

Who says “Ps get Degrees”? Examining the Profile of Undergraduate Students Maintaining High Achievement at University

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Abstract

The circumstances associated with high levels of achievement in undergraduate studies has not been thoroughly explored in the Australian context. This study investigated factors predicting high academic achievement, defined as maintaining a Distinction average, at undergraduate level. Findings revealed several factors that predicted achievement after two semesters of study. These factors included essay writing skills, with students having satisfactory writing 5.16 times more likely to maintain a Distinction average compared to those with below satisfactory writing; faculty, with students enrolled in Health Sciences 4.63 times more likely compared to students from other faculties; language background, with English-speaking background students 1.67 times more likely compared to English as an additional language or dialect (EAL/D) students; gender, with females 1.45 more likely compared to males; and age, with older students 1.03 times more likely to achieve high performance compared to younger students. Creating a profile of students likely to excel academically assists decision makers in allocating resources to students less likely to achieve. This research opens the door to further studies investigating whether these factors play a role in predicting student achievement at university.

Keywords: Academic performance; high achievement; predictors; undergraduate students; post-entry language assessment.

Introduction

Since the COVID-19 pandemic, international students are returning to Australian universities in substantial numbers (Universities Australia, 2023). However, increasing numbers of students undertaking tertiary education has, unfortunately, not enhanced their academic outcomes. Due to myriad reasons, attrition rates are higher than hoped, whilst retention and success rates are below desirable (Department of Education, 2023). Much has been written about attrition (Thomas et al., 2021; Tynan & Johns, 2015; Whannell & Whannell, 2015) and retention (Kift & Nelson, 2005; Lobo, 2012). Nevertheless, there is a distinct gap in the literature regarding academic success, specifically, students' high achievement at university.

It is necessary to define academic achievement, as measuring it has proven to be complex (York et al., 2015). Although several measures exist, including 'success rate' and 'weighted average marks', the most commonly used measure of academic achievement remains grade point average or GPA (Bridgeman et al., 2016; Ihlenfeldt & Rios, 2022), which can be calculated by averaging the marks awarded to each subject (Zheng & Mustapha, 2022). GPA, therefore, indicates the quality of assessed items completed, providing an indicator of how well, or poorly, students are performing. The literature typically defines achievement, like success, as passing or completion of subjects without considering additional factors, such as academic confidence, sense of achievement and employability, among many others (Lydster & Murray, 2018). However, it is undisputed



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that, at a minimum, students passing their subjects is desirable for all stakeholders, including students, their educators, support services, universities, employers and society.

Consequently, efforts to maximise student achievement have become essential endeavours for educators, institutions and governing bodies. The first year is frequently cited as the most critical for student achievement (Linden, 2022; Thalluri, 2016; Tinto & Love 1995; van der Meer et al., 2018). Kift (2009) maintained that the first year experience of students is “arguably the most crucial time for engaging students ... not only to persist, but to be successful and independent in their new learning throughout their undergraduate years and for a lifetime of professional practice” (p. 40). At a government level, changes have been recommended to enhance the tertiary education experience of students in Australia, including the commission of the Australian Universities Accord (Department of Education, 2024), a review of the country’s higher education system. The Universities Accord aims to meet the future needs of the nation, which requires increases in the level of the population being tertiary qualified. Thus, the accessibility, quality, and sustainability of the tertiary education sector must be enhanced. Student outcomes are anticipated to be highly prioritised in the coming years. One strategy in response to this priority involves predicting students’ academic performance.

Common Factors Predicting Academic Achievement

There is a multitude of factors that contribute to students’ academic achievement. Academic factors include, for instance, students’ performance in their previous studies, such as secondary school or other university studies (Scott & Smart, 2005). Non-academic factors are typically categorised into demographic and psychosocial factors (Grebennikov & Shah, 2012), including age, gender and language background. Predictive studies have documented inconsistent findings regarding the role played by various factors in students’ performance at university. Simply, there exists no single set of factors that predict academic performance (Smith et al., 2012). This highlights the need to examine multiple factors that may play a central or important role in academic performance.

A commonly investigated factor that predicts academic achievement is age, for which mixed findings have been determined. Younger students (e.g., recent school leavers) have been found to attain higher results and are more inclined to persist with their studies compared to older and mature-aged students (Cao & Gabb, 2006; Department of Education, Skills and Employment, 2021; McKenzie & Schweitzer, 2001). It was suggested that this is because younger students find it easier to adapt to the academic culture at university (Vinke & Jochem, 1993). However, other studies investigating age as a predictor of academic performance have found that mature-aged students have greater academic achievement than younger students (Anderton et al., 2016; Johnes, 1997; McKenzie & Schweitzer, 2001; Smith et al., 2012). A systematic review by Mthimunye and Daniels (2019), which investigated predictors of performance of undergraduate nursing degree students, also found that the older the student was, the higher the chances they would achieve desired results. In sum, there are mixed findings in the literature concerning the relationship between age and academic performance.

Like age, there have been numerous studies analysing and comparing educational performance of males and females. Overall, studies have revealed that females are more likely to complete their degree programs and demonstrate higher academic achievement compared to males (Cao & Gabb 2006; Grebennikov & Skaines, 2009; Mthimunye & Daniels, 2019). For example, Anderton et al. (2016) investigated which variables predicted grades on a health sciences subject. Significant factors included gender, with females performing 2.8% to 7.8% better than their male counterparts over a three-year study. Braund et al. (2020) examined the academic achievement of female students who identified as mothers and found that participants identified grit (e.g., courage, determination and resilience) as a characteristic of their academic achievement. A number of studies have found that if and when gender is a significant factor, the margin between males and females in terms of academic performance is minimal. No difference between females and males in terms of academic achievement was found in science, for instance (MacKenzie & Schweitzer, 2001). Additionally, Tumen et al. (2008) found that, when controlling for student experiences and achievement, gender, among other factors, had “no predictive power” (p. 245). Harvey and Luckman (2014) also found that demographic factors such as gender as well as age, socio-economic status, and regionality, had no significant relationship with attrition within a sample of 1,124 commencing undergraduate students. Consistent with this finding was Danilowicz-Gösele et al.’s (2014) study which determined that gender and other factors “play only a minor role” (p. 21). Overall, when an association has been found between gender and academic performance, it is typically minor.

Previous academic performance has also proven to be a “powerful” (Tumen et al., 2008) predictor of academic achievement (p. 234). Generally, the literature is in agreement that students who commence tertiary studies with higher entry scores via secondary school achieve higher tertiary results (Johnes, 1997). In the Australian context, students’ performance in senior secondary school (i.e., years 11-12) is commonly measured by their Australian Tertiary Admission Rank (ATAR). Numerous studies have found a significant correlation between students’ ranking scores and academic performance (Anderton et al., 2016; Dobson & Sharma, 1993; Evans & Farley, 1998; McKenzie & Schweitzer, 2001; Rayner & Papakonstantinou, 2018).

Furthermore, previous experience at university has been found to predict academic achievement (Asif et al., 2015; Ruegg et al., 2020). Students who have completed one semester or one year of study, for instance, with higher GPAs perform better than their peers in the remainder of their studies (Gershenfeld et al., 2015). A longitudinal study of 7,314 undergraduate students determined that progress and GPA were two important predictors of different academic outcomes amongst students (Tumen et al., 2008). However, there are inconsistencies in the literature with Dobson and Skuja (2005) reporting that although high entrance rankings were sound predictors of tertiary performance, this was not the case in certain disciplines, such as information technology, business, humanities and creative arts. Given this, university entrance scores, on their own, may not be ideal predictors of academic performance (Holder et al., 1999; Jones et al., 2000).

A final commonly researched predictor of academic performance has been students' language proficiency. Language proficiency has been described as "a crucial factor" (Daller & Phelan, 2013, p. 188) and "extremely important" (Scouller et al., 2008) for academic achievement (p. 176). To determine students' language proficiency as a predictor of academic performance, large-scale examinations, such as the International English Language Testing System or IELTS, have been utilised. Many studies using IELTS as a predictor of academic performance have found a moderate to strong association exists with GPA (Humphreys et al., 2012; Woodrow, 2006; Yen & Kuzma, 2009). Additional studies have found comparatively weak, positive correlations between IELTS scores and academic performance (Avdi, 2011; Ihlenfeldt & Rios, 2022). Other studies investigating the role of language proficiency have utilised post-entry language assessments, known as PELAs. Compared to IELTS research, there is a dearth of published studies examining PELAs and academic performance (see Read, 2015). Amongst existing literature, results typically predict approximately 10% of students' performance at university (Erlam & Botelho de Magalhaes, 2021; Fox et al., 2016). Studies have also found that students appreciate feedback provided via PELA procedures in terms of setting them up for success (Palmer et al., 2018). Therefore, the aim of this study was to investigate whether a PELA, as well as other factors including age and gender, predicted high achievement amongst first-year, undergraduate students.

Method

Employing quantitative analysis, this case study aimed to determine possible factors predicting high achievement of undergraduate students at tertiary level. High achievement was defined as maintaining a minimum GPA of 3.0 out of 4.0 (i.e., Distinction average). The examined factors included academic essay writing, as measured by a PELA; demographic factors, such as age, gender, and language background; and GPA over two semesters of study. Ethical approval was gained from the university's Human Research Ethics Committee (ethics application number CL03283) in March 2019.

Participants

Participants in this study comprised 1,246 undergraduate university students enrolled in one compulsory subject over five semesters. After removing students who had repeated the subject ($n = 70$), the sample comprised 1,176. The mean age of students was 20.09 years ($SD = 4.64$ years). There were slightly more females ($n = 604, 51.36\%$) than males ($n = 572, 48.64\%$). Please see Table 1 below for additional sociodemographic characteristics of the sample.

Table 1*Sociodemographic Characteristics of Sample*

Characteristic	Sample	
	<i>n</i>	%
Gender		
Female	604	51.4
Male	572	48.6
Citizenship		
Australian	735	62.5
Chinese	125	10.6
Canadian	55	4.7
USA	25	2.1
Indian	23	1.9
Other	213	18.1
Language background		
English	878	74.7
Mandarin	123	10.5
Arabic	27	2.3
Japanese	14	1.2
Portuguese	13	1.1
Other	121	10.3

Measures**Post-entry language assessment (PELA)**

The PELA is an online measure of students' academic essay writing skills. Specifically, the task required that students write an essay on an educational topic, with a suggested word limit of between 300 - 400 words and a time limit of 60 minutes. The main aim was to screen students as having either 'below satisfactory' or 'satisfactory' writing skills. The PELA was integrated into the subject's curriculum and assessment as a compulsory homework task worth 2%, to be completed by the start of week 2 of semester. The majority of undergraduate students enrolled at the university complete the PELA (see Lydster & Brown, 2017).

Grade point average (GPA)

GPA is defined as the average of the grades achieved by students in all of their subjects, weighted by the value of credit attached. At the university, GPA is measured on a continuum from 0 to 4 (0 to .99 = *Fail*, 4 = *High Distinction*). For the purpose of this study, students' cumulative GPA data after two semesters of study were used as a measure of academic performance. High achievement was defined as maintaining a GPA of 3.0 or above (i.e., *Distinction average*).

Data Analysis

Students' coded background data was analysed via IBM SPSS version 28. Data was checked for errors and analyses were run. To determine which factors might possibly predict students high achievement, binary logistic regression analysis was employed. Logistic regression allows researchers to analyse the probability of one variable predicting an outcome (e.g., age predicting academic achievement). Odds ratio measures the association between the variable and the outcome. Specifically, logistic regression was used to estimate the probability of a student maintaining a GPA of 3.0 or above; an alpha level of 0.05 was set. The probability was estimated depending on student demographics (i.e., age; gender; citizenship; language background; faculty; country of origin; indigeneity; disability), as well as academic performance data, which were both added to the model.

Results

A test of the full model against a constant-only model was statistically significant, $\chi^2 (df = 10, N = 1,115) = 144.33, p < .001$, indicating that the predictors, as a set, reliably distinguished between whether participants would obtain a Distinction (i.e., GPA of 3.0+) or more after two semesters. The entry of the predictors increased the variance accounted for, Cox and Snell R^2

= .12, Nagelkerke $R^2 = .19$. The model was 79.2% accurate in its prediction of obtaining a Distinction or higher after two semesters. Hosmer and Lemeshow test results confirmed that the model was a good fit for the data, $\chi^2 = 13.10$, $p = .109$. Regression coefficients, odds ratios, and 95% confidence intervals for odds ratios for all predictors are shown in Table 2 below. According to the Wald criterion, obtaining a satisfactory score on the PELA, enrolment in a Health Sciences degree, gender (female), English-speaking background, and age (older students) statistically significantly predicted whether students would obtain a Distinction or more after two semesters. Specifically, the odds of obtaining a GPA above 3.0 after two semesters were 5.16 times higher for students obtaining a satisfactory score on the PELA, 4.63 times greater for students enrolled in Health Sciences, 1.67 times greater for English-speaking background students, 1.45 times greater for females, and 1.03 times greater for older students.

Table 2

Analysis of Obtaining a Distinction Average After Two Semesters as a Function of Demographics and Other Academic Information

	<i>B</i>	<i>SE</i>	Odds Ratio	95% CI for Odds Ratio	
				Lower	Upper
Constant	-4.31**	0.52	0.01		
Gender (Female)	0.37*	0.16	1.45	1.06	1.98
Age	0.03*	0.02	1.03	1.06	1.98
Society & Design (Yes)	0.10	0.19	1.11	0.77	1.60
Law (Yes)	-1.34	0.31	0.72	0.39	1.31
Health Sciences (Yes)	1.53***	0.21	4.63	3.05	7.02
English-speaking (Yes)	0.51*	0.22	1.67	1.09	2.54
Indigenous (Yes)	20.29	7112.99	0	0	0
Disability (Yes)	0.10	0.52	1.11	0.40	3.08
PELA (Satisfactory)	1.64***	0.34	5.16	2.64	10.10
Support unit (Did attend)	0.35	0.19	1.42	0.98	2.05

Note. CI = confidence interval; * $p < .05$, ** $p < .01$, *** $p < .001$.

Discussion

The main aim of the current study was to determine if certain factors could predict high achievement amongst undergraduate students. The following characteristics were found to be predictors: obtaining a satisfactory score on the PELA, enrolment in a Health Sciences degree, coming from an English-speaking background, gender (female), and age (older students).

Students obtaining a satisfactory score on the PELA, thus displaying adequate academic writing skills, were more likely to achieve a Distinction average or above compared to those receiving a below satisfactory score. The extant literature investigating PELAs as predictors of academic achievement indicates that students scoring high on PELAs are likely to maintain high GPAs. For instance, Erlam and Botelho de Magalhaes (2021) demonstrated a significant, modest correlation between the results of a PELA used at the University of Auckland, the Diagnostic English Language Needs Assessment (DELNA), and GPA. The researchers found that students scoring above a threshold score on DELNA achieved higher GPA outcomes in comparison to students scoring below. Lydster and Brown (2017), utilising the same PELA as in the current research to examine the extent to which students' performance on the PELA was related to performance on their major essay, determined that the balance of grades for students with a satisfactory score was much higher in comparison to grades for those with a below satisfactory score. However, there is a paucity of research investigating high performance on PELAs and academic performance; hence, the current study's finding makes a notable contribution. The finding also demonstrates the value of early indicators of engagement and performance (Linden, 2022).

Concerning faculty of study, students enrolled in Health Sciences were more likely to achieve a Distinction average compared to those from other faculties/college. This finding is consistent with a New Zealand study by Tumen et al. (2008), who reported that students undertaking human biology and science degrees were, overall, more likely to finish their subjects amongst all third-year students. Although the current study focused on high academic achievement as opposed to completion, this is an important finding, as previous studies have found students enrolled in natural and physical science degrees (e.g., biology and chemistry) were more likely to withdraw from their studies compared to other cohorts (Scott & Smart, 2005). Students enrolled in Health Sciences degrees at the university are inclined to pursue medical degrees, which typically require, amongst other

attributes, a high GPA for admission. Health Sciences students often leave no stone unturned in order to achieve academically. This is evidenced by Ashton-Hay and Doncaster's (2021) finding that amongst over 13,000 students, approximately half of the students who attended an academic language and learning (ALL) consultation were studying a degree within the School of Health and Human Sciences faculty. In Ashton-Hay and Doncaster's (2021) study, students attending ALL consultations performed better academically in terms of subject completion and GPA and maintained lower rates of attrition than students who did not utilise the support services.

Students from English-speaking backgrounds were more likely to average a Distinction or above in comparison to English as an additional language or dialect (EAL/D) students. This finding is consistent with what has been reported regarding the propensity of English-speaking background students to perform better academically than their EAL/D student peers (Grebennikov & Skaines, 2009; Smith et al., 2012). In contrast, studies have also found no relationship between language background and academic performance (Berman & Cheng, 2010; Wu Pong et al., 1997), while some studies indicate that English-speaking background students have higher rates of attrition (e.g., McMillan, 2005) and lower rates of retention and success compared to their EAL/D student counterparts (Department of Education, 2023). While findings in relation to this are noteworthy, further research is required.

Gender was a predictor of high academic achievement after two semesters of study. Specifically, female students were more likely than males to average a Distinction or above after two semesters. This finding is consistent with what has been reported in the relevant literature. Females tend to demonstrate slightly higher academic achievement compared to males (Cao & Gabb 2006; Grebennikov & Skaines, 2009; Mthimunye & Daniels, 2019). The current study's finding is consistent with Scott and Smart's (2005) study that determined females perform consistently better than males academically and were 1.2 times more likely to complete their degree programme compared to males. However, the slight difference between females and males suggests more research is required, particularly into why a difference exists. Extant literature points to factors such as academic motivation, learning strategies, and self-efficacy for instance (Pirmohamed et al., 2017), but these factors may be contextual.

The final factor determined to predict high achievement was age. Older students were found to be slightly more likely than younger students to average a Distinction or above after two semesters. The finding does not follow trends observed nationally. National data indicates bachelor degree students in the 19-years and under category maintained a higher success rate in comparison to students in the 40-years and over category (Department of Education, 2023). Throughout the literature, age has been found to have only "a minor effect" on academic achievement (Tumen et al., 2008, p. 248). Age in itself is stated not to be a factor affecting the academic achievement of university students; however, it is related to factors, such as prior content knowledge, which may immediately affect achievement at tertiary level (Vinke & Jocham, 1993). Thus, it is important to be mindful of this when investigating the relationship.

Implications

There are several implications associated with the current study's findings. The first implication is the achievement of the study's aim, to identify factors able to predict high academic achievement amongst first-year students. Identifying factors that predict high academic achievement allows for the creation of a profile of students who are likely to maintain high achievement. Such a profile, used in an ethical manner that does not stereotype nor discriminate, may allow decision makers to allocate resources to support mechanisms. Tumen et al. (2008) posited, "the production of such profiles provides educational institutions with a tool for forecasting the outcomes of students and for the early detection of divergences from a pathway of completion" (p. 246) Identifying factors predicting high academic achievement allows stakeholders to address lack of achievement, for instance, targeting those who may not be equipped with requisite academic writing skills.

Furthermore, the current study's findings have implications for how institutions manage resources in the first year for students. As demonstrated throughout the literature on academic achievement, students' first year is considered to be the most important in terms of achievement (Linden, 2022; Thalluri, 2016; Tinto & Love 1995; van der Meer et al., 2018). University decision makers, as well as educators and support units, can affect policy so that interventions can increase the likelihood of completion amongst undergraduate students (Tumen et al., 2008). These interventions may include provision of resources to support units, such as ALL units, Indigenous tutoring services (see Lydster & Murray, 2019), and post-entry language assessment policy. As Linden et al. (2022) argue, "institutional commitment to the student experience in the early stages of university has the greatest potential to exceed student expectations" (p. 42).

A final implication this study highlights is the importance of PELAs and the availability of connected support services, such as ALL units, in terms of academic achievement. PELAs integrated in students' subjects early in the semester act as indicators of academic language skills (Fenton-Smith & Humphreys, 2015; Murray, 2016). Early indicators provide opportunities for development to occur (Read, 2015). PELAs may also perform as reminders for students of the importance of ongoing

development (Baird & Dooley, 2017), whilst connecting students with support units available to them (Murray, 2016, 2018). Pointing students to appropriate and targeted support can be critical in terms of both retention and achievement. Although more and more studies are providing valuable insight into the important role played by such services (e.g., Edwards et al., 2021; Knoch, 2012; Voisin et al., 2023), it has proven difficult to measure impact. As noted by Ashton-Hay and Doncaster (2021), “few studies have been able to successfully establish a link between ALL work, student success and retention” (p. 104). The current research has provided insight into the impact of the PELA and student support policy at the research site. This finding is timely given the changes recommended by the Universities Accord (Department of Education, 2024), as well as a lack of resources to support students to achieve success academically (Barthel, 2023).

Considerations and Future Research

The first consideration to note is the use of the term, ‘academic achievement’. While ‘achievement’, like ‘success’, is often used to define academic completion, it has multiple meanings with different stakeholders viewing it through different lenses. GPA has been the most commonly utilised measure of academic achievement (York et al., 2015), yet students have expressed that grades are not the only measure. For instance, Hannon et al. (2017) described how one student’s definition of achievement is dependent on their background, field of study, previous achievements, and personal standards, amongst other factors. Notably, happiness and confidence played an important role in students’ definitions (Hannon et al., 2017). Furthermore, a study undertaken amongst Indigenous students at the university found participants identified success, in particular, as not merely maintaining a high GPA, but more about setting oneself up for the future, for instance, establishing a pathway to positive outcomes concerning employment or further studies (Lydster & Murray, 2018). Understanding students’ goals may allow universities to assist in achieving them.

Furthermore, there is a plethora of factors that play a role, to various extents, in terms of academic achievement. This study combined the results of a PELA, demographic factors, as well as academic performance variables. Future studies may seek to broaden the scope and include psychological variables, for instance. Personality factors, self-efficacy, mood, and motivation are cited as impacting academic achievement (Bullock, 2015; Mthimunya & Daniels, 2019). It was beyond the scope of the current research to investigate such factors; however, there is a future research opportunity to collaborate with experts in the field of educational psychology.

Conclusion

The aim of this study was to investigate factors predicting high academic achievement at undergraduate level. Recent regulatory and legislative changes, including the release of the Australian Universities Accord (Department of Education, 2024), may go some way to strengthen the ability of universities to accurately predict academic performance, which is ultimately beneficial to achieve desirable outcomes for all stakeholders. Establishing a profile of students likely to maintain high achievement and using it in an ethical manner allows policymakers to make informed decisions regarding allocation of appropriate resources. The results of this study may not be generalisable to other university contexts. However, it may encourage researchers to investigate whether similar factors play a role in other contexts.

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