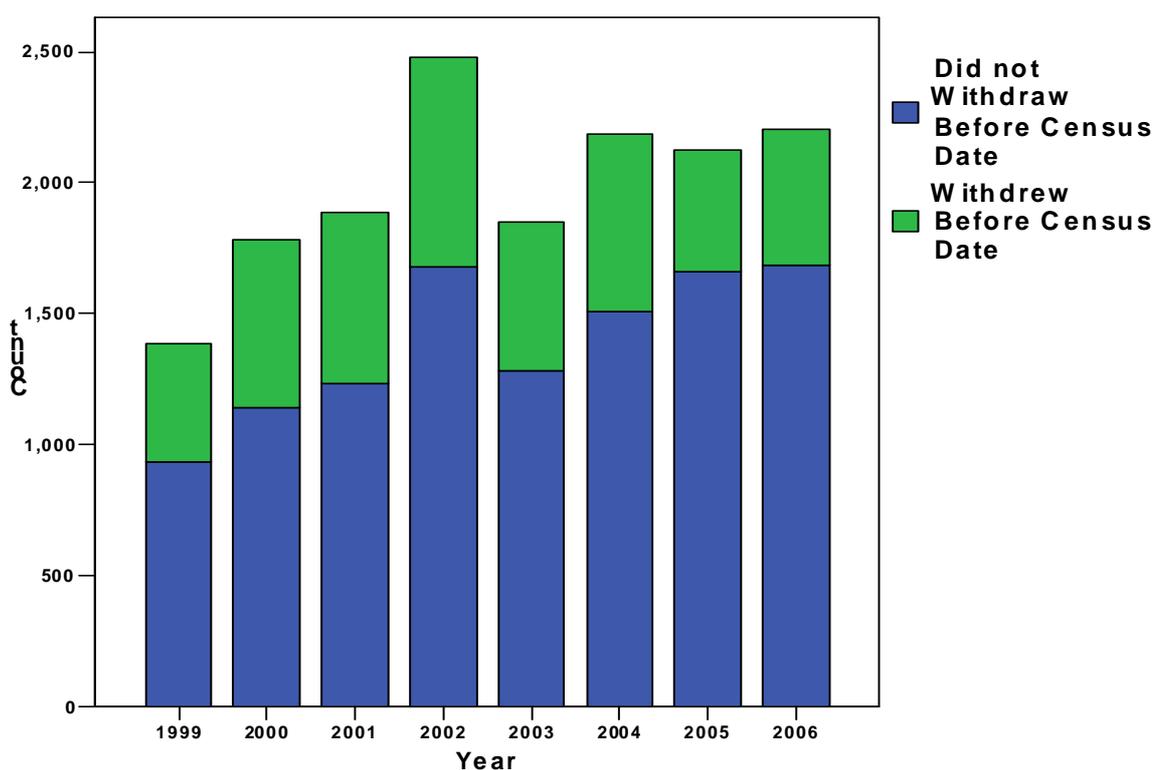
4. ATTRITION TRENDS AND EQUITY OUTCOMES: 1999–2006

In this section we look in more depth at the trends in student outcomes and their equity group predictors, noting the fluctuations in withdrawals and pass rates on the one hand, and at the strength of their predictor variables on the other. The aim is to obtain a sense of the overall changes in the course of the development of the program, as well as of the background variations in terms of student characteristics and situations in which these have been produced. At this stage the emphasis will be on descriptions of the single outcome fluctuations and of their associations with the range of predictors included in the data description of the previous section. In the following section, since these predictor variables have over-lapping effects on the two outcomes, we shall attempt to tease out their independent effect as these may have changed over the entire period of observation.

4.1 Trends in Student Outcomes: Program Performance 1999–2006

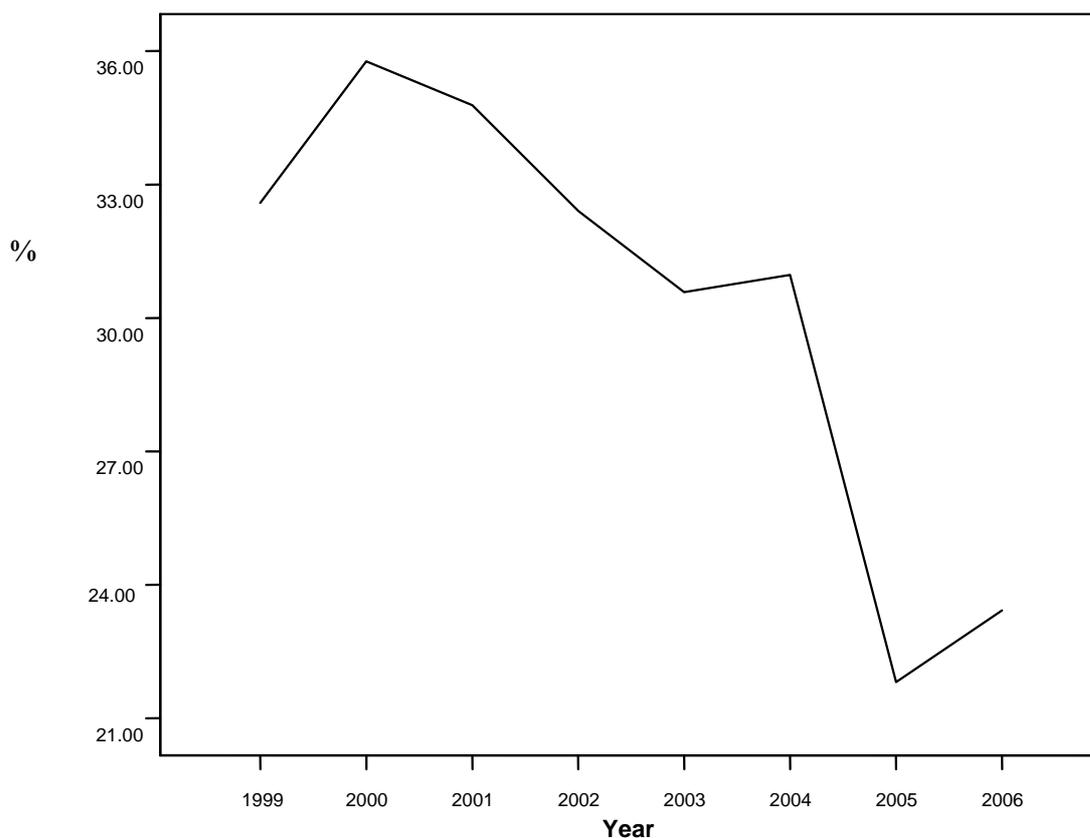
Trends in the performance aspects of the Common Units may be tracked by the analysis of changes in rates of enrolments, early withdrawals and student success and failure over the eight years in the combined sample 1999–2006 (Figs. 4.1, 4.2, 4.3).

Fig. 4.1 Counts in Enrolments and Early Withdrawals: Common Units 1999–2006



Enrolments since 1999 appear to have settled down to a more or less stable pattern, after some initial swings, especially between those for 2002 and those for 2003, the latter being the date of the introduction of the simplified unit offerings (from 5 units to 2). In the most recent three years (2004–6), however, the count has remained remarkably stable, at just over 2,000 enrolments per year. This return to greater stability should be welcomed and perhaps reflect a greater level of acceptance of the program by both students and parent course coordinators.

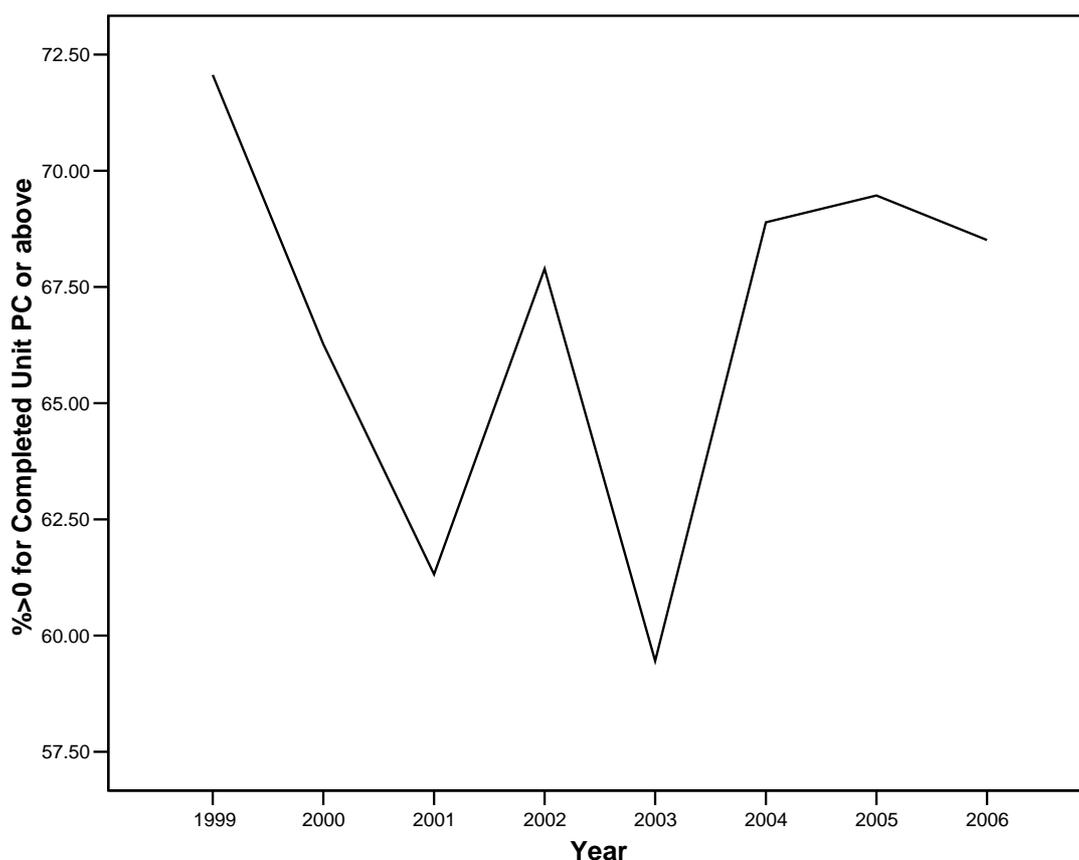
Fig. 4.2 Trend in Percentage Early Withdrawals: Common Units 1999–2006



Withdrawal rates, by contrast, appear to have remained fairly stable at about 33% for the initial four years of “turbulence” in enrolments, but have decreased markedly over the three recent years of enrolment stability, falling from about 30% in 2003–4 to 22% in 2005–6 (Figs. 4.1 and 4.2). The reduction in early withdrawals is remarkable, given the apparent stability of intake, and further confirms the possibility that the program has gained greater acceptance among incoming students. The slight recent upturn between 2005 and 2006 must be seen in context, as it is still consistent with a dramatically fallen rate of early withdrawals. This is difficult to explain perhaps, other than in terms of an increase in external enrolments, which has been associated in earlier years with lower withdrawals, or else a change in the motivation and commitment of students coming into these programs. Certainly the rate of early withdrawal is in 2005–6 far less of a concern than when it reached its historic peak of 35% in the second year of the program, 2000.

Trends in the rate of passes in the Common Units (Fig. 4.3) might indicate how the fluctuations in the rates of enrolments and early withdrawals from the Common Units have translated into student success. As suggested by the analysis of the 2003–4 data in the second report, a lower rate of early withdrawals may be the cause of decline in the pass rate, other things, including the effect of increasing diversity of intake, being equal. However, the precipitous decline in the early withdrawal rate we see in the years 2005–6 has been clearly accompanied by a recovery of the pass rate from about 64% in 2003 to a consistent rate of 68–69% in the following years. There is no obvious depressing effect, in other words, of the decline in the withdrawal rate in 2005–6 and the pass rate. In fact just the opposite appears to have been the case. Students in these more recent years of observation not only seemed more committed to staying on in the enrolled Common Unit, but also to completing it. This followed through the trend of recovery of the unit reforms of 2003 and increased proportions of part-time and external enrolments of that year.

Fig. 4.3 Trend in Percentage Passes: Common Units 1999–2006

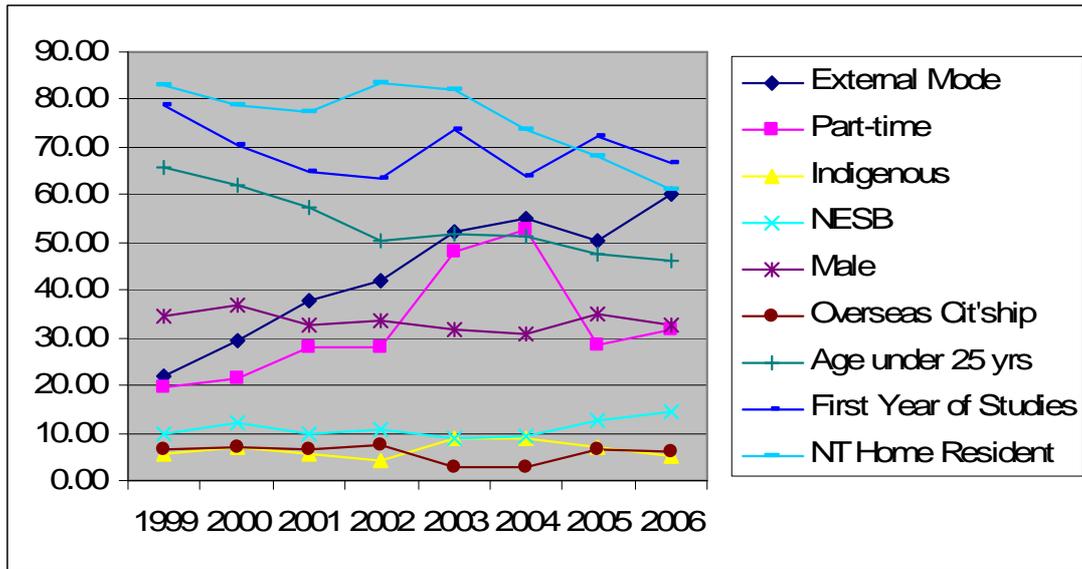


The resilience of the program to these external and internal shocks should not divert attention from the obduracy of the general problem of attrition in the program as a whole. An association of the rates of early withdrawal (22%) with a failure rate of 31% means that only 53 out of 100 initial enrolments are translated into unit credits or completions. For the years 2005–6 this represents a combined loss or possible wastage of 47%, which can still hardly be acceptable, even though it may be a considerable improvement on an overall loss rate of 56% for the students enrolling in 2003–4. Might this improvement, and a potential for discerning strategies for further progress in survival and success rates, be found in a more detailed analysis of the trends in composition of the intake over these four recent years of observation? This leads us to consider the trends in the same years of these predictors of early withdrawal and unit failure.

4.1.1 Trends in Equity Predictors: Enrolments, Early Withdrawals and Passes

This section will examine the trends over the years 1999–2006 for rates of both early withdrawals and passes. This will enable us to compare the different profiles of withdrawal and completed enrolments in terms of both situation and individual socio-demographic characteristics over the total period of observation, with particular attention to the direction of trends in these areas for 2005–6. Though not yielding statistically precise measures of association, a graphical display of these trends, given the high numbers involved, will provide a useful indication of the association between background and situation variables on the one hand and each outcome or attrition indicator on the other, taken over a period of eight consecutive years. This will be preceded by a further analysis of the trends in intake over these years, based on the data contained in Table 3.2 above, displayed here in line chart format.

Fig. 4.4 Trends in Equity Group Representation in Common Unit Intake: 1999–2006



The changing character of the student intake observed in the recent years is the falloff by over twenty percent in the proportion of part-time enrolments, between 2004–5, with only a small recovery in 2006. However, the other major contributor to increased diversity, the proportion of external enrolments, was marked by a monotonic tripling over the observation period from 20% in 1999 to 60% in 2006, with only a slight fall and subsequent recovery in 2005. These trends no doubt reflected the general changes in university strategies of student recruitment, though the decline in part-time enrolments is more difficult to explain.

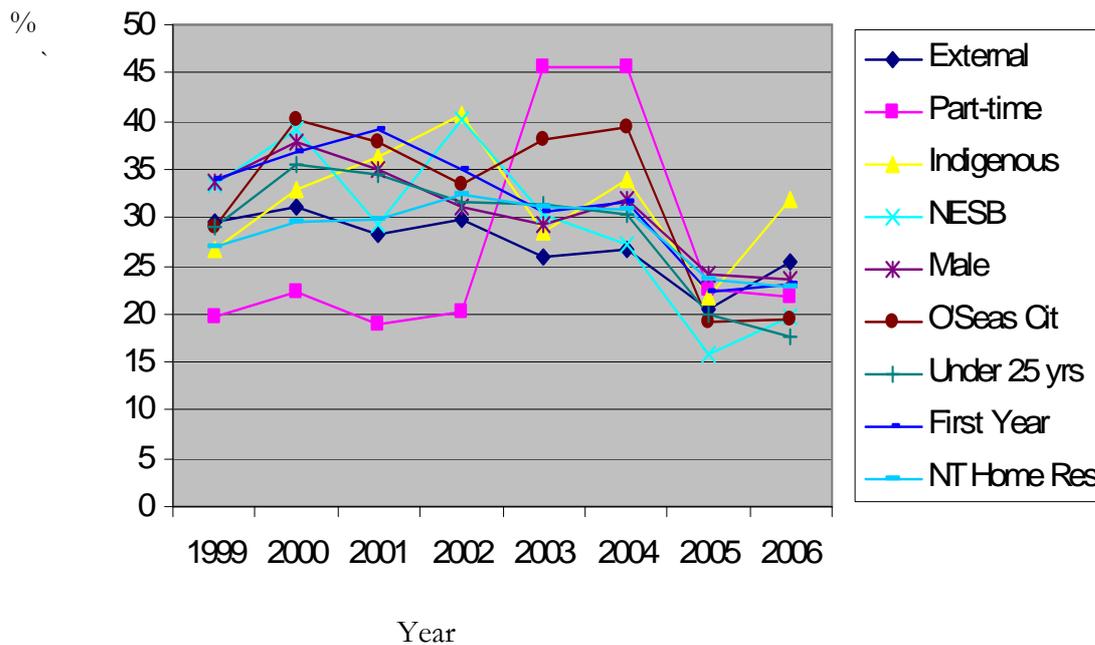
The trend towards externalisation and flexibility of delivery is marked by a corresponding decline in the proportions of NT home residency from over 80% in 1999 to 60% in 2006 and by a decreasing proportion of enrolments from students aged under 25 years. Indigenous enrolments declined in this latter period, while Non English Speaking Background enrolments rose by about 50% from a low base (from 10% in 2004 to 15% in 2006). The gender ratio remained relatively stable, with females consistently representing about two-thirds of total enrolments, while First Year of Studies enrolments continued to fluctuate around 70%. We may now turn to examine how these equity group categories were represented in the rates of withdrawal and completion over this period (the larger question of increased diversity on these rates was explored in some detail in the third chapter of the previous report).

4.1.2 Trends in Composition of Early Withdrawals

Trends in the composition of early withdrawals from 1999–2006 is displayed in Fig. 4.5. The general trend is one of general decline in all groups, with a slight increase in 2006. The exception here is the steep increases in both part-time and overseas citizenship enrolments in the middle period of observation, 2003–4. These groups, however, rejoined the general downward trend in 2005–6. The trends in part-time withdrawals needs to be put beside the 2.5 times increase in part-time enrolments charted in Fig. 4.3, mirrored here in almost the same rate of increase in early withdrawals. Perhaps this relationship can be explained partly in terms of the attraction of the new degrees which were offered for the first time in 2003, particularly in health sciences, education and law and the subsequent unexpected pressure that the Core Units in these fields may have placed on Common Unit commitments. This area needs to be studied in greater detail, in the context of the whole first year experience for part-time and external enrolments.

The increase in the proportion of early withdrawals in the case of Indigenous students (about 10% difference in rate for 2005 versus that for 2006) deserves further attention. This group, as seen in the early years (1999–2002) had an overall lower than average withdrawal rate, a pattern that has been linked to Indigenous enrolments' much higher rate of failure. The balance between a realistic decision to withdraw rather than to proceed to a Failed Absent grade (as shown in the first report) as against a commitment to survive the unit appears to be a difficult one to achieve and should be the subject of further discussion, counselling and support at the critical early weeks of unit delivery.

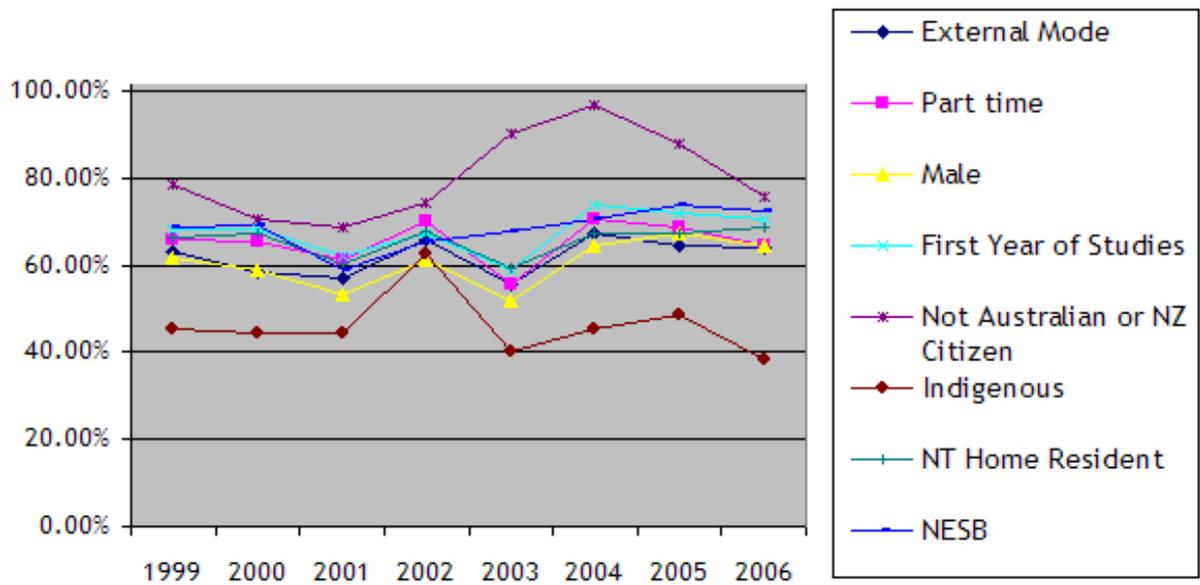
Fig. 4.5 Trends in Equity Group Representation in Early Withdrawals: 1999–2006



4.1.3 Trends in the Composition of Successful Completions (Pass Grade or Above)

The changing composition of the pass grade or above enrolments is illustrated in Fig. 4.6. These trends in the Common Units over the period 1999–2006 reveal remarkable stability in both the rates of the majority of equity group representation and in their rank order. The two obvious exceptions are the instabilities in the two small groups, Overseas Citizenship and Indigenous enrolments in the period 2003–4, with contrasting rates of increase and decline respectively, before returning to trend average rates in 2005–6. The remarkable increase in the rate of Overseas Citizenship has been explained in the previous report for that period in terms of the anomalous restricted distribution around the pass grade, rather than an increase in the grade awarded. The recent decline in the rate of Indigenous success is a cause for concern, indicating, at below 40%, an historic low for this category of enrolments (for the differentiation within Indigenous enrolments by Mode of Study and Age, see the following section). The improvement in the rate of male representation over recent years is encouraging, but still at about 5% below that for females (down from about 9% for the first period).

Fig. 4.6 Trends in Equity Group Representation in Unit Completions: 1999–2006



4.1.4 Trends in diversity and attrition rates 1999–2006

These trends in composition of passing grades may not accurately reflect the overall patterns of attrition of equity groups, unless set against the rates and composition of intake and of early withdrawals for each year. For these purposes, “diversity” for each year, as for the previous study, was indexed by the annual coefficient of variation (standard deviation of rates of representation divided by the annual mean) for seven equity groups (External Mode, Indigenous, ESL, Male, Overseas Citizenship, Part-time and Over 25 years). A comparison of all three trends, in diversity of intake, or early withdrawals and of pass rates for each equity group is shown in Fig. 4.7.

Fig. 4.7 Trends in Intake Diversity and Rates of Attrition: Common Units 1999–2006



The display of the joint trends of pass rate, early withdrawals and diversity of intake indicates a long term trend to increased diversity from a low point in the early years, through to a peak in the years 2003–4, followed by a plateau for the two recent years. The effect of this increase on the pass rate is notable for the year 2003, where the pass rate dropped as the two lines diverged, followed by convergence as the effects of unit restructuring and the “shock” of the new intakes of 2003–4 was absorbed. It is a sign of the resilience of the program that this recovery was sustained despite the sharp decline (by 8-10%) in the rates of early withdrawal. The combined effect was to result in a much improved overall retention rate for the program in recent years, although, as noted above, the proportion of enrolments resulting in unit completion is still only about 56% (compared to 47% for 2003–4).

4.2 Trends in Students’ Qualitative Response to Common Units

4.2.1 Response to the Student Experience of Teaching and Learning (SELT)

In terms of qualitative data of students’ responses to Common Units our most consistent source of qualitative data for the period of this report has been through the university’s official student evaluation tool SELT (Student Experience of Teaching and Learning) introduced in 2004.

In order to provide a broad enough picture we include below the SELT data for 2005, although this data spills into the time frame for the next phase of reporting in 2005–2006. The response rate for 2004 and 2005 (unweighted for student load) overall was 23.7%, which is not unusual in surveys that include a large number of external students. Although this rules out statistical treatment, there are some points of interest in these graphics with regards to student response over time and across domains. The SELT asks students to rate their responses on a scale from 0-7 with 7 being the most positive.

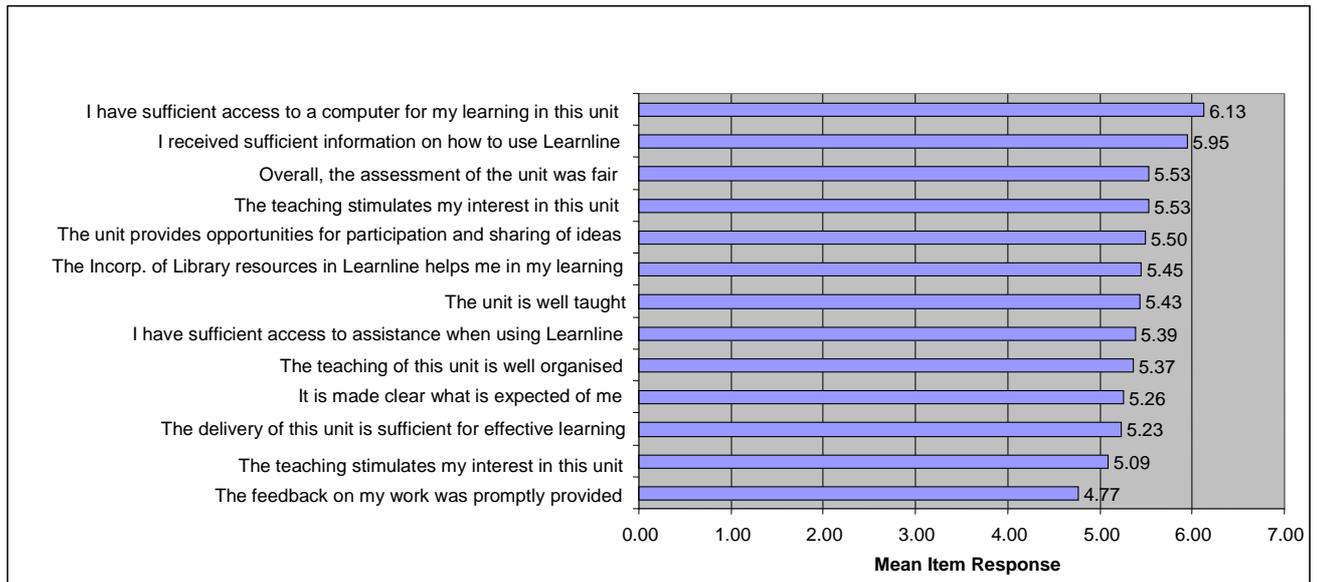
As with any such questionnaire responses need to be viewed in the context of a range of subjective elements including:

- The Common Units being compulsory interdisciplinary units and therefore not always popular
- The tendency for students who bother to respond having polarised views
- The content of the different Common Units appealing more or less to different students
- The performance of one rogue staff member skewing results (for example feedback on marking in the chart below), and not reflecting general performance.

However this is not to deny we have much to learn from such surveys, in this instance, as illustrated below, this includes: the importance of vigilance about marking turnaround, the need to examine the Semester 0 teaching and learning experience and review CUC106 delivery.

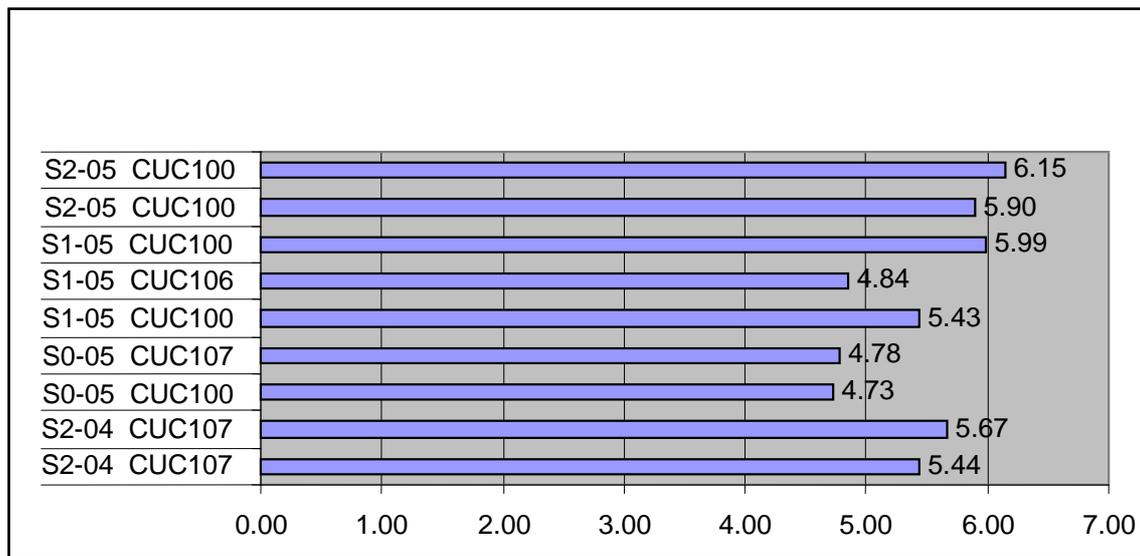
The following two global charts illustrate students’ responses to various components of the units with items ranked in the second chart in order of average rating. The first chart reveals each item with a mean response across all Common Units with responses indicating that for all items, students were affirmative with the exception of *prompt feedback for work* which at 4.77 took this score close to undecided.

**Fig. 4.8 SELT Mean Item Response Scores
New Common Units 2004–5**



The second chart provides the mean SELT score for each Common Unit from 2004–2005. A couple of interesting patterns emerge. First, it appears students' response to the units in the 0 semesters for both units was lower than in other semesters, CUC100's mean score moving from 4.73 in Semester 0, 2005 to 6.15 in Semester 2, 2005 and CUC107 moving from 5.67 in Semester 2, 2004 to 4.78 in Semester 0, 2005. CUC100 had a slightly higher overall mean score to the other two units. It appears students responses to CUC106 were lower than the other two units which may be related to the fact that the unit was in its first semester of delivery. However, in general none of the three units (CUC100, CUC106 or CUC107) fell below the mean score of 4.73 (a response of 4 being undecided and 7 strongly agree in response to each item).

Fig. 4.9 Mean SELT Scores
New Common Units



4.2.2 Verbal Feedback from Students

In terms of anecdotal data, responses emailed to coordinators from students have been recorded below under the two units CUC100 and CUC107 as they provide a valuable indication of what students find useful about Common Units. This feedback only covers students' positive responses as negative verbal feedback thus far relates to indignation at having to do the units, in which case the student is often eligible for exemption, and to misunderstandings with a particular tutor that are resolved by coordinators.

Response to CUC100 Academic Literacies

"Having left school at 15 (20 years ago) I found this unit invaluable. The information on how to reference properly came in very handy for my other unit. The easy-to-follow method used to teach us how to formulate and layout an assignment correctly was great. I feel this helped me to achieve a good result in my other studies so thank you. I will definitely benefit from this unit through the rest of my studies and continue to use the material as a guide. I found this [Communications learning resource] valuable and will keep the entire text to the unit as it will assist me in future for further studies and essays."

"I thought that I was already a confident and skilled communicator, which I had learned over 44 years. This unit has made me realise that I was lacking a little and has helped me change. I now listen better and hear more. I am gaining confidence in writing and already I have seen the difference in my writing at work."

"The reading and critical thinking part of the unit definitely clarified some issues and certainly developed these important skills. The readings were wide-ranging and varied and gave us an opportunity to read others' views, [and] to see how change and development is occurring still in academic learning and research. All my notes are being kept for future reference."

"These [online discussions] are extremely helpful. I loved the fact that I could look and see that other people were in this with me. It is really hard to stay focused externally but having this discussion board helps you with your assignments and motivation. I have another online course that did not have this facility available and I fell behind, finding it hard to finish the work with no support."

“As a mature-aged student who has essentially never used a computer before, every aspect of this module was a new experience for me. The step-by-step (almost idiot-proof) instructions were a great relief, although I can understand how people with greater ability may have been frustrated by this simple approach. Tables, spreadsheets and PowerPoint presentations! Wow! I've already used my new-found knowledge to achieve good results in my other units. I rated my computer skills at the beginning of this module as being 2 out of ten. Now I would say I'm about a 6. I have definitely benefited and will continue to build on what I have gained.”

“I have gotten a lot out of [CUC100] and will refer back to the material many times over during my Uni Studies. Keep up the good work.”

“I am just sending you a quick, though heart-felt THANK YOU for the researching skills I have gained during this unit.”

Response to CUC107 Northern Perspectives

“Apart from the fact that I hate sitting in front of computers I found the ideas were explained really well online and this helped me understand the readings better”

“Even living in the NT does not make you fully aware of decisions being made by the Government. The materials gave plenty of interesting info about a variety of topics, but they were also relevant to the assignments, which I liked. I learned new info in this unit.”

“The material was easy to access, and very interesting to read. Very conscious of the fact that we are sitting behind computer screens and therefore made the readings comparable to things we could all relate to.”

“This is my first attempt at Uni study and external study. I found the information relevant and easy to access, and appropriate to the course.”

“I have found this common unit to be very informative and I certainly have learnt a lot from doing this subject. The information presented has been interesting and the extra resources suggested has also provided some interesting learning. As a 1st time mature external student I have found this course enjoyable.”

“I found the group assignment excellent. I was lucky enough to get into a fantastic group. We worked together extremely well.”

4.3 Questions for Further Analysis

This investigation has opened up wider possibilities for the analysis of attrition. While the trend of over- and under-representation of equity groups in the attrition rates is indicative of the patterns of changing student outcomes, it has several limitations. First, while there are some clear relationships between equity groups and outcomes (e.g. the recent low achievement of part-time students), a firmer basis of this link can only be established through controlling for the other equity variables with which they are associated. Are the part-time students, for example, more likely to be older, male, studying externally, resident outside the NT and enrolled in certain courses? Second, what might be the risk factors which are not fully captured by an additive, linear model of prediction—are groups at risk of either withdrawing or failing best identified, not from single effects but rather from unique combinations or “mixes” of values sprinkled among the equity groups? This approach would require a different technique, associated with a segmentation analysis based on interactive effects, as used in market research. As noted in the first section, this method has in fact been recommended recently by the U.K. House of Commons Public Accounts Committee (2008) for investigation of University student retention, and has been applied in this series of reports on Common Unit outcomes.

5. PREDICTING ATTRITION IN COMMON UNITS: 1999–2006

The following questions will be explored in this section:

Predicting Attrition:

- What are the independent predictive effects of each of the equity groups detailed above on the two attrition outcomes for the entire period of Common Units program, 1999-2006?
- Has the recent period of observation had an independent effect (whether negative or positive) on the prediction of either outcome?

Segmenting Risk Factors:

- Can those enrolments at greater risk of either withdrawal or failure in a unit be usefully identified according to unique combinations of predictor values rather than single variable effects?
- What might be the implications of such an analysis for program planning and delivery?

5.1 Predicting Outcomes in the Common Units: Equity, Attrition and 1999–2006

The previous section has provided an analytical challenge in setting out the trends in representation of nine equity groups in the rates of attrition over an eight year period. The task ahead is to identify which of these categories explains each of the outcomes, withdrawals and passes/failures, when the others have been controlled for (i.e. set at their mean values). There will likely be two types of associations between predictors and outcomes discovered by the statistical analysis which could provide the answer to this question: those predictors that make a statistically significant difference (explanatory variables) and those that have only a correlation with one or more of the explanatory variables and do not have a significant effect when these are controlled for. This predictive analysis, as for that of the previous reports, will employ logistic regression techniques to produce precise weights for estimating the independent effect of each predictor on the “log odds” of early withdrawal and passing or failing a unit. These are then converted back to “odds ratios” which express the probability of an outcome (e.g. passing a unit) divided by the probability of not passing.

Both outcomes and predictor variables have been described elsewhere in this and in previous reports. They are both expressed in terms of simple dichotomies, with the possession of a quality (e.g. Indigenous identity, External Mode of Study for a unit) in terms of 1's and 0's. The predictive model is based on Table 3.1, in which student characteristics and their situations (external mode, part-time status, as well as year of course) are the predictors and either early withdrawal or passing a unit are the predicted or outcome variables. Separate regressions are performed for each outcome variable. To estimate the effect of the current period of observation on the outcome when other predictors are controlled for, a distinctive “dummy” variable was added to the model, which scored 1 for an enrolment falling in the recent period 2005–6 and a 0 for the previous two observation periods. In this case, the model is strengthened by including all of the data available (over 15,800 enrolments), while at the same time showing up any effect that may be due to independent effect of year of observation.

5.1.1 Predicting Early Withdrawals in Common Units 1999–2006

Table 5.1 ranks by their statistical significance the odds ratios and their significance for the prediction of early withdrawal enrolments over the whole period of the Common Units. These ratios indicate the relative odds ratios of an enrolment resulting in an early withdrawal, where 1 is the average ratio

against which comparison can be made. While an odds ratio greater than one indicates a positive predicted outcome (i.e. that the enrolment will result in an early withdrawal), a value less than one indicates a negative outcome (no withdrawal). While these odd ratios are not the equivalent of probability estimates that an enrolment will result in a withdrawal, they provide an accurate relative ranking of the predictive power of each variable.

Table 5.1 Predicting Withdrawals: Equity Groups and Recent Period Effects
All Enrolments in Common Units 1999–2006 (n=14,314)

<i>Predictor</i>	<i>Odds Ratio*</i>	<i>Significance</i>
Part-time Status	2.713	0
2005–6 Period	0.687	0
External Mode for Unit	0.481	0
First Year of Studies	1.108	0.028
NT Home Residency	0.905	0.082
Overseas Citizenship	1.131	0.229
Aged Under 25 yrs	1.047	0.31
English as Second Language	0.943	0.424
Indigenous Identifier	0.971	0.73
Male Gender	1.014	0.752
Constant Term	0.287	0

*Where 1.00 is the mean odds ratio for all predictors

Equity Group Effects

The rank order of the nine equity predictors shows that only three reach statistical significance. Part-time status stands out as the most powerful predictor of early withdrawal, with an odds ratio of almost three times that of the average. External mode of study is almost the mirror image with about 2.5 times less likely than the average to result in withdrawal. First year of studies is slightly higher than the average, while the odds ratio for NT home residence is just below the average and just exceeds statistical significance of .05. It may be surprising that, when these four indicators (plus the observation period 2005-6 and the constant term) are controlled for, that the other five predictors are far too close to the average of 1 to have a statistically significant effect.

Effect of Recent Observation Period: 2005–6 versus 1999–2004

The effect of the period of observation 2005–6 as a separate “dummy” variable reflects the much lower rate of withdrawals for the period of observation, 2005–6, observed earlier in the trend charts

of the previous section. Even when the fluctuations of the effects of the equity groups on this outcome over the years of increasing diversity are controlled for, the odds ratio for this year is still quite important. At only .69, it indicates that for this period there is a significantly lower average chance of early withdrawal than that for the previous years of the program. That the decline of the withdrawal rate appears to be so robust must reflect positively on the resilience and adaptability of the Common Units to meet the challenges of a much more diverse intake. Whether some of this improvement may reflect a general tendency towards higher rates of first year retention will be explored in the comparative analysis in Sections 6 and 7 below.

5.1.2 Predicting Passes in Common Units 1999–2006

If we apply the same methodology as above to the prediction of passing enrolments, we have a similar ranking of effects according to their statistical significance (Table 5.2).

Table 5.2 Predicting Passes: Equity Group and Recent Period Effects
All Completed Enrolments 1999–2006 (n=10,542)

<i>Predictor</i>	<i>Odds Ratio*</i>	<i>Significance</i>
External Mode for Unit	0.559	0
Indigenous Identifier	0.356	0
Male Gender	0.646	0
Overseas Citizenship	1.667	0
Aged Under 25 yrs	0.687	0
2005–6 Period	1.167	0.001
NT Home Residence	0.899	0.063
First Year of Studies	1.073	0.138
English as Second Language	0.919	0.258
Part-time Status	1.028	0.596
Constant Term	3.945	0

*Where 1 is the mean odds ratio for all predictors

Equity Group Effects

In contrast to early withdrawals, the majority of equity groups appear to have significant effects on enrolment passes. When all the other effects are controlled for, Indigenous identifier has the greatest (negative) effect, followed by external mode, male gender and age under 25 years (not typically the source of disadvantage in most studies of first year effects). The only two positive effects appear to be overseas citizenship, which has about a two thirds improvement in the odds ratio over the model

average. The other terms do not reach statistical significance. It is interesting to note that the external mode of study, a powerful negative predictor of early withdrawal, is here the second most significant positive predictor of the other attrition outcome. This reversal of effect on attrition also applies to Indigenous identity, which again has contradictory effects on the two outcomes. Apparently, the tendency not to withdraw early in either case may have produced a negative effect on academic performance in the unit. If this causal relationship is to hold, it might be expected to show up in the awarding of the Failed Absent grade. However, as was demonstrated in the first report for 1999-2002, this connection appeared to apply only to Indigenous identity among all the equity predictors. Even this link may also have been weakened, however, given the increase of Indigenous representation in early withdrawals, as discussed in the previous section. Clearly more research needs to be done on explaining this “see-sawing” of effects between the two attrition outcomes for both external mode of study and Indigenous enrolments.

Effect of Recent Observation Period 2005–6 versus 1999–2004

As for early withdrawals, the recent period shows a positive influence on overall retention rates, with a small, if significant odds ratio of 1.67. The increased chances of passing in this period appears to contrast with the depressing effect noted for the year 2003, where there was a drop in pass rate following a fall in the withdrawal rate. The trend towards greater retention to successful completion of units is encouraging and demonstrates again the potential of the program to successfully adapt to the changed circumstances of intake and unit restructuring.

5.2 Segmenting Risk Factors: Withdrawal and Failure 1999–2006

In this section we go across some of the predictor categories to identify the combinations which predict an attrition outcome more efficiently than the addition of individual values. The method used here employs the CHAID technique (Chi-Squared Automatic Interaction Detector), whose main features were described in the first and second reports (Tyler, 2003, p. 69). To reiterate, the following extract from the SPSS CHAID manual describes its operation in identifying the clusters or segments which it generates:

- CHAID divides a population into two or more distinct groups based on categories of the “best” predictor of a dependent variable. It then splits each of the groups into smaller groups based on other predictor variables. This splitting process continues until no more statistically significant predictors can be found (or until some other stopping rule is met). CHAID displays the final subgroups (segments) on an easy-to-understand tree diagram.
- The segments that CHAID derives are **mutually exclusive** and **exhaustive**. That is, segments do not overlap, and each population unit (case) is contained in exactly one segment. In addition, since segments are defined by combinations of predictor variables, you can easily classify each case into its appropriate segment simply by knowing the categories of the predictors (1993, p.3).

The segments so generated are then ranked in order of the percentage of either all enrolments that have withdrawn early or the percentage of continuing enrolments that passed the unit. This procedure is carried out automatically and produces a hierarchy of segments which can be useful for targeting groups that are seen to be problematic. The “splits” that are not significant at the .05 level (using a logistic regression procedure) are dropped from the analysis, so that not every predictor will necessarily feature in the one of more of the final rankings of combined values. In this section we will look at both early withdrawals and pass rates across the range of nine predictors that have been included in the previous prediction equations. Due to the complexity of this format, this analysis will be confined to the entire sample rather than to inter-period comparisons. As well, in order to avoid over-complexity for planning and development purposes, a constraint of a depth of three levels in the tree was imposed (see Appendix to this section for example and further explanation).

5.2.1 Segmentation Analysis of Early Withdrawals: Common Units 1999–2006

The results of the segmentation analysis for all years 1999–2007 are shown in Table 5.3. An indeterminate category (n= 1,559) not readily coded as either full or part-time was excluded, as it had a withdrawal rate over 95%. Although all nine enrolment predictors were included in the original model, only five met the default criterion probability $p < .05$ for making a statistically significant “split”—NT Residence, Mode of Study, Full-time/Part-time status, Indigeneity and First Year of Study. The excluded or non-significant predictors were Male gender, Overseas Citizenship, ESL and Age under 25 years. The two most important predictors in terms of its presence in each split were Full-time/Part-time status, along with Mode of study for the unit. NT Residence was also represented in half the segments but First Year of Study only once. It is significant that Indigenous identification and NT Residence were the only student characteristics that met the criterion for inclusion. Notably, in the case of Indigeneity, it was for its combined effect towards a *lower* rate of withdrawal/attrition than for non-Indigenous enrolments. For both of these student characteristics, however, the overall segmentation effects in absolute numbers are relatively small compared with those of Part-time status, Year of Study and above all, Mode of Study.

**Table 5.3 Results of Segmentation Analysis of Early Withdrawals
All Enrolments in Common Units 1999–2007 (n=14,334)**

<i>Segment</i>	<i>Number Withdrawn</i>	<i>% Withdrawn</i>
Non-NT resident, Internal, Part-time	66	72.5
NT Resident, Internal, Part-time	694	45.5
First Year, External, Part-time	500	28.2
Non-Indigenous, Internal, Full-time	1210	20.7
Non-First Year, External, Part-time	335	18.4
NT Resident, External, Full-time	254	15.2
Indigenous, Internal, Full-time	63	14.2
Non-NT resident, External, Full-time	135	11.46

It is clear here that situational variables, rather than student characteristics, make most difference in segmenting the “market” for early withdrawals. This finding, based on the largest observation database so far in the monitoring program, may have implications for the ways in which the program has been structured, marketed and administered. We turn now to examine the patterns of segmentation that may emerge from a similar analysis of unit completions (pass grade or above). For the bulk of enrolments, the major fault line for segmentation predicting early withdrawal appears to be based on Part-time status and Mode of Study, that is, major situational factors, rather than on individual student characteristics.

5.2.2 Segmentation Analysis of Unit Completions: Common Units 1999–2006

The rank order of the segments (Gains Chart) for completions for all continuing enrolments is shown in Table 5.4. Here we see, in contrast to the composition on segments predicting early withdrawal, a prominence of predictors relating to student background characteristic rather than to their study or course situation. While Indigeneity was the only clearly individual background characteristic appearing among the early withdrawal segments (apart from NT Residence, which may be part situational), Mode of Study is the only situational variable among those predicting unit completion. Among these student background characteristics Indigeneity appears in all eleven segments, Age group in eight, Gender in four. Mode of Study appears in seven segments, but again, is defined here in terms of its combination with student characteristics and not as an independent effect.

Table 5.4 Results of Segmentation Analysis of Unit Completions
All Continuing Enrolments in Common Units, 1999–2007 (n=10,562)

<i>Segment</i>	<i>Number Passed</i>	<i>% Passed</i>
Internal, 35+ yrs, Non-Indigenous	459	83.61
Overseas Citizenship, 20-24 yrs	198	81.15
Internal, 17-19 yrs, Non-Indigenous	1603	74.39
Female, 25-34 yrs, Non-Indigenous	1263	72.42
External, 35+ yrs, Non-Indigenous	984	71.88
Australian or NZ Cit., 20-24 yrs, Non-Indigenous	1518	59.23
Male, 25-34 yrs, Non-Indigenous	489	59.2
Female, Internal, Indigenous	157	57.93
External, 17-19 yrs, Non-Indigenous	246	54.67
Male, Internal, Indigenous	56	38.89
External, Indigenous	85	34.41

A major feature of this analysis is the large “gap” between the top five segments in completions and the bottom six: the former averaging 76.7% completions and the latter only 50%. This method has therefore discovered something of a fault line in the continuing enrolments, similar to that observed between the top two and the bottom six among the early withdrawal segments but not so readily attributable to one variable (such as part-time status above). Indigeneity was not totally consistent in its interactive effects—Indigenous females studying internally, for example, outperform non-Indigenous school-leavers (aged 17-19) studying externally. Externally-studying Indigenous students

and male Indigenous students in internal mode appear to be most at risk of failure, with pass rates well below 40%.

5.3 Conclusion: Risk, Segmentation and Attrition

The above analysis has to some extent simplified the causal patterns in the model set out in Section 3, where both student characteristics and student situations were seen to affect the two attrition outcomes. The segmentation analysis produced a much clearer pattern, whereby the bulk of factors affecting early withdrawal appear to lie within the scope of student situation variables such as Mode of Study, Part-time status and Year of Course; while the most important factors for continuing students in completing a unit appear to depend more on the characteristics which they bring to the university—age, gender, citizenship, Indigeneity, rather than on the range of situational factors. However, given the presence of Mode of Study in a high proportion (seven of the eleven) of these segmentations, it would be incorrect to see situational and individual factors as causal “blocks”, having only effects on one variable alone.

If anything, the segmentation analysis has shown the weaknesses associated with the additive model applied in the first section of individual variable regressions (“the more/less of A, the more/less of B in every case”). It has shown that it might be better to think of the predictors as operating as unique combinations to produce different “bundles” of risk factors that cut across the values of individual variables. Here it is suggested that combinations of situational factors appear to be the primary drivers of early withdrawals (with the possible exception of Indigeneity and NT Residence), while student individual characteristics, in interaction with Mode of Study, appear to be the main basis for segmentation of completions. The appearance of what appear to be quite marked “fault lines” in the ranking of these segments of risk factors for each of the attrition outcomes yields a much more manageable set of data. While both the individual effects prediction and the segmentation analysis yield valuable insights into the processes of attrition, the latter appears to provide a more manageable basis for informing program planning and development.

6. COMPARING OUTCOMES: CORE AND COMMON UNITS 2005–6

In the two following sections we will examine the relative performance of the two classes of large intake units in terms of academic results in Common and Core. The latter units were selected from those taken by students in the first year of studies within the more popular courses, typically in Nursing, Teaching and Learning, Business, Law and Natural Sciences, and Engineering. While this chapter will be concerned with a descriptive comparison of the mean withdrawal and pass rates and average grades awarded of the two classes of units in the years 2005 and 2006, the following section will explore the effects of admission categories through multivariate methods which allow adjustment for the effects of both admission category and student situation on completions. For school-leavers, a separate analysis was carried out on the effect of TER score on academic outcomes.

At the conclusion of Section 7, it will be possible to draw conclusions as to:

- The relative performance of individual Common Units with selected Core Units as indexed by their withdrawal and pass rates and average grades awarded.
- The effect of admission category on early withdrawal and pass rates.
- The independent effects of admission category and situation on student pass rates across all the units sampled, both Common and Core.
- The independent effects of class of unit (Common or Core) on pass rates, controlling for admission and situational variables.
- The effect of TER score on pass rates for students admitted under that category.

6.1 Data, Variables and Units

The unit of analysis taken for this study was the individual CALLISTA enrolment (supplied by Ms Casey McKenzie) in the three Common Units—CUC100 (Academic Literacies), CUC106 (Design and Innovation: Communicating Technology), CUC107 (Northern Perspectives) and selected Core first year units drawn across a range of degree courses such as those in Law, Business, Arts, Nursing and Teaching/Education, Engineering and Statistics (Table 6. 1).

Table 6.1 Frequencies of First Year Unit Enrolments Included in Sample
All Enrolments 2005–6 including Early Withdrawals

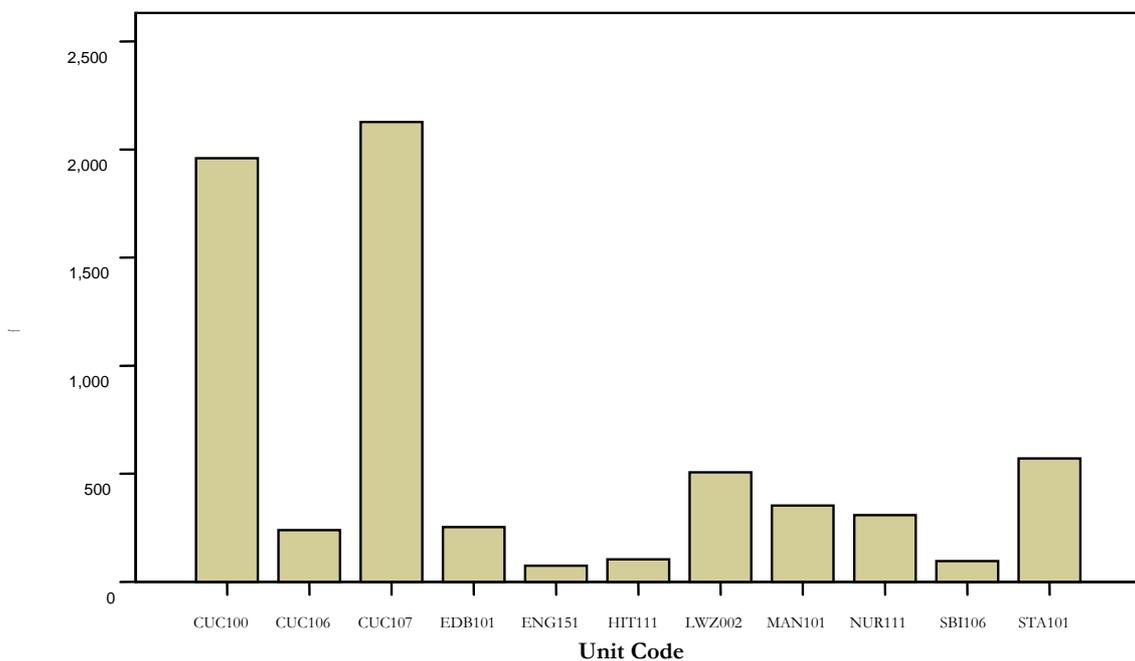
<i>Unit Title</i>	<i>Unit Code</i>	<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
Academic Literacies	CUC100	1960	29.7	29.7	29.7
Design and Innovation	CUC106	239	3.6	3.6	33.4
Northern Perspectives	CUC107	2127	32.3	32.3	65.6
Essential Learner	EDB101	253	3.8	3.8	69.5
Statics	ENG151	74	1.1	1.1	70.6
Programming Concepts	HIT111	104	1.6	1.6	72.2
Intro. to Public Law	LWZ002	506	7.7	7.7	79.9
Understanding Organisations	MAN101	353	5.4	5.4	85.2
Health and Health Professions	NUR111	308	4.7	4.7	89.9
Biology B	SBI106	96	1.5	1.5	91.3
Statistics	STA101	571	8.7	8.7	100
Total		6591	100	100	

Total enrolments for all units were subject to considerable attrition from enrolment to completion. An initial *n* of 6,591, after withdrawals before census date, was reduced to continuing enrolments *n* of 5,107, with very similar rates of attrition (22%) at this stage across all first year units (Table 6.2). Completed enrolments (i.e. awarded a passing grade) further reduced the available numbers to 3,509.

**Table 6.2 Cross-tabulation Comparing Early Withdrawal Rates:
Common and Core Units (All Enrolments 2005–6)**

<i>Withdrawal before Census Date</i>	<i>Core Unit</i>	<i>Common Unit</i>	<i>Total</i>
Withdrawn	1760	3347	5107
	77.70%	77.40%	77.50%
Continuing	505	979	1484
	22.30%	22.60%	22.50%
Total	2265	4326	6591
	100.00%	100.00%	100.00%

Fig. 6.1 Enrolments in Common and Selected Core First Year Units 2005–6



Because of their central position in the first year program, the Common units, especially CUC100 and CUC107, dominate the enrolment statistics for this comparison. This discrepancy should not, however, distort the comparisons, provided that the diversity within and between each class of unit is recognised in general observations. Again, statistical rigour will be needed for drawing valid inferences between classes which vary so much in their aggregate student loads.

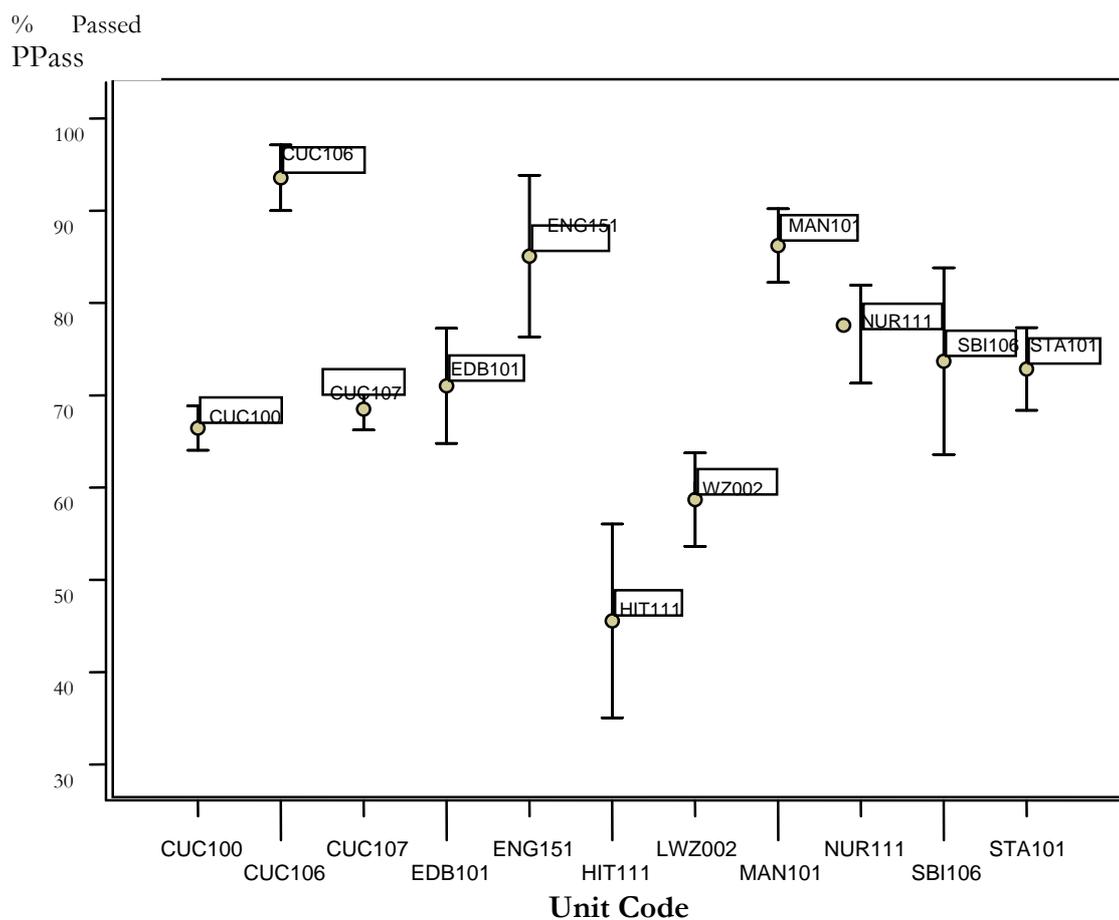
6.2 Comparing Common and Core Units 2005–6: Pass Rates and Average Grade

Are there any significant differences in the pass rates and grades awarded between Common Units and Core First Year Units? This question was answered in three parts:

- (1) by comparing the pass rates by error bars to examine the differences across individual units (Fig. 6.2)
- (2) by carrying out a *t-test* of the statistical significance of the pass rates of units aggregated by type to test the null hypothesis that there was no significant difference between Common and Core units on this outcome.
- (3) by comparing the distribution of grades awarded to completed enrolments scored from 1 (PC or PA or PU) through to 5 (High Distinction).

(1) Comparing Pass Rates across all Selected First Year Units

**Fig. 6.2 Error Bars Comparing Pass Rates by Unit Code
(95% Confidence Intervals of Mean Pass Rates)**



It is obvious from the distribution of mean passes in Fig. 6.2 above that there is considerable diversity in average student performance within both Common and Core units. In general terms, the average

pass rates of the three Common Units are comparable with those of the other larger or Core Units. The exceptions here are the Common Unit CUC106 which demonstrates an exceptionally high pass rate of over 90% and HIT111, with a mean pass rate in the mid-forties. These apparent extremes need, of course, to be put into context and no doubt are related to withdrawal rates and other aspects of course load in parent courses.

(2) Comparing Common and Core Unit Pass Rates

A *t-test* was carried out to test the null hypothesis that the mean pass rates for aggregated outcomes on both Common and Core units were equal (Table 6.3).

**Table 6.3 Comparison of Pass Rates: Common and Core First Year Units
(Continuing Enrolments 2005–6)**

<i>Outcome</i>	<i>Unit Type</i>	<i>N</i>	<i>% Passed Unit</i>	<i>Std. Deviation</i>	<i>Std. Error Mean</i>	<i>t-test Sign. Of Diff.*</i>
Passed Unit PC or Above	Core Unit	1729	71.49%	45.16%	1.09%	0.066
	Common Unit	3295	68.98%	46.26%	0.81%	

*2-tailed, equality of variances assumed

Despite this diversity within unit types, when the outcomes for each class of unit are aggregated, it appears that the pass rate between Common and Core units may differ significantly. The “gap”, however, is fairly small in absolute terms (2.5%) and the two-tailed *t-test* probability (.066) just fails to reach the accepted test of statistical level ($p < .05$) of significant mean difference in the pass rates. However, since the Common Units draw from across the whole spectrum of the first year intakes and do not have the explicit admission criteria of the main course, the relatively small disparity in pass rates speaks well of the program’s overall performance. It is also important to note that, despite this wider variation in intake (diversity factor), that the standard deviations of the distribution of both classes of unit are very similar.

(3) Comparing Average Grade Awarded: Common and Core Units 2005–6

A *t-test* was first carried out to compare the average grades awarded for all passing or completed enrolments for both Common and Core units (Table 6.3). In order to explore underlying distributions behind this statistic, a breakdown of the distribution of grades is provided (Table 6.4).

**Table 6.4 Comparison of Common and Core Units: Mean Grade Awarded
Completed Enrolments: 2005–6**

Grade Score: PC=1; P or PU =2; C=3; D=4; HD=5

<i>Dependent Variable</i>	<i>Unit Type</i>	<i>N</i>	<i>Average Grade Score</i>	<i>Std. Deviation</i>	<i>Std. Error Mean</i>	<i>t-test Sign. of Diff. between Means*</i>
Grade Awarded for Unit (scale 1-5)	Core Unit	1236.00	2.92	0.99	0.03	0.00
	Common Unit	2273.00	3.46	0.88	0.02	

The *t-test* of average grades of completed enrolments indicates that Common Units, although they may have a lower pass rate, have a significantly higher average of awarded grades than the Core Units selected here. The gap is quite wide, representing an average of mid-Credit range for Common Units as against a high Pass-marginal Credit average for the Core Units. The “gap” in standard deviations shows as well that the distribution of grades for Common units is much “tighter”, with a difference of about a tenth of a grade, indicating perhaps a tendency towards a greater homogeneity of marking.

**Table 6.5 Cross-tabulation of Counts and Percentages of Grades Awarded
(Completed Enrolments: Common and Core Units 2005–6)**

<i>Grade Awarded</i>	<i>Core Unit</i>	<i>Common Unit</i>	<i>Total</i>
PA or PC	N=48	15	63
	3.90%	0.70%	1.80%
Pass or Pass Ungraded	N=422	N=287	709
	34.10%	12.60%	20.20%
Credit	N=435	N=879	1314
	35.20%	38.70%	37.40%
Distinction	N=243	N=829	1072
	19.70%	36.50%	30.60%
High Distinction	N=88	N=263	351
	7.10%	11.60%	10.00%
Total N	1236	2273	3509
Total	100.00%	100.00%	100.00%

A cross-tabulation of grades awarded (Table 6.4) indicates that Core Units are skewed towards Pass/Credit grades while the Common Units are much more skewed towards the Credit/Distinction range, though the proportion of Credits awarded is roughly similar (35% for Core vs 38.7% for Common Units). Common Units also seem to award a higher proportion of High Distinction (11.6% compared to 7.1%). Although the modal (most frequently occurring) grade for both classes is in the Credit range, the real contrast lies in the grades on either side of Credit. Here we find a kind of inverted equality: the proportion of Distinctions for the Common Units (36.5%) is roughly equal to that of Passes for the Core Units (34.1%) , while the proportion of Passes for the Common units (12.6%) and of Distinctions for the Core units (19.7%) is also quite comparable. This contrast across the classes of units is something of an anomaly, reflecting perhaps differences in the nature of the assessment procedure, the difficulty of content or in marking standards.

6.3 Conclusion

A comparison of the performance of Common and selected Core Units reveals a small, though statistically significant, difference in the rates of completions, balanced by a higher level of awarded grades among the Common Units. Within each class of unit, however, there is a great deal of variation in completion rates, despite an overall communality in rates of early withdrawal (converging at around 22%), both within and between the two classes of unit. The performance of the Common Units is therefore quite creditable, given the compulsory and universal position of the program in the first year of study.

The only source of concern arising from this comparison appears to be the discrepancy in the level of grades awarded, with Common units having a statistically significant higher average. This discrepancy is illustrated by the finding that Common Units have a high ratio of Distinction to Pass grades (38% to 12%), in complete contrast with a low ratio for the Core Units (19% to 35%). This outcome may be a function of the nature of the content materials and assessment procedures, but may also provide grounds for further review by the Common Unit Management Group.

7. COMMON AND CORE UNITS 2005–6: THE EFFECTS OF ADMISSION CATEGORIES

This section explores the relative performance of Common and Core Units when admission categories are introduced into the predictive mix on the data base of enrolments for the years 2005-6. This will also include an investigation into the influence of student situation. The section will conclude with an exploration of the effect of TER scores on first year performance for students entering through a secondary education course.

This investigation will be divided into four stages:

- (1) an explanation of the predictive model employed, with a breakdown of the categories of admission in the years 2005–6
- (2) an exploration of the relative effects of *admission category* on withdrawal and pass rates across all units, controlling for the independent effect of unit type (Common or Core)
- (3) an estimation of the effect of *student situation variables* (Mode of Study, Part/Full-time) into pass rates, when both admission category and unit type are controlled for
- (4) a specific investigation into the effect of *TER score bands* in predicting academic outcomes for students entering University from a secondary school course.

7.1 Predictive Model and Admission Categories

7.1.1 Adapting the Generic Model

The framework for this section could therefore be expressed in terms of the following predictive model:

Fig. 7.1 Reduced Predictive Model for Estimation of Admission Category Effects

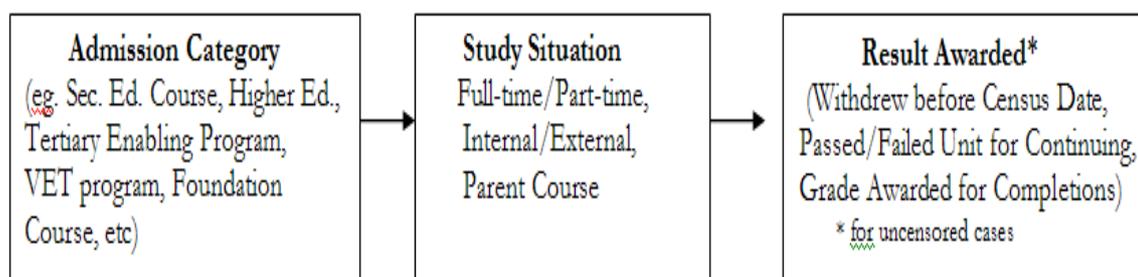


Fig. 7.1 is a reduced version of the generic predictive model specified in Fig. 3.1 above, based on the same database as for Section 6 (all Common Unit and selected Core Unit enrolments 2005–6), with the inclusion of the admission category as the main background variable. Student characteristics, though important, were omitted at this stage due to the specificity of this exercise and the complexity a full model would impose for interpretive purposes. Further analyses which will include controls for student background effects (age, gender, citizenship etc.) will be taken forward into a later stage of the monitoring project.

7.1.2 Admission Categories: Common and Core Units 2005–6

The breakdown of the admission categories for the combined first year units, Common and Core, is provided in Table 7.1. Since the basic unit here is the individual enrolment (not the individual student), it is expected that there will be considerable overlap between the two classes of unit, given the universal provision of the Common Unit program. This overlap may be the cause of some difficulties of interpretation, since the basis of admission will be shared by both classes of units. In light of this *caveat*, it is clear that the three main bases of admission are Secondary education (undertaken at school or by a VET or HE provider), a previous higher education course, or a VET award. The categories with the lowest frequencies are Foundation studies (not included in the following analyses), Indigenous Pre-Program (all withdrawn) and Professional Qualification. Tertiary enabling has a considerable loading of 361 as has “other basis” at 801.

Table 7.1 Admission Categories: Combined First Year Units 2005–6

<i>Basis of Admission</i>	<i>Frequency</i>	<i>Percent</i>
A higher education course (Australian or overseas equivalent complete or incomplete)	1757	26.7
A professional qualification	53	0.8
A VET award course (Australian or overseas equivalent complete or incomplete)	1243	18.9
Foundation studies program	4	0.1
Indigenous pre-program	4	0.1
Mature age	317	4.8
Non commencing student, including transfers	63	1
Other basis	801	12.2
Secondary education (Taken at School, Vet or HE provider)	1988	30.2
Tertiary enabling program	361	5.5
Total	6591	100

7.2 The Effects of Admission Category: Withdrawals and Passes

7.2.1 Admissions and Early Withdrawal

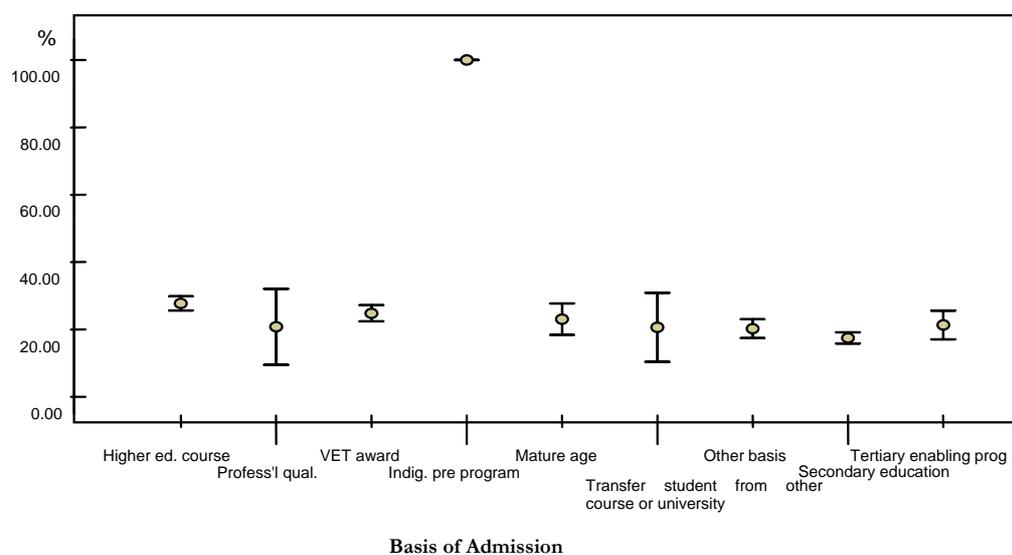
The cross-tabulation of the relationship between nine categories of course admission and early withdrawals are shown in Table 7.1. Two categories, Indigenous Pre-Program (n=4, all withdrawn) and Foundation Studies (n=4, 2 withdrew) provide unreliable results because of low numbers. However, the 100 percent withdrawal from the Indigenous Pre-Program is a cause for some concern.

Because the numbers vary considerably across the admission categories, an error bar graph (Fig. 7.2) shows the confidence intervals of the mean withdrawal rate for each admission category.

Table 7.2 Cross-tabulation of Early Withdrawal Rates and Admission Categories*
All First Year Units (Common and Core) 2005–6

Outcome	Basis of Admission								Total
	Higher Ed.	Prof.qual.	VET award	Mature age	Transfer	Other basis	Sec. Ed.	Tertiary Enabling	
<i>Did not Withdraw</i>	1270	42	935	244	50	639	1641	284	5107
	72.30%	79.20%	75.20%	77.00%	79.40%	79.80%	82.50%	78.70%	77.50%
<i>Early Withdrawal</i>	487	11	308	73	13	162	347	77	1484
	27.70%	20.80%	24.80%	23.00%	20.60%	20.20%	17.50%	21.30%	22.50%
<i>Total</i>	1757	53	1243	317	63	801	1988	361	6591
	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Fig. 7.2 Error Bars: Early Withdrawal Rates (%) by Basis of Admission (95% C.I.)
Common and Core Unit Enrolments 2005–6 (N=6589*)



*Notes: (a) Indigenous Pre-Program (n=4, all withdrawn); (b) Foundation Studies (n=4, 2 withdrew) has been excluded.

The two methods of analysis both indicate that, apart from the small group admitted under the Indigenous Pre-program, there was statistically significant variation in rates of early withdrawals across the range of admission categories (between-groups F ratio=9.7, df=8, p<.000), though the overall relationship is a weak one (Contingency Coefficient=.11). Secondary Education stands out as the one with the lowest withdrawal percentage, at 17.5%, while Higher Education course admission has the highest rate at almost 28%.

Although these variations may not be great, given the number of admission categories available, it would be useful to examine their relation to unit type or class. Would, for example, variations in early withdrawals across admission categories persist when unit type (Common or Core) is controlled for? If they do, then we might conclude that these effects are distributed across all the first year units, and not attributable to their association with either Common or Core Unit type. While it is not expected that the effect of unit type will vary greatly, for this or for other attrition outcomes, from the t-tests of the previous section, this multivariate procedure will be a more efficient method for isolating admission category effects.

In order to investigate this question, a univariate General Linear (ANOVA) model was carried out on all enrolments (n=6591), with early withdrawal as the dependent variable and independent or predictor “dummy” variables representing each of the three main admission categories: Secondary education course, Higher education course (complete or incomplete), VET course (complete or incomplete). These, together with type of unit (Common Unit/Core Unit) were introduced as four main effects. The results of this analysis are shown in Table 7.2.

Table 7.3 Predicting Early Withdrawal by Admission Category and Unit Type*
All First Year Units (Common and Core) 2005–6

<i>Dependent Variable = Withdrawn from the Unit</i>						
	<i>Type III Sum of Squares</i>	<i>df</i>	<i>Mean Square</i>	<i>F</i>	<i>Sig.</i>	
Corrected Model	10.816	4	2.704	15.634	0	
Intercept	90.977	1	90.977	526.026	0	
Unit Type (Common/ Core)	0.109	1	0.109	0.631	0.427	
Higher Ed. Course	3.491	1	3.491	20.185	0	
Secondary Ed. Course	1.338	1	1.338	7.736	0.005	
VET Course	0.794	1	0.794	4.589	0.032	
Error	1139.053	6586	0.173			
Total	1484	6591				
Corrected Total	1149.869	6590				

*Univariate (ANOVA) model, main (fixed) effects only.

The results of this predictive procedure indicate that the significant effects are direct, based on the independent influence of each of the three main admission categories, unmediated by unit type. From a regression model (results not shown), higher education course admission would seem to have the greatest (positive) effect. This represents students enrolling from previous courses, but more likely, those switching mid-stream from one course into another. Secondary education has a negative effect on early withdrawal, as does admission via a VET award course (complete or incomplete). While overall the predictive power of the model is quite low (multiple R is about 1 percent), these variations in withdrawals deserve attention. In particular, some further probing into the much higher rate of higher education admissions promises to have the greatest impact on reducing the overall rate of attrition at this stage for both Common and Core Units.

7.2.2 Admission Categories and Pass Rates

This analysis applies the preceding admission/withdrawal prediction procedure to the pass rates across admission categories and type of unit. The first procedure is to determine whether admission categories have the same statistically significant influence (however slight) on passes, as they have apparently had on withdrawals (Table 7.3, Fig. 7.3). The second is to determine whether type of unit (Common or Core) has any mediating effect on passes when admission categories have been controlled for, or adjusted out of the equation (Table 7.4).

Table 7.4 Cross-tabulation of Pass Rates (%) and Admission Categories*
All First Year Units (Common and Core) 2005-6

Outcome	Basis of Admission								Total
	Higher Ed.	Prof. qual.	VET award	Mature age	Transfer Student	Other basis	Sec.Ed.	Tert. Enabl.	
Failed Unit	371	15	273	95	13	218	417	111	1515
	29.70%	36.60%	29.80%	39.70%	26.50%	34.70%	25.70%	39.90%	30.20%
Passed Unit	878	26	644	144	36	411	1203	167	3509
	70.30%	63.40%	70.20%	60.30%	73.50%	65.30%	74.30%	60.10%	69.80%
Total	1249	41	917	239	49	629	1620	278	5024
	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

*Univariate (ANOVA) model, main (fixed) effects only.

Fig. 7.3 Error Bars (95% C.I.) Pass Rates by Admission Categories (Continuing Enrolments 2005–6, n=5024)

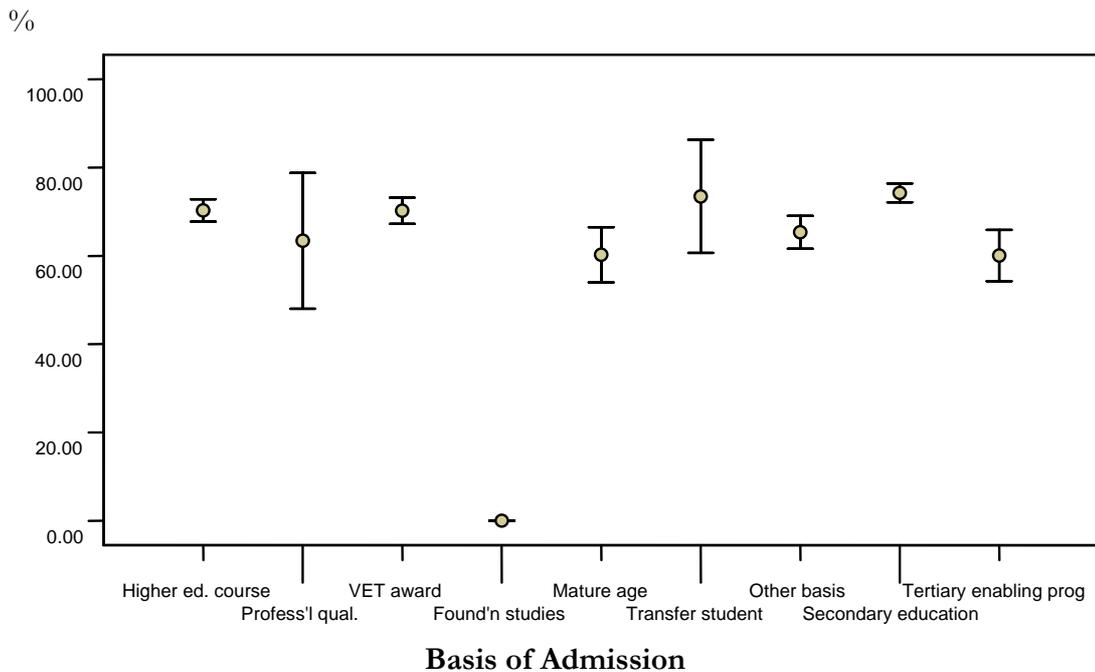


Table 7.3 and Fig. 7.3 show that there is significant between-groups variation in pass rates among the admission categories ($F=6.3$, 8 df, $p<.000$). Pass rates are relatively close, but at the extremes do show considerable disparity, from 60% for Tertiary Enabling Program and Mature Age to 74% for Secondary education admissions. Both VET and Higher Ed admissions are roughly comparable, close to the overall average of 69.8%. The statistical association is relatively low (Contingency Coefficient of .1), though this must be seen in the context of the inter-group gap in performance at the extremes which provide, as for the withdrawal rates, some grounds for intervention across the range of first year units in the range of programs and courses sampled.

Table 7.5 Predicting Passes by Admission Category and Unit Type*
All First Year Units (Common and Core) 2005–6

<i>Passed Unit PC or Above</i>					
<i>Source</i>	<i>Type III Sum of Squares</i>	<i>Df</i>	<i>Mean Square</i>	<i>F</i>	<i>Sig.</i>
Corrected Model	9.152	4	2.288	10.947	0
Intercept	681.464	1	681.464	3260.513	0
Unit Type (Common / Core)	0.698	1	0.698	3.339	0.068
Higher Ed. Course	2.778	1	2.778	13.293	0
Secondary Ed. Course	8.377	1	8.377	40.08	0
Vet Award Course	2.642	1	2.642	12.64	0
Error	1048.996	5019	0.209		
Total	3509	5024			
Corrected Total	1058.148	5023			

* Univariate (ANOVA) model, main (fixed) effects only.

In order to estimate the effect of the type of unit (Common or Core) on the success of students in this range of first year units, a univariate general linear (ANOVA) model was executed on the continuing enrolments (n=5023). This followed the same design as for the withdrawal analysis in Table 7.2, with a pass/fail result for each enrolment as the dependent variable and the same four predictors, Common/Core unit, Higher Education, Secondary Education and VET course experience or completion as bases for admission. The results displayed above (Table 7.4) have a similar pattern (though Secondary Education replaces Higher Education as the most powerful predictor), with the notable exception of the increased influence of type of unit, which just fails to reach statistical significance. As a check on the direction of the effect of these predictors, a separate OLS regression was run on the same model, indicating that the unit type (Common Unit rather than Core Unit) exerted a negative influence on a pass result, while all of the three other predictors had a positive effect. This is consistent with the earlier finding of the “gap” of about 2.5% in the overall pass rate between Common and Core Units (see previous section).

7.3 Unit Type, Admission Category, Student Situation and Attrition Outcomes

In this sub-section the effect of two student situation variables, external mode of study and part-time status, are introduced into the predictive mix for both attrition outcomes. For this analysis, the loglinear regression (binary) is preferred, as it provides a useful set of comparisons that repeat the methodology of Section 5. This time, however, student background characteristics are replaced by admission category and type of unit is added to the equation. The results for both outcomes,

withdrawals and passes, are displayed in Table 7.5, with commentary on statistically significant effects for concise summary of the pattern of prediction over the field of attrition in these first year units.

**Table 7.6 Predicting Attrition: Unit Type, Admission Category and Student Situation
Results of Loglinear Regressions: Common and Core Units 2005–6**

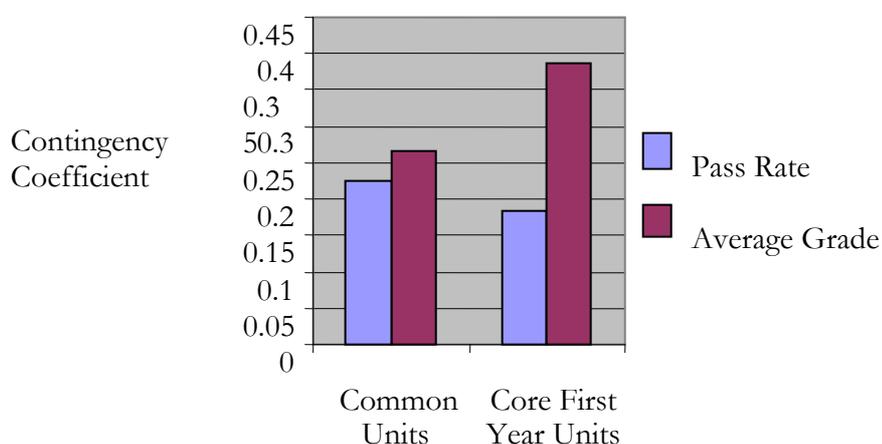
Predictor Variable	Early Withdrawals (n=6591)			Passes (n=5107)			Comment
	<i>B</i>	<i>Sig.</i>	<i>Exp(B)</i>	<i>B</i>	<i>Sig.</i>	<i>Exp(B)</i>	
Common Unit	0.142	0.058	1.152	-- 0.027	0.693	0.974	More likely to withdraw
VET Course Admission	-0.046	0.671	0.955	0.405	0	1.499	More likely to pass
Secondary Course Admission	-0.077	0.428	0.926	0.385	0	1.469	More likely to pass
Higher Ed. Course Admission	0.253	0.008	1.288	0.363	0	1.438	More likely to withdraw <i>and</i> to pass
External Mode of Study	- 0.324	0	0.723	- 0.564	0	0.569	Less likely to withdraw, <i>much</i> less likely to pass
Part-time Status	0.748	0	2.114	0.028	0.691	1.028	<i>Much</i> more likely to withdraw
Constant	-1.86	0	0.156	0.859	0	2.361	

The introduction of student situation variables into the prediction equation has had a marked impact on the explanation of the overall pattern of attrition. On the one hand the admission category effects are now confined to pass rates, having lost any significant effect on early withdrawals. On the other hand, the pattern of effect of unit type has completely reversed across the two outcomes; it now shows a marginally significant positive effect on early withdrawals and no significant effect at all on passes. An inference can therefore be drawn that the two situational variables were somehow distorting or suppressing the “true” underlying effect of Common Units on these outcomes. For early withdrawals, removing the effect of student situation variables and higher education admission gives a marginal significance to unit type; while it appears that the slightly negative effect of unit type on pass rates (i.e. the gap of 2.5%) may have been largely due to its association with External Mode of Study.

7.4 Tertiary Entrance Scores and Academic Outcomes in First Year Units: 2005–6

In this sub-section we examine the specific effects of secondary education admission through the extra information provided by Tertiary Entrance Rating (TER) scores, an important category of total admissions, numbering 2254 (or 44.1%) of the 5107 continuing (i.e. non-early withdrawn) enrolments. We will examine the strength of the statistical association between TER scores for those continuing enrolments and pass rates and average passing grades awarded. For this analysis, the chi-square-based measure of the Contingency Coefficient (which can vary between 0—no association, to 1—complete association) was chosen, in order to capture possible curvilinear (and possibly non-monotonic) relationships between grouped categories of TER. For analytical purposes, therefore, TER scores were grouped into seven bands of 10 points each (30-39 through 90-99), while grades awarded were scored numerically on a 5 point scale from 1=PC or equivalent, 2=Pass, 3=Credit, 4=Distinction and 5=High Distinction.

Fig. 7.4 Comparing Strength of Association between TER Scores and Academic Performance*



**n* for each bar (left to right) = 1469, 1041, 754, 560 respectively (31 cases missing values); sig. $p < .000$ for all coefficients.

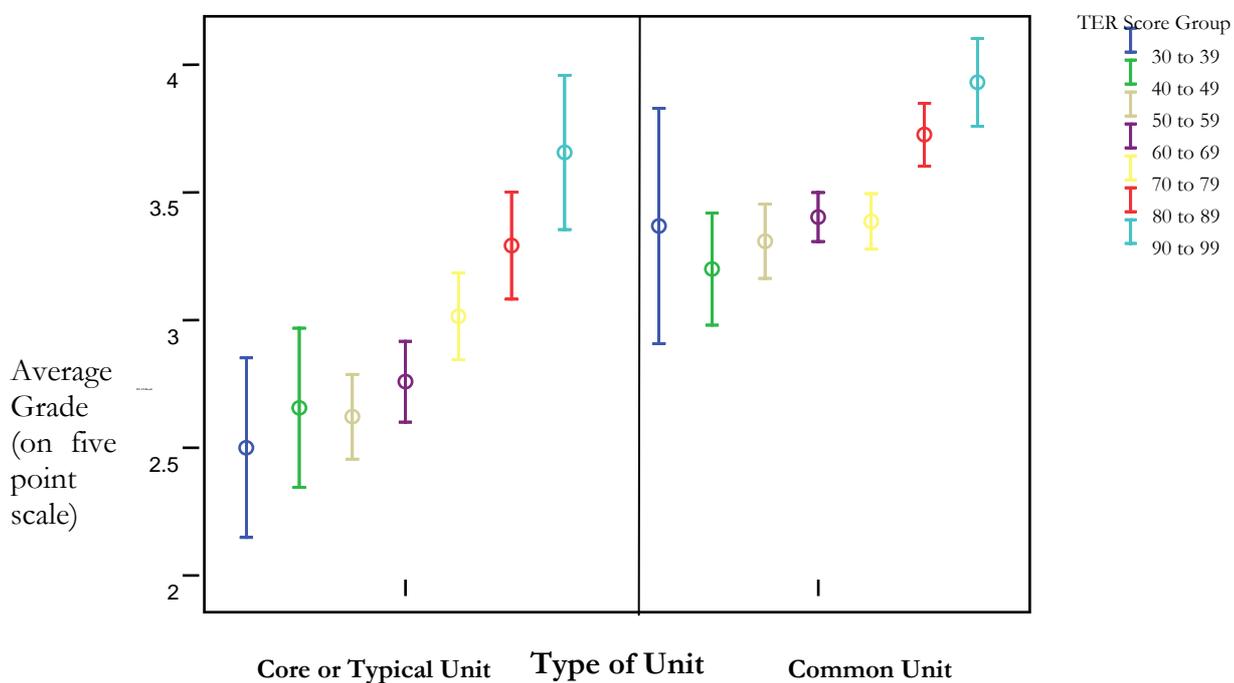
The bar chart in Fig. 7.4 shows significant associations in every instance of associations between TER scores and academic performance for both the Common and core first year units. Both the strongest and the weakest value of association are found in the Core Units, perhaps indicating some compensatory relationship between the two, as a more open association for passing the unit is balanced against a more finely differentiated gradation within the awarded grades. For the Common Units, the value of the association is much more comparable between pass rates and average grades, though the imbalance goes in the same direction. Overall then, one might see a tendency for the Core Units to spread grades more widely on the basis of academic entry score, possibly because of their greater importance in selection for honours and post-graduate degrees.

Average Grade Awarded for Passing Enrolments: The contingency coefficients, though indicative of the strength of an overall association, conceal many features of an association that are of interest to course planners in that a general relationship, however strong, may also not be strictly linear (i.e. each step in a TER score will not necessarily produce on the average the same increment in pass rates or average grades). There is also a potential problem of interpreting any “overlap” between the

distributions of academic performance outcomes within each TER range, where the statistical significance of observed mean differences relies on the number of enrolments in the base grouping.

All of these variations and possibilities within the four associations are captured in the error bar graph of Fig. 7.5, which compares average grades by TER range between Common and the selected Core first year units.

Fig. 7.5 Error Bar Comparisons between Common and Core Units by TER Range of Average Grade* (Completed Enrolments 2005–6)



*Scored on five point scale from PC/PU=1, Pass=2, Credit=3, Distinction=4, High Distinction=5

Fig. 7.5 suggests that, while there is generally an increase in average grade awarded for every ten-point increase in TER range, there is a good deal of overlap between the bars, particularly in the lower ranges, from 30 to 59 for each type of unit. One notable difference in achievement in the lower ranges of TER scores is the higher mean grade awarded to the 30–39 TER group for the Common Units (surely one of the most marginal for university entry) than that for the second lowest group. This effect contrasts with the consistent correlation between the lowest TER and grades for the Core first year units, where this anomalous effect appears to have pushed up the bivariate distribution in that here the 40–49 range outperforms the 50–59. Not too much can be read into these apparent anomalies, given the degree of overlap and the small numbers in the lowest groups. It would appear, however, in the case of the Common Units, the program may well be providing the vital support for those among these academically marginal groups at the bottom of the TER range that would not be otherwise available. Other than these exceptions, there would appear to be quite a strong monotonic relationship between the TER scores and the average grades awarded in both kinds of first year units.

7.5 Summary and Conclusion

The basis on which a student is admitted to a course has a relatively low association with the probability of passing a unit and the average grade of enrolments in that admissions category. While estimates of the correlation between admissions category and outcomes (withdrawals and passes and grade of completed enrolments) may appear small (Contingency Coefficient values vary between .1 and .39), difference can be quite important in comparisons between pairs at extremes (e.g. 14% gap in pass rate between TEP and Professional Qualifications admissions). VET admissions perform well on the average, though more work needs to be done to estimate the effect of exemptions on particular units, particularly the Common Units (see following section).

The effect of admissions category on performance in all units appears to lose statistical significance when student situation variables (external mode of study and part-time status) are controlled for or adjusted out of the predictive equation. External mode of study has contradictory effects on each of the two main attrition outcomes, predicting both lower rates of early withdrawal but a higher rate of failure. Part-time status on the other hand has the highest impact on early withdrawals but no significant effect on unit completion. The three main admissions categories, entry through Higher Education, Secondary or VET courses, have significant effect on withdrawal rates (HE course complete or incomplete the greatest), as well as on passes (Secondary education the greatest). These effects remained significant after controlling of external mode of study and part-time status. Type of unit (Common as against Core) had only a marginally significant effect (positive) on early withdrawal. When the mode of study was controlled for, the previously negative effect of Common Unit on the pass rate (representing a gap of about 2.5% in favour of Core Units) became statistically negligible.

Among the admissions based on TER scores (about 44% of non-withdrawal or continuing unit enrolments), associations between score group (in intervals of 10 points) and academic outcomes yield coefficient estimates of about .2, ranging from .18 for predicting pass rates to .39, in both cases for first year Core Units. Although no controls were made for student situation, it is expected that the overall trend of higher TER group admissions to gain higher grades will persist, especially for the upper range of admission scores.

The pattern of associations between TER with academic outcomes in the lower score ranges (from about 40–60 points) appears to vindicate the more flexible admissions policy on the TER category pursued by CDU. In these TER bands, the association between TER scores and academic performance (pass rates and average grades) is quite weak, illustrated by the considerable overlap in the distribution of performance outcomes. Even in the very lowest TER group (30–39), the majority (52%) of enrolments achieved a passing grade of PC or above for all units. The mean grade awarded for this group who completed the unit was a mid-Pass (2.5; n=18) for the Core units and a surprising mid-Credit (3.37; n=19) for the Common Units.

There is evidently great potential for following up and broadening this line of statistical enquiry by pursuing a cohort of admissions through the considerable database resources held across the University. Here it would be possible to track the effect of admissions category, Common Unit exposure and performance and course field of education while holding constant both situational and socio-demographic variables (the latter were available but not included in this preliminary study). These possibilities are explored in greater detail in the following section.

8. SUMMARY AND RECOMMENDATIONS: COMMON UNITS 1999–2006

This section will provide a brief summary of main findings of the previous sections, highlighting issues in areas of program development, trends in enrolments, equity and performance, and finishing with comparisons with other large first year (Core) units in the more popular parent courses. This section will also allow both reflection on the maturation of the Common Units and a projection of the monitoring program to emerging issues of concern for the years 2007–8 and beyond. Among these latter topics might be an investigation into the effects of Common Unit participation/exemption on student progress in later years of their main courses. Have the Common Units “made a difference” in later performance, compared with those who have not had this exposure, either through an individual or a general course-specific exemption? This and other questions may emerge from the review of the findings for the years 1999–2006.

8.1 Objectives and Orientations: New Directions in the Monitoring Program

8.1.1 Orientation and Research Design

As stated in Section 1, the terms of reference of the present phase of the project were to carry out:

- An investigation into the performance of the Common Units by extending the existing monitoring methodology into the update of relevant research literature and the analysis of Student Outcomes in the Common Unit Program into the years 2005–6. This analysis will include exploration of trends and patterns of student survival and of predictors of student withdrawal, satisfaction and academic success from the whole period of monitoring in 1999–2006.
- A comparative analysis of the Common Units outcomes against those of a selected number of large first year units for years 2005–6. At the suggestion of the Vice-Chancellor, this section was expanded to include an estimation of the effects of admission categories on all the first year units included, both Common and Core.

While the focus of the previous report (Tyler and Pritchard, 2007) was the estimation of the effects of increases in the diversity of student intake on student outcomes in the Common Units program, together with an appraisal of the impact of the restructuring of the unit offerings in 2003, this phase of the monitoring project was broadened to include a study of the general processes of success and survival in first year of university study. Common to all of the three phases of the monitoring project (1999–2002; 2003–4; and the present phase 2005–6), has been the study of the causal background to attrition (early withdrawal and failure) in terms of a range of predictors drawn from official records of student background and study situation (all data were treated with strictest confidentiality and anonymity).

One major advantage of the support for the monitoring project has been the gradual expansion of the database of Common Unit enrolments, including early withdrawals, growing from over 7,000 in the first phase, to over 11,000 in the second and now totalling 15,895 (Table 8.1). The agglomeration of such an internally consistent data set in terms of variables, labels and format (SPSS) has provided an invaluable resource for charting and exploring not only the development of the Common Units, but because of the program’s near-universal participation, an insight into the entire first year experience at Charles Darwin University (prior to 2003, Northern Territory University).

Table 8.1 Monitoring Project Database: Common Unit Enrolments 1999–2006

<i>Year</i>	<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
1999	1384	8.7	8.7	8.7
2000	1781	11.2	11.2	19.9
2001	1889	11.9	11.9	31.8
2002	2481	15.6	15.6	47.4
2003	1851	11.6	11.6	59.1
2004	2183	13.7	13.7	72.8
2005	2123	13.4	13.4	86.1
2006	2203	13.9	13.9	100
Total	15895	100	100	

8.1.2 Research Design and Methodology

The analytical procedure was formulated in terms of relationships between student characteristics and program outcome, mediated by (a) course admission categories or unit type (Common or Core) and (b) student situational variables, whether unit or course-specific. Common Unit-specific variables refer to the student's mode of study, mode of delivery (print/lecture/online/face-to-face), as well as unit content (e.g. skill- or general education-oriented), while course-related variables refer to a student's part-time or full-time status and year of study. For the purposes of this analysis, however, since admission category data were only available for the years 2005–6, the estimation of these effects was introduced only into the comparative section of Core and Common Units (Sections 6 and 7).

The generic predictive model (see Fig. 3.1) proved flexible enough to be used not only to estimate the individual effects of both student admission and situational variables on attrition outcomes, but also for capturing the unique combinations of values across these variables by means of a segmentation analysis. The latter is an analytical technique only recently recognized as a powerful tool for predicting and addressing university attrition (see U.K. report "Staying the Course", House of Commons Public Accounts Committee, 2008, Conclusions and Recommendations, No. 2). This approach sequentially divides the sample of enrolments into "segments", based on unique combinations of values among the predictor variables according to their relative rates of passing, or withdrawing from, a unit. This data-mining technique (often used in market research) was successfully applied in both of the previous monitoring reports (Tyler, 2003, Tyler and Pritchard, 2007) and found to be particularly effective in disaggregating effects such as those of age, gender and Indigeneity.

The analytical study of attrition was followed by a comparative analysis of the Core and Common Units (Sections 6 and 7), which included an estimation of admission category effects, based on a simplified version of the generic model (Fig. 3.1). Because of the complexity that student background characteristics would bring to the predictive model, these variables were excluded for this section of the analysis. The focus was therefore on the comparisons between the two types of unit, based on

rates of withdrawal, passes and average grade awarded while controlling for admission categories and student situation variables such as external mode of study and part-time status.

8.2 Trends in Enrolments, Early Withdrawals and Passes: Common Units 1999–2006

The trends in enrolments, early withdrawals and pass rates were demonstrated by time-series line graphs, spanning the whole observation period, 1999–2006. The interaction among trends lines for these three indicators of inputs and outcomes to the Common Units was synthesized in the form of a line graph depicting early withdrawal and pass rates against a composite measure of diversity of intake over this period.

8.2.1 Trends in Enrolments

Since 1999, **total enrolments** (including early withdrawals) appear to have settled down to a more or less stable pattern, at just over 2,000 enrolments per year, after some initial swings, especially between those for 2002 and those for 2003; the latter being the date of the introduction of the simplified unit offerings (from 5 units to 2). This stability perhaps reflects a greater level of acceptance of the program by both students and parent course coordinators.

Withdrawal rates, by contrast, appear to have remained fairly stable in the first years of the program, hovering at around 33%; but they have decreased markedly over the three recent years of enrolment stability, falling from about 30% in 2003–4 to just 22% in 2005–6. The reduction in early withdrawals brings the Common Units into convergence with withdrawal rate in other large or Core first year units (see Section 6) and further confirms the possibility that the program has gained greater acceptance among incoming students. Certainly the rate of early withdrawal in 2005–6 is far less of a concern than when it reached its historic peak of 35% in the second year of the program, and supports the position that the program has been “normalised” within the first year of studies for the bulk of incoming students.

Trends in the pass rate indicate that fluctuations in the rates of enrolments and early withdrawals from the Common Units may have translated into student success. A lower rate of early withdrawals may have been the cause of decline in the pass rate, as well as having an effect on the increasing diversity of intake (see below). However, this hypothesis falls down for the current period, as the precipitous decline in the early withdrawal rate for 2005–6 noted above has been clearly accompanied by a recovery of the pass rate from about 64% in 2003 to a consistent rate of 68-69% in the following years. This followed through the trend of recovery of the unit reforms of 2003 in the following year, 2004.

The apparent resilience problem should not be a cause of complacency towards the underlying obduracy of overall attrition rates in the Common Unit program, and perhaps the first year. Combining the reduced rates of early withdrawal (22%) with a failure rate of 31% still means that only 53 out of 100 initial enrolments are translated into unit credits or completions. For the years 2005–6 this represented a combined loss of 47% of initial enrolments, even though it may be a reduction of 9% (about 360 enrolments) from the high attrition rate of 56% for the students enrolling in 2003–4. The improvement needs to be followed up by more detailed attention to the areas of loss, in which the role of equity factors, especially in their unique combination of values across different “markets” may prove crucial.

8.2.2 Trends in Diversity, Equity and Outcomes: Common Units 1999–2006

The major change in the diversity of intake to the Common Units in the recent years has been the falloff by over twenty percent in the proportion of part-time enrolments, between 2004–5, with only a small recovery in 2006. However, the other major contributor to increased diversity, the proportion of external enrolments, has increased apace, marked by a monotonic tripling over the observation

period from 20% in 1999 to 60% in 2006, with only a slight fall and subsequent recovery in 2005. These conflicting trends perhaps reflect changes in university strategies of student recruitment as well as changes in the market for part-time courses in a period of low unemployment.

The trend towards externalization of unit delivery has been accompanied by a corresponding decline in the proportions of NT home residency, from over 80% in 1999 to 60% in 2006, and by a decreasing proportion of enrolments from students aged under 25 years. Indigenous enrolments declined in this latter period, while Non English Speaking Background enrolments rose by about 50% from a low base (from 10% in 2004 to 15% in 2006). The gender ratio remained relatively stable, with females consistently representing about two-thirds of total enrolments; while first year of studies enrolments continued to fluctuate around 70%, though declining slightly in recent years.

Trends in the **composition of early withdrawals** from 1999–2006 indicate a general decline in all groups, with a slight increase in 2006. The exception here is the steep increase in withdrawals in both part-time and overseas citizenship enrolments in the middle period of observation, 2003–4; both groups then rejoined the general downward trend in the years 2005–6. The trends in part-time withdrawals need to be put beside the 2.5 times increase in part-time enrolments charted in Fig.4.3, mirrored here in almost the same rate of increase in early withdrawals. This relationship (which showed up in the very high predictive effect of part-time status on early withdrawal in the previous report for 2003–4) may be explained partly in terms of the attraction of the new degrees which were offered for the first time in 2003. In any case, this “spike” in part-time enrolments in 2003–4 appears to have disappeared, accompanied by a significant decline in rates of early withdrawal. The connection here has not been fully explained, though the unexpected levels of workload from the Core Units in the parent course may have increased rates of deferral of the Common Units to a later year. The increase in the proportion of **early withdrawals of Indigenous students** (about 10% increase in rate for 2005 versus that for 2006) deserves further attention. While (as shown in the first report) a realistic decision to withdraw early rather than to proceed to a Failed Absent grade may be preferable in some cases, this increase may require further investigation.

The changing composition of the **pass grade or above** among Common Units over the period 1999–2006 reveals remarkable stability in both (a) the rates of equity group representation and (b) in their rank order of average success. Against this stability, there was extreme variability observed in the completion rates for two groups of enrolments: Overseas Citizenship and Indigenous. In the period 2003–4 these two groups showed contrasting rates of increase and decline respectively, before returning in 2005–6 to their trend rates. The fall-off for Indigenous enrolments in 2003 was accentuated by a sharp increase in 2002, a result which might be worth investigating: what was the program “doing right” for Indigenous students in that year? The recent decline in the rate of Indigenous completions to below 40%, an historic low for this category of enrolments, might be cause for further exploration of variations in Indigenous performance. The improvement in the rate of male representation over recent years is encouraging, but still at about 5% below that for females (down from about 9% for the first period).

An analysis of the combined effects of trends in rates of intake diversity, early withdrawals and pass rates indicated that, except for a low point in the pass rate of 2003, the Common Units have absorbed the twin “shocks” of increased diversity and unit restructuring. Not only has the early withdrawal rate been “normalised” to a rate of just above 20% (from a past average rate of over 30%), it has maintained an increase in completions. The combined effect was to result in a much improved overall retention rate for the program in the recent years; although, as noted above, the proportion of enrolments resulting in unit completion still has room for considerable gains in improvement in retention, given that overall survival rates from enrolment to completion is still only about 56% in 2005–6. Further study of the impact of specific predictors on these two attrition indicators should help to target those groups of enrolments which may require further attention in areas of recruitment, induction and delivery.

8.3 Equity and Outcomes: Predicting Attrition in the Common Units 1999–2006

This predictive analysis, as for that of the previous reports, employed logistic regression techniques to produce precise weights for estimating the independent effect of each predictor on the “log odds” of early withdrawal and passing or failing a unit. These are then converted to the “odds ratios” which express the probability of an outcome, e.g. passing a unit divided by the probability of not passing.

8.3.1 Predicting Early Withdrawals: 1999–2004 and 2005–6

The rank order of the nine equity predictors showed that only three reach statistical significance. Part-time status stood out as the most powerful predictor of early withdrawal, with an odds ratio of almost three times that of the average odds of withdrawing early. External Mode of Study is almost the mirror image of Part-time status, showing an odds ratio coefficient indicating that this enrolment was 2.5 times less likely than the average to result in withdrawal. First Year of Studies is slightly higher than the average; while the odds ratio for NT Residence is just below the average and just exceeds statistical significance of .05. It may be surprising that, when these four indicators (plus the observation period 2005–6 and the constant term) are controlled for, the other five predictors (Overseas Citizenship, Age under 25 years, ESL, Indigeneity and Male gender) were far too close to the average of odds ratio of 1 to have a statistically significant effect.

Effect of Recent Observation Period: 2005–6 versus 1999–2004

The significant (negative) effect of the period of observation 2005–6 as a separate “dummy” variable reflected the much lower rate of withdrawals for the period of observation, 2005–6. Even when the fluctuations of the effects of the equity groups on this outcome over the years of increasing diversity are controlled for, the odds ratio for this year is still quite important. At only .69, it indicates that for this period there is a significantly lower average chance of early withdrawal than that for the previous years of the program. That the decline of the withdrawal rate appeared to be so robust must reflect positively on the adaptability of the Common Units to meet the challenges of a much more diverse student intake.

This most recent period, 2005–6, showed a positive influence on overall retention rates with a significant odds ratio of 1.67 (where 1 is the sample average). This was in contrast to the effect noted for the outcomes for 2003 where there was a drop in pass rate, following a notable increase in diversity and a fall in the withdrawal rate. The trend towards greater retention to successful completion of units in the face of an increased diversity and lower withdrawal rate was encouraging and demonstrated again the potential of the program to successfully adapt to the changed circumstances of the first year.

An inspection of the odds ratios showed that five of the nine equity groups have significant effects on completing or passing a Common Unit over the entire period 1999–2006. There was a significant effect (positive) in 2005–6, as against that for previous years (1999–2004). When all the other effects are controlled for, Indigenous identifier has the greatest (negative) effect, followed by negative effects for External mode, Male gender and Age under 25 years. The only other positive effect observed (other than that for the 2005–6 period), was for Overseas Citizenship, which has about a two thirds improvement in the odds ratio over the average value of 1. Values for the NT Residence, First Year of Studies, ESL and Part-time status did not reach statistical significance, though NT residence just failed to reach significance as a negative effect ($p < .07$). It is interesting to note that the External Mode of Study, a powerful negative predictor of early withdrawal, was here also the second most significant negative predictor of passing a Common Unit. This reversal of effect also applies to Indigenous identity, which has contradictory effects on the two outcomes: less likely to withdraw, more likely to fail. More research might identify a causal link between these two attrition outcomes for these groups.

8.3.4. Segmenting Attrition: Difference and Survival in the Common Units 1999–2006

In this section, we employed the CHAID technique (Chi-Squared Automatic Interaction Detector) to divide a population into two or more distinct groups based on categories of the “best” predictor of a dependent variable (e.g. withdrawal rate). This technique then splits each of the groups into smaller groups based on combinations of the other explanatory variables on the basis of their predictive power. CHAID displays the final subgroups (segments) on an easy-to-understand tree diagram or a “gains” chart which ranks the segments or combinations of values across the selected predictors by the percentages of the dependent variable that it encloses.

Early Withdrawals: Segmentation Analysis

Although all enrolment predictors were included in the original model for the whole sample of enrolments ($n=15,895$), only five met the default criterion probability $p<.05$ for making a statistically significant “split”: NT Residence, Mode of Study, Full-time/Part-time status, Indigeneity and First Year of Study. Indigenous identification and NT Residence were the only student characteristics that met the criterion for inclusion. For both of these student characteristics, however, the overall segmentation effects in absolute numbers were relatively small compared with those of Part-time status, Year of Study and above all, Mode of Study, with Part-time, NT residence and Internal enrolments showing the highest levels of risk of early withdrawal, with a 45% rate for this segment. This finding, based on the largest observation database so far in the monitoring program, may have implications for the ways in which the program and other first year units have been structured, marketed and delivered, particularly in the first crucial weeks of semester.

Unit Completions: Segmentation Analysis

Here we saw a prominence of predictors relating to student background characteristics, rather than to their study or course situation in the formation of discriminatory segments. While Indigeneity was the only purely individual background characteristic appearing among the early withdrawal segments, Mode of Study is the only situational variable among those predicting unit completion segments. Indigeneity was not totally consistent in its interactive effects—Indigenous females studying internally, for example, outperformed non-Indigenous school-leavers, aged 17-19, studying externally. Externally-studying Indigenous students and male Indigenous students in internal mode appear to be most at risk of failure, with pass rates well below 40%.

A major feature of this analysis was the large “gap” between the top five segments averaging a pass rate of 77% (most frequently occurring enrolments here were Internal, Female and non-Indigenous aged between 17 and 34 years) and the bottom six, averaging a 50% pass rate (most populous category was Australian or NZ Citizenship, 20-24 yrs, Non-Indigenous). The first group averaged 8% over the mean pass rate, the latter had a pass rate almost 20% below it (this latter group represented 56% of the classified enrolments).

This segmentation method seems to have uncovered something of a “fault line” dividing the segments of continuing enrolments, similar to that observed between the top two and the bottom six among the segments of early withdrawals. The method has therefore demonstrated considerable potential, in principle simplifying rather than complexifying the task of targeting those groups of students most at risk of either withdrawal or failure. Effort directed at situational characteristics for minimizing early withdrawals and at groups identified by individual background characteristics in the case of unit completions would also seem to be a productive strategy.

8.4 Common and Core Units Compared: Admissions, Situations and Attrition, 2005–6

Here we will examine the relative performance of the two classes of larger intake units in terms of academic results in Common and Core Units in the most recent period of observation, 2005–6. The

latter units were selected from those taken by students in the first year of studies within the more popular courses, typically in Nursing, Teaching, Business, Law Natural Sciences and Engineering. The first analysis was concerned with a statistical test of the differences of the means of the two classes of units in the years 2005 and 2006 in withdrawal and pass rates and average grades awarded. The second and third (see the two following subsections) explored the effects of admission categories and student situation on unit completion, while a third analysis was carried out on the effect of TER score on pass rates and average grade awarded.

8.4.1 Comparing Outcomes: Unit Type, Early Withdrawals and Passes 2005–6

Common versus Core: Withdrawals and Passes

A *t-test* was first carried out to compare the average grades awarded for all passing or completed enrolments for both Common and Core Units. A comparison of error bars of pass scores of eleven first year units (three Common, eight Core) revealed considerable diversity in average student performance. In general terms, the average pass rates of the three Common Units are comparable with those of the other larger or core units.

The exceptions here were the Common Unit CUC106 (Design and Innovation), which demonstrated an exceptionally high pass rate of over 90%, contrasting with HIT111 (Programming Concepts), which had a mean pass rate in the mid-forties. Despite this diversity within unit types, the between-unit type mean difference of 2.5%, based on aggregated rates, just fails to reach the accepted test of statistical level (i.e. $p < .07$) and may indicate a small, though important “gap”, in survival rate between the two unit types. This difference must be put in context, in that Common Units embrace virtually the whole spectrum of the first year intakes and do not have the explicit admission criteria of the main course. Despite the diversity of intake that this universality of intake entails as well, it should be noted that the standard deviations of the distribution of both classes of unit are very similar.

Common versus Core: Average Grade Awarded

The *t-test* of the average grades of completed enrolments indicates that Common Units, although they may have had a lower pass rate, had a significantly higher average of awarded grades than the eight larger Core Units. The gap in average grade was quite wide, representing an average of mid-Credit as against a high Pass/borderline Credit average for the Core Units. Common Units also showed a greater homogeneity of marking, as indicated by a smaller standard deviation. Not surprisingly then, a cross-tabulation of grades awarded against unit type indicated that Core units are skewed towards Pass/Credit grades, while the Common Units are much more skewed towards the Credit/Distinction range. There are a number of possible factors that could explain this disjunction between a lower pass rate of Common Units and a higher average grade awarded which may relate to the emphasis in the program on formative assessments that build students knowledge and skills towards the major assignment, as well as the tendency for assessments in common units to embrace a range of modes of presentation and expression which allow for a less rigorous pass/fail approach to grading.

8.4.2 Admission Categories, Situation and Outcomes: Common and Core Units 2005–6

This section explored the relative performance of Common and Core Units when admission categories, unit type and student situation were introduced into the predictive mix on the database of enrolments for the years 2005–6.

Admissions Categories and Withdrawal Rates

Two methods of analysis (error bars and univariate analysis of variance) both indicated that there was statistically significant variation in rates of early withdrawals across the range of admission categories. However, the statistical association between admission categories and early withdrawal was found to

be a weak one (Contingency Coefficient=.11). Secondary Education had the lowest withdrawal percentage, at 17.5%, while Higher Education course admission has the highest rate at almost 28%.

Do variations in rates of early withdrawal across admission categories persist when unit type (Common or Core) is controlled for? In order to investigate this question, a univariate (ANOVA) model was carried out on all enrolments (n=6591), with early withdrawal as the dependent variable and three predictor “dummy” variables representing each of the three main admission categories: Secondary Education course, Higher Education course (complete or incomplete), VET course (complete or incomplete). These, together with type of unit, were introduced into the model as four main effects.

The results of this predictive procedure indicated that the significant effects are direct, based on the independent influence of each of the three main admission categories, unmediated by unit type. Further analysis showed that Higher Education course admission predicted the highest rates of withdrawal, possibly representing those switching mid-stream from one course into another. Secondary Education had a negative effect on early withdrawal, as did admission via a VET award course (complete or incomplete). Though the amount of variance explained is small, some further exploration of the much higher rate of Higher Education admissions hold some promise for bringing down the overall rates of early withdrawal.

Admission Categories and Pass Rates

Similar analyses (error bars and Analysis of Variance) of the effects of admissions on pass rates showed a low overall variation with a weak statistical association as for early withdrawals (Contingency Coefficient of .1). As for early withdrawals, however, considerable disparity was observed between extreme groups, e.g. from 60% for Tertiary Enabling Program and Mature Age to 74% for Secondary Education admissions. Both VET and Higher Education admissions were found to be roughly comparable, close to the overall average of 69.8%. All three admission categories had significant positive effects, while unit type just failed to reach statistical significance as a negative effect. This pattern of disparity, small overall but important between the extremes of admission categories, appears to provide some grounds for intervention across the range of first year units in the programs and courses sampled.

Admissions, Student Situation and Attrition Rates

The introduction of student situation variables (Part-time status and External Mode of Study) into the prediction equation had a marked impact on the explanation of the overall pattern of attrition. The overall effect on early withdrawals was to remove the significant effect of admission categories, supporting the earlier finding that these were influenced by situational rather than individual background factors. On the other hand, the pattern of effect of unit type had completely reversed across the two outcomes. It now showed a marginally significant positive effect on early withdrawals and no significant effect at all on passes. An inference can therefore be drawn that Part-time status and External Mode of Study were suppressing the “true” underlying effect of the Common Unit on these outcomes. For early withdrawals, controlling for student situation variables and Higher Education admission revealed a marginally positive effect for Common Unit enrolments: that of increasing the probability of withdrawal. On the other hand, it appeared that the slightly negative effect of unit type on pass rates (the observed gap of 2.5% in favour of Core Units) may have been largely due to its association with External Mode of Study.

8.4.3 The Effect of Tertiary Entrance Ratings in Common and Core Units 2005–6

In this sub-section we examine the specific effects of the Secondary Education admission through the extra information provided by the Tertiary Entrance Rating (TER) scores (numbering 2254 or 44.1% of the 5107 continuing enrolments). We examined the strength of the statistical association between TER scores for those continuing enrolments and pass rates and average passing grades awarded. For

the pass rate analysis, comparisons between the strength of the chi-square-based measure of association (Contingency Coefficient was chosen), while an error bar graph was also used for displaying the associations between TER bands and average grade awarded. For analytical purposes, therefore, TER scores were grouped into seven bands of 10 points each (30-39 through 90-99), while grades awarded were scored numerically on a 5 point scale from 1=PC or equivalent, 2=Pass, 3=Credit, 4=Distinction and 5=High distinction.

TER Bands and Pass Rates

Contingency coefficient values showed significant associations in every instance of associations between TER scores and academic performance for both the Common and Core first year units. Both the strongest and the weakest value of association are found in the Core units, as a weaker association for passing the unit was balanced against a stronger association with awarded grades. For the Common Units, the size of the association with TER bands is much more even across both outcomes, pass rates and average grades, though the stronger association here is also with the latter. Overall then, one might see a tendency for the Core Units to spread grades more widely on the basis of academic entry score, possibly because of their greater importance for selection towards possible honours and post-graduate degrees.

TER Bands and Average Grade Awarded

While there was found to be generally an increase in average grade awarded for every ten-point increase in TER range, there was also found to be a good deal of overlap between the bars, particularly in the lower ranges (30 to 59 points) for both types of unit. One notable difference in achievement in the lower ranges of TER scores was the higher mean grade awarded to the 30-39 TER group for the Common Units (surely one of the most marginal for university entry) than that for the second lowest group. This effect contrasted with the consistent correlation between the lowest TER bands and grades for the Core first year. However, a similar anomalous effect appears in the next band range, where the 40-49 point range outperformed that for the 50-59 point band. Given the degree of overlap and the small numbers in the lowest scoring bands, these anomalies may be expected. However, the Common Unit program would appear to be providing a vital support for those among these academically marginal groups at the bottom of the TER range.

8.5 Beyond First Year: Attrition, Equity and Course Retention 2007–8

This is the third report presented to the Common Units Management Group of analyses of the trends, risk factors and market segments in the Common Unit program from its inception in 1998 to the recent phase covering the years 2005–6. This project has so far assembled an impressive continuous database of almost 16,000 individual enrolment records and provides essential monitoring services, not only to the Common Units Committee, but also has important implications for marketing and recruitment, and first year student attrition, retention and progress across all University programs. In order to carry this forward into the years 2007–8, when data become available, the monitoring project should strike out into new directions, develop new themes of enquiry and build on its established base in enriching decision-making throughout the undergraduate academic program at Charles Darwin University. As for the Common Units program itself, the monitoring project must not lose sight of its original goal of increasing rates of retention and improving the transition of students of diverse backgrounds and abilities into University life and study.

This phase of the monitoring project, as the others, has opened up a number of possibilities for further action and investigation. The following list includes some of the directions that were proposed in the previous report and are repeated here, together with those emerging from this phase:

- (1) Extension and maintenance of the enrolment database 1999–2008

- (2) Broadening the scope of the study to compare outcomes for those students who have completed a Common Unit against those who have not completed or gained entry exemption in designated courses
- (3) Updating and revision of the literature review on the relation of Common or Core Units to the first year university experience, with particular attention to distance learning and flexible modes of delivery
- (4) Establishment of focus groups and development of qualitative evidence of student satisfaction
- (5) Continuation of Common Unit workshops, including the regular reporting of monitoring results to the Common Unit Management Group
- (6) Detailed research on Indigenous students in relation to progress rates in Common and Core Units
- (7) Further monitoring of effects of unit restructuring and development on rates of attrition
- (8) Development of a monograph reviewing the Common Unit experience at CDU over a ten-year period of observation, 1999–2008

The strategies proposed above appear to encompass two related, though independent, components:

- (1) Extending and consolidating the attrition monitoring project (continuing):

This phase of the investigation should first replicate the existing methodology and reporting of Student Outcomes in the Common Unit Program to the years 2007–8, focusing, as in the two previous reports, on trends and patterns of student survival and of predictors of student withdrawal, satisfaction and academic success. This would entail the maintenance and development of the already large database to well over 20,000 enrolment records. This phase may also replicate the comparisons with other large or Core first year units and the effect of admission categories on student outcomes begun in the present phase of the monitoring program for years 2005–6.

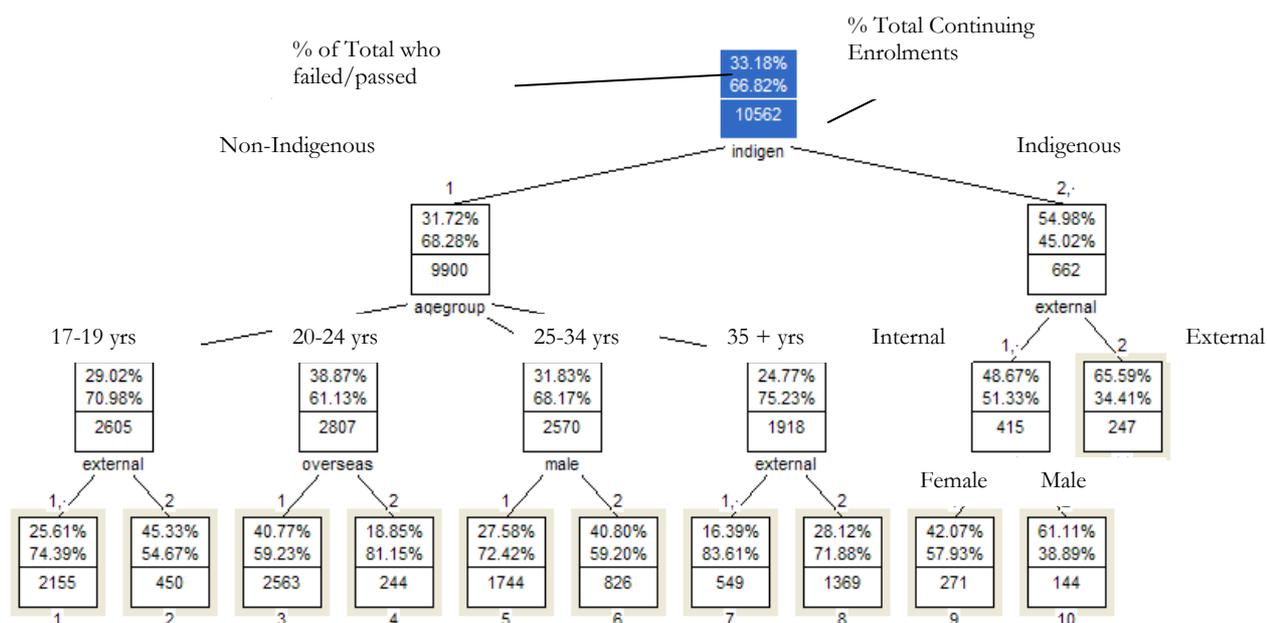
- (2) Investigating the impact of Common Units on student progress and survival in selected courses (new):

This will be a separate and original extension of the monitoring project which will examine the effects of participation in the Common Units program on later student progress and survival in a number of selected courses over a number of years. In this exploratory, quasi-experimental design, academic performance between students who participated in the Common Units (“treatment group”) will be compared with those students who were granted entry exemptions from the Common Units (control group, particularly in undergraduate programs in Business, Law and Environmental Science) across the years 2005–8. Covariate analysis will allow for controls for student background variables, admission status and student situation in those courses in fields of education such as Teaching, Nursing, Law and Business. This aspect will demand a much larger analytical exercise since it will involve the application of more sophisticated statistical techniques such as repeated measures ANOVA, survival analysis and perhaps some multilevel modelling.

The new directions opened up by the comparative and course entry provisions in this phase have enormously expanded the potential of the Common Units project to inform teaching and learning strategies at Charles Darwin University. Not only has the monitoring project developed a unique cumulative database for interrogation on matters of diversity, attrition and equity in the Common Units, but it has also provided a framework for a rigorous analytical approach to course and student performance across the first year of University and beyond. The proposals for the next phase will see the culmination of a ten-year evaluation project with potential, yet to be fully exploited, for providing informed insights into undergraduate teaching and learning in diverse student populations.

APPENDIX TO SECTION 5

CHAID Tree Diagram: Failed/Passed Unit 1999–2006



Explanation: The outcome variable (in this case passes) is first split by the most powerful predictor among the list of student characteristic and situational variables. Here it is Indigeneity (“indigen”) that is selected. As a value of 2 indicates a positive score on the variable, while a score of 1 indicates its absence, then 1= non-Indigenous, 2= Indigenous. This was split in turn according to the strength of prediction among the remaining variables. In this case it was age group, which were split themselves in turn, e.g. 1 = age group 17-19 on the far left, which was split by Mode of Study into Internal mode and External mode.

Since the tree was limited to 3 levels, that stem was closed off. When each branch or stem of the tree exhausts the significant remaining predictor for that level, it is closed off. It then becomes the end point of a segment. Segments are then numbered by each closed branch and can be ranked as a Gains Chart based on the combinations of values which formed the splits by which they have been generated (e.g. see Tables 5.3 and 5.4 above).

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