Diversity and student performance in higher education

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Abstract

Research indicates that students admitted to university on a basis other than Year 12 are less likely to complete a higher education course than school leavers. This paper analyses administrative data for a cohort of students admitted to first year undergraduate programs in an Australian university, to investigate the academic progression and retention of students from diverse educational backgrounds. The findings indicate that students admitted on the basis of Year 12 completion have a higher mean grade point average (GPA) than all other groups. However, the findings also reveal that after controlling for GPA, students who did not meet the minimum requirements for entry and completed an enabling course on campus prior to commencing their undergraduate program, are less likely to discontinue their university studies than Year 12 completers. This suggests that enabling programs play an important role in supporting students from diverse educational backgrounds to complete a university degree.

Less than half of all undergraduate commencing students in Australian universities are admitted on the basis of their Year 12 results. Over 55 per cent gain admission to university via alternative pathways. This diversity of student intake contributes to Australia's reputation as the world's most inclusive higher education system (Ederer, Schuller & Willms, 2008). Yet evidence indicating the persistence of inequality in Australian higher education (Cardak & Ryan, 2009; Chesters & Watson 2012; Gale & Tranter, 2011) underpins a long-standing policy commitment to equity of access and participation in all sectors of education and training (Australian Government 2009, 2010; Watson & Pope 2000).

Student diversity and educational outcomes

In 2010, one quarter of commencing undergraduates in Australian universities had attempted other higher education courses, ten per cent were admitted on the basis of a vocational education and training (VET) award, and one fifth were admitted on an 'other basis' such as mature-age, special entry or professional qualifications (Watson, Hagel & Chesters 2013).

Studies of student progression suggest that students admitted to higher education on a basis *other than* Year 12 achievement, are more at risk of discontinuing their studies than Year 12 completers. Long, Ferrier & Heagney (2006) found that students with an apprenticeship, trade, vocational or other qualification were almost twice as likely (24.4 %) to drop out in their first year of studying for a bachelor degree than the average for all students (13.7 %). A recent study

of engineering students admitted on the basis of a VET award found that only 20 per cent successfully completed their university degrees (King et al 2011). Cram & Watson (2008) concluded that structured pathways were more effective in retaining students admitted to undergraduate programs on the basis of a VET award.

Among students admitted to university on the basis of their Year 12 results, there is a link between Australian Tertiary Admission Rank (ATAR) and student retention. Lomax-Smith et al (2011) revealed that 26 per cent of students who enter university with an Australian Tertiary Admission Rank (ATAR) of between 30 and 60 discontinue their studies after the first year whereas just six per cent of students with an ATAR of between 91 and 100 discontinue their studies. In an analysis of data from the Longitudinal Survey of Australian Youth (LSAY), Marks (2007) concluded that an individual's ENTER (Equivalent National Tertiary Education Rank) score, the predecessor of ATAR, was the strongest predictor of whether or not they completed their degree program. Almost 95 per cent of students with scores above 90 completed compared to just 73 per cent of students with scores between 60 and 69 (Marks 2007). Dobson & Skuja (2005) also found that ENTER scores were a reliable predictor of attainment at university, particularly for students enrolled in engineering, agriculture or science degrees. However Levy & Murray (2005) argue that the provision of foundation or enabling programs assists 'at risk' students to become successful tertiary students.

Enabling programs

Many Australian universities offer enabling courses, which are also called preparatory, foundation and bridging programs, for applicants deemed inadequately prepared for university studies (Palmer, Bexley & James, 2011). An enabling course is "a course of instruction provided to a person for the purpose of enabling the person to undertake a course leading to a higher education award" (Australian Government 2012, p. 26). Enabling courses are generally undertaken by students who have not met minimum entry requirements in terms of their ATAR or previous level of education. The Federal Government provides funding for enabling courses via the Commonwealth Grants Scheme (Lomax-Smith et al. 2011).

An analysis of Australian student data reported by the *Higher Education Base Funding Review* found that the completion of an enabling course concurrently with undergraduate studies was associated with a slightly higher retention rate (86%) for students with an ATAR below 40 compared to those with an ATAR below 40 who did not undertake an enabling course (82%). However the study related only to students who undertook enabling courses concurrently with an undergraduate program, who comprised about one third of the 19,298 students undertaking enabling courses in 2009 (Lomax-Smith et al. p. 124).

Methodology

This study analysed the academic progress of an entire cohort of students admitted to the first year of undergraduate studies in an Australian public university –1,738 students – in 2007. Students beginning their Honours year in 2007 or education students enrolled in graduate entry

courses on the basis that they have previously completed a bachelor degree were excluded. Data for each semester, in each of the three years from 2007 to 2009 were analysed.

Students' academic progress was measured by calculating a grade point average (GPA) for each student. Students receive a grade of between 0 and 7 for each unit completed. Zero indicates that the student did not submit any assessment items, 4 indicates that the student passed the unit and 7 indicates that the student received the highest grade possible. The GPA was calculated by adding the grades received for each unit and dividing the total by the number of units completed. The GPA variable refers to the student's grade point average for all semesters in 2007 and 2008.

As this study relied on administrative data, we used a proxy measure of course attrition, based on enrolment and unit completion data. If a student who commenced in 2007 had not enrolled in semester 2 in 2008 and semester 1 in 2009 and had not completed 24 units, they were deemed to have discontinued their studies. Undergraduate students may enrol in units of study in different patterns, depending on their course of study, course load (full-time or part-time) and individual preference. A full-time student load is four units per semester and most undergraduate units are equivalent to 3 credit points. In addition to the standard two semesters per year, the university offers some units over the summer break and others over the winter break. Although there is no consistent point in time when students complete their undergraduate degree, the completion of 24 units usually signals the completion of a three year program, such as Arts, and the completion of 30 units signals the completion of a four year degree program, such as Education. Thus, the attrition measure we have adopted excludes students who may have expeditiously completed their degree within two years. To take into account that some students defer their studies for a semester, for personal or financial reasons, we only consider students who were not enrolled in semester 2 in 2008 as well as semester 1 in 2009 as having discontinued their studies.

Characteristics of commencing students

Commencing students were divided into groups according to the basis of their admission to university, and the educational institution they previously attended. This produced seven groups of students.

Pathway	n=1738	Per cent
Year 12 completion at school	879	51
Year12 completion at a non-school institution	63	4
VET certificate 1-4	126	7
VET diploma	189	11
On campus enabling course	281	16
Other enabling course	104	6
Mature age/ Other basis	96	6

Table 1 Commencing undergraduates by basis of admission, 2007

As shown in Table 1, of the commencing undergraduate cohort, 55 per cent of students were admitted on the basis of their Year 12 results (ATAR), 18 per cent were admitted on the basis of a VET award and six per cent were admitted on another basis, such as mature age. Some 16 per cent of students were admitted on the basis of completing an enabling course offered by the university on campus and a further six per cent had completed an enabling course offered by other providers. In total, 22 per cent of commencing undergraduate students in 2007 had completed enabling courses.

Academic achievement

Differences in the average GPA (our measure of academic achievement) of each group is shown in Table 2. This table indicates the average (mean), median (50^{th} percentile), lowest 5 per cent (the 5^{th} percentile) and highest 5 per cent (the 95^{th} percentile) of GPA scores by students' basis of admission. The difference between the lowest 5 per cent and highest 5 per cent give an indication of the spread of scores.

Basis of Admission	n=	Mean	Median	Lowest 5%	Highest 5%
Year 12 school	879	4.68	4.75	3	6.0
Year 12 other	63	4.69	4.71	3	5.88
VET certificate	126	4.41	4.55	3	6.0
VET diploma	189	4.64	4.7	3	6.17
On campus enabling	281	4.45	4.5	3	5.75
Other enabling	104	4.47	4.53	3	5.92
Mature age/other	96	4.54	4.53	3	6.1

NOTE: calculated GPA for all units completed in 2007 and 2008.

Table 2 Summary statistics of GPA by basis of admission

As shown in Table 2, students admitted to university on the basis of holding a VET certificate recorded the lowest average GPA at 4.41 and students admitted on the basis of completing Year 12 at school recorded the highest average GPA at 4.68. VET certificate holders also recorded the largest mean-median difference with 0.14, indicating that the distribution is skewed towards the bottom end. The mean-median difference for mature age/ other students was just 0.01. The spread of scores was smallest for students who had completed an enabling course on campus, with a gap between the lowest and highest 5 per cent of 2.75. In contrast, VET certificate holders also recorded the largest gap of 3.2.

To establish the extent to which the difference between the mean GPA for each group was significant, we applied a t-test of the difference between the mean GPA of the Year 12 at school completers and each of the other groups.

	Mean GPA	difference with Yr12 mean	p-value
Year 12 school	4.68		
Year 12 other	4.69	-0.01	0.9193
*VET Certificate	4.41	-0.27	0.0024
VET Diploma	4.64	-0.04	0.5652
*On campus enabling	4.45	-0.23	0.0001
*Other enabling	4.47	-0.21	0.0253
Mature age/other	4.54	-0.15	0.1306

**indicates statistically significant results*

Table 3 ttests of differences in the GPA means of sub-groups compared to Year 12

As shown in Table 3, the mean GPA scores for VET certificate holders, and students who completed on-campus enabling courses and other enabling courses, were significantly lower than the mean GPA for students admitted on the basis of completing Year 12 at school.

While all groups have a mean GPA of 4 or above, which implies that students are attaining a passing average and are therefore on their way to course completion, there were differences in the distribution of GPA scores within each group, as illustrated in Figure 1.

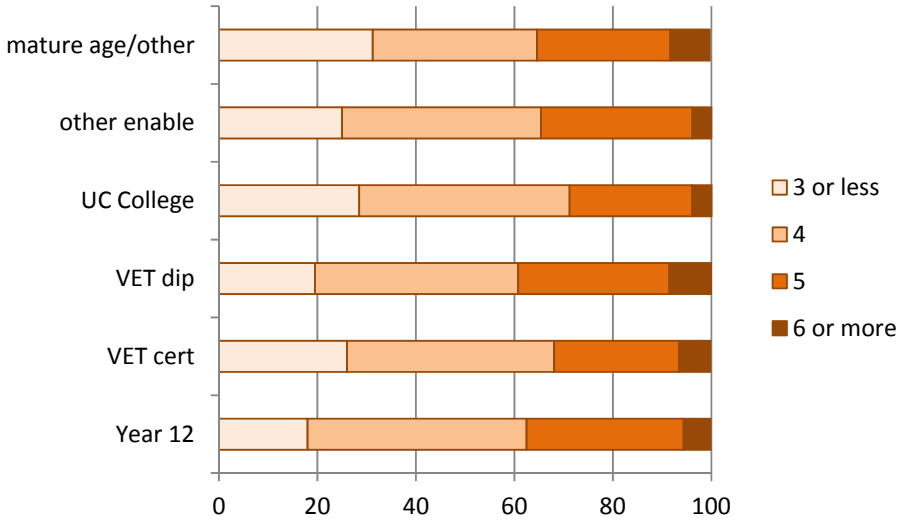

Figure 1 GPA band by pathway into university

Around 30 per cent of students who entered university via the mature- age / other pathway recorded a GPA of 3 or less compared with 18 per cent of Year 12 completers. Almost 45 per cent of students admitted on the basis of Year 12 recorded a GPA of 4 whereas only one third of mature- age/other students were located in this band. Over 30 per cent of Year 12 completers and

those who entered university after completing a VET diploma or an enabling course at another institution recorded a GPA of 5.

One-quarter of students who entered undergraduate programs after completing the university's enabling course achieved a GPA of 5. Less than 10 per cent of students who had completed the university's enabling course recorded a GPA of 6 or more and only 4 per cent of those who completed an enabling course at another institution record a high GPA. Of all groups, students admitted on the basis of a VET diploma had the highest proportion of students attaining a GPA of 6 or more (8.5%).

Student attrition

The overall attrition rate for the cohort was 23 per cent, and some groups had higher attrition rates than others. These differences are illustrated in Table 4.

	n=1738	**% discontinued**
Male	670	23
Female	1068	23
Birth cohort		
<1971	120	40
1971-1975	58	28
1976-1980	102	30
1981-1985	424	27
1986-1990	1038	19
Basis of admission		
Year12 at school	879	20
Year12 other institution	63	25
VET Certificate	126	27
VET Diploma	189	28
On campus enabling	281	19
Other enabling	104	32
Mature age/ Other	96	38

Table 4 Characteristics of students who discontinued their studies

As shown in Table 4, whereas both males and females were equally likely to discontinue studying, older students were more likely to discontinue their studies than younger students. Forty per cent of students in the oldest group (born prior to 1971) discontinued their studies compared to only 19 per cent of the youngest students (born since 1986). Most groups of students other than those admitted on the basis of completing Year 12 at school had a higher attrition rate than Year 12 school completers (20%). The exception was the group of students who had completed the university's enabling course prior to entry, of whom only 19 per cent discontinued their studies.

	Discontinued (%)			
Year 12 school	20.02	Difference to Year 12 (%)	chi2	p-value
Year 12 other	25.4	5.38	1.0462	0.306
VET Certificate	26.98	6.96	3.2309	0.072
*VET Diploma	28.04	8.02	5.9392	0.015
On campus enabling	18.51	-1.51	0.3105	0.577
*Other enabling	31.73	11.71	31.73	0.006
*Mature age/other	38.54	18.52	38.54	0.0001

** indicates statistically significant results, based on Chi Square tests of differences in the attrition rate of Year 12 school completers compared to each of the other groups*

Table 5 Students who discontinued their studies, by basis of admission

As shown in Table 5, the attrition rate of students admitted to undergraduate programs in 2007 from the university's enabling course was not significantly different to that of students admitted on the basis of Year 12 completion at school. The highest attrition rate was among students admitted on the basis of mature age/other (38%) followed by students from other enabling programs (32%). At least one in four students admitted on the basis of a VET Diploma discontinued their studies. In contrast, only 19 per cent of students admitted to undergraduate programs in 2007 from the university's enabling course discontinued their course.

As many factors influence student attrition, we conducted a series of logistic regressions to examine the relationships between students discontinuing study and sex, birth cohort, basis of admission (pathway) and GPA.

	Model 1		Model 2	
	odds	Std err	odds	Std err
Female =1	1.02	0.12	1.21	0.15
Birth cohort				
1986-1990 (ref.)				
1981-1985	1.63**	0.26	1.61**	0.26
1976-1980	1.84*	0.46	1.63	0.43
1971-1975	1.63	0.53	1.54	0.51
<1971	2.71***	0.64	2.64***	0.65
Pathway				
On campus enabling (ref.)				
Yr12 at school	1.47*	0.28	1.73**	0.34
Yr12 other institution	1.92	0.64	2.40*	0.83
VET certificate	1.40	0.36	1.53	0.41
VET diploma	1.64*	0.37	1.98**	0.48
Other enabling	1.67	0.45	1.88*	0.53

Mature age/other	2.28**	0.61	2.48***	0.69
GPA			0.24***	0.03
Constant	0.57***	0.08	0.35***	0.07
n=	1738		1738	
Pseudo R2	0.0258		0.0861	

****p<0.001; **p<0.01; *p<0.05*

Table 6 Odds of discontinuing study by sex, age GPA and pathway

The results for two models are presented in Table 6. In Model 1 we include sex, birth cohort and pathway into university. In Model 2, we add in GPA. The reference category for admission into university is the group who completed the university's on-campus enabling course.

The results for Model 1 show that after controlling for the effects of sex and birth cohort, students who entered university on the basis of completing year 12 at school, or the completion of a VET diploma, or via the mature-age/other pathway were more likely to discontinue their studies compared to students who entered university via the on campus enabling course (odds of 1.5, 1.6 and 2.3 respectively).

When we take into account a student's GPA (Model 2), we find that after controlling for the effects of sex, birth cohort and pathway into university, GPA is negatively associated with discontinuing study. In other words, as GPA increases the odds of discontinuing decrease. Furthermore, students entering via each of the other pathways, apart from the VET certificate pathway, are more likely to discontinue their studies net of the effects of GPA than students entering via the on-campus enabling program. Although students who enter the university via the on-campus enabling program received lower GPAs than students entering via the traditional (Year 12 completion at school) pathway, the association between GPA and attrition was weaker for the students who had completed the university's on campus enabling course. Students who were admitted on the basis of completing Year 12 at school were 1.7 times more likely to discontinue their studies than students who entered via the on-campus enabling course pathway with the same GPA.

Discussion

This paper has explored the relationship between pathway into university, academic progress and student attrition to understand the influence of widening participation on student performance. We found that the average GPA of school leavers admitted on the basis of Year 12 is higher than that of students admitted on other bases, although all groups recorded an average GPA that was higher than the passing average of 4. Initially, we found that there is no statistically significant difference in the attrition rate between school leavers admitted on the basis of completing Year 12 at school and students who had completed the university's enabling course. However, when age, sex, and mean GPA are taken into account, school leavers admitted on the basis of completing Year 12 at school were 1.7 times more likely to discontinue their studies than students who had completed the on campus enabling course.

Students admitted on the basis of the completion of a VET Diploma or an enabling course elsewhere were almost twice as likely to discontinue their studies compared to students who had completed the university's enabling course after controlling for the effects of sex, age and GPA. Students admitted after completing Year 12 at another institution or on a mature age/ other basis were two and a half times as likely to leave university before completing their degree, as those who had completed the university's enabling course after controlling for the effects of sex, age and GPA.

In other words, despite having not met the initial minimum requirements for admission, and despite receiving lower, on average, academic grades for their university studies, students who had completed the university's enabling course were less likely to discontinue their studies than Year 12 school leavers with comparable academic grades. These results suggest that the successful completion of an on campus enabling course assists students who have a low or no ATAR, to make a successful transition to undergraduate university studies.

On campus enabling program

The main reason that students undertake enabling programs at the university which provided the data for this study is because they do not qualify for entry to undergraduate programs, either because their ATAR was too low or they did not have an ATAR. In 2006, two types of enabling courses were offered for school leavers who did not meet the minimum requirements for admission – a 14 week course for the majority of students, and an extended course of 22 weeks' duration for students with the lowest level of educational attainment. The extended program is delivered at a slower pace in order to provide more support. A 14 week program was also offered for mature age students. Between 75 – 80 per cent of school leavers and 50 – 60 per cent of mature age students who enrol in these enabling programs successfully complete them and are admitted to the first year of university.

The enabling courses offered by the university are delivered by the university's RTO. The content is focused on the development of skills required for university study and the curriculum is designed to develop students' analytical thinking skills and their confidence and competence in solving mathematical problems. It also teaches the practical skills that students will need in order to comply with university standards and expectations. While the courses aim to prepare students for the content, study and subject matter of academic thinking and teaching, they do not deliver academic knowledge, nor do they assume any academic knowledge on the part of students. The courses are conducted on campus, with student ID numbers, student cards, student email and using the university's Learning Management System. Thus students are very familiar with the university by the time they commence undergraduate studies. Further research is needed to understand how on campus enabling programs contribute to student retention in undergraduate programs of study.

Conclusion

Admitting students with low or no ATARs to university is often portrayed as a threat to higher education standards (Hare 2014; Mather 2013). Yet the completion of higher levels of education

is an increasingly important prerequisite for lifetime employment in a rapidly changing labour market (Ryan & Watson 2003). This study suggests that high rates of student attrition need not be the outcome of widening participation. Students who have completed an enabling course on campus prior to commencing undergraduate studies have comparable retention rates to Year 12 school leavers and when GPA is taken into account, are less likely to discontinue their studies.

The provision of a semester – long enabling program focused on skills development while promoting familiarisation with university processes, facilities and systems appears to be more effective in preparing students for study in this university, than enabling programs completed elsewhere. The reasons for this should be explored in further research.

The implications of this study are that students who do not meet minimum entry requirements due to having a low or no ATAR can be adequately prepared for undergraduate studies by completing an on campus enabling course prior to enrolment. The fact that such students go on to complete undergraduate programs at a similar rate to school leavers admitted on the basis of Year 12 completion, challenges the assumption that widening participation undermines higher education standards.

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