



THE UNIVERSITY OF THE WEST INDIES

University Office of Planning
and Development

RESEARCH BRIEF

Predictors of Degree Performance at the University of the West Indies

Introduction

In recent times the University has been dedicating resources towards the investigation of academic and administrative performance of its students and staff. Particularly, information that evaluates progress in areas such as: widening access to higher education, student throughput and retention, student advisory services and the measurement of quality teaching and learning. In this light, this study investigates student performance as determined by GPA earned upon graduation. This study examined the predictive validity of prior educational attainment and demographic factors that may affect and influence performance of students at the UWI. Data from this study will provide University senior management, as well as students, with evidence based information that could influence policy decisions and consequently enhance students' performance during their University tenure.

Background

The UWI's mandate to serve the human resource needs of the region by widening participation in higher education has resulted in significant expansion in enrolment over the last decade (total University enrolment increased by 68% from 2003/04 to 2013/14). The expansion of student intake has led to greater student diversity in terms of abilities, learning styles and levels of preparation. With this massive expansion, the UWI has changed

Summary

The computerized records of the University of the West Indies (UWI) were analyzed to determine if certain variables were effective predictors of undergraduate academic performance. Entrance scores were the strongest predictor of final Grade Point Average (GPA) earned followed by type of entrance qualifications. There was a positive relationship between entrance scores and final GPAs, however, those who entered the University with lower matriculation requirements tended to have higher final GPAs in comparison to their cohorts. The results are broadly consistent with previous studies, and suggest that opening access to mature students and to those with non-traditional qualifications has not led to any diminution of standards at the UWI.

from an academically exclusive institution to a more academically diverse institution. With the increase in the diversification of students, there has been concern about the impact this may have on the overall academic performance of students and student retention and throughput. Therefore, it is of significant interest to the University to determine whether its students who do not matriculate with normal qualifications (i.e. lower level qualifications and mature students) perform at different levels than A-Level or CAPE (Caribbean Advanced Proficiency Examination) students. It is in this context that this study attempts to examine the influence of prior educational attainment (i.e.

entrance scores and type of matriculation) on academic performance. Other control variables such as gender, age, faculty or discipline, and student status will also be examined.

Study Objectives

The present research primarily examines the predictive validity of student entrance scores (QSI score) and type of entry qualifications on final GPAs earned by undergraduate students. Any differences in GPAs due to sex, age, campus, discipline and mode of study are also investigated. The variables chosen for study were largely opportunistic, as they were data points that could be extracted from the UWI student information system (SIS). Nonetheless, they are variables which are of considerable practical and theoretical interest to the UWI, and which have attracted much previous attention in the research literature.

Data Analysis

An ANOVA was performed on the variables to determine any differences in final GPAs according to the demographic variables. In addition, multiple regression analysis was used to test if student demographic variables, type of entry qualifications and QSI scores significantly predicted final GPA scores.

Methodology

Data on the 2007/8 cohort of undergraduate students was extracted from the University SIS. Due to data discrepancies only entries for students who graduated on time at the end of the 2010/11 academic year were included in the analysis, this left 2758 cases for analysis (total first degrees enrollment for 2007/2008 was 26119, Statistical Review Academic Year 2007/2008). The principal student variables of interest were entry qualifications (score and type), age, sex, campus, discipline, mode of study and GPA. Entry Scores or the Quality of Student Intake score (QSI) were calculated based on grades attained on

the CAPE or GCEA examination results. Entry qualification type was classed in two categories: normal matriculation (Qualifying A-Level passes and associate degrees or equivalent) and lower matriculation (Qualifying CXC (CSEC)/GCE/BGCSE passes only, mature students and other qualifications).

Age on entry was calculated based on year of entry and birth date, for ANOVA analysis the effect of age was analyzed in two ways: as analyzed in previously cited studies (Bourner & Hamed, 1987; Woodley, 1984; Smith & Naylor, 2001), students who were estimated to be under 21 years old on entry were classified as traditional students ($n = 2350$) while those classed 21 and older were considered to be non-traditional students ($n = 408$). Students were also categorized in the following age groups: 16-19 ($n = 2063$), 20-24 ($n = 532$), 25-29 ($n = 79$), 30-35 ($n = 32$) and 40 and older ($n = 22$).

Sex was a binary variable, with 1981 females and 777 males.

For the purposes of the ANOVA and regression analyses the independent variables were assigned dummy codes.

Results

Demographic Analysis of Final GPAs

The demographic profile of students included in the study is presented in figure 1. A one-way between groups ANOVA was conducted to determine any differences in final GPA due to demographic groupings. There was a significant effect of QSI score on final GPAs for the four QSI categories $F(3, 2754) = 47.7, p = .000$. Post hoc comparisons using the Tukey HSD test (statistical test to pinpoint which groups in the sample differs) indicated that the mean GPA for each QSI category differed significantly from each other, as seen in figure 1, the mean GPA increases as QSI score increases. Effect size (η^2) is a measure of the magnitude or strength of the difference seen between groups, effect size calculations suggest that QSI entrance scores has a medium effect on final GPAs earned (table 1).

The type of entry qualifications also had a significant effect on final GPA, $F(3, 2513) = 6.31, p = .000$. Post Hoc analysis indicated that the final

GPA's for those who entered the University with Normal matriculation (M = 2.78, SD = .68) was significantly different than those who entered with Lower matriculation (M = 2.95, SD = .70). The results suggest that those who enter with lower matriculation requirements have higher average final GPA's in comparison to those who enter with normal matriculation standards. Effect size calculations indicate that type of entry qualifications has a minimal practical effect on final GPA's.

Sex also had a statistically significant effect on GPA, $F(1, 2756) = 9.47, p = .002$. Females graduated with higher mean GPA's (M = 2.83, SD = .67) in comparison to males (M = 2.74, SD = .72). The effect size results show that the effect of sex on final GPA's was minimal.

The effect of Age on final GPA was also significant, $F(5, 2752) = 5.21, p = .000$. The mean GPA's of persons in the 25 to 29 age group (M = 3.04, SD = .59) was higher and differed significantly from those in the 16-19 age group (M = 2.81, SD = .66), the 20 to 24 (M = 2.75, SD = .73) and the 30 to 35 age group (M = 2.51, SD = 1.33). Those in the 30 to 35 age group also had lower final GPA's than those in the 36 to 40 (M = 3.01, SD = .66) and those 40 years and older (M = 3.10, SD = .72), an effect that was also statistically significant. Effect size calculations show that the effect of age on final GPA's was minimal.

Final GPA's earned also showed a statistical difference according to campus $F(2, 2755) = 5.80, p = .003$. Post hoc analysis reveal that persons who attended the Mona campus (M = 2.85, SD = .63) had a statistically significant higher mean GPA than those who attended the St. Augustine campus (M = 2.76, SD = .72). The effect size calculations show that the effect of campus on final GPA's was minimal.

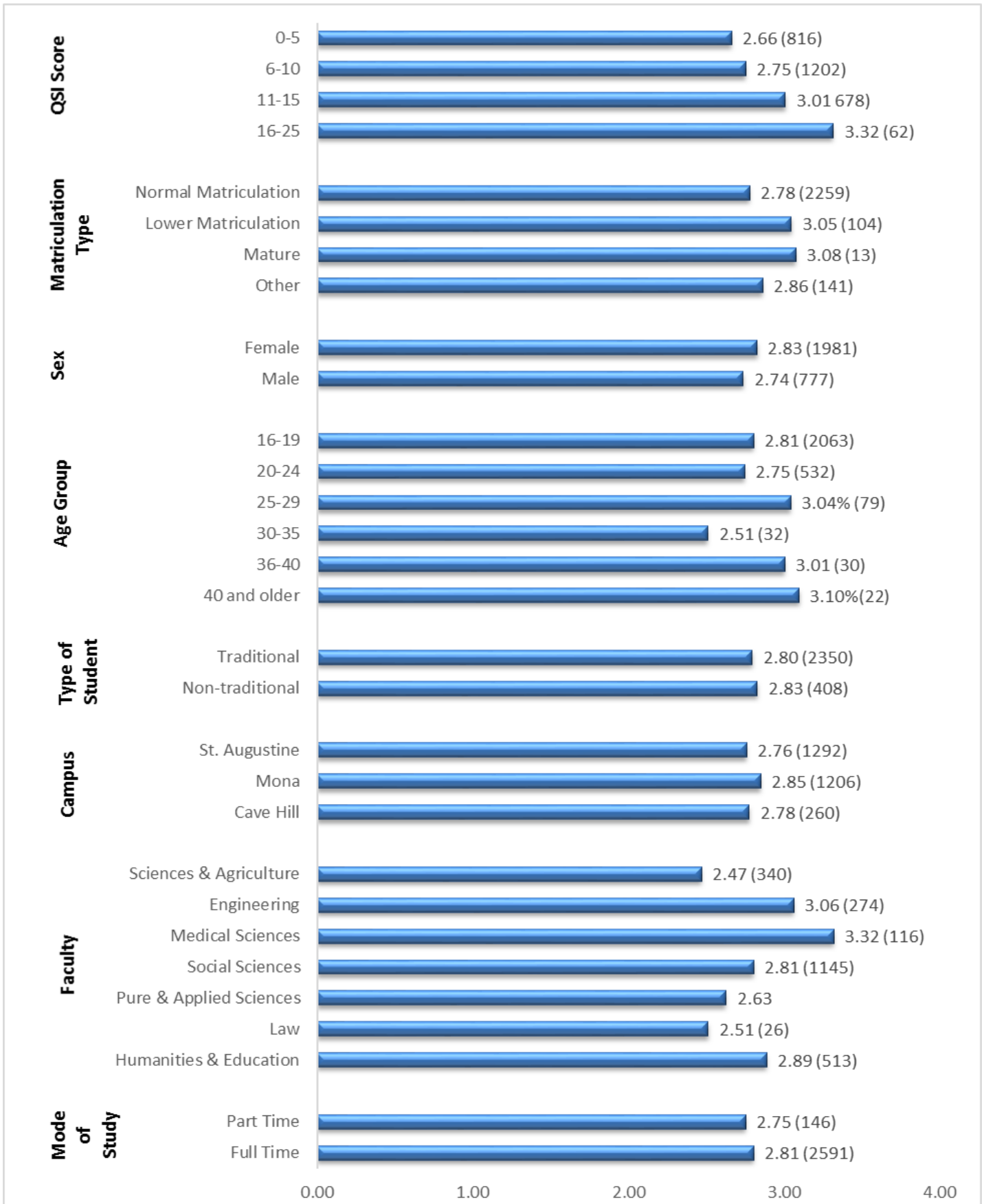
Medical Sciences differed significantly from all other faculties or disciplines and had the highest mean final GPA (M = 3.32, SD = .62). Engineering had the second highest mean GPA (M = 3.06, SD = .55) and also differed significantly from the other disciplines. Humanities and Education (M = 2.89, SD = .63) also had significantly higher than Pure & Applied Sciences (M = 2.63, SD = .67) and Sciences & Agriculture (M = 2.47, SD = .69). Effect size calculations show that the discipline or faculty had a medium size effect on final GPA's.

Table 1: One –way ANOVA of final GPA by Demographic variables

See for effect sizes categories: <http://imaging.mrc-cbu.cam.ac.uk/statswiki/FAQ/effectSize> * Medium Effect Size

Variables	df	F	p	Effect Size (η^2)
QSI Score	3	47.67	.000	.049*
Entry Qualifications	3	6.307	.000	.007
Sex	1	9.471	.002	.003
Age Group	5	5.211	.000	.009
Traditional	1	.777	.38	.000
Campus	2	5.804	.003	.004
Discipline	6	40.51	.000	.081*
Mode of Study	1	.781	.38	.000

Figure 1: Mean GPA by Demographics (n)



Predictors of Final GPA scores

Multiple regression analysis was used to test if student demographic variables and QSI scores significantly predicted final GPA scores, the results further corroborated the results of the correlation analysis. The overall model for all predictor variables was significant but only accounted for approximately 14% of the variance in final GPAs ($R^2_{Adjusted} = .137$, $F(6, 2226) = 60.3$, $p < .001$).

Controlling for other variables, entry QSI scores was the strongest predictor of final GPAs ($\beta = .39$, $t(2232) = 17.5$, $p < .001$) and the results showed there was a positive relationship between QSI scores and final GPAs (figure 2). Type of qualifications was the second strongest predictor in the model ($\beta = .19$, $t(2232) = 9.2$, $p < .001$). Campus attended was the third strongest predictor in the model ($\beta = -.12$, $t(2232) = -5.3$, $p < .001$).

Multiple regression results for the predictor variables are presented in table 2.

Table 2: Summary of Multiple Regression Analysis for Demographic variables predicting Final GPA scores.

Variable	B	SE B	β	Sig.
QSI Score	.076	.004	.386	.000
Qualification Type	.693	.075	.190	.000
Campus	-.130	.024	-.124	.000
Discipline	-.031	.008	-.084	.000
Age	.038	.011	.073	.000
Sex	.088	.030	.058	.004

Discussion

The results are of substantial interest with respect to the issues summarized in the introduction and the implications for the University. The main variables of interest, namely, entrance scores and type of entry qualifications were found to be significant predictors of final GPAs earned by undergraduate students. The results of the statistical analyses indicate that prior academic achievement (measured by entrance scores) was the “strongest” predictor of final GPA and the results show that GPA increases as entrance scores increases (figure 2, table 2). These findings are in line with previously cited research (Bligh, 1980 & Sear, 1983) and the results confirm the importance of prior academic achievement and final GPA earned at the UWI.

Qualification type was the second “strongest” predictor in the model, persons who entered with lower matriculation requirements had slightly higher final GPAs in comparison to those who entered the University with normal matriculation requirements (figure 2). This finding is similar to the results of the Bourner &

Hamed (1987) study and this result may be explained in terms of motivation. Older students with non-traditional qualifications may have taken a conscious decision to return to education and may be more persistent in their studies than those who fulfil normal matriculation requirements. These particular findings suggest that The University admissions office can accept persons who fulfil lower qualification matriculation requirements with minimal concerns about their ability to cope with study at the tertiary level.

The other variables of interest were also significant predictors in the model, campus attended was a significant predictor and the results show that graduates from the Mona campus earned slightly higher GPAs than those from the other residential campuses. Persons graduating from the faculties of Medical Sciences and Engineering had higher final GPAs in comparison to the other faculties or disciplines, a result that could be explained by the higher prior academic achievement by persons who enrolled in those disciplines. Students in the 25-29 age group and those 36 years and older had higher GPAs than the other age groupings, a finding that can again be explained by the motivation to achieve by these older students. Lastly, females slightly outperformed males with regards to final GPAs earned upon graduation.
