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First-year university retention and academic performance of non-traditional students entering via an Australian pre-university enabling program

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Pre-tertiary enabling programs have become an increasingly popular pathway to university in Australia in recent years, however little is published about how well enabling students fare once they start university. This paper examines and compares first-year retention and academic outcomes of students that entered Murdoch University between 2014 and 2016 via successful completion of its enabling program, OnTrack. A greater proportion of students transitioning via OnTrack were from equity and disadvantaged backgrounds than any other entry pathway; thereby demonstrating an important function of this enabling program in boosting the representation of these students at the university. Further, OnTrack-pathway students were retained at a rate that was similar or better than students entering via all other admission pathways, despite poorer academic performance. This persistence suggests enhanced resilience amongst this cohort, potentially built during their enabling education experience. Multivariate regression modelling was also undertaken, revealing that admission pathway, demographic and enrolment factors collectively explained very little of the observed variation in student outcomes

for all first year students, and were particularly poor predictors of academic underperformance. Thus, once students are enrolled in undergraduate study, student outcomes may be better explained by student variables not captured in university databases, such as personal circumstances or psychological factors. In summary, these findings provide empirical data to support the notion that enabling programs have been successful in 'enabling' access and participation of students who are capable but otherwise lack opportunity, including those from disadvantaged backgrounds. However, enabling pathway students may experience ongoing challenges that impact their academic performance, and thus future equity and access policy should address appropriate mechanisms for supporting the broader transition experience of these students.

***Keywords**: first-year university, retention, academic performance, pre-university enabling programs, transition, equity*

Introduction

Equitable access to and participation in higher education (HE) has featured as a key policy imperative since the transition from elite to mass HE systems in most developed countries (Trow, 2007). Pre-university enabling programs, referred to by a variety of names such as "bridging courses, university preparation courses, foundation courses and pathway courses" (Hodges et al., 2013) became a key strategy in boosting the representation of non-traditional students in HE in Australia and abroad (Agosti & Bernat, 2018). These programs are diverse in nature (e.g. length, delivery method, institution/teaching environment) but typically target students that have experienced educational disadvantage or disruption within the local communities that they serve. They also share a common aim of enabling a second chance for university access and participation by providing the necessary preparation and requisites

for entry. In Australia, the rise in the popularity of these programs was facilitated by national policy intervention and substantial investment by the Australian government from 2008 onwards in order to meet 'widening participation' targets identified by Bradley, Noonan, Nugent, & Scales (2008) for equity, economic and social justice reasons. As a result, by 2013 more than 27 Australian universities offered at least 35 enabling programs (Hodges et al., 2013), with the number of student enrolments and program offerings ever-expanding to meet increasing demand (Lisciandro & Gibbs, 2016; McKay et al., 2018).

Despite the injection of resources and increasing popularity of Australian enabling programs as a pathway to university, "enabling programs are not part of the Australian Qualifications Framework and seem not to have been subject to a targeted review of effectiveness despite having existed since 1990" (Lomax-Smith, Watson, & Webster, 2011, p. 122). Most research to date has been qualitative in nature, revealing significant 'soft' benefits (Bennett et al., 2013) for students such as increased self-confidence, leadership and a sense of belonging (Crawford, 2014), greater self-belief and transformation (Habel, Whitman, & Stokes, 2016; Willans & Seary, 2007), improved study and employment opportunities (Crawford et al., 2015), an enhanced first year university experience (Smith, 2010), as well as positive flow-on effects for students' families and communities (Johns et al., 2016). However, empirical data on the outcomes achieved by enabling pathway students remains limited.

This is further complicated by discord on definition(s) of success, which may be viewed differently by different stakeholders (Bennett et al., 2013). For example, while in-program retention and conversion to undergraduate enrolment may be seen as a measure of success, there is a strong argument for the case of some attrition being positive, particularly where the enabling program experience has opened up other meaningful study

or employment opportunities (Hodges et al., 2013; Muldoon & Wijeyewardene, 2013). The contribution of enabling programs to boosting university participation by traditionally under-represented groups, such as those from recognised equity subgroups, may be another indicator of efficacy. Among these subgroups are people with disabilities and those from low socio-economic status (SES) or non-English speaking backgrounds (NESB), as defined by DEET (1990, p. 10). Previous research related to this outcome has shown that students belonging to such equity subgroups have a substantially higher representation in Australian enabling programs compared to other sub-bachelor pathways, as well as at Bachelor level (Pitman et al., 2016). Others yet, including those investing in enabling education, may place more value on measures of undergraduate student retention, completion and academic performance. To date, findings related to these latter measures are scarce and "often based on small numbers of enabling program students, hence, not generalisable" (McKay et al., 2018). However, in the current neoliberal political environment characterised by a desire for HE reform and the tying of enabling funding to demonstrating quantitative evidence of efficacy (Australian Government, 2017, p. 25), there is an urgent need not only for greater sectoral research, but also for this "research to be translated more effectively into policy through greater dissemination and advocacy" (Harvey, 2017).

Purpose and scope

The OnTrack enabling program, which has been operating since 2008 at Murdoch University in Western Australia, has delivered high and sustained in-program retention and conversion to undergraduate enrolment for the thousands of students that have completed it (Lisciandro & Gibbs, 2016). However, the retention and academic outcomes of OnTrack-pathway students during their undergraduate study program are yet to be explored. These are valuable measures for evaluating the success of programs such as OnTrack

in 'enabling' university participation by traditionally underrepresented groups and thus fulfilling the purpose for which they were designed.

The aim of the current evaluation was to investigate the outcomes of OnTrack-pathway students during their first year of undergraduate study, as an indication of program efficacy. This period is of particular importance as it is "the time when the highest amount of academic failure and discontinuation occurs" (Mills, Heyworth, Rosenwax, Carr, & Rosenberg, 2009); and indeed a number of studies have well established that once a student progresses from the first year to the second year, they are more likely to continue to completion (Hillman, 2005; Marks, 2007; McInnis, Hartley, Polesel, & Teese, 2000).

The major research questions in this study were:

(1) What is the first-year retention rate for students that enter university via OnTrack? How does this compare to retention rates for students that enter university via other pathways?

(2) How well do OnTrack-pathway students perform in their first-year units? How does this compare for students who enter university via other pathways?

Additionally, we were also interested in exploring: (a) whether OnTrack contributes to boosting undergraduate enrolment by traditionally under-represented groups such as those with a disability or from low SES or NESB backgrounds, as well as (b) other enrolment and demographic factors that may also influence or predict retention and academic outcomes during the first year of university.

Methods

Permission to undertake this study was granted by the Murdoch University Human Research Ethics Committee (Approval No. 2014/131) and de-identified data were obtained from Murdoch University's Student Records databank. The subjects for this evaluation were all domestic students who enrolled and started their undergraduate degree in Semester 1 or 2 in 2014, 2015 or 2016. Students were differentiated on the basis of admission pathway. This included traditional entry pathways such as via completion of standardised Secondary School exams, and non-traditional entry pathways such as successful completion of OnTrack, prior participation in Higher Education or prior Vocational Education and Training (VET) such as Technical and Further Education (TAFE) or equivalent. Table 1 shows the total number of students in each of these groups during the period under study. Notably, 14% of all students gained entry via OnTrack, and more students used non-traditional pathways than traditional pathways to gain access over this period.

Table 1. *Number of domestic students who entered via various pathways during intake periods between 2014 and 2016.*

Intake period	Entry pathway						Total
	OnTrack	Higher Education participation	VET e.g. TAFE or equivalent	Other non-traditional pathways[1]	School Leaver[2]	Completed Secondary Education[2]	
2014	312	430	523	296	740	221	2522
2015	298	491	501	234	485	210	2219
2016	429	547	515	306	738	243	2778
Total	1039	1468	1539	836	1963	674	7519

[1] Other non-traditional pathways included entry via the Special Tertiary Admissions Test (STAT), a standardised aptitude test available Australia-wide (offered to mature-aged students as a pathway to access Murdoch University) or enabling programs other than *OnTrack* (offered at Murdoch University or other universities).

[2] 'School leavers' are students that gained admission to university directly from school on the basis of their Australian Tertiary Admission Rank (ATAR), while

'Completed Secondary Education' is anyone else whose basis of admission is that they completed secondary education (typically this is mature age students or high school leavers who took time off and then applied for a university course).

First year student retention and academic performance of students entering Murdoch University via different pathways were analysed. Definitions, specific indicators and calculations of these dependent variables under study were according to previously published and broadly used government definitions (Table 2).

Table 2. *Dependent (or measured) variables to be studied: definitions, specific indicators and associated calculations.*

Dependent variable	Broad definition	Specific indicator used	Calculations for each indicator
Retention	"The number of students who continue to be enrolled in a degree after a certain time period." (Mills et al., 2009).	*Retention rate:* "the number of students enrolled in a course in one year in relation to the number enrolled in the following year" (Gale & Parker, 2013).	"Retention rate for year (x) = the number of students who commenced an undergraduate course in year (x) and continue in year (x+1) as a proportion of students who commenced an undergraduate degree course in year (x)" (DIISRTE 2011; as cited in Gale and Parker 2013).[1, 2]
Academic Performance	How well students successfully complete their first-year units.[3]	*Success (Pass) Rate:* "measures academic performance by comparing the equivalent full-time student load (EFTSL) of units passed to the EFTSL of units attempted" (DIISRTE 2011; as cited in Gale and Parker 2013).	"Success Rate = student load passed, divided by student load certified (passed, failed, withdrawn)" (DIISRTE 2011; as cited in Gale and Parker 2013).

[1] Calculated separately for each intake period – for example, students starting at the beginning of 2014 were followed up one year later at the commencement of 2015; and mid-year intakes were followed up mid-year the following year.

[2] Does not take into account student transfers to other institutions, as this data was not available.

[3] The term 'unit' in this context refers to single subject of study within an

undergraduate/Bachelor level course.

Additional demographic and enrolment information was collected for students included in this study. This included: gender, age at commencement of the undergraduate degree, School of enrolment (i.e., Faculty), attendance mode (internal/on-campus or external), enrolment load (full-time: enrolled in 0.375 or more EFTSL per semester; part-time: enrolled in less than 0.375 EFTSL per semester), disability, NESB and low SES. Disability and NESB data were based on student self-disclosure at the point of enrolment, according to the students' own definition. Low SES data was "based on the students' postcode of permanent home residence, with the SES value derived from the 2011 SEIFA Education and Occupation Index for postal areas, where postal areas in the bottom 25% of the population aged 15-64 being classified as Low SES" (Australian Government, 2013). The collection of this data enabled multivariate regression analysis to be performed, in order to investigate whether any demographic or enrolment factors were associated with, or can be used to explain, statistics regarding retention or performance for the student cohorts under study. Of note, the campus of enrolment was not considered here as all but one undergraduate course (Nursing, in the School of Health Professions) was offered at a single campus (metropolitan) during the period of the study.

Analysis of influences on student retention and success rates

Admission pathway, demographic factors and enrolment characteristics were investigated as potential predictors of student retention and performance. The independent variables studied were those for which information was readily available from university student records. First year retention and success rates were used as the dependent (response) variables in the analyses.

Single associations between student retention and each independent variable of interest were explored via a

chi-square analysis. However, multivariate analysis was deemed necessary as some independent variables of interest were correlated (Appendix Table A1). Single association variables with a conservative p-value of less than 0.20 were further investigated in the multivariate regression model. Multi-collinearity between independent variables was ruled out before proceeding with further analysis. Plausible interactions were also investigated as part of the model. The final multivariate regression model included the following predictor variables: admission pathway, School, attendance mode, enrolment load, gender, age group, low SES, disability and success rate. As the dependent variable (retention) was dichotomous, a logistic regression analysis method was employed. For this analysis, categorical data were dummy coded into exhaustive and mutually exclusive variables, each with a designated reference group for comparison. As it is recommended that multivariate logistic regression models employ an n value of at least 10-15 per independent variable included in the model (Johnson & Wichern, 2007; Tabachnick & Fidell, 2007), the sample size for modelling was more than sufficient.

Associations between success rate and admission pathway as well as other independent variables of interest (demographic and enrolment factors) were investigated using the method described above for analysis of retention. For multivariate analysis, the dependent variable (success rate) was dichotomised into a binary variable (passed less than 50% of units attempted versus passed 50% or more of units attempted) before proceeding with logistic regression analysis.

Statistical analysis

Analyses were conducted using the statistical package SPSS, version 21. Chi-square analyses were used to test for differences in frequency data, while t-tests were used for cohort comparisons of retention and success rates. Associations were considered statistically significant if two-

sided p-values were less than 0.05.

Findings

Student characteristics

Demographic and enrolment characteristics significantly differed for students that accessed university via different entry pathways (Table 3). Notably, the proportion of low SES students and students with a disability was highest in the OnTrack pathway cohort compared to the other cohorts under study. Further, compared to students entering via other 'alternative' pathways (such as VET, STAT or other enabling programs), OnTrack pathway students tended to be younger, and more likely to study on-campus and take on a full-time enrolment load in their first year of undergraduate study.

Table 3. *Demographic and enrolment characteristics of students by entry pathway**

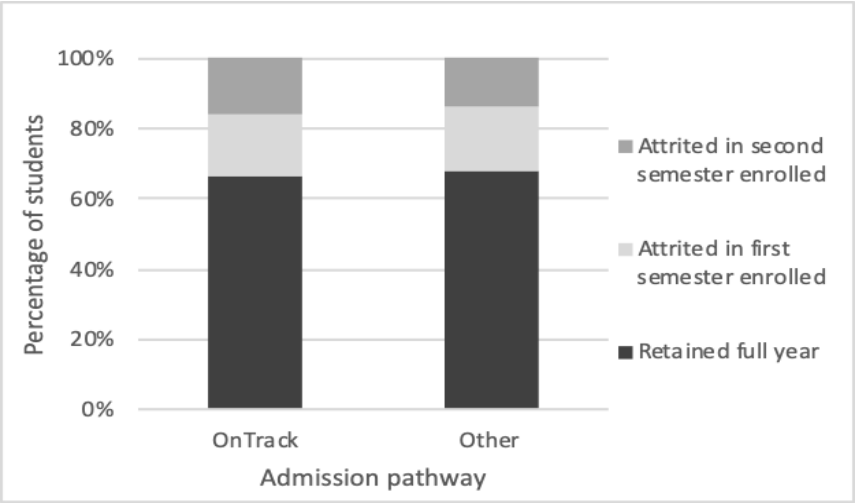
Student characteristics	Entry pathway						p-value
	OnTrack	Higher Education participation	VET	Other non-traditional pathways	School Leaver	Completed Secondary Education	
Gender							0.009
Female	592 (57%)	879 (60%)	943 (61%)	510 (61%)	1250 (64%)	396 (59%)	
Male	446 (43%)	588 (40%)	594 (39%)	326 (39%)	710 (36%)	278 (41%)	
Age							<0.001
≤19 years	644 (62%)	284 (19%)	383 (25%)	257 (31%)	1942 (99%)	466 (69%)	
20-29 years	301 (29%)	735 (50%)	689 (45%)	397 (47%)	18 (0.9%)	172 (26%)	
30+ years	94 (9%)	449 (31%)	467 (30%)	182 (22%)	3 (0.1%)	36 (5%)	
Low SES	286 (28%)	215 (15%)	373 (24%)	209 (25%)	400 (20%)	114 (17%)	<0.001
Disability	150 (14%)	165 (11%)	136 (9%)	94 (11%)	116 (6%)	52 (8%)	<0.001
NESB	84 (8%)	130 (9%)	167 (11%)	63 (8%)	107 (5%)	41 (6%)	<0.001
Attendance mode							<0.001
Internal	1037 (99.9%)	1288 (88%)	1322 (86%)	767 (92%)	1954 (99.6%)	628 (93%)	
External	1 (0.1%)	180 (12%)	215 (14%)	69 (8%)	8 (0.4%)	46 (7%)	
Enrolment load							<0.001
Full-time	668 (64%)	818 (56%)	861 (56%)	497 (59%)	1832 (95%)	516 (77%)	
Part-time	371 (36%)	650 (44%)	677 (44%)	339 (41%)	131 (5%)	158 (23%)	
School							<0.001
Psychology & Exercise Science	119 (12%)	128 (9%)	136 (9%)	62 (7%)	207 (11%)	57 (8%)	
Arts	166 (16%)	174 (12%)	163 (11%)	119 (14%)	265 (14%	100 (15%)	
Business & Governance	86 (8%)	152 (10%)	245 (16%)	87 (10%)	145 (7%)	75 (11%)	
Law	76 (7%)	245 (17%)	65 (4%)	119 (14%)	249 (13%)	77 (11%)	
Veterinary & Life Sciences	175 (17%)	276 (19%)	172 (11%)	131 (16%)	545 (28%)	133 (20%)	
Engineering & IT	117 (11%)	196 (13%)	220 (14%)	73 (9%)	202 (10%)	72 (11%)	
Health Professions	144 (14%)	204 (14%)	301 (20%)	144 (17%)	183 (9%)	85 (13%)	
Education	150 (15%)	92 (6%)	237 (15%)	94 (11%)	166 (8%)	72 (11%)	

* Counts, column percentages and two-sided p-values from chi-square analyses are shown.

Student retention in the first year of undergraduate enrolment

The first outcome to be explored was student retention in the first year of undergraduate study, as this provides an important indication of student progress and persistence. Of all students that enrolled and started their degree between 2014 and 2016, 66% of OnTrack-pathway students were retained for the full year, compared to 68% of all other students (Figure 1). There were no significant differences in the frequency of retention outcomes between these groups [Pearson chi-square (χ^2) = 3.443, df=2, p=0.179]. Notably, during the first year of enrolment, 6.5% (68/1039) of OnTrack-pathway students and 4.9% (325/6669) of all other students transferred between courses.

Figure 1. *Student progression outcomes over the first year of enrolment for those who started between 2014 – 2016 (OnTrack n=1039; Other pathways n=4538)*



The retention rate was also analysed and compared for students entering via specific pathways (Table 4). OnTrack-pathway students were retained at the same rate as students entering via all other pathways, except School Leavers.

Table 4. *First year retention rate of students entering via various admission pathways*

Admission pathway	Retention (% of students retained)
OnTrack	66
Higher Education participation	67
VET	64
Other non-traditional pathways	65
Completed Secondary Education	68
School Leaver	75*

* Indicates statistical difference ($p<0.05$) in retention rate compared to *OnTrack* pathway students

Retention within the OnTrack group was also examined to determine whether retention outcomes for this group were stable over time; no significant differences in student retention were found for different intake periods [Pearson chi-square ($\chi 2$) = 8.123, df=10, p=0.617].

Finding predictors of student retention

To determine whether the admission pathway influences student retention in the first year of undergraduate study, this should be studied whilst taking into account (or controlling for) potential confounders or other variables that may also influence/explain retention outcomes. For example, demographic characteristics differ for students entering via different admission pathways, and it is important to account for this when studying and understanding predictors of retention. Moreover, student performance in units may also influence student decisions to continue or drop out of university (Mills et al., 2009). A regression analysis technique was employed to control for potential confounders whilst studying the effects of the admission pathway on retention. Firstly, single associations between independent variables of interest (e.g. success rate, demographic and enrolment factors) and the response variable (retention) were investigated (Table 5).

Table 5. *Relationship between student retention in the first year of undergraduate study and student demographic and study factors* [1]

Demographic and study-related variables[2]		Retention		P-value
		No	Yes	
Gender	Female	1430 (30%)	3262 (70%)	**<0.001**
	Male	1048 (35%)	1961 (65%)	
Age group	≤19 years	1150 (29%)	2878 (71%)	**<0.001**
	20-29 years	847 (35%)	1541 (65%)	
	30+ years	485 (38%)	807 (62%)	
NESB	No	2276 (32%)	4816 (68%)	0.833
	Yes	197 (33%)	409 (67%)	
Low SES	No	1913 (32%)	4117 (68%)	**0.137**
	Yes	551 (34%)	1086 (66%)	
Disability status	No	2218 (32%)	4746 (68%)	**0.058**
	Yes	261 (35%)	479 (65%)	
School	Psychology & Exercise Science	241 (34%)	470 (66%)	**<0.001**
	Arts	356 (36%)	641 (64%)	
	Business & Governance	327 (41%)	467 (59%)	
	Law	212 (25%)	623 (75%)	
	Veterinary & Life Sciences	448 (31%)	991 (69%)	
	Engineering & IT	314 (35%)	574 (65%)	
	Health Professions	251 (23%)	852 (77%)	
	Education	261 (32%)	559 (68%)	
Attendance mode	Internal	2183 (30%)	4982 (70%)	**<0.001**
	External	296 (55%)	243 (45%)	
Enrolment Load	Part-time	994 (41%)	1433 (59%)	**<0.001**
	Full-time	1487 (28%)	3793 (72%)	
Pass/success rate	<50% of units attempted	1262 (73%)	476 (27%)	**<0.001**
	≥50% of units attempted	1214 (20%)	4749 (80%)	

[1] Counts, row percentages and two-sided p-values from chi-square analyses are shown.
[2] Variables that met conservative single association criteria ($p \leq 0.20$) for inclusion in the multivariate logistic regression model are highlighted in boldface.

Female gender, and full-time and on-campus attendance were associated with a significantly enhanced retention rate. Increasing age and passing less than 50% of units attempted was associated with significantly reduced retention rates. Retention also varied significantly according to the School of enrolment, with the highest retention rates observed in the Schools of Health Professions, Law, and Business and Governance. There was a trend for slightly lower retention rates for students with a disability or from a low SES background, but this was not significant at the 5% level. NESB was not associated with student retention (Table 5).

Importantly, a number of these independent variables were found to correlate with each other as well as the admission pathway (Appendix Table A1), highlighting the need to investigate covariates in a multivariate model. No multicollinearity issues were detected. An interaction between attendance mode and enrolment load was considered plausible, however, was not significant and therefore not considered further. The multivariate model is shown in Table 6.

Table 6. *Multivariate Logistic Regression Model analysing the influence of admission pathway, academic performance, demographic and enrolment factors on student retention*

Independent variable[1]		Odds ratio	(95% CI)	P-value[3]
Admission pathway	*OnTrack*[2]	1.000		
	Higher Education participation	0.857	(0.694 – 1.057)	0.150
	VET	0.825	(0.673 – 1.011)	0.064
	Other non-traditional pathways	0.876	(0.696 – 1.102)	0.259
	Completed Secondary Education	0.752	(0.590 – 0.957)	**0.021**
	School Leaver	0.865	(0.706 – 1.059)	0.159
School	Psychology & Exercise Science[2]	1.000		
	Arts	1.083	(0.860 – 1.364)	0.500
	Business & Governance	1.162	(0.907 – 1.491)	0.235
	Law	1.554	(1.212 – 1.993)	**0.001**
	Veterinary & Life Sciences	1.235	(0.993 – 1.536)	0.057
	Engineering & IT	1.391	(1.086 – 1.782)	**0.009**
	Health Professions	1.775	(1.395 – 2.259)	**<0.001**
	Education	1.364	(1.065 – 1.747)	**0.014**
Attendance Mode	External[2]	1.000		
	Internal	1.924	(1.531 – 2.418)	**<0.001**
Enrolment Load	Part-time[2]	1.000		
	Full-time	1.418	(1.241 – 1.620)	**<0.001**
Gender	Female[2]	1.000		
	Male	1.008	(0.890 – 1.141)	0.905
Disability	No[2]	1.000		
	Yes	1.014	(0.839 – 1.227)	0.885
Low SES	No[2]	1.000		
	Yes	0.983	(0.856 – 1.128)	0.804
Age group	≤19 years[2]	1.000		
	20-29 years	0.994	(0.850 – 1.163)	0.944
	30+ years	0.821	(0.676 – 0.997)	**0.046**
Success rate	Passed <50% of units attempted[2]	1.000		
	Passed ≥50% of units attempted	10.001	(8.777 – 11.395)	**<0.001**

[1] Model Chi-square = 1677.7 *df* = 20, p<0.001; Nagelkerke R-squared = 0.283; *N*=7456 included in the analysis.
[2] Reference group
[3] P-values significant at the 5% level are highlighted in boldface.

The model (Table 6) suggests that OnTrack-pathway students were retained at a similar or significantly better rate compared to students entering via all other pathways when taking into account demographic and enrolment factors, as well as academic performance during the first year of undergraduate study.

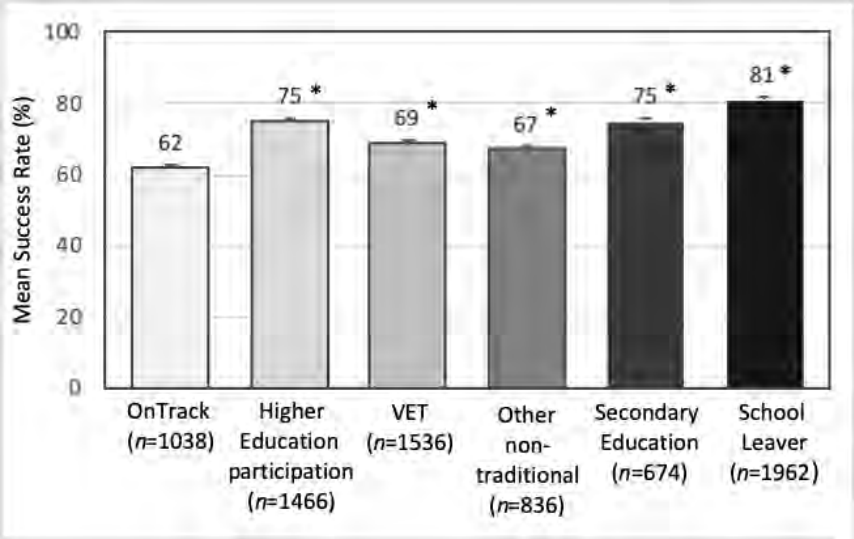
The model also suggests students who passed 50% or more of their units were ten times more likely to be retained than those that passed less than 50% of their units. As well as this, students enrolled internally and full-time had higher odds of being retained than those enrolled externally and part-time, respectively. Students enrolled in the School of Health Professions, Law, Engineering and IT, and Education were more likely to be retained than those enrolled in other Schools. Demographic factors such as gender, disability and low SES status did not influence retention whilst controlling for other variables.

The model correctly allocated 78.2% of total cases, with 50.6% of attrited students correctly predicted and 90.9% of retained students correctly predicted. Importantly, the model's effect size, Nagelkerke R-squared was 0.283; indicating that 28.3% of the variance in the dependent variable (retention) was explained by this model. Notably, student performance in first year units had the greatest influence on retention of any other variable in this model. When success rate was excluded as an independent variable in the regression model (Appendix Table A2), the Nagelkerke R-squared was much lower at 0.057; indicating that only 5.7% of the variance in retention is explained by admission pathway, demographic and enrolment factors alone. Further, this alternative model correctly allocated 69% of cases, with only 8.9% of attrited students correctly predicted. Therefore, despite some of these variables reaching significance, admission pathway, demographic and enrolment factors collectively explained very little about student retention and were particularly poor predictors of attrition during the first year of undergraduate study.

Student performance during the first year of undergraduate enrolment

The second outcome to be explored was student success rate in the first year of undergraduate degree enrolment, defined as the proportion of units passed versus attempted, as an indicator of how well students perform. On average, OnTrack-pathway students passed 62% (± Standard Error of the Mean (SE) = 1%, n=1038) of attempted units, which was lower ($p<0.001$) than the mean success rate of 74% (± SE 0.5%, n=6474) for the rest of the student cohort collectively. Figure 2 shows the first year mean student success rate (+SE) for each individual admission pathway; OnTrack pathway students underperformed compared to students entering via other admission pathways.

Figure 2. *Mean success rate of students entering via different admission pathways for the first year of undergraduate study*



* Indicates statistical difference ($p<0.05$) in success rate compared to OnTrack pathway students

Finding predictors of student performance

As per student retention, to determine whether the admission pathway influences student performance in the first year of undergraduate study, it is important to control for potential confounders or other variables that may also influence/ explain performance outcomes. Firstly, single associations between potential confounders/independent variables of interest (e.g. demographic and enrolment factors) and the response variable (performance) were investigated (Table 7).

Table 7. *Relationship between student performance in the first year of undergraduate study and student characteristics*

Demographic and enrolment factors[1]		Mean success rate ± SE	P-value[2]
Gender	Female	76 ± SE 0.5%	**<0.001**
	Male	67 ± SE 1%	
Age group	≤19 years	74 ± SE 0.5%	**<0.001**
	20-29 years	67 ± SE 1%	
	30+ years	76 ± SE 1%	
NESB	No	73 ± SE 0.5%	**0.002**
	Yes	68 ± SE 2%	
Low SES	No	73 ± SE 0.5%	**0.001**
	Yes	70 ± SE 1%	
Disability status	No	73 ± SE 0.5%	**0.001**
	Yes	68 ± SE 1%	
School	Psychology & Exercise Science	74 ± SE 1%	**<0.001**
	Arts	71 ± SE 1%	
	Business & Governance	64 ± SE 1%	
	Law	77 ± SE 1%	
	Veterinary & Life Sciences	73 ± SE 1%	
	Engineering & IT	64 ± SE 1%	
	Health Professions	84 ± SE 1%	
	Education	72 ± SE 1%	
Attendance mode	External	60 ± SE 2%	**<0.001**
	Internal	73 ± SE 0.5%	
Enrolment Load	Part-time	67 ± SE 1%	**<0.001**
	Full-time	75 ± SE 0.5%	

[1] Variables that met conservative single association criteria ($p \leq 0.20$) for inclusion in the multivariate regression model are highlighted in boldface.
[2] Two-sided p-values derived from one-way ANOVA test.

Female gender, full-time study and internal enrolment modes were associated with a significantly enhanced success rate. The 20-29 year old age group, NESB, disability and low SES status were associated with a lower success rate. Performance also varied according to the School of enrolment, with the highest success rates observed in the Schools of Health Professions and Law (Table 7).

As these demographic and enrolment variables were found to significantly influence student performance, as well as the fact that a number of these variables also correlate with each other and admission pathway (Appendix Table A1), a regression analysis technique was employed to control for potential confounders whilst studying the effects of admission pathway on performance (Table 8). A multiple logistic regression model was employed with the dependent variable (student performance) included in the model in dichotomous format (passed less than 50% of units attempted versus passed 50% or more of units attempted).

Table 8. *Multivariate Logistic Regression Model analysing the influence of admission pathway, demographic and enrolment factors on student performance*

Independent variable[1]		Odds ratio	(95% CI)	P-value[3]
Admission pathway	*OnTrack*[2]	1.000		
	Higher Education participation	1.751	(1.435 – 2.138)	**<0.001**
	VET	1.384	(1.145 – 1.673)	**0.001**
	Other non-traditional pathways	1.151	(0.932 – 1.422)	0.191
	Completed Secondary Education	1.770	(1.399 – 2.241)	**<0.001**
	School Leaver	2.742	(2.247 – 3.345)	**<0.001**
School	Psychology & Exercise Science[2]	1.000		
	Arts	0.832	(0.653 – 1.059)	0.134
	Business & Governance	0.711	(0.552 – 0.915)	**0.008**
	Law	1.134	(0.871 – 1.478)	0.351
	Veterinary & Life Sciences	0.772	(0.614 – 0.970)	**0.027**
	Engineering & IT	0.710	(0.554 – 0.909)	**0.007**
	Health Professions	2.117	(1.613 – 2.780)	**<0.001**
	Education	0.948	(0.734 – 1.224)	0.680
Attendance Mode	External[2]	1.000		
	Internal	1.441	(1.157 – 1.793)	**0.001**
Enrolment Load	Part-time[2]	1.000		
	Full-time	1.626	(1.426 – 1.853)	**<0.001**
Gender	Female [2]	1.000		
	Male	0.750	(0.663 – 0.849)	**<0.001**
Disability	No[2]	1.000		
	Yes	0.790	(0.658 – 0.949)	**0.012**
Low SES	No[2]	1.000		
	Yes	0.767	(0.670 – 0.879)	**<0.001**
NESB	No[2]	1.000		
	Yes	0.808	(0.659 – 0.990)	**0.040**
Age group	≤19 years[2]	1.000		
	20-29 years	0.951	(0.819 – 1.104)	0.511
	30+ years	1.580	(1.294 – 1.929)	**<0.001**

[1] Model Chi-square = 466.724 *df* = 20, p<0.001; Nagelkerke R-squared = 0.093; *N*=7456 included in the analysis.
[2] Reference group
[3] P-values significant at the 5% level are highlighted in boldface.

After controlling for covariates by performing multivariate logistic regression, the model suggests that OnTrack-pathway students have lower odds of passing 50% or more of their units compared to students entering via most other pathways, except those who enter via "other non-traditional pathways" (i.e. STAT test or other enabling programs).

The model also suggests that students enrolled on-campus and full-time are more likely to pass units than those enrolled externally and part-time, respectively. Having a disability, residing in a low SES postcode, NESB and male gender was associated with reduced odds of passing 50% or more of units attempted, while students aged 30 years or older were more likely to pass 50% or more of their units. The odds of success also differed by School of enrolment.

The regression model correctly allocated 77.6% of cases, with 99.1% of the students passing 50% or more of their units correctly predicted, but only 2.3% of students passing less than 50% of their units correctly predicted. Additionally, the model's effect size, Nagelkerke R-squared was also only 0.093; indicating that 9.3% of the variance in the dependent variable (student performance) was explained by this model. Therefore, despite these variables reaching significance, admission pathway, demographic and enrolment factors collectively explained very little about student performance during the first year of undergraduate study. Moreover, these were a particularly poor predictor of academic underperformance.

Discussion

Similar to that reported for enabling programs across Australia (Pitman et al., 2016), we found that a greater proportion of students transitioning via OnTrack were from equity and disadvantaged backgrounds than any other pathway; thereby demonstrating an important function of this enabling program in boosting the representation of these students at the university. Further, multivariate regression analysis revealed that OnTrack-pathway students were retained at a rate that was similar or better than students entering via all other admission pathways, despite poorer academic performance.

This is in line with previous findings at other Australian universities: both Chesters and Watson (2016) and Cantwell, Archer, and Bourke (2001) reported that once enabling-pathway students reach university, they are retained at a level that is commensurate with their peers entering via other pathways, including school leavers, but tend to have lower academic achievement. In an Australia-wide study, Pitman et al. (2016) also found that equity students who articulated via enabling programs had higher first-year retention rates and engendered "greater resilience or 'stickability'" (p. 55) than those accessing university via other sub-Bachelor pathways, despite experiencing academic barriers to success. On the contrary, traditional students may be more prone to discontinuing study in the face of unsatisfactory academic performance (Mills et al., 2009). Of the variables analysed in the current study, academic performance was the most important predictor of retention, and yet the retention of enabling pathway students appears relatively unaffected by their poorer academic performance compared to their non-enabling pathway peers. Taken together, these findings suggest that even though enabling students are more likely to struggle academically in first-year university, they may be more resilient in the face of new challenges; an encouraging finding given that students tend to arrive at their enabling program with low levels of confidence and academic self-efficacy (Atherton, 2015).

Alongside enhanced resilience, enduring social connections built during the enabling experience (Lisciandro & Gibbs, 2016) and "feelings of belonging" reported by enabling cohorts (Pitman et al., 2016, p. 5) may also go some way to explaining their persistence as they transition to university.

Other variables for which information was available, including demographic and enrolment factors, were also considered in this study as potential confounders of the relationship between admission pathway and first year outcomes. This was important as demographic and enrolment variables significantly differed by entry pathway, and therefore could potentially contribute to the cohort differences in outcomes observed. Multivariate regression analysis revealed that many of these demographic and enrolment variables were associated with statistically significant differences in retention and academic performance. For example, students who studied full-time and on-campus were more likely to be retained and achieve greater academic success than students enrolled part-time and externally, respectively. Notably, student choices regarding enrolment mode are likely influenced by personal circumstances and/or competing responsibilities (e.g. carer, financial, familial); factors that may also modulate their level of academic and social engagement at university, and therefore also their outcomes (Krause, 2005; Krause & Coates, 2008; Tinto, 2019; Whannell, 2013). Further, variables indicating equity status such as disability, low SES and NESB were not found to influence retention, but were associated with a reduced odds of academic success in the first year of undergraduate study, similar to that reported by McKay et al. (2018) using national data. The comparatively higher representation of equity, part-time and/or online students amongst non-traditional cohorts, including enabling cohorts, may go some way to explaining observed differences in outcomes and alert us to the additional challenges that these students face as they move into their undergraduate studies.

It is important to note that the admission pathway, and demographic and enrolment factors were not sufficient to explain the vast majority of the variance observed in either retention or academic performance. Moreover, these variables were particularly poor predictors of attrition and academic underperformance. These findings were not surprising: enrolment and demographic factors also were not sufficient to explain most of the observed variation in student retention during the OnTrack experience (Lisciandro & Gibbs, 2016). Instead, attrited students most commonly cited "medical and emotional issues" as the reason for prematurely leaving OnTrack, similar to that reported for other Australian enabling programs (Hodges et al., 2013). Psychological factors, in particular, may have a

significant influence on student outcomes during the first year transition. Research has revealed an ever-increasing burden of mental ill-health and psychological distress amongst university students (Said, Kypri, & Bowman, 2013; Stallman, 2010), including those in enabling pathways (Crawford et al., 2016); and the dire effect on student retention (Hodges et al., 2013; Orygen, 2017; Walter, 2015). In one recent study, almost all (95%) enabling students were found to be experiencing above normal levels of psychological distress (Nieuwoudt 2021). Belonging to an equity subgroup (Orygen, 2017) and the stress of transitioning to university (Cleary, Walter, & Jackson, 2011) are also significant risk factors that likely contribute to, or compound, poor mental health in this cohort. The Orygen (2017) report highlighted that "the mental health of university students has largely been absent at a government policy level" (p. 6), and that it "must be included in the higher education policy agenda" going forward (p.7). Australian universities are now starting to make a concerted effort to implement institution-wide mental health strategies, with many drawing on the "Enhancing Student Wellbeing" framework (Baik & Larcombe, 2016) that emphasises a role for curriculum in supporting student wellbeing. Proactively addressing student affect and social and emotional learning in enabling and first-year curricula is one example of a strategy that aims to enhance student wellbeing and success (Jones, Lisciandro, & Olds, 2016; Lisciandro, Jones, & Geerlings, 2018; Lisciandro, Jones, & Strehlow, 2016). Recent guidelines and recommendations from the National Centre for Student Equity in Higher Education also reinforce the importance of teaching, learning and curriculum to supporting student wellbeing and persistence of disadvantaged groups (Crawford 2021).

Limitations of the current study

The variables included in the current study were limited by the types of information captured in university administrative databases, and therefore other variables that may have better explained student outcomes, such as psychological data, were not investigated here. Moreover, 'disadvantaged' groups have long been recognised as "difficult to define and differentiate" (Pitman et al., 2016, p. 9); and measures of disadvantage can have their limitations. For example, the postcode method of identifying low SES students does not take into account the complexity of factors that determine an individual's overall social and economic position (Sinclair, Doughney, & Palermo, 2003).

In the current study, it was not feasible to explore outcomes beyond the first year of undergraduate study, however, it would be useful to address this in future. Nonetheless, the first year is

the time when the greatest risk of discontinuation occurs, and our findings provide empirical data to support the notion that enabling programs have been successful in 'enabling' access and participation of students who are capable but otherwise lack opportunity, particularly those from disadvantaged backgrounds. Corroborating the findings of Pitman et al. (2016, p. 55) their "success rates remind us that disadvantage does not disappear after the enabling pathway has been completed. Many equity-group students still require ongoing academic support in their undergraduate studies" (p. 55). Future discussion regarding access and equity policy should centre around ways that we can continue to support the transition experience of these students into the first year of university and beyond.

Final Considerations

In recent years, there have been questions about the efficacy of enabling programs in meeting academic standards and equity goals (Shah & Whannell, 2017). The proposed Higher Education Reform package (Australian Government, 2017), and the more recent Consultation paper (DET, 2018) attempted to define empirical measures of evaluating program efficacy and emphasise these as essential criteria for determining the future of enabling funding. While this study goes some way toward investigating some of these measures at one Australian university, it is important to note that quantitative data regarding student retention and academic performance provides only one part of the story. It does not necessarily value the knowledges and experiences of enabling participants, or alternative measures of success such as increased confidence, as well as other study and employment opportunities gained. It may not capture the success experienced by disadvantaged students who take a longer or more convoluted path to achieve the same ends amidst many personal, health or circumstantial hurdles. As Bennett and Lumb (2019, p. 7) argue "notions of 'competition', 'measurement' and 'return on investment' – exemplify the neoliberal approach to policymaking". This is a discourse that seems far removed from the social justice principles of achieving a "fairer and more just society" that Dawkins wrote about in A Fair Chance for all (DEET, 1990) and which set in motion the Bradley et al. (2008) Review and the resulting expansion of enabling pathways.

Nonetheless, this study found that an enabling program boosted participation by underrepresented groups at one Australian university, and equipped students to persist through their first year of undergraduate study just as well as other entry pathways. Enabling programs hence remain an important tool for enacting social justice in universities and the communities in which they serve.

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Appendix

Table A1. *Single associations between independent variables*

Predictor variables	Spearman rho correlation coefficients[1]								
	School	Age group	Gender	Disability	NESB	Low SES	Attendance mode	Enrolment mode	Success rate
Admission pathway	-0.034 **	-0.412 **	-0.037 **	-0.089 **	-0.049 **	-0.017	-0.081 **	0.269 **	0.119 **
School	X	0.048 **	-0.060 **	-0.040 **	0.025 *	0.095 **	0.016	-0.077 **	0.030 *
Age group		X	-0.020	0.073 **	0.066 **	0.013	0.266 **	-0.375 **	-0.044 **
Gender			X	-0.010	0.003	-0.050 **	0.012	0.058 **	-0.95 **
Disability				X	-0.033 **	0.005	-0.012	-0.038 **	-0.040 **
NESB					X	0.012	-0.025 *	-0.062 **	-0.024 *
Low SES						X	0.002	-0.030 **	-0.036 **
Attendance mode							X	-0.216 **	0.085 **
Enrolment mode								X	0.104 **

[1]Significant associations at the 5% level are shaded in grey. P-values not corrected for multiple comparisons, thus exercise discretion in the interpretation of results. Association data not replicated on the bottom left of the table.

* indicates 2-sided p-value <0.05

** indicates 2-sided p-value <0.01

Table A2. *Alternative Multivariate Logistic Regression Model analysing the influence of admission pathway, demographic and enrolment factors only on student retention*

Independent variable[1]		Odds ratio	(95% CI)	P-value[3]
Admission pathway	*OnTrack*[2]	1.000		
	Higher Education participation	1.135	(0.944 – 1.365)	0.177
	VET	0.998	(0.835 – 1.193)	0.980
	Other non-traditional pathways	0.975	(0.797 – 1.192)	0.804
	Completed Secondary Education	1.033	(0.835 – 1.279)	0.763
	School Leaver	1.345	(1.125 – 1.607)	**0.001**
School	Psychology & Exercise Science[2]	1.000		
	Arts	0.993	(0.807 – 1.221)	0.944
	Business & Governance	0.976	(0.782 – 1.218)	0.828
	Law	1.495	(1.194 – 1.872)	**<0.001**
	Veterinary & Life Sciences	1.070	(0.880 – 1.301)	0.495
	Engineering & IT	1.126	(0.904 – 1.402)	**0.291**
	Health Professions	2.073	(1.663 – 2.584)	**<0.001**
	Education	1.262	(1.011 – 1.575)	**0.040**
Attendance Mode	External[2]	1.000		
	Internal	1.952	(1.593 – 2.392)	**<0.001**
Enrolment Load	Part-time[2]	1.000		
	Full-time	1.615	(1.435 – 1.818)	**<0.001**
Gender	Female[2]	1.000		
	Male	0.893	(0.800 – 0.998)	**0.047**
Disability	No[2]	1.000		
	Yes	0.921	(0.779 – 1.090)	0.338
Low SES	No[2]	1.000		
	Yes	0.885	(0.783 – 1.000)	0.051
Age group	≤19 years[2]	1.000		
	20-29 years	0.971	(0.846 – 1.116)	0.682
	30+ years	1.017	(0.855 – 1.210)	0.850

[1] Model Chi-square = 310.611, *df* = 19, p<0.001; Nagelkerke R-squared = 0.057; *N*=7459 included in the analysis.
[2] Reference group
[3] P-values significant at the 5% level are highlighted in boldface.

About the author

Dr Joanne Lisciandro is a Lecturer in University Preparation Pathways at Murdoch University and has worked in enabling education for the last ten years. Her current research interests focus on the scholarship of teaching and learning in enabling education; and understanding the mechanisms that support the wellbeing, retention, success and achievement of non-traditional students in their transition to university.

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