

The student departure puzzle: do some faculties and programs have answers?

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ABSTRACT: University attrition prevention strategies are typically generic, centrally managed, whole of university strategies that have emerged from an examination of whole of university attrition data. This paper takes an intra-organisational comparative approach, through the examination of faculty and program attrition rates of students who joined an Australian university in the first term of 2004. The faculty with the highest attrition had a rate two and-a-half times that of the faculty with the lowest rate, and in programs with 40 or more students enrolled the program with the highest attrition had a rate over five times that of the program with the lowest rate. The paper identifies five practical implications of these findings and concludes that investigating the causes of these differences will help in understanding student attrition. It also suggests that universities wishing to reduce student attrition may benefit from adopting integrated and situated strategies that take into account faculty and program differences.

Introduction

According to one of the best-known academic commentators on student attrition and retention:

Research on student retention is voluminous. It is easily one of the most widely studied topics in higher education over the past thirty years....Despite all the research that has been conducted to date, little work has been devoted to the development of a model of student persistence that would provide guidelines to institutions for creating policies, practices and programs to enhance student success. (Tinto, 2005a, p. ix)

The lack of development of such a model is surprising, given that:

The early twenty-first century has dawned with retention fully entrenched as a major policy issue....Retention efforts are well established on virtually every campus in the nation [the United States], [and] retention is used as a key indicator of institutional effectiveness. (Berger & Lyon, 2005, p. 25)

Similarly in Australia, the former Commonwealth government initiated a 'bonus scheme', via a Learning and Teaching Performance Fund, of \$54 million in 2006 (rising to \$82 million in 2007 and \$109 million in 2009) across 38 public universities based on seven 'performance' indicators, two of which are attrition and progression rates (DEST, 2005).

Student attrition represents a significant problem for nearly all universities, with studies indicating that between 20% and 50% of undergraduate students do not complete their degrees (Astin & Oseguera, 2005; Martin, Maclachlan & Karmel, 2001; Mortenson, 2005). The bulk of the attrition, typically around 20% of students, takes place in the first year of an undergraduate degree (DEST, 2004).

Australian universities have responded to this situation principally by developing university-wide programs such as 'Orientation', 'First Year Experience' and 'Student Mentoring', creating courses or units that attend to perceived deficiencies in the students' academic skills and knowledge, and adopting interventionist strategies designed to assist the student to move to a successful engagement with her or his studies.

However, according to Hartnett and Centra (1977):

...[V]irtually all of the research of the effects of higher education on students has looked at total colleges (or universities) as the primary unit of analysis, [despite] the fact that often institutions represent little more than an administrative framework for a variety of separate – and often quite distinctive – divisions, departments, or other academic units. (p. 492)

Although the argument for greater focus on intra-university units continues to remain valid more than 30 years later, Pascarella and Terenzini (2005), in their synthesis of studies of the impact of college upon students, state that 'Persistence and degree completion specifically in the sciences, engineering, mathematics and technology fields have attracted substantial attention' (p. 443, note 21).

In some studies of students who have left prior to completion, the students gave their program as the primary cause of leaving. Yorke (1998) reports that, when former students were asked to identify influences on the decision to withdraw, three of the four most common reasons given were: 'Chose wrong field of study', 'Lack of commitment to the programme' and 'Programme not what I expected'. The Queensland Studies Authority (2004), in a longitudinal study of attrition among Queensland students, noted that half of the students surveyed wished that they had known more about the program before they had enrolled. This kind of situation presents university recruiters of students with an ethical dilemma. On the one hand, their job is to increase enrolments. On the other hand, providing greater information to potential students may turn some away who could ultimately succeed in their preferred program.

However, a substantial Australian report by Long, Ferrier and Heagney (2006), while reporting similar data, is cautious about the value of increasing career advice:

One of the most frequently endorsed reasons for discontinuing their study in 2004 was *I changed my career goals* (21.6%), which corresponds with the broader scales tapping a change of direction (22.3%) – three in every 100 commencing students. For most students a change of career goals appears to arise when they realise there is a mismatch between their interests and abilities, the course they have enrolled in and related careers. This mismatch raises issues of efficiency and waste and appears to indicate a need for improved careers advice, but while better career guidance is often advanced as a means of reducing attrition, this study suggests that more of the same will not do. (pp. 163–164)

Interestingly, the then Australian Commonwealth Education Minister announced in mid-2006 that the Learning and Teaching Performance Fund indicators would be calculated separately for four discipline groups: science, computing, engineering, architecture and agriculture; business, law and economics; humanities, arts and education; and health (DEST, 2006). This change, however, may have been driven more by recognised variability across disciplines in the other measures than by such variability in attrition and progression.

This paper examines the variation in attrition rates across programs and faculties at an Australian university. The goal is to use an intensive analysis of that variation as a foundation for reflecting on the strategies deployed in contemporary universities to minimise student attrition that are most likely to engage comprehensively with what is a very complex, differentiated and situated phenomenon.

Method

Student attrition rates were examined for students commencing undergraduate study in the first term of 2004 at an Australian university. Commencing students ('the cohort') were defined as students new to undergraduate study at that university. The university is a medium-sized university with complex mixes of Australian domestic internal and distance education students (supported by the Commonwealth government) and international students. Enrolled students were defined as students who were liable for fees. Commencing students were students who were enrolled for the first term of 2004.

Attrition in a term was measured with regard to students in the cohort who were enrolled in the term of interest and neither graduated nor enrolled in any course linked to an undergraduate program in the subsequent term of interest. The university operates a two-term year, with a third term offered in some courses during the summer break. Enrolments in the summer term were not tracked.

Data were extracted from the university's computerised student record system. As the data in this system are used for critical functions such as fee collection and academic grades, it must be an accurate reflection of a student's enrolment record. The 77 undergraduate programs drawn from the five faculties of the university were included in the study. These programs had a total enrolment of 3288 students, with 459 students in the largest program examined.

Attrition in the second term was determined by counting the number of students in term 1, 2005, who had enrolled in the first term of 2004. Therefore students in the cohort who did not study in term 2, 2004 but who returned in term 1, 2005 would increase attrition statistics for term 1, 2004 and reduce the statistics for term 2, 2004. In one program, one student returned and none left, causing a negative attrition rate.

The Chi-squared (χ^2) test for categorical data was used to test the null hypothesis that attrition rates across faculties and programs do not vary and that the observed variation can be explained as random chance.

The analysis is divided into two sections. The first section examines whether observed variations in attrition rates across faculties and programs can be explained simply as random variations. The analysis uses all students in the cohort.

The second section, using the attrition rates of larger programs, identifies three patterns in the data, and tests whether they are statistically significant or can be explained as chance. Only programs with 40 or more students were included in this analysis. Low enrolment programs were excluded, as a marginal shift in enrolments in such programs creates a considerable shift in percentage that may confuse any underlying pattern.

Results

Section A: are attrition rates across faculties and programs random?

Attrition rates across faculties ranged 8.9–21.5% in the first term and 6.7–19.9% in the second term, with means of 16.6% and 12.8% respectively (providing an institutional whole-of-year effect size ranging from –13.8% to 11%). A Chi-squared test shows that there is a 99.9% probability that the variation across faculties is significant (test statistics χ^2 of 35.1 and 24.9, compared to a critical value of 18.5 for v [degrees of freedom] = 4 and $\alpha = 0.001$). Figure 1 shows the attrition rates for the different faculties.

Variation in whole-of-year attrition rates between programs within each of the faculties was significant at the 99.9% level in two of the faculties (test statistics χ^2 of 60, 44, 28, 16 and 20 compared to critical values of 31, 34, 34, 30 and 30 for $v = 14, 16, 16, 13$ and 13 , respectively, and $\alpha = 0.001$). There was no obvious pattern to those faculties with significant variation; for example, the faculty with the lowest attrition rate did not show the lowest variation across its programs.

Section B: patterns in attrition across larger programs

There were 20 programs with 40 or more students in the cohort. The programs' attrition rates for the year ranged 11.9–65.0%. The mean attrition rate of students in these 20 programs was 28.2% compared to 29.5% for all students. Figure 2 shows the number of programs with different total attrition rates for the year. The central horizontal line represents the rate for the whole cohort. Some variation on a traditional bell-shaped curve is apparent.

A small percentage of students in these programs changed programs after the first term (2.8%) and a larger percentage of students changed programs after the second term (7.2%).

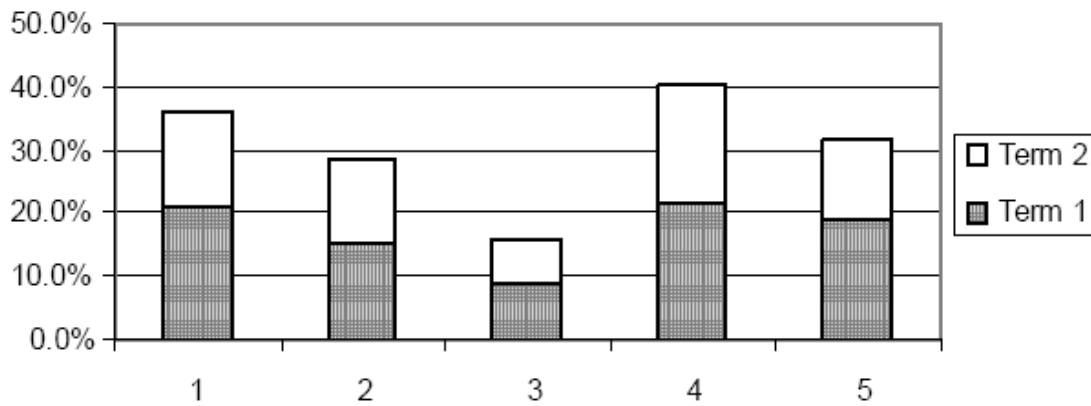


Figure 1. Attrition rate by faculties.

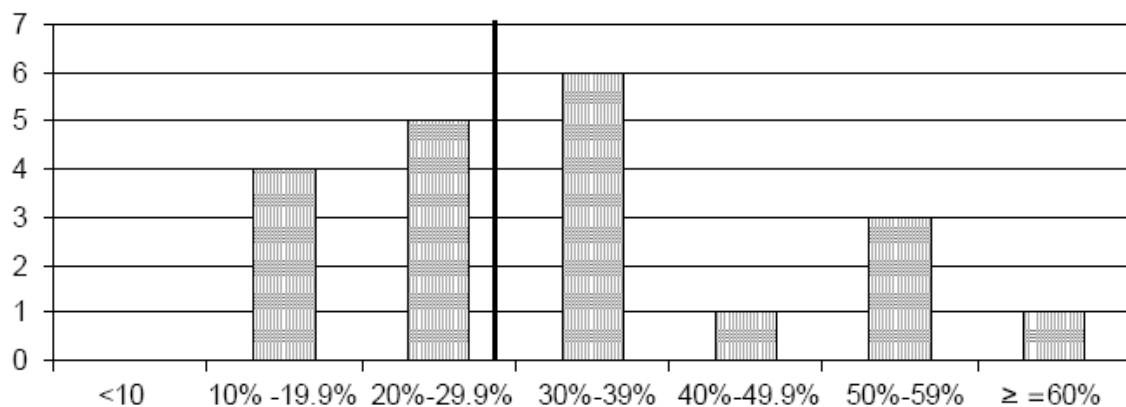


Figure 2. Number of programs with different attrition rates.

The coefficient of correlation (r) between attrition in the first and second terms for these 20 programs was +0.38. The coefficient of correlation between the percentage of students in the program who left the university in the first year and those who changed programs in the first year was -0.36 . The coefficient of correlation between the attrition rate and the number of students in the program (at the start of the year) was -0.44 .

Although such coefficients of correlation are considered low in the physical sciences, Cohen (1988) suggests that, in the social sciences, an r of 0.5 could be considered a large size effect and an r of 0.3 a medium-size effect. The university policy of admitting students based on school grades, for example, is accepted, with similar coefficients of correlation between high school and university performance (Somasundaram, Bowser & Danaher, 2006; Vialle & Hall, 1996). The test statistic ' t ' for the three correlations is 1.75, 1.62 and 2.07. The t -value for the two-tailed test with 90% confidence and (20,2) degrees of freedom is 1.73. Therefore one can state with 90% confidence that a positive relationship exists in programs between attrition in the first and second terms and that, for larger programs, an inverse relationship exists between attrition and program size. Although an inverse relationship may exist in programs between students pursuing another program and students leaving the university, one cannot state this with an acceptable level of confidence.

Figure 3 is a scatter plot of attrition rate compared to the number of students who enrolled in the program, with the dark horizontal line representing the mean attrition rate. The y-axis, the total number of students, is presented logarithmically instead of linearly, as the former is visually clearer. All programs, instead of only the larger programs, are plotted, to illustrate that smaller programs are much more susceptible to wide fluctuations. The Chi-squared test does take program size into consideration, whereas the coefficient of correlation of percentages does not. Therefore the correlation analysis was done using only larger programs. Nevertheless, as the figure illustrates, larger programs do not necessarily have higher attrition rates.

Discussion

Attrition rates were defined and measured for this study on a term-by-term basis. This differs from the approach used by the previously named Australian Department of Education, Science and Training (2004), now called the Department of Education, Employment and Workplace Relations, which measures from year to year.

The data clearly indicate that there is a discernable variation in attrition levels across faculties and programs, thereby providing further support for the view that there are faculty and program-specific factors that affect attrition. Martin, Maclachlan and Karmel (2001), in calculating Australian completion rates, give a range from a low of 58.3% for science to a high of 89.8% for veterinary science. The variation for socio-economic background, on the other hand, grouped into four categories varies only from a low of 62.2% to a high of 66.2% (Martin et al., 2001, Table 2).

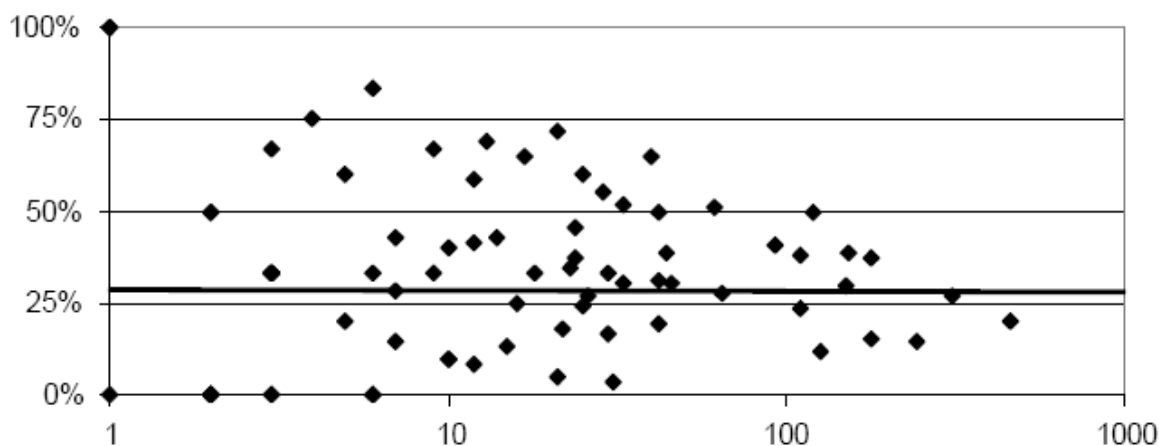


Figure 3. Attrition versus program size.

Astin and Oseguera (2005) performed a multivariate analysis of completion on a sample of 56 818 students at 262 United States institutions (p. 251). They reported (Appendix B, pp. 270–271) negative relationships between degree completion and four majors: engineering, health professions, fine arts and ‘other technical’ (they did not report other disciplines).

The highest beta, for engineering, was -0.0705 for four-year completion. Of the 47 characteristics reported, only four had higher beta values: ‘High school grades’, ‘Type: public university’, ‘Type: public 4-year college’ and ‘Selectivity’ (i.e., highly selective universities) (having beta values of 0.1537, -0.1455 , -0.1079 and 0.1570 respectively). Interestingly, the beta for completion for engineering majors increased to -0.0268 for completion in six years. This may be the result of students in that discipline either reducing their study load or taking a break from the program. This is somewhat supported by Pascarella and Terenzini (2005), who note that:

...[W]ith few exceptions...the largest cluster of students majoring in the sciences, mathematics, and engineering (SME) and/or business and health-related professions are more likely to persist and earn bachelor’s degrees than their peers with majors in social sciences, humanities or education. (p. 424)

At the same time, ‘The former group of students, however, is apt to take longer than the latter to earn the bachelor’s degree’ (p. 424).

Vickers, Lamb and Hinkley (2003), from a longitudinal survey of Australian youth, which included vocational institutions, state that:

Being in the Humanities rather than in Agriculture increases the odds of dropping out by 90 per cent; being in the Behavioural Sciences increases the odds by 150 per cent, and being in

the Fine and Performing Arts increases the odds of dropping out by 166 per cent, in comparison with being in Agriculture. (p. 26)

Their paper also reports a negative relationship between attrition and contact hours, and a positive relationship between attrition and hours of employment. In addition, they note that 'The propensity to work varies by field of study and course contact hours' (p. 30).

Yorke (1998) speculates that those leaving the field of pre-clinical and clinical medicine 'come from relatively well-off backgrounds and hence finance is unlikely to be a general problem' (p. 6). As noted above, high school grades are an indicator of completion, and some programs require higher grades.

Braxton (2000), in reviewing the theory on college student departure, grouped departure models into four frameworks: economic, organisational, psychological and sociological (pp. 260–265). Tinto (2005a) stated that 'we can say with a good deal of confidence that academic preparation, commitments and involvement matter' (p. ix). The authors of the present paper do not propose that these factors are relatively unimportant but, rather, that there are faculty and program-specific effects on these factors that must be factored into the attrition–retention equation. Student characteristics such as ethnicity, gender, age, mode of study and high school grades also do influence attrition (Bowser, Danaher & Somasundaram, 2006).

Practical implications

Tinto (2005b) asks and answers the question: 'What does research on student persistence and success tell us about the conditions within institutions in which students are more likely to persist? The "research points" to five conditions; namely, institutional commitment, institutional expectations, support, feedback and involvement' (p. 90).

The research reported in the present paper suggests that these conditions vary considerably across individual faculties and programs. Therefore the first and foremost implication of this paper is that there is a place for decentralised strategies to promote persistence. As Peach (2005) points out, both centralised and decentralised strategies have strengths as well as weaknesses. Nevertheless, as Ferguson and Grainger (2005) show, a focused effort can significantly improve the retention rates even of traditionally difficult programs such as Japanese language learning. We would recommend a mix of both generic and specific targeted retention strategies as the most effective and economical.

Second, questionnaires completed by students who leave university early (Yorke, 1998) reveal a lack of knowledge of the requirements of the program as a common reason. This suggests that programs with high attrition rates may be indicative of programs whose requirements are not well understood by the students. Although a clearer communication of expectations may reduce the demand for these programs, they are likely to increase retention rates.

Third, when high attrition rates in a particular program are matched by low grades in some of the individual courses that are required for that program, there may be a need to review entry requirements for such programs.

Fourth, consolidated data may hide patterns that are discernable more easily when contextualised. For example, one may find high attrition rates in a new program that needs bedding down, pulling overall rates down.

Fifth, this and other research suggests that the discipline plays a part in student attrition rates, and this may be outside the control of the institution. One needs, then, to ask the question of what it is about the discipline that causes attrition (or retention).

Finally, universities are increasingly driven to maintain or cut costs, while simultaneously enrolling larger numbers of increasingly varied cohorts of students, attending in multiple modes. In this environment, there is a need for sophisticated data analysis – whether it be traditional regression analysis or through decision trees and neural networks (Herzog, 2006) – and for reporting to identify developing patterns that need attention. Student attrition rates across programs and faculties are one such set of indicators.

Conclusion

It is a game of money, honour and patronage. The publication of the first set of teaching and learning rankings for Australia's universities has coincided with an analysis of Australian Research Council grants that shows – surprise, surprise – that men in traditional subjects in the older universities do better. That mixture of grievance and defensiveness characteristic of higher education came quickly to the fore.... All those who think the teaching and learning outcomes (prepared by the federal education department) were 'flawed' or 'misleading', or just plain wrong, need to come up with a better measure. My guess is that there will usually be as much within-university variation as across-university variation, so that a single index figure for each university will conceal as much as it reveals... (Aitkin, 2005, p. 33; **emphasis as in original**)

In the present study of one university, attrition levels across faculties and programs, which are intra-university administrative, cultural and disciplinary blocks, show significant variation that is as high as and even higher than the differences among disparate institutions.

The use of the single index figure for measuring individual institutions' level of attrition does not allow for informative comparisons and, perhaps, conceals trends and patterns that provide valuable insight into the complex causes of, and strategies for managing, student attrition.

Comparative analysis across organisational and disciplinary units provides another window into exploring and extending the understanding of student departure. Although it is inconceivable that such a focus can provide all the answers to the departure puzzle, the causes that it identifies may be those that are more amenable to influence by institutional staff.

There is the risk that staff will be unwilling to engage with data that provide internal comparisons, through a reluctance to be seen as critical of one's peers and thereby as engendering disharmony. Nevertheless, the data analysed in the present paper suggest that a necessary step for institutions wishing to manage student attrition is to explore the causes of variations in attrition rates within their institutions.

Simpson (2003) has suggested two types of institutions – survivalist and remedialist – with the former institutions perceiving higher education as a competition resulting in the survival of the fittest, whereas the latter are oriented to a more inclusive culture. An analysis by the authors (Somasundaram, Bowser & Danaher, 2006) comparing entrance scores and subsequent university grades suggests that such variations may also occur across disciplines, the data suggesting that engineering and the physical sciences, in particular, may be ‘survivalist’, and with education and nursing being examples of ‘remedialist’ cultures. Ascribing cultural differences to disciplines is tempting, as long as we resist the simultaneous temptation to jump to conclusions about one being ‘better’ or ‘worse’ than the other.

Student retention is likely to be affected not only by the push factor of students’ ‘readiness’ for university study but also by the pull factor of the attractiveness of the subsequent profession (Bowser, Somasundaram & Danaher, 2007). In Australia, for example, there is periodic concern that we fail to attract and retain bright students into mathematics and science, or that the university entrance scores required of teachers are too low, and this concern leads to calls for changes in education policy. Similarly, the culture that university disciplines adopt is often dictated by the culture for which the discipline is training the students. Changing a university culture may ultimately be doing the student a disservice if it fails to prepare the students for life outside the university. Some of the solutions to the departure puzzle may lie in industry.

Data analysis and interpretation provide some direction but they must be balanced by qualitative research and dialogue (Bowser, Danaher & Somasundaram, 2005, 2006). Some of the causes of persistence may be related to the nature of the discipline, the characteristics of the students whom it attracts and the way that it is taught. Some of the causes of persistence may also be related to the way in which different internal administrative units operate.

We suggest that both conceptually informed and methodologically framed dialogue and multivariate analysis of data are necessary next steps in understanding why progression rates vary so much within institutions and across disciplines, in order to extend our collective understanding and management of the departure puzzle.

From all of this, the answer to the, not entirely hypothetical, question constituting the paper’s subtitle is: ‘Yes, it is likely that some faculties and programs do have at least some of the answers to the student departure puzzle’. At the same time, the argument presented here should not be seen as a panacea or as diminishing the complexity of a multifaceted phenomenon over which universities have only part of the responsibility and capacity for action; students and communities also contribute indispensably to the ‘problem’, as well as to its possible ‘solutions’. Nevertheless, if student departure can be regarded as a jigsaw puzzle, faculty and program variations in student attrition represent significant pieces in that puzzle. And to unlock that puzzle we need to unlock the science and the politics in parallel.

References

- Aitkin, D. (2005, August 20). It is a game of money, honour and patronage. *The Australian Financial Review*, 33.
- Astin, A.W., & Oseguera, L. (2005). Pre-college and institutional influences on degree attainment. In A. Seidman (Ed), *College student retention: Formula for student success* (pp. 245–276). Westport, CT: American Council on Education/Praeger.
- Berger, J.B., & Lyon, S. (2005). Past to present: A historical look at retention. In A. Seidman (Ed), *College student retention: Formula for student success* (pp. 1–30). Westport, CT: American Council on Education/Praeger.
- Bowser, D., Danaher, P.A., & Somasundaram, J. (2005). Stories as perspectives and interests: Approaches and issues in conceptualising student attrition and retention at Central Queensland University. *Studies in Learning, Evaluation, Innovation and Development*, 2(1), 44–51. Retrieved October 24, 2005, from <http://www.sleid.cqu.edu.au/viewissue.php?id=6>
- Bowser, D., Danaher, P.A., & Somasundaram, J. (2006). Decreasing attrition while increasing diversity: Connections and contradictions in transforming marginalisation in an Australian contemporary university. In J. McConachie, R.E. Harreveld, J.T. Luck, F. Nouwens & P.A. Danaher (Eds.), *Doctrina perpetua: Brokering change, promoting innovation and transforming marginalisation in university learning and teaching* (pp. 220–243). Teneriffe, Qld: Post Pressed.
- Bowser, D., Somasundaram, J., & Danaher, P.A. (Eds). (2007). Recruitment, retention and placement: Progressing the knowledge economy. *Studies in Learning, Evaluation, Innovation and Development*. 4(2), i–vi, 1–83.
- Braxton, J.M. (2000). Reinvigorating theory and research on the departure puzzle. In J.M. Braxton (Ed.), *Reworking the student departure puzzle* (pp. 257–274). Nashville, TN: Vanderbilt University Press.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd edn). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Department of Education, Science and Training [DEST]. (2004). *Higher education attrition rates 1994–2002: A brief overview (Research note no. 1)*. Retrieved May 26, 2005, from http://www.dest.gov.au/sectors/higher_education/publications_resources/profiles/higher_education_attrition_rates_1994_2002.htm
- Department of Education, Science and Training [DEST]. (2005). *Learning and Teaching Performance Fund 2006: Administrative information for providers*. Retrieved August 12, 2005, from <http://www.dest.gov.au/NR/rdonlyres/018DB581-375F-4BDF-ABD8-F5E608A4382/7637/FINALAIP2August2005.pdf>
- Department of Education, Science and Training [DEST]. (2006). *New model for the Learning and Teaching Performance Fund*. Retrieved April 24, 2007, from <http://www.dest.gov.au/Ministers/Media/Bishop/2006/07/B001100706.asp>
- Ferguson, C.A., & Grainger, P. (2005). Attrition in Japanese language learning at Central Queensland University. *Studies in Learning, Evaluation, Innovation and Development*, 2(3), 76–87. Retrieved March 9, 2005, from <http://www.sleid.cqu.edu.au/>
- Hartnett, R., & Centra, J. (1977). The effects of academic departments on learning. *Journal of*

Higher Education, 48, 491–507.

Herzog, S. (2006, September 5–7). *Predicting enrollment retention and degree completion time of first year university students: Institutional research and the challenge of expanding analytical tools*. Paper presented at the 6th Annual Conference of the South East Asian Association for Institutional Research, Langkawi, Malaysia.

Long, M., Ferrier, F., & Heagney, M. (2006). *Stay, play or give it away? Students continuing, changing or leaving university study in first year*. Clayton, Vic.: Centre for the Economics of Education & Training, Monash University.

Martin, Y.M., Maclachlan, M., & Karmel, T. (2001). Undergraduate completion rates: An update. Retrieved September 4, 2006, from <http://www.dest.gov.au/archive/highered/occpaper/01f/default.htm>

Mortenson, T. (2005). Measurements of persistence. In A. Seidman (Ed), *College student retention: Formula for student success* (pp. 31–60). Westport, CT: American Council on Education/Praeger.

Pascarella, E.T., & Terenzini, P.T. (2005). *How college affects students: A third decade of research, Vol. 2*. San Francisco, CA: John Wiley & Sons.

Peach, D. (2005). Ensuring student success – the role of support services in improving the quality of the student learning experience. *Studies in Learning, Evaluation, Innovation and Development*, 2(3), 1–15. Retrieved March 9, 2005, from <http://www.sleid.cqu.edu.au/>

Queensland Studies Authority. (2004). Attrition and persistence of first-year tertiary students in Queensland: Longitudinal research study, Queensland Studies Authority, Spring Hill. Retrieved August 18, 2005, from <http://www.qsa.qld.edu.au/research/te/docs/attrit-yr1.pdf>

Simpson, O.P. (2003, November 5–7). *Mature student retention - the case of the UK Open University*. Paper presented at the International Student Retention Conference, Amsterdam. Retrieved April 26, 2007, from [http://www.staffs.ac.uk/institutes/access/docs/Amster-papersOS\(1\).doc](http://www.staffs.ac.uk/institutes/access/docs/Amster-papersOS(1).doc)

Somasundaram, J., Bowser, D., & Danaher, P.A. (2006). Gate-keeping into the knowledge society: Have we got it right? In Z.W. Abas & N. Idrus (Eds.), *6th Annual SEAAIR Conference* (pp. 494–503). Langkawi, Malaysia: South East Asian Association for Institutional Research/Open University Malaysia.

Tinto, V. (2005a). Forward. In A. Seidman (Ed), *College student retention: Formula for student success* (pp. ix–x). Westport, CT: American Council on Education/Praeger.

Tinto, V. (2005b). Reflections on retention and persistence: Institutional actions on behalf of student persistence. *Studies in Learning, Evaluation, Innovation and Development*, 2(3). Retrieved March 6, 2005, from <http://www.sleid.cqu.edu.au/>

Vialle, W., & Hall, N. (1996, November). Patterns of achievement in a tertiary setting. Paper presented at the Annual Conference of the Australian Association for Research in Education, Singapore. Retrieved August 18, 2005, from <http://www.aare.edu.au/96pap/vialw96221.txt>

Vickers, M., Lamb, S., & Hinkley, J. (2003, February). *Student workers in high school and beyond: The effects of part-time employment on participation in education, training and work (Research report no. 30)*. Camberwell, Vic: Australian Council for Educational Research.

Retrieved August 12, 2005, from

<http://www.acer.edu.au/research/LSAY/documents/LSAY30.pdf>

Yorke, M. (1998). Non-completion of undergraduate study: Some implications for policy in higher education. *Journal of Higher Education Policy and Management*, 20(2), 189–201.