Common Critical Academic Success Factors of Postgraduate Accounting Students

An investigation into the possible effects Gender, Race, Age, Undergraduate Degree, Matriculation Education Department, English Proficiency and Numerical Proficiency have on academic performance amongst students in the Postgraduate Diploma in Accounting programme at the University of Cape Town 1995-2001.

This dissertation is in fulfillment of the requirements of the Masters in Commerce degree at the University of Cape Town

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Preface

The Harvard style of referencing has been used in this dissertation, and except where otherwise indicated this dissertation is entirely my own unassisted work. However, I would like to thank the following people for assisting me along the way:

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ABSTRACT

Overview

Recent research by the Human Sciences Research Council has indicated that there is a large need for skills in the Financial and Accounting Services (FAS), governmental and private sectors of the South African economy. Local and international events have led the call for greater ethical behaviour and accountability from financial professionals. South African Chartered Accountants are equipped with the necessary skills and education to fulfil these demands, and thus should be a major contributor to this demand.

The South African Institute of Chartered Accountants (SAICA) has a member profile that is not in line with the current demographics of the country. Females and non-whites are the two groups that have very poor representation within the SAICA membership. There are current initiatives that are attempting to redress these imbalances.

A degree or equivalent in Accounting is the first requirement on the path to qualification for South African Chartered Accountants. Thus, tertiary institutions in South Africa are a very important part of the process to produce more qualified financial personnel. Tertiary institutions also need to be aware of the challenges that the FAS sector and SAICA face.

The University of Cape Town (UCT) is a significant contributor of academically qualified financial personnel for admission to SAICA's training programme for potential Chartered Accountants. In light of the restructuring of government grants to tertiary institutions and the personnel needs of public and private sectors, UCT needs to be aware of how to maximise its throughput of students. This implies admitting students with identified potential.

Identifying successful student characteristics of academic performance will assist the university in setting admissions policies. This will thus increase graduation rates and the throughput of qualified personnel, and decrease the current high rate of student attrition and its related cost.

The Post-Graduate Diploma in Accounting is the only post-graduate programme at the University of Cape Town that is recognised by SAICA for direct eligibility To write Part 1 of the Qualifying Examination.

Findings

This research followed a backward looking approach and investigated whether there were any successful characteristics in the Post-Graduate Diploma in Accounting. The variables that were investigated were Age, Gender, Race, Education Department (School type), Undergraduate degree, Prior Exposure to Accounting, Numerical proficiency and Language Proficiency. It must be noted that these characteristics are only one factor that will contribute to successful and should not be interpreted in isolation.

The research approach was to test the performance means of the nominal variables, and to run a least squares regression between the performance means and the ordinal variables. Both of these methods require certain assumptions of normality to be true. However, even though the cohort was not statistically normally distributed, assumptions were made to enable effective testing and analysis.

No significant relationship was identified between performance in the PGDA programme and exposure to school accounting. Similar South African research found that the effect of prior accounting exposure did not persist past first year tertiary studies, and this research identified that the effect of prior accounting exposure did not persist to a post-graduate level. Thus the effect of accounting education at a secondary school level would appear to have minimal long-term academic benefits.

Gender has no significant effect on the performance of students at the post-graduate level. Thus there is no academic reason as to why only 20% of registered Chartered Accountants in South Africa are female. However, approximately a third of all PGDA students were females and no trend is visible that would indicate that this proportion is changing.

Unlike prior research, a student's age did not appear to be a significant characteristic of success in the PGDA programme. Slight performance differences were noted between the different age groupings, but these appeared to be more a function of the degree profile of the groups than a function of age.

Matriculation Department, Race and Undergraduate degree were the only identified significant characteristics of success. Race was determined to be a good proxy for Matriculation department, except for students who held Business Science degrees. The majority of all Business Science students attended schools that were not systematically disadvantaged by previous South African governments. Students who attended schools that were previously disadvantaged, performed worse than students who had attended private, foreign or traditionally 'Whites only' schools.

Race was identified as a significant characteristic of success in the PGDA programme. White students outperformed Black, Coloured and Indian students at both the undergraduate level and the post-graduate level. This gap in performance widened from undergraduate level to post-graduate level, and contradicted previous South African findings that the gap between white and non-white students diminishes over the duration of study. There was no difference in the performance between Black, Coloured and Indian students.

Students who completed Business Science degrees performed better than students who had completed other undergraduate degrees or other methods of entrance (such as a conversion course.) Some of this performance may be attributable to the nature and length of the degree and to the courses studied. However, it appears as though there is a previously existing condition, noticed in the Matriculation scores, which may explain why Business Science students outperform other students.

Matriculation English and Mathematics appeared to be good indicators of performance in the PGDA programme. Even though the regression models for Maths and English in isolation and in a multiple regression model were assumed inadequate due to heteroscedasticity, some interesting observations were made.

School Mathematics appeared to explain more variation in performance, yet school English contributed more to overall performance, Surprisingly, there was not a large degree of multi-collinearity between the two variables, and they thus both individually explain different levels of performance in the PGDA programme. This may be because of the varying content of the various courses within the PGDA programme.

The significance of performance in Matric Maths and English contributing to performance affirms the admissions policy of the University to place greater weighting of these two subjects when calculating admissions scores.

Table of contents

List of Exhibits

Chapter 1

INTRODUCTION

Economically there is a demand for an increase in professionally qualified financial and accounting personnel in South Africa (HSRC, 2002). Universities in South Africa play a vital role in producing personnel with the necessary skills and knowledge to fulfil these requirements. Alongside this demand, there is a corresponding need to have a demographically representative profile in professional organisations. Thus universities should be concentrating their efforts on identifying potentially successful students that represent the demographic profile of the country and ensuring a high student success rate.

1.1. Professional Accounting skill demand in South Africa

There is a large need for skills in the Financial and Accounting Services sector in South Africa. The Human Sciences Research Council (HSRC) made drew this conclusion from a survey conducted of 1261 organisations, 15 professional bodies, and 31 public and 19 private education and training providers (HSRC, 2002).

The study estimated that the Financial and Accounting Services (FAS) sector consists of 7 200 organisations that employ approximately 1% of the total employees in the formal sector in South Africa (total estimated at approximately 92 000). Contribution from the FAS sector to the GDP (Gross Domestic Product) of South Africa was R62 billion in 2002.

The HSRC sub-divided the organisations within the FAS sector into six sub-sectors. The Accounting, Bookkeeping, Auditing and Tax Services (Accounting) sub-sector was the third

highest contributor to total sector turnover, the second highest contributor to the total sector salary bill and the highest in the number of employees (HSRC, 2002).

However, the FAS sector is not the only sector in the South African economy that is experiencing a need for suitable financial personnel. The introduction of the Public Finance Management Act has increased the demand for financial services in the public sector. The King Report on Corporate Governance and the Access to Public Information Act have resulted in a call for greater accountability and transparency from organisations and management. Local and international incidents over the last few years (Enron, Worldcom, Parmalat and Leisurenet) have highlighted the need for greater professionalism and ethical behaviour from financial professionals, but has also led to management recruiting better qualified financial staff. These developments have resulted in a trend to employ more Chartered Accountants (CAs) in commerce and industry (HSRC, 2002).

These increased demands for professional financial services require South Africa to produce more personnel with the necessary skills and qualifications for the FAS and other sectors.

The fields of study most relevant to the FAS sector were identified by the HSRC as being: Accounting, Cost and Management Accounting, Business and Financial Management, Auditing, Financial Information Systems, and Taxation. All of these fields form part of the core curricula of the academic components for qualification as a Chartered Accountant. These components are prescribed in university programmes accredited by the South African Institute of Chartered Accountants (SAICA).

The Chartered Accountancy profession should thus be and is a major feeder to the FAS sector and the public sector.

SAICA is aware of the skills shortage in the market, as identified in the HSRC's report, and has implemented programmes for the development of more Chartered Accountants. South Africa faces different problems in respect to education and equal opportunities compared to the rest of the world. Due to past inequities, there is an imbalance in the racial composition of the membership of all professional bodies. In order to redress these imbalances, plans and processes, particularly in respect to education, need to be implemented to obtain a representative qualified accounting population.

At the end of August 2004, 22 773 qualified Chartered Accountants were registered with SAICA. Of all registered Chartered Accountants, 20% were female and less than 10% were black (2 116) members (SAICA 2004). SAICA is aware of this imbalance, and a large part of the programmes are focused on the transformation of the demographic composition of qualified Chartered Accountants in South Africa.

Thuthuka (a Zulu verb meaning 'to develop') is one of the programmes that SAICA has implemented for effective transformation to achieve more female and black representatives with professional financial skills. The principal objectives of Thuthuka are to contribute to changing the demographics of SAICA to become ultimately more in line with the demographics of South Africa. The Thuthuka initiatives range from increasing numerical, literacy and accounting skills of school learners who wish to proceed to tertiary education, through undergraduate

programmes at accredited Universities, to assisting postgraduate students in preparation for Part I of the Final Qualifying Examination.

1.2. The University of Cape Town and the Chartered Accountancy Profession

As a degree is the first requirement in the path to qualification to becoming a CA, universities in South Africa play a vital role in supplying qualified financial personnel to the FAS and public sectors. The universities that have SAICA accredited undergraduate and postgraduate degrees need to be aware of the issues mentioned above. They have an incredibly important role to play in not only the Chartered Accountancy profession, but in education as a whole.

The University of Cape Town (UCT) is a significant supplier of candidates who write the Final Qualifying Examination (FQE), supplying over ten percent of the full-time students writing the examinations from 1996 to 2001 and approximately 6% of all students over this time period. Thus UCT plays a very important role in producing candidates for the Chartered Accountant qualification. The Postgraduate Diploma in Accounting offered at the University of Cape Town is one of the SAICA accredited postgraduate programmes in South Africa.

The demand for places at UCT has consistently exceeded the places on offer. Thus UCT should be able to select applicants with high potential and have a very high student throughput rate. For the 2004 Academic year, there were approximately 13 000 applicants and only 3 700 places offered (Herman, 2004[1]).

With the new funding framework that was issued in February 2004 (Ministry of Education 2004) for Higher Education Institutions, the need for increasing the throughput of students has been intensified. Previously government grants were made predominantly in accordance with student enrolment figures, with some consideration given to the number of graduates. With the new funding framework, there is a greater emphasis being placed on throughput of students.. 26% of the total National Budget for higher education institutions has been allocated to the weighted number of successful outputs (non-research and research degrees, diplomates, masters, doctorates and publications) an institution produces per year. With a high percentage of the national budget being set aside for successful outputs, there is a declining interest in a university, particularly at UCT, to have a policy to merely increase the number of registered students.

[1] Interview with Carl Herman, Head of UCT Admissions - *20 October 2004*

Diagram 4: Division of government budget between grant categories: 2004/05 to 2006/07

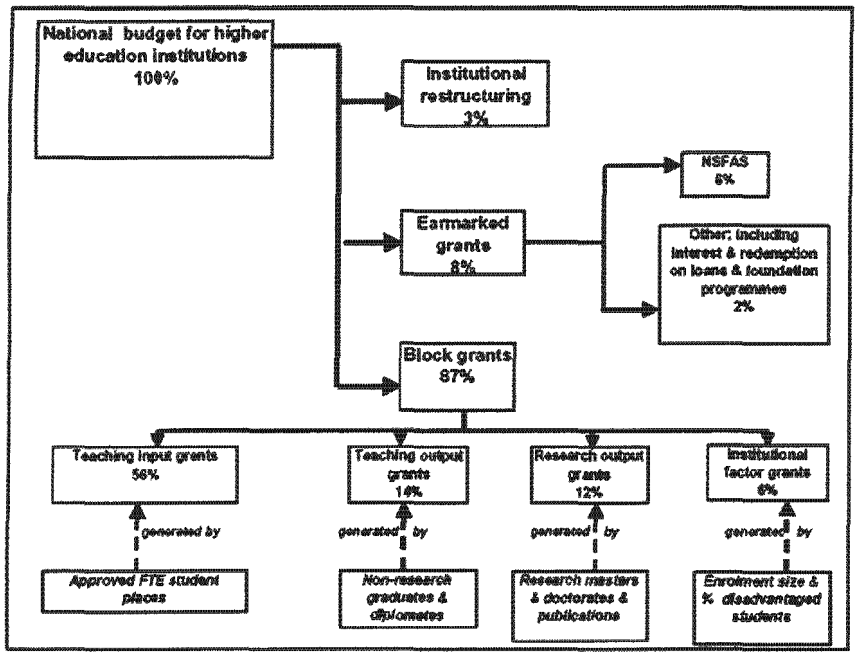


Exhibit 1.1

Source: Ministry of Education; February 2004

Universities in South Africa continue to face high attrition rates in all courses and degrees. The process of identifying students with the potential for success is thus of critical importance to university faculties and staff, not only to maximise funding from Government grants, but also to enhance the educational quality of successful students.

There is also an additional 6% of the budget that has been set aside for institutional factors such as enrolment size and percentage of disadvantaged students and the UCT Mission Statement refers to being "active in redress".

There is a current process in motion in the South African Higher Education system to merge Universities, Technikons and Colleges into consolidated tertiary institutions. In 2001 there were 36 institutions, and the government has put in place plans to reduce this number to 21. The University of Cape Town is not one of the institutions to be affected by the merger process. However, according to Herman[1], UCT will be under close scrutiny to see if it is making progress in the development of students from disadvantaged backgrounds, further emphasising the need to identify indicators of potential success.

1.3. Research objectives

Much of the prior research into academic success factors has been forward looking i.e.: examining the predictive validity of using certain variables in admissions models or for career guidance. This current research is looking at performance at the terminal stage of a postgraduate programme, and identifying any variables that may indicate a potential successful characteristic for potential success.

This research will investigate a cohort of students who registered for the postgraduate diploma in accounting course (PGDA) at the University of Cape Town from 1995 to 2001, to determine if there are any:

i). common success factors of academic performance; and

ii). significant differences in academic performance between various defined sub-groups.

The variables that will be analysed have been chosen due to their importance to one or more of the following:

- The University of Cape Town (and other tertiary institutions) in monitoring current and setting future admissions policies
- The University of Cape Town in increasing the throughput and success of accepted and registered students
- The goal of the University of Cape Town and SAICA to have the demographic composition of graduates and qualified Chartered Accountants more representative of the country
- The University of Cape Town for the structuring of various courses within the accredited programme, the Extended Curriculum Programme and the Commerce Academic Development Programme
- The identification of the effect that prior inequalities in education may have at a postgraduate level

The variables to be used as defining criteria will include:

i). Race
ii). Gender
iii). Age
iv). Matriculation Education Department
v). School Accounting Exposure
vi). Undergraduate Degree
vii). English Proficiency
viii). Mathematical Proficiency

Prior University academic performance will not be used as a primary means of identifying potentially successful students. Through research (Bartlett et al, 1993) and intuitively, it is accepted that recent academic performance will have a significant effect on future academic performance and that academic entrance requirements within a degree act as a filtering of academic ability. However, when a difference between various groupings does exist, an investigation into prior academic performance will take place to determine whether there was a pre-existing condition that could explain the difference. This will be discussed further in the chapter on the research methodology.

By following a backward looking approach, there is a survivorship bias that will exist. However, this does not limit the validity of the results of the research, as it is the intention to look at the composition of successful PGDA students, and not to follow a survival analysis such as Hendry (1998) or Bartlett et al (1993). The findings will present the University's Commerce Faculty with the opportunity to identify characteristics that may impact on academic progress and assist in the admissions requirements to accredited undergraduate degrees and the Postgraduate Diploma in Accounting.

Chapter 2

LITERATURE REVIEW

2.1. Admissions policies

Traditionally in South Africa, school matriculation marks have been used as the main criterion for determining admissions into University. In a South African paper, Miller (1992) noted that there is a problem with relying on school marks when there is a lack of equality in the educational experience amongst the students. Due to inequalities in South Africa's education system as a result of previous governmental policies, and large socio-economic differences across the population, there is a historical and current inequality in the level of educational instruction of school matriculants (Shochet, 1994).

Under the apartheid government in South Africa, the secondary school system was divided into four departments along racial lines[2]:

- The Departments of Education and Culture in
  - i). the House of Assembly (HoAss) for 'Whites',
  - ii). the House of Delegates (HoDep) for 'Indians' and
  - iii). the House of Representatives (HoRep) for 'Coloureds'; and
- The Department of Education and Training (DET) for 'Africans'.

[2] References made to black schools or black students (lower case 'b') are indicating all schools or students that were discriminated against under the apartheid government along racial lines.
For references relating to American studies, 'black' refers to all race groups that are not deemed white (and thus comparable to the South African 'black' classification).
The use of capital letters indicates specific racial groupings, i.e: Black, Coloured, Indian and White as defined under the apartheid government
The use of the above terminologies has been consistently applied throughout this research, unless clearly indicated otherwise.

These departments received unequal funding from the Nationalist government. Naidoo et al (1998) identified that in 1989 annual Government funding at secondary school level per White pupil was R3 600, yet per Black pupil it was only R750.

The qualifications of the educators in black[3] schools were also below those of the educators in white schools. Huysamen (2000) identified that in 1989 32% of teachers at Black DET schools had not matriculated, and only 5% held university degrees. This is in comparison to educators at White schools where all of them had matriculated and 32% held degrees. The effect of this inequality is expected to affect the performance of scholars.

In 1993, 16% and 27% of DET matriculants sat the final Physical Science and Mathematics papers respectively and less than 50% and 35% respectively passed the examinations. 48% and 69% House of Assembly (White) students sat the final Physical Science and Mathematics papers respectively, and over 98% of the scholars passed each subject (Naidoo et al 1998). It is suggested that these discrepancies in secondary school performance have been observed due to the inequalities that existed in the education system (Naidoo et al 1998; Huysamen 2000).

Whilst some research (Miller 1992; Shochet 1994) has suggested that school marks should not be used as the sole criteria for admissions policies for South African tertiary institutions, there have been research findings that have indicated that there is a strong correlation between matriculation marks and tertiary education performance.

[3] Refer footnote 2 on prior page

Fresen and Fresen (1987) compared the performance of students' matriculation points to first year performance in Business Statistics at the University of the Western Cape. They found that there is a strong correlation between matric symbols and performance in first year Business Statistics. Fresen and Fresen's research was similar to that of Van Wyk and Crawford (1984), and the findings were comparable. Van Wyk and Crawford (1984) noted that matriculation scores had a strong predictive ability on first-year university success rates. Both of these studies, however, did not control for the differing Education Departments from which students matriculated.

In contrast to the above findings, Jackson and Young (1988) and Huysamen and Raubenheimer (1999) found that school marks did not prove to have high predictive power for determining success in first-year University students for scholars who came from DET Schools. They identified that there were recognisable trends that could be useful in setting admissions requirements, but that they predominantly had an interpretive value in educational research.

It appears that when the effects of a differing quality of schooling have been taken into account, the results of Fresen and Fresen (1987), and Van Wyk and Crawford (1984) are no longer valid. There has been found to be no correlation in the performance of Department of Education and Training (DET) school leavers and performance in first-year University (Badsha et al 1986, Shochet 1986). However, Fresen and Fresen's (1987) research was conducted on University of the Western Cape students. This was a 'Coloured' University during Apartheid, and thus it is expected that the majority of the students would have come from House of Representative (HoRep) schools. Assuming that the student body was predominantly from House of Representative schools, Fresen and Fresen's (1987) findings would indicate that there could be

a distinction in the quality of schooling between House of Representative schools and DET schools. According to Naidoo et al (1998), in 1989 R2 100 was spent per annum on a scholar at a HoRep school compared to the R750 from DET schools. Coloured and Black scholars were allocated approximately 58% and 20% respectively, as a percentage of expenditure per pupil at a 'Whites only' House of Assembly schools.

Even though there has been a change in Department names, Miller (1992) cautioned that a change in departmental names would not result in an overhaul of the previous DET school experience.

2.2. Rationale for admissions

The rationale behind admissions testing is to determine the potential or aptitude of applicants to succeed in a specified programme at University to reduce the number of failures and to increase the number of successful candidates.

In a South African study, Miller (1992) discussed the possibility of using an admissions test that correlates with university performance, but is however not affected by socio-economic factors. This hypothetical test is not affected by previous educational backgrounds or experience, and measures an applicants true potential. A test of this type is a "theoretical abstraction and not an empirical reality" (Miller 1992). Even if this test were to be a reality, it would imply that an applicant's potential is solely genetic and there would be no requirement for any sort of schooling or education prior to tertiary admission. This is obviously nonsensical, but it illustrates the difficulty in trying to measure the raw ability of a student.

Given that there must be some educational or schooling experience that would affect the results of an admissions test, it is clear that applicants who have received inferior education during their formative years will be discriminated against in such tests. Shochet (1994) identifies a method for controlling for these past inequities. He identifies that there have been some positive findings in predicting the success of previously disadvantaged students. While ability may not be able to be identified in previously disadvantaged groups at the initial stage, a sub-group can be identified based on previous educational experience that will be exposed to further specialised instruction or 'mediated learning'. After this stage, potential can be more reliably predicted. This teach-test-teach approach is also supported by Miller et al's (1997) research.

The University of Cape Town uses this type of alternative selection procedure in its Commerce Academic Development Programme (CADP). Within most of the Faculties, educationally disadvantaged students are able to participate in an extended curriculum degree. Apart from one or two minor courses additionally prescribed, students entering the extended curriculum complete the normal credit carrying courses, but are permitted to take an extra year to complete the first year or two of the degree. Thus a normal three-year degree would take four years (and a four-year degree, five years), and the first two years in the extended curriculum would include the same courses as those included in the first year of the prescribed degree. The CADP delivers the same outcomes, but with extended or more intensive instruction.

Huysamen (1997) discusses the results of admissions tests in a South African context and notes that the results were generally measures of scholastic achievement and not of aptitude, thus failing to address the situation of differing educational instruction and exposure of applicants.

Most of the literature prior to 1990 deals with admissions policies at American institutions. The majority of these studies used regression or multiple regression analysis (Delaney et al, 1979; Eckel and Johnson, 1983; Clark and Sweeney, 1985). The results were not highly correlated, and the most successful model in terms of percentage of correct predictions was less than 85%. This was by Eckel and Johnson in 1983, but they increased their success rate by admitting the marginal students, i.e.: the students who were ranked fractionally below the cut-off point. This, however, avoided one of the factors contributing to the need for admissions policies, that of the problem of limited resources and places at Universities. Clark and Sweeney, (1985) only had 80% success rate from their model, but did not add the marginal students as Eckel and Johnson did.

2.3. Characteristics of success

Most previous research has focused on psychological factors such as personality types (Nourayi and Cherry 1993), learning style (Zeegers 1999) and achievement motivation goals (Eppler and Harju 1997) emotional intelligence (Mashishi and Rabin 2000) as characteristics of academic success. These studies require time-consuming effort to assimilate the data through questionnaires or extra testing, and have shown to date that the correlations between the variables and academic performance are weak.

This research will investigate the effect that certain objective variables have on the academic performance of students in the Postgraduate Diploma in Accounting (PGDA) at the University of Cape Town. It is not an analysis of student survival as conducted by Hendry (1998), but it is a backward looking investigation as to what characteristics may exist and are common amongst successful students in the PGDA programme.

The variables selected have been the subject of prior research and investigation, but mostly in isolation, and in as far as this researcher is aware, never in the case of a postgraduate accounting programme within South Africa. Thus, this appears to be an initial research paper in this area.

As will be discussed in the following sections, there is an abundance of research on each of the variables selected. However, what is prevalent across all of the studies is that performance measures and the classification of some cohorts are treated differently. This makes the statistical comparison between the various studies difficult, but the underlying concepts surrounding the findings will be discussed.

Race

The search to see if there is an inequity between the performance of different groups should not be construed as being a process to identify inferior or superior groups, but it is rather a means of identifying where inequality may exist.

Previous inequalities in the education system under the apartheid government (Naidoo et al 1998) has resulted in the differing educational experience of scholars along racial lines. The monetary allocation for Black scholars at DET schools was approximately 20% of the White, 30% of Indian and 35% of the Coloured scholars' allocations. Whilst there has been a change in the education structure of South Africa since democracy in 1994, it is commonly held that this change has not had an immediate impact on the quality of education at previously disadvantaged schools (Miller 1992).

Most South African studies (Miller 1992, Huysamen 2000, Negash 1997) draw no distinction between the new and old education structure, but regard all black students as having an inferior quality of schooling compared to white students. There will be some black scholars who have attended private schools, or have, since 1991, attended previously 'White Only' schools, but as in previous research (Miller 1992, Huysamen 2000, Negash 1997), these numbers have been accepted as being not large enough to affect the results of any observations made in this paper.

Most of the studies concerning race and academic performance have focussed on the differential validity of predictive variables between white and black students (Huysamen and Raubenheimer 1999, Wilson 1980 and 1981, Gist et al 1996, Miller 1992, and Shochet 1994). The above research has had three main findings. They are:

- There is a poor predictive validity in using prior academic performance as a predictor of future academic success for black students.
- Using the same prediction model, black students underperform and white students overperform in relation to the expected level of performance.
- Black students perform worse than white students do, even once general academic aptitude has been provided for.

However, it is hypothesised in Wilson (1980) that there is a diminishing difference over time of the above findings. He referred to this as a 'Late-Bloomer' hypothesis. In other words, in third year tertiary studies, the gap in performance between white and black students is smaller, the differential predictive validity is smaller and the difference between expected and actual performance is smaller than in first and second years of tertiary studies.

Wilson (1980 and 1981) performed two studies in America, and neither one confirmed his 'Late-Bloomer' hypothesis. In fact, in the first study he noted that the gap in performance between white and black students actually increased. Wilson, however, did admit that his methodology had potential flaws in that the course load of students may not have been equitable.

Huysamen (2000) followed Wilson's methodology, but he only included students that were completing the prescribed number of credits per year. This means that the course loads of the sub-groups remained comparable and Huysamen's research would be able to more accurately test the 'Late Bloomer' hypothesis.

Huysamen (2000) found that his results supported the notion of the 'Late Bloomer' hypothesis as students from educationally disadvantaged schools (black students) narrowed the differential in academic performance between themselves and students from educationally non-disadvantaged schools (white students). There was also an increase over time in the predictive validity of prior academic performance of black students.

The differences in the findings of Wilson (1980 and 1981) and Huysamen (2000) could be attributed to the fact that there is a greater discrepancy in the disadvantages and challenges that black students faced in South Africa to America.

The 'Late Bloomer' hypothesis means that the effects of unequal secondary school education will be minimised at the postgraduate stage of the degree. However, the findings of Huysamen

(2000) fail to address the possibility of the weaker disadvantaged students dropping out of the courses, and thus only the more academically adept and brighter students will get through for testing. This will lead to survivorship bias, and the results of Huysamen may not be valid.

The 'Late-Bloomer' hypothesis also allows students to become accustomed to the culture, living conditions and financial arrangement of study at a university. It is thus speculated that, as time is spent at university, black students may have less socio-economic concerns, and thus allocate more effort to their studies.

In an American study, Graham (1991) performed bivariate and multiple regression analyses on MBA students. A variety of demographics were used – undergraduate GPA, age, ethnic background, gender, marital status, scores from two different admissions tests, number of years since undergraduate degree and type of undergraduate degree. He noted that performance in an undergraduate degree was the only significant variable consistent between the two admissions tests, but ethnic background was a significant contributor to performance in one of them, specifically white students outperformed students from other race groups.

Graham also goes on to say that when admitting students to a tertiary institution, entrance boards need to consider the ethnic background above all other factors. However, he does not mention how the entrance boards should inform potential students that they have been rejected from a programme primarily because of their ethnicity.

In a study on the performance of students in accounting courses at Rhodes University in South Africa, Negash (1997) noted that black students performed statistically worse than white

students did. This was observed over two years and for accounting courses above the first year level. Negash also noted that the failure rate for black students was 32% and for white students it was 10,7%.

Negash then compared the variances of the white and black groups and noted that there was a higher variance in the performance of white students. Results of a Kolmogorov-Smirnoff test indicated that the grades obtained by white and black students did not come from the same population. This is in spite of the fact that the class had been together for two years, the same lecturer had taken the course and the tutorial groups were randomly formed.

From Negash's findings, it would appear that the effect of a disadvantaged education persists into second and third year of university.

Gender

There is a perception that female students do not have the same level of mathematical proficiency as male students, and this would put them at a disadvantage in courses such as engineering, mathematics and accounting (Grant and Sleeter 1986). However, in Busch's (1995) research he found that across a variety of disciplines (including mathematics, accounting and statistics), the only significant difference in performance along gender lines, was that females outperformed males in statistics.

It appears this perception of mathematical proficiency superiority, and thus supposedly accounting proficiency, by males does not have any statistical support as found by Mutchler et

al (1987). They investigated the performance in an auditing course over 18 years at a major mid-western America University along gender lines. They concluded that females outperformed males over this time period. Whilst this is the same finding as Hanks and Shivaswamy (1985) and Fraser et al (1978), Mutchler et al's results were the only ones that indicated that the difference in performance was statistically significant.

Mutchler et al's (1987) research then looked at academic performance data across three institutions with ten different instructors. They found that there was no difference in performance associated to the institutions or the instructors, but there was a statistically significant difference in the performance of male and female students. Again, the females outperformed the males. Mutchler et al do not examine possible reasons for why these differences exist, but they do provide commentary on other researchers' discussions and its possible rationale for the differences.

Mutchler et al admitted that the limitation to their research was that they did not look at the gender of the instructor as a possible reason for higher performance. This effect was addressed in Lipe (1989) who found that neither student nor instructor gender had an individual impact on the performance of students. However, a combined interaction of student and instructor gender did have a statistically significant effect on performance i.e.: Male students performed better than females in classes instructed by males, and females performed better in classes instructed by females than in classes instructed by males. However, there was no difference in performance between males and females in classes instructed by females.

Tyson (1989) followed on from Mutchler et al (1987) and addressed the issue of 'Why Female Students Outperform Males'. He looked at achievement motivation and prior academic performance possibly being linked to gender, and thus to performance in current courses. He identified, like Mutchler et al (1987) that there was a statistically significant difference in the average grades of female and male students, and again, females outperformed males.

However, when Tyson controlled for previous academic performance (by adding either Grade Point Averages or High School Rankings to the co-variate model), the gender of a student had no impact on performance in accounting courses. Yet, regarding there being a possible pre-existing differential in prior academic measures, there was found to be no difference in the GPA's or High School Rankings along gender lines.

Tyson's research then examined possible reasoning for higher performance in accounting by females. In response to questionnaires regarding achievement-motivating factors, females indicated that performance in the course was important for future employment opportunities and career development. Females placed less emphasis on grade performance than males, and thus contradicted Mutchler et al's (1987) observation that females are more highly motivated to compete and outperform their classmates. Similarly, Carpenter et al (1993) noted that females have lower grade expectancy than males, but perform at an equal level. It would thus appear that there are more than just genetic differences relating to the performance of male and female and students.

Buckless et al (1991) found that without controlling for any variables such as instructor gender or academic aptitude, results for male versus female performance were split between the

different Universities they investigated. When they controlled for academic aptitude though, there was no difference in the performance of any gender group at any institution.

In Nourayi and Cherry's (1993) study, they noted that males outperformed females in an American university's first year accounting programme. Lipe (1989) found that gender differences in accounting performance might be attributed to the gender of the instructor. The instructors in Nourayi and Cherry's research were male, and thus it may appear that Lipe's explanation may be sufficient to explain the difference in performance.

The research of Busch (1995), Negash (1997) and Huysamen and Raubenheimer (1999) found that there was no difference in the performance in accounting courses along gender lines. Busch studied the gender differences in academic performance in marketing, organisational behaviour, accounting, computing, mathematics and statistics at a Norwegian college. Only statistics yielded a significant gender difference in performance, with females outperforming males.

Negash (1997) noted that there was no difference in the performance of male and female students in a second year accounting course at Rhodes University. Huysamen and Raubenheimer (1999) noted that performance in first year accounting is marginally affected by gender (less than 0,5%).

From the above literature and discussion there is no definitive conclusion on the performance of male versus females in accounting courses. There is a perception that females are not as numerically competent as males and would thus relatively underperform. However this has been

statistically refuted and more research has indicated that females outperform males than males outperform females.

Age

The definition of a mature student differs across all the research referred to below. Most of the research uses two groups, and this split is around 21 years of age (either including or above 21 in the mature category). This would not be appropriate for purposes of this research, as it is a postgraduate course with the minimum prerequisite being a three-year degree. Assuming a minimum school leaving age of 17 and no years failed at tertiary level, nor any breaks in study or gap years after schooling, the youngest possible student would be 20 years old on entering the PGDA year. Richardson (1994a) however, mentions that the age for a mature postgraduate student in Britain is defined as a student who enters a postgraduate course aged 25 or over.

Richardson (1994a) addressed the commonly held perception that mature students are at a disadvantage when entering tertiary education. It was believed that mature students in Britain were those that were unable to enter their chosen tertiary programme immediately after secondary school and had to complete further schooling or other qualifications to gain admission to their intended course of tertiary study (Woodley, 1984). Another argument was that mature students lacked recent academic exposure and were 'out of practice in the art of learning' (Roberts and Higgins, 1992). This would only apply to first-time mature entrants, as opposed to mature students completing a degree or continuing with postgraduate studies.

However, more recent studies in the area have indicated that mature students may be outperforming their younger classmates. Murray-Harvey (1993) noted that there was a 'wealth

of research' showing that one of the main predictors of academic performance was that of the metacognitive capability of students. Although it is a complex construct, the definition is relatively straightforward. Metacognition is the ability to understand and control the way one thinks. Thus it is expected that the higher the metacognitive ability of a student, the higher level of academic achievement. The understanding of metacognitive ability is beyond the scope of this research, but it is necessary to have a definition in mind when reviewing some of the prior research.

Murray-Harvey (1993) identified that metacognitive capability is composed of two parts: awareness and locus of control (achievement related characteristics) (McKenzie and Gow 2004). Her research examined a cohort of 453-second year students enrolled at Flinders University in Australia. During her research, Murray–Harvey found that there was a strong relationship between the age of a student and their locus of control and that age was a pivotal factor in identifying a successful student. Nunn (1994) had a similar finding, and added that older students had a more positive view of themselves. By virtue of the locus of control being one of the two components of metacognitive capability, and metacognitive capability one of the main predictors of academic performance (from prior research mentioned above), it is expected that there should be a positive relationship between age and academic performance.

Numerous other studies have found that at a tertiary education level mature students outperform younger students (Hoskins and Newstead 1997, Zeegers 1999, Cantwell et al 2001, Kevern et al 1999). When considering admissions policies or predicting academic success, Sawyer (1986), Power et al (1987) and McKenzie and Gow (2004) showed that using previous performance as a predictor for future academic performance, school leavers and mature age students should be evaluated separately for use in determining an appropriate model. Prior performance was a

weak predictor for mature age students, but a good predictor for school leavers and younger students. Sawyer (1986) also found that when using one prediction model for all students, the performance of mature students exceeded the model's predicted performance. A separate model for mature aged students proved far more reliable.

McKenzie and Gow (2004) noted that the gap between the predictive ability of prior performance, whether school performance or prior semester performance at University, between school leavers and mature-age students decreases over the duration of University study. This conclusion would limit the comment of Roberts and Higgins (1992) regarding mature students being 'out of practice in the art of learning' to only apply to mature aged first-time entrants into tertiary education.

Thus it is expected that there is a minimal or no difference in the predictive ability of prior performance when evaluating the performance of mature aged students and younger students in a postgraduate course such as the Postgraduate diploma in Accounting.

Bartlett et al (1993) noted that from demographic characteristics, educational background, financial characteristics and first year performance, the only factor contributing to performance in a third year accounting course was performance in the first year.

This finding could have some significant ramifications for the restructuring of University admissions policies. In McKenzie and Gow (2004), they noted that mature aged students meet the entrance requirements through alternative measures such as standardised admissions tests or other qualifications, and thus reliance on school performance should not be used in determining admissions.

What the above research concludes is that in the initial stages of learning, younger students are expected to outperform mature-age students, if the mature students do not have recent academic exposure. This gap decreases over the length of time exposed to studies, and mature students end up outperforming younger age students.

Some of the above authors and in other studies have researched the reasons for the superior performance of mature-age students over younger students. Hoskins and Newstead (1997) attributed their findings to the higher level of intrinsic motivation by the mature age students. Zeegers (1999) explained that mature age students used deeper learning techniques than school leavers did and it was more likely for this and socio-economic factors such as family commitments and financial responsibilities, that they were more committed to performance. This indicates a higher locus of control as mentioned in Murray-Harvey (1993).

Of the 2000 PGDA year, only 44% of students had completed a three-year B Com degree, and 49% had completed a four-year B BusSc degree. The rest of the students had completed a bridging or conversion course, and thus had completed another degree, plus the one year bridging or conversion course and possibly had had some work experience. For purposes of this research the population will be stratified into five different age nominal cohorts (similar to that of Kevern et al, (1999)) to determine if there is any difference in the means between the cohorts.

Due to the high concentration of students around the mean of the population's age, it would not be appropriate to have a dichotomous split in this vicinity.

Undergraduate degree

The qualification profile of a postgraduate degree programme would either have a broad array of undergraduate degrees and diplomas, such as an MBA or Higher Diploma in Education programme; or one discipline specific degree that was required as a prerequisite, such as an Engineering, Science or Health Sciences postgraduate degree.

The Postgraduate Diploma in Accounting prescribes that either an accredited Bachelor of Business Science or a B Com degree majoring in Financial Accounting from the University of Cape Town or equivalent is a prerequisite for registration.

If a student holds a similar SAICA accredited degree in commerce from another University, they will be required to write an entrance exam prior to admission into the PGDA programme. If the degree is not accredited by SAICA, students are required to complete a one-year Management diploma at the discretion of the faculty.

Students who hold a degree that does not include a major in accounting (i.e. a science or humanities degree), are required to complete a one year conversion course – this is the equivalent of a three year B Com degree majoring in Financial Accounting, but condensed into one intensive year.

While both of these two common accredited UCT degrees in commerce have Accounting III, Tax I and Auditing I as prescribed courses, the Business Science degree is structured differently as outlined below.

The accredited Business Science degree is a four-year programme encompassing management disciplines in addition to the prescribed Chartered Accountancy curriculum, and an Honours component (comprising selected course work and a group dissertation), whilst the B Com degree is a three-year degree without an honours component. The average course load per year is 4,5 full year courses (total of 18 for the degree) for Business Science and 4,17 full year courses (total of 12,5 for the degree). Due to an additional academic year at the University, the greater average annual course load and the additional educational breadth and depth of exposure, there is a possibility that a student's Business Science undergraduate degree may give him or her a different level of preparedness for the PGDA year.

As this is an unusual situation, it is expected that there will be limited research on this or a similar topic. No related studies were able to be located that examined the differentiating effect a choice of undergraduate degree may have on academic performance in an accredited postgraduate accounting programme. This analysis is important for the Accounting Department staff at UCT and other institutions that may face similar issues.

If the choice of undergraduate degree better prepares one for the PGDA year, then career guidance and counselling may need to be given prior to initial admission to tertiary education i.e. three or four years prior to commencement of the PGDA year, or even at a school level. In an extreme case, this could lead to PGDA admission requirements being dependent on the undergraduate degree completed.

Prior Exposure

According to Rowlands (1998), accounting studies at high school level was traditionally the subject choice of the less gifted students. However, there has been an increase in the number of students entering University who have had prior exposure to accounting at a school level. At Rhodes University, South Africa, from 1985-1988 40% of entrants into initial accounting course had completed Accountancy at school (Rowlands 1998), and from 1991-1992, 75% of students writing Accounting I at the University of Natal, Durban had prior exposure to Accounting (van Rensburg et al 1998). At the University of Cape Town[4], 53% of the 1366 students entering into Financial Accounting I at the beginning of the 2004 year had taken Accounting as a matric subject. This can be compared to the 56% of students from the UCT PGDA classes of 1995 – 2001 who had taken accounting as a matric subject (refer *Appendix A-2*).

With a high percentage of students entering into UCT Financial Accounting I having had prior exposure, it is important to determine whether school accounting prepares a student for University accounting. Rowlands (1998) and van Rensburg et al (1998) in South African studies and Farley and Ramsay (1988) in an Australian study, found that students having taken school accounting in matric, marginally outperformed students who had not taken accounting in matric in an introductory course in Financial Accounting. However, this marginal benefit diminishes over the duration of the first academic year.

Van Rensburg et al expanded on Rowlands research and investigated the effect of school accounting on performance in a second year accounting course. They found that students who did not take accounting as a school subject (NPE) marginally outperformed students who had

[4] Source: University of Cape Town's student records system, Heritage. (October 2004)

taken accounting in school (PE). In an earlier American study, Doran et al (1991) had the same findings.

It is suggested that this relative decline in performance in the first academic year by PE students could be attributed to a waning interest in the subject matter. Having already mastered the basics of the course, there is sufficient familiarity with the work and they are not stimulated within the course for the first portion of the year. This attitude could then affect the performance of the PE students who may have become lazy or uninterested.

These findings should be particularly relevant to school career counsellors, teachers and Education Departments. It appears that selecting accounting as a school matric subject could even detrimentally affect the performance of students in later accounting studies. This could also mean that a revision of the accounting syllabus at university or school level could be required.

Regarding the performance of Postgraduate accounting students in an American institution, Moses (1987) made and examined the premise that success in financial accounting courses came from three sources:

- Formal Accounting instruction
- Work Experience in accounting or finance related fields
- Independent self motivated exposure to accounting or financial issues.

He noted that performance in and prior exposure to accounting courses did not strongly correlate with postgraduate performance in accounting, but that general academic ability was a

strong predictor of performance in postgraduate accounting studies. Thus choosing students with general academic ability and no prior accounting exposure could produce successful accounting postgraduate students.

These results must be used carefully in the context of the Postgraduate Diploma in Accounting at UCT. Moses was specifically looking at entrants in an MBA programme, which would offer a broader accounting course, as opposed to the focused curriculum of the PGDA programme.

Interestingly, Moses also noted that work experience in an accounting or finance related field and independent reading would have a positive effect on performance in a postgraduate accounting course. However, these two items (work experience and reading) were not additive contributors.

Krausz et al (1999) also found that there is a positive relationship between prior work experience in an accounting or finance related field and performance in a postgraduate accounting course. Like Moses, their study was on an accounting course within an MBA programme. Yet, unlike the results of Moses, Krausz et al found that previous course work in accounting did offer value in a postgraduate course, but only if accompanied by work experience.

Whilst there is research that addresses the correlation of performance in postgraduate accounting courses and prior exposure to accounting, there is limited research that addresses whether the level of performance in undergraduate accounting courses is a strong predictor of performance in a postgraduate accounting focussed course.

From the research of Bartlett et al (1993) and intuitively, any recent academic performance, and particularly within a given discipline, will be a strong predictor of any future academic performance.

English Proficiency

Admission into an undergraduate degree in the Commerce Faculty at the University of Cape Town requires that school Mathematics and English scores are doubled when calculating Faculty points. The calculation of entrance points will be discussed in *Chapter 4: Methodology*. This implies that there is an expectation that performance in tertiary level commerce courses is correlated with performance in school Mathematics and English. Any relation between the performance at university and matric English is thus of relevance to the University.

During the testing phase of this research, it will not be possible to examine whether there is any difference in the performance of students who *speak* English as their 1st or 2nd language. Whilst it is possible to determine the level at which students *wrote* English as a matriculation subject, home language is not an identifiable field that is included in the UCT Heritage system database.

Miller et al (1997) assessed the differing performance between students whose 1st language was English, and those whose 2nd language was English. At the beginning of a new first year Psychology course at the University of Natal, Durban, all enrolled students were required to complete a questionnaire that assessed their English and Mathematical proficiency. The students were then grouped into three High/Low categories (High and Low were classified as above and below the median student respectively) as follows: HH (High on Language and High on Mathematical), LL (Low on Language and Low on Mathematical) and HL (one High

classification and one Low classification). This was done irrespective of whether they had written matric English as a 1st or 2nd language subject.

From various forms of assessments during the year (tutorials, essays and multiple-choice questions), an analysis was made within each group of HH, LL and HL. Within each group there was no difference noted between the performance of English 1st language students and English 2nd language students. This would appear to give the indication that language is not a characteristic of success in a first year Psychology course.

However, by categorising students into groups using prior academic measures, as Miller et al did by using English and Mathematical proficiency as a measure for categorisation, intuitively no difference in performance will be expected. In other words, in Miller et al's HH group, there will be students who are proficient in both Maths and English and intuitively students within this group will perform at a similar level. Thus the effect of any other variable will have a minimal effect. In this case, Miller et al's findings indicate that within groups there is no difference in performance between English 1st and 2nd language students.

Miller et al's findings should have indicated that once controlling for academic ability, there is no difference in performance between English 1st and 2nd language students.

Miller et al did note that there was a disproportionate number of 2nd language students in the LL group, and a disproportionate number of 1st language students in the HH. But if English as a 1st language does offer students a comparative advantage, English speaking students will already be included in a 'more capable' grouping, and due to the disproportionate distribution of 1st and

2nd language students, any subsequent performance above a non-English speaking student has already been accounted for.

If however only Mathematical ability was used as the classification criteria, a more meaningful interpretation of the effect of English results could have been obtained.

Another point to consider from Miller et al's research was that all of the 2nd language students spoke one of the African languages spoken in South Africa. Miller et al speculated that this could indicate that they received their schooling from former DET schools, and thus language may not be the sole reason that the grouping was skewed. It could be the effect of the poor schooling which the students received (Naidoo et al 1998), as has been discussed previously in the review of literature.

Interestingly, Walbeek (2002) identified that there was no difference in the performance of 1st and 2nd language English speaking students in multiple choice and essay questions. This was found even though the medium of instruction and examination in the Economics course he investigated was in English.

As mentioned above, the availability of data for this research does not make it possible to examine whether there is any difference in the performance of students who *speak* English as their 1st or 2nd language. An analysis will be performed to determine whether English proficiency is a characteristic of success. Prior academic ability will not be controlled for, as was the case with Miller et al.

Nash (2003) identified that while English performance at matriculation level is not regarded as a good indicator of language proficiency, it can be used as a proxy in lieu of a more reliable indicator. Such an indicator could be the results of the Placement Test in English for Educational Purposes (PTEEP) as used by the University of Cape Town. During the period covered by this research, it was not a requirement for students entering the Commerce Faculty to complete the PTEEP test, and thus no data is available.

Numerical Proficiency

As discussed in the previous variable, English proficiency, on admission into an undergraduate degree in the Commerce Faculty, school mathematics and English scores are doubled when calculating Faculty points. Thus, any relation between the performance at university and matric Mathematics is of relevance to the University.

Mitchell (1988) in a British study and Keef (1994) in a New Zealand study independently identified that secondary school mathematics had no effect on the result of courses in the first year of a tertiary accounting programme, except in the management accounting section.

In a study on the first year tertiary performance of students in two accounting programmes at Technikon Natal, Bargate (1999) noted that there was no correlation between secondary school mathematics and first year performance.

Negash (1997) found that at Rhodes University there wasn't any correlation between mathematics performance at matric level and results in a first year accounting course. However, Negash did note that there is a strong correlation between performance in second year

accounting and school mathematics. Negash does not address why this would occur. Unfortunately Negash's sample for this analysis was only 50 out of an approximate 250 students that were registered and only included one year of study.

Apart from one of the findings of Negash (1997), there appears to be no correlation between performance in school mathematics and tertiary studies in Accounting.

School mathematics will be used as a proxy for numerical proficiency. This is similar to Nash's (2003) use of school English performance as a proxy for Language proficiency. A more reliable indicator of numerical proficiency would be to use the results of the Mathematics Achievement or Mathematics Comprehension Test as used in alternative admissions testing at UCT. However, this data is unavailable for our test population.

Schooling

Much has been said elsewhere in this chapter regarding the inequalities that existed and continue to exist in the public South African secondary education structure. In summation, black scholars received significantly less governmental funding than white scholars did, the educators at black schools were not as qualified as those at white schools and blacks were less successful in examinations than white students.

Even though there have been significant restructuring attempts in the Education Department since 1991 to redress these past imbalances, the conditions that existed prior to 1991 still persist (Miller 1992). It has been generally accepted in research that there has been no marked change in the quality of education received merely due to a change in the structure. Until such time as

research indicates that there has been a change and all schools are equal, or some other measurement criteria comes into play, the use of the Education departments as they were pre-1991 should be used in research.

Chapter 3

DATA COLLECTION AND TRANSFORMATION

This research will investigate a cohort of students who registered for the Postgraduate Diploma in Accounting (PGDA) at the University of Cape Town from 1995 to 2001, and determine if there are any characteristics within this cohort that contribute significantly to performance in the Postgraduate Diploma in Accounting.

3.1. The sample

The student cohort selected consists of students that registered for the Postgraduate Diploma in Accounting at the University of Cape Town for the years 1995 to 2001. UCT's current students record system, the Heritage system, first became operational in 1995, thus limiting the availability of data.

There were no significant changes in the course structure over this time period. The same subjects have been examined (although there have been periodic updates to the syllabi), the majority of the lecturers remained the same, the examination structure was unchanged, the lecture timetable remained constant and the streamed tutorial structure was consistent. Thus in terms of comparing one year to another, this cohort should be a homogeneous population that will allow for effective comparison of students from all of the years specified.

3.2. Data Collection

Raw data was obtained from UCT's student records system, the Heritage system. By using each student's unique student identity number, the following data was extracted (explanations to follow):

i. Race
ii. Gender
iii. Date of Birth
iv. Year of registration for the PGDA programme
v. Undergraduate Degree
vi. School Matriculation symbols and grade (higher grade or standard grade)
vii. Matriculation Education Department[5]
viii. Entrance Category into the PGDA programme
ix. University Marks obtained

3.3. Transformation and Explanations

Some of the above raw data required transformation into a usable format. From the data extracted, the following transformations were performed:

a) **Age**: From the 'Date of Birth' and the 'Year of Registration' fields, the age of each student on the 1st of January in the year they commenced the PGDA course was determined.

b) **PGDA Performance**: Performance has been defined as the weighted average mark obtained by a student in the final year examinations of the Postgraduate Diploma in

[5] The Matriculation department information indicated the old education department that the students matriculated from. As was mentioned by Miller (1992), the use of the old education department is considered acceptable.

Accounting. This figure is expressed as a percentage, after adjusting for different course weightings.

The Postgraduate Diploma in Accounting programme consists of four prescribed subjects, viz.:

- Financial Accounting IV (Accounts)
- Management Accounting and Finance II (MAF)
- Taxation and Estate Duty II (Tax)
- Auditing and Corporate Governance II (Auditing)

Although Tax and Auditing are taken over the whole academic year, their workload is comparable to that of a course that could be completed in half a year. Accounts and MAF are classified by the University as full-year courses, whilst Tax and Auditing are classified as half-year courses.

Thus when calculating the performance measure for analysis, the following weightings are used for the University marks obtained for the respective subjects:

- Accounts 33 ⅓ %
- MAF 33 ⅓ %
- Tax 16 ⅔ %
- Auditing 16 ⅔ %

This weighting can be expressed by the following formula:

$$P = (Acc \times \tfrac{1}{3}) + (MAF \times \tfrac{1}{3}) + (Tax \times \tfrac{1}{6}) + (Audit \times \tfrac{1}{6})$$

where: P = *weighted average performance in the Postgraduate Diploma in Accounting expressed as a percentage*

Acc = *final percentage obtained in Financial Accounting IV*

MAF = *final percentage obtained in Management Accounting and Finance II*

Tax = *final percentage obtained in Taxation and Estate Duty II*

Audit = *final percentage obtained in Auditing and Corporate Governance II*

This formula is consistent with that used by the Accounting Department in determining final class positions for the PGDA programme.

If a student wrote a supplementary examination, his or her final mark in the formula was that as obtained in the first sitting of an examination. Thus performance is measured consistently for all students. Supplementary marks were not taken into consideration when assessing performance.

c) **Undergraduate performance:** There are standard prescribed courses that are included in all of the pre-requisite undergraduate degrees for the Postgraduate Diploma in Accounting programme. Three common courses are precursors to the courses in the PGDA. They are:

   i. Financial Accounting III,

   ii. Taxation and Estate Duty I and

   iii. Auditing I

Although Management Accounting and Finance (MAF) II is the fourth and final course within the PGDA programme, MAF I was not selected. MAF I is not a common prescribed undergraduate course for the PGDA programme, as the content of Business Finance Honours, a prescribed course in the Bachelor of Business Science degree, covers similar material and is regarded as a suitable substitute. In addition to the course contents being slightly different, the Business Finance Honours course is completed over four years, whilst MAF I is a single year course normally completed in the year preceding the commencement of the PGDA year. For this reason performance in Business Finance Honours and MAF I have been omitted from the measurement of Undergraduate Performance.

The measurement of Undergraduate performance in these three common precursor courses uses a similar weighting formula to the measurement of PGDA performance. Accounts III is classified as a full year course and Auditing I and Tax I as half year courses. Thus the weighting formula would be as follows

- Accounts 50 %
- Tax 25 %
- Auditing 25 %

This weighting can be expressed by the following formula:

$$Up = (Acc \times \tfrac{1}{2}) + (Tax \times \tfrac{1}{4}) + (Audit \times \tfrac{1}{4})$$

where: Up = weighted average performance in the prescribed common undergraduate courses expressed as a percentage

Acc = final percentage obtained in Financial Accounting III

Tax = final percentage obtained in Taxation and Estate Duty I

Audit = final percentage obtained in Auditing I

If a student wrote a supplementary examination, his or her final mark in the formula was that as obtained in the first sitting of an examination. Thus performance is measured consistently for all students. Supplementary marks were not taken into consideration when assessing performance.

d) **Matric Points:** School matriculation performance is captured into the Heritage system in symbol format, i.e.: A, B, C etc. Next to each symbol, is an annotation indicating at what level the subject was taken i.e. Higher or Standard grade.

The University of Cape Town has an admissions rating system that assigns points in relation to the grade (in symbol format) achieved at school. The following table is used by the University and was used in the data transformation in this research.

SYMBOL	HIGHER GRADE	STANDARD GRADE
A	8	6
B	7	5
C	6	4
D	5	3
E	4	2
F	3	1

University of Cape Town's admissions rating table

Exhibit 3.1

Source: University of Cape Town, 2004

Due to the near normal distribution of the age groups of the students (refer diagram below), a dichotomous classification would not be conducive to yielding any effective results. Thus students will be allocated into five different age categories as follows:

A Younger than 21 years

B 21 years

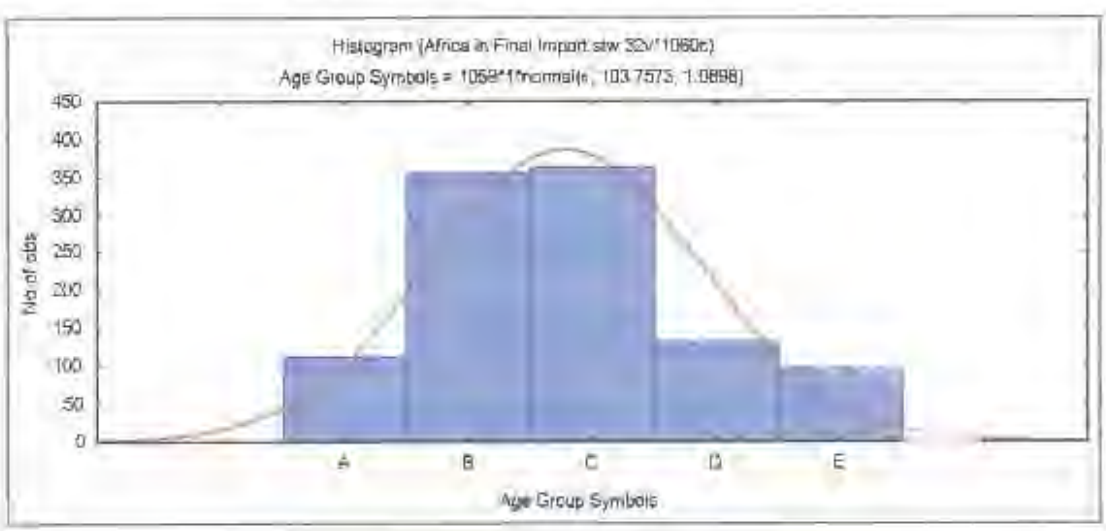
C 22 years

D 23 and 24 years

E Over 24 years

where: years *is the age of the student at the beginning of the year of their registration in completed years; i.e. if the student is 23 years and four months at the 1st of January in her year of entering the Postgraduate Diploma in Accounting, she will be classified in Group D.*

The distribution profile of the students' age for our cohort is as follows:



Distribution of observations within the defined age groups

Exhibit 3.2

Undergraduate Degrees

As mentioned in the review of prior research, the PGDA programme at UCT faces a rare situation with regards to its prerequisite undergraduate degrees.

The two undergraduate degrees that are the predominant feeder routes for the UCT PGDA course are the Bachelor of Business Science (Business Science) and the Bachelor of Commerce (B Com) degrees from the University of Cape Town. From 1995 up to and including 2001, of the students registering for the PGDA programme immediately after completing a UCT undergraduate degree or diploma, 34% had completed a Business Science degree, whilst 47% had completed a B Com degree. The remaining 19% of students from UCT had completed a conversion course or management diploma in accounting.

Information extracted from the Heritage system indicates the undergraduate degree or diploma for which a student was registered in the preceding year. Due to the limitations of the Heritage system the information regarding the undergraduate degrees of the 1995 PGDA class and students that completed their undergraduate degrees at other universities before transferring to UCT for the PGDA year was unobtainable. Thus the 1995 PGDA class and transferring students will fall out of the data set when analysis is performed using undergraduate degree as a variable.

The symbols used to indicate the various undergraduate degrees are:

BBUSSCI - Bachelor of Business Science

BCom - Bachelor of Commerce

'Other' - Conversion Course or Postgraduate Management Diploma (due to their minimal number of observation and similar nature, these two have been grouped together)

English Proficiency

Prior research has questioned the validity of using English matriculation results as a measure for English proficiency. In the absence of a test such as the Placement Test in English for Educational Purposes[7], English matriculation symbols will be used as a proxy for English proficiency. This is consistent with the methodology as used by Nash (2003).

Mathematical Proficiency

School mathematics will be used as a proxy for numerical proficiency. This is similar to Nash's (2003) use of school English performance as a proxy for Language proficiency. A more reliable indicator of numerical proficiency would be to use the results of the Mathematics Achievement or Mathematics Comprehension Test[8] as used in alternative admissions testing at UCT However, this data is unavailable for our test population.

The symbols obtained from student records and from the data transformation as explained previously in Section 3.3(d) will be used for both English and Mathematical proficiency.

[7] The PTEEP test: this is completed by students entering the Humanities and Health Sciences, and for those entering the Commerce Academic Development Programme (CADP). In future this could be used as a tool for identifying potential success factors, and replace the proxy of English matric scores.
[8] The MAT and MCT test: this is completed by students applying for entrance to the Commerce Academic Development Programme (CADP).. In future this could be used as a tool for identifying potential success factors, and replace the proxy of Mathematics matric scores.

Chapter 4

METHODOLOGY

4.1. Overview

For each of the variables examined, the cohort of students was divided into the relevant groups. Where variable data was missing for a certain student, he or she was removed from the cohort to be tested for that particular variable. As each variable is tested individually and students for whom there is some missing data only represent a very small portion of the total cohort, the omission will not affect the results.

The objective of this research is to determine if there are any common characteristics of students within the PGDA that may be indicators of performance. The characteristics (or variables) to be used in this research can be defined into two different scales of measurement. These two scales are:

i) Nominal scale

- This level is used to simply classify an object or person into a defined group. There is no concept of ranking or values attributed to the group. Examples are gender or race

ii) Ordinal scale

- This occurs when an object or person is classified into group that is considered greater than or less than another group. Examples are the academic symbols obtained students obtained in matric.

For each different level of classification, a different statistical approach needs to be followed in order to identify possible successful characteristics. These will be discussed below.

4.2. Means Testing

Nominal data will be analysed in the Statistica software package (Statsoft 2003) by utilising various forms of means testing. The aim is to determine whether the mean of a variable is the same for each group. As an example, is the mean Postgraduate Diploma in Accounting mark obtained by students in the different race groups equal? Using an example of student race versus performance, expressing our aim statistically would be as follows:

$$H_o : \bar{x}_W = \bar{x}_B = \bar{x}_C = \bar{x}_I$$

$$H_1 : \bar{x}_W, \bar{x}_B, \bar{x}_C \text{ and } \bar{x}_I \text{ are not all equal}$$

where: *H_o is the null hypothesis that the mean performance between all race groups is equal*

H_1 is the alternative hypothesis that the mean performance between all race groups is not equal; i.e. the mean performance of Black and Coloured students may be equal, but these differ from the means of Indian and White students

$\bar{x}_W$ = *the mean performance of White students in the PGDA*

$\bar{x}_B$ = *the mean performance of Black students in the PGDA*

$\bar{x}_C$ = *the mean performance of Coloured students in the PGDA*

$\bar{x}_I$ = *the mean performance of Indian students in the PGDA*

When there is a dichotomous classification i.e.: Males and Females, a students t-test will be used to determine if there is any statistically significant difference in the means of the two groups.

A t-test can only be used when investigating the difference between two populations. When faced with more than two populations, as in our Race example above, the accepted approach is to perform an analysis of variance (ANOVA). This is merely an extension of the t-test and is used to determine whether the means of more than two populations are different.

If the null hypothesis cannot be accepted for a t-test, no further testing is required as we have already identified where the difference lies i.e.: between Males and Females or between those who have had prior accounting exposure or those that have not had prior exposure. Although the ANOVA is used for determining if the means of more than two populations are not equal, it is unable to determine between which classifications the means are equal or unequal.

It needs to be determined where the differences lie i.e. we need to make simultaneous conclusions about the performance means of each race group. Is there a difference in performance between Indian and White students? Is there a difference in the performance between Indian and Black students?

Scheffe's method enables the identification of which pairs of means differ from one another. When the null hypothesis of the ANOVA cannot be accepted and there are more than two variables, Scheffe's method will be run on the data to identify where differences may exist.

The variables to be tested by using either a students' t-test or an ANOVA and Scheffe's Method are:

a) Race
b) School Matriculation Department
c) Gender
d) Prior Accounting Exposure
e) Undergraduate Degree
f) Age

However, as the PGDA programme is a postgraduate course and has an academic minimum entrance requirement, it is theorised that the null hypothesis should hold true for most means testing. Previous filtering methods, such as entrance requirements and examinations, should have produced a cohort of students that are already successful. Thus a White Female entering the PGDA programme should have a comparable level of academic achievement to a Black Male. Any variations in performance between individual students should be explained by normal distribution, and thus statistically, the performance means of all groups are expected to be equal.

With this in mind, academic ability as measured by prior academic achievement, will not be controlled for in this research. This may be seen as a major limitation in the value of the results obtained. However, subsequent analysis of the performance of groups of students in their undergraduate year will be compared to their performance in the PGDA year. This is now discussed below.

Post-Hoc Analysis

A difference in the performance of one group of students over another group of students, may be more of an indication as to what makes a successful university student and not necessarily a successful PGDA student. To determine whether the different performance between groups of students is particular to the PGDA year as opposed to performance in a normal undergraduate degree, it is necessary to identify if there was a prior existing condition before the commencement of the PGDA year.

If a difference between groups existed at the end of the both the PGDA and the final year of their undergraduate degree, it may be an indicator that the difference in performance is not restricted to the PGDA programme, but the group may perform better or poorer irrespective of the programme of study.

However, from our example, if there is a difference in the performance between Indian and Coloured students in the PGDA programme, and there is no difference in the performance between the two groups in their final undergraduate year, it would imply that the one group is better equipped to perform in the PGDA than the other.

A caution must be issued here though. This post-hoc analysis cannot be used to draw meaningful statistical conclusions (see discussion below). The results will merely act as an indicator of when one group may be relatively outperforming another and will be used in lieu of controlling for ability. This will be of use to the co-ordinators of the PGDA programme that, for example, may be made aware of the possibility that male performance relative to female performance increases over the PGDA programme.

Limitations in post-hoc methodology

Due to the unavailability of certain data from the Heritage student records system arising from the manner in which students completed their undergraduate degrees, the full cohort of students did not have complete academic records for their final undergraduate year. This is because students may have received credit for one of the courses when transferring from another university, they may have failed one of the courses and been required to complete only one or two of them in order to graduate or they may have completed their degree a few years prior to their commencement of the PGDA programme. All of these students were eliminated from the post-hoc analysis.

By eliminating some students who would have been included in the initial stages of testing, it is not possible to draw any statistical comparison between performance in the final undergraduate year and the PGDA year. It can be assumed that the performance of the remaining students in the group would not be significantly different from the whole population. Under this assumption, it is not possible to draw any statistical conclusions, and care must be exerted when interpreting the results of the above mentioned post-hoc analysis.

Analysis of significant variables

Once all the appropriate variables have been tested, those variables that could be successful characteristics will be further analysed. This analysis will not take the form of rigid statistical techniques, but will discuss possible reasons for the characteristics leading to success, and

whether the characteristics themselves are not the cause for success. This analysis will be largely speculative, so the results should be accepted with caution.

There may be other mitigating factors that would influence a particular demographic profile to perform at a certain level. These factors will not fall within the scope of this research, but will be identified as areas for further possible research.

4.3. Regression Analysis

When the variable is ordinal an analysis will be performed to determine how much a change from one group to the next group will affect the PGDA performance. An ordinary least squares (OLS) regression using the Statistica software package (Statsoft 2003) will be performed on this data. An OLS regression is appropriate under the following circumstances:

- The dependant variable is continuous and approximately normal
- The independent variables are ordinal
- The residuals are roughly normally distributed with constant variance

As mentioned earlier, the dependant variable (Performance in PGDA) is approximately normally distributed. The independent variables we intend using, matric symbols for Mathematics and English, are ordinal. The analysis of residuals can only be performed once the regression has been run. Thus an OLS regression appears appropriate at the initial stages. An analysis of the residuals will be conducted after the regression results have been obtained.

The objective of a regression equation is to determine whether there is a relationship between the independent variables and the dependant variables, and whether this effect is statistically significant, i.e.: can we rely on the results of the regression equation. Thus, the null hypothesis of a regression is that there is a significant statistical linear relationship between the independent and dependant variables. By using example

H_0 : Significant relationship between Eng and PGDA

H_1 : An insignificant relationship or no relationship between Eng and PGDA

where: H_o *is the null hypothesis*

H_1 *is the alternative hypothesis*

Eng is performance in matric English expressed as a symbol

PGDA is performance in the PGDA

Once the regression equation has been run, further analysis will be done on the F-statistic, to determine the significance of any relationship, and on the R^2, to determine the amount of variation in the dependant variable that is explained by the regression equation.

To determine whether a relationship exists between performance in the PGDA programme and performance at school level, an Ordinary Least Squares regression will be performed for the following variables.

a. English Proficiency

b. Mathematical proficiency

Chapter 5

RESULTS

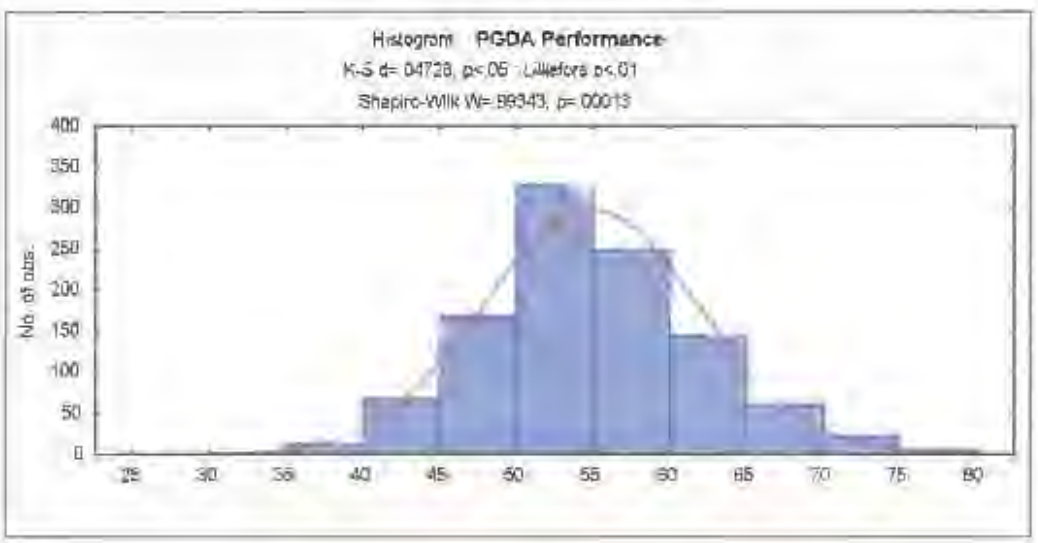
5.1. Descriptive Statistics

All of the statistical methods to be used in this research assume that the data is normally distributed. Therefore before data analyses can be performed, results obtained and conclusions drawn, tests need to be performed on the normality of the dependant variables.

The two dependant variables being used are the two measures of academic performance at University viz. PGDA marks and Final Year Undergraduate marks. The distribution of both these variables was assessed using visual inspection and statistical techniques.

PGDA performance

The following diagram represents the distribution of final marks in the PGDA programme for the full cohort of students (N = 1059)



Distribution of PGDA performance - Exhibit 5.1

From visual inspection it appears that the dependant variable of PGDA performance to be normally distributed. However, test statistics given by the Kolmogorov-Smirnoff 'd', the Lilliefors p-value and the Shapiro-Wilkes p-value indicate that the data is not normally distributed.

The Kruskal-Wallis test is a non-parametric alternative to one-way (between-groups) ANOVA. It is used to compare three or more samples, and it tests the null hypothesis that the different samples in the comparison were drawn from the same distribution or from distributions with the same median. Thus, the interpretation of the Kruskal-Wallis test is basically similar to that of the parametric one-way ANOVA, except that it is based on ranks rather than means. There is no need to test for the normality of data in non-parametric testing.

Even though the data is not normally distributed, a visual inspection indicates that it appears normal. In order to be able to accept the data as being nearly normally distributed a Kruskal-Wallis test was run on the PGDA performance and the dependant variable of Degree. This was compared to the results of Scheffe's method. The two tests produced approximately the same test statistic between all levels. Refer below.

	Kruskal-Wallis test: Variable **PGDA Performance** H (2, N= 979) =138.6794 p =0.000		
	Other R:417.18	BBUSSCI R:637.52	BCOM R:411.63
Other		0.00	1.000000
BBUSSCI	0.000000		0.000000
BCOM	1.000000	0.00	

Results of Kruskal-Wallis non-parametric test.

Exhibit 5.2

	Scheffe test; Variable **PGDA Performance** Error: Between MS = 44.203, df = 976.00			
	Degree Held	Other 53.111	BBUSSCI 58.541	BCOM 53.116
1	Other		0.00	0.999956
2	BBUSSCI	0.000000		0.000000
3	BCOM	0.999956	0.00	

Results of Scheffe's parametric method

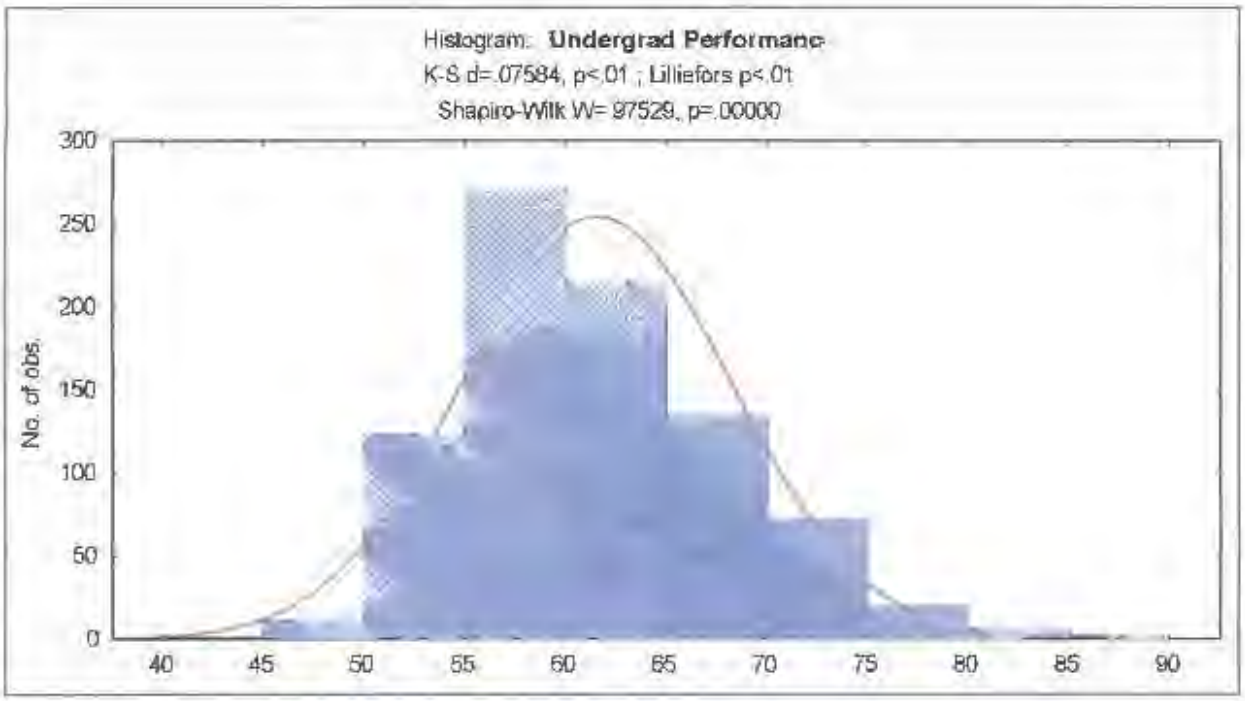
Exhibit 5.4

The results of the Kruskal-Wallis test and Scheffe's method produce similar conclusions for the cohort of students in this research. The limitations of accepting not normally distributed data as being normally distributed, will have an effect on areas where there are small differences.

However, Non-parametric tests are generally considered being not as powerful as parametric tests. The two tests to be used, t-test and ANOVA, are reasonably robust to departures from normality. Thus we accept the distribution as being near normal, and appropriate for parametric testing.

Final Year Undergraduate Performance

The following diagram represents the distribution of final marks in the undergraduate year for students that had the required information (N = 854).



Distribution of Undergraduate performance

Exhibit 5.4.

Again the test statistics indicate that the data is not normally distributed, but visual inspection indicates that it is near normal. Thus, as above, Undergraduate performance is accepted as near normal and can be tested using ANOVA and t-tests.

5.2. Results of Means Testing

As per the discussed methodology, various tests will be run to determine if any difference in the means of PGDA performance exists within each of the following nominal variables.

a) Race

b) Gender

c) School Matriculation Department

d) Prior Accounting Exposure

e) Undergraduate Degree

f) Age

Race

The results of the ANOVA test for comparison of means between multiple populations indicate that the null hypothesis for the equality of performance between race groups cannot be accepted at the 5% level of significance. Thus, there is a difference in the means of the performance between the four different race groups as defined.

To determine where the differences lie, Scheffe's method is used. The results indicate that there is a significant (less than 1% level of significance) difference in the performance of White students and the three other race groups. There was no statistical difference between the Coloured, Indian and Black student groups. The means of the race groups are given below:

Groups	*Count*	*Mean*	*Variance*
White	806	56.13	6.8453
Black	83	49.82	5.5838
Coloured	114	51.18	6.4247
Indian	56	50.93	6.1230
Total	*1059*	*54.83*	*7.0664*

Mean PGDA performance between Race groups

Exhibit 5.5.

Thus White students in the PGDA programme outperform their Black, Coloured and Indian classmates. Negash (1997) identified that white students outperform non-white students in second- and third-year university accounting courses, and it appears now that this difference persists at the postgraduate level. Huysamen (2000) found that Wilson's (1980 and 1981) 'Late Bloomer' hypothesis that non-white students reduce the performance gap over time, held true in a South African context. It appears as if this hypothesis may not be valid in the case of the PGDA programme.

It is noted from the preceding table that the mean performance of Black students is a failing mark (less than 50%), which may have significance for admission and entrance requirements. This does not mean that the average Black student fails; it is merely the average mark. The median for Black students is 50%, and indicates that there is an approximately equal split of Black students that have passed and failed PGDA (results of supplementary examinations notwithstanding).

A review of the performance of students in their final undergraduate year courses indicated that again there was a difference in the performance means between White students and other students.

	Scheffe test; Variable **Undergrad Performance** Error: Between MS = 43.507, df = 850.00				
	Race	Coloured 59.938	White 62.165	Indian 58.637	Black 58.746
1	Coloured		0.041984	0.791252	0.773289
2	White	0.041984		0.013245	0.002341
3	Indian	0.791252	0.013245		0.999863
4	Black	0.773289	0.002341	0.999863	

Results of Scheffe's parametric method

Exhibit 5.6.

Groups	*Count*	*Mean*	*Variance*	*PGDA Mean*	*Decrease in mean*
White	674	62.16	6.9033	56.13	9.7%
Black	59	58.75	5.4351	49.82	15.2%
Coloured	81	59.94	5.5165	51.16	14.6%
Indian	40	58.64	4.4180	50.93	13.1%
Total	*854*	*61.55*	*6.6963*	*54.83*	*10.9%*

Mean Undergraduate performance between Race groups

and decrease in mean performance from Undergraduate year to PGDA Year

Exhibit 5.7.

The mean performance of all groups of students decreases from the undergraduate year to the PGDA programme. Black, Coloured and Indian performance means decrease by 15,2%, 14,6% and 13,1% respectively, whilst the mean performance of White students only decreases by 9,7%. This indicates that the gap in performance between White and Non-white students widens at the postgraduate level. This finding is again in contrast to Huysamen's (2000) 'Late Bloomer' finding, but is similar to the findings of Wilson (1981) when he noticed that the gap in performance between White and Non-white students widens over time.

The above findings indicate that Non-white students perform worse than White students at a postgraduate level. However, caution must be exercised when interpreting these results in

isolation. Race may be a characteristic of success but it may not be the cause of success. In the context of UCT and South Africa, there are many mitigating factors that may have contributed to the relatively poor performance of Non-white and particularly Black students.

For example, the education department that a student matriculated at could be more causal than race itself – would a Black student who attended a 'Whites only' school still perform poorly at a postgraduate level? A look at the table below of the mean performance of Black students per education department appears to indicate that a Black student would still perform below the mean performance of the total cohort of 54.83%, irrespective of the education department that he or she matriculated from. However, this will be addressed in the following paragraph.

Groups	Count	Average	Variance
DET	19	49.09	30.5536
FEA	5	47.63	16.5056
HoAss	20	52.96	28.5230
IEB	13	49.22	43.7703

Mean PGDA performance of Black students between Matriculation Department

Exhibit 5.8.

This study is examining a cohort of students that were in a postgraduate programme up to 2001. Thus with a minimum of three years of undergraduate study, students in the 2001 PGDA year would have been in Grade 6 (Standard 4) when government schools were open to scholars of all races in 1991. It is thus speculated that the non-white students in the 2001 PGDA class would have spent at least 6 and the non-white students in the 1995 class would have spent at least 11 out of 12 years of their school career in traditionally non-white schools. The effects of prior inequalities in formative education may have a long lasting effect on students educated under education departments that systematically received less funding and had less qualified teachers,

and this could be the cause for the difference in performance between White and Non-white students.

UCT does consider the effects of ethnicity and prior schooling for admission through the Commerce Academic Development Programme. However, this differentiation in admissions is to assist weaker students who may have had an inferior secondary schooling, yet have academic potential, in becoming accustomed to the University environment and academic structure. Graham's (1991) suggestion was to 'consider ethnic background above all other factors' and to restrict the entrance based on race. A policy of this nature has no place at an institution in South Africa or globally.

The findings of this research indicate that differences in performance exist in a postgraduate accounting diploma between White and Non-white students and that the gap in performance widens from final undergraduate year to the postgraduate level. It is clear that inequalities that were present during previous governments in South Africa have affected the academic performance of Non-white students at a postgraduate level. SAICA's Thuthuka initiatives to increase numerical, literacy and accounting skills of school learners and the nurturing of students throughout tertiary education are well placed to increase the number of successful Black postgraduate accounting students and ultimately Chartered Accountants.

From the above tables, it can be seen that approximately 80% of all students were White. This is approximately equal to the percentage of White registered Chartered Accountants. Thus it initially appears as if UCT is not contributing to the increase of Black registered Chartered Accountants in South Africa. However, an inspection into the trend of registered PGDA

students indicates that there is a gradual increase in the proportion of Non-White students in the PGDA programme.

	1995	1996	1997	1998	1999	2000	2001
Non-White	19.15%	18.13%	26.28%	27.41%	23.94%	30.40%	24.84%
White	80.85%	81.88%	73.72%	72.59%	76.06%	69.60%	75.16%

Percentage of PGDA enrolments between White and Non-white Students

Exhibit 5.9.

Matriculation Department

Even though the governmental education departments mentioned below are defunct, Miller (1992) suggested that these old classifications should still be used for research purposes. Whilst 12 years have passed since Miller's comments, it is contended by the author of this current research that these classifications should still be used for research purposes until it is found that schools that operated under departments that were previously systematically discriminated against, are comparable to previous Whites only schools. In lieu of such findings to date, the old classifications will be used in this research.

On application to the University of Cape Town, students are categorised into six different matriculating authorities. There are four departments that were administered by the previous Nationalist Government and two independent authorities. These are the groupings:

- The Departments of Education and Culture in
  i. the House of Assembly (HoAss) for 'Whites',
  ii. the House of Delegates (HoDel) for 'Indians' and
  iii. the House of Representatives (HoRep) for 'Coloureds';
- The Department of Education and Training (DET) for 'Africans' (or Blacks);

- The Independent Examination Board (IEB); and the
- Foreign Examining Authority (FEA)

The first four groupings are self-explanatory. The Independent Examination Board is the examination authority of many of the private schools in South Africa, and the Foreign Examining Authority is the collective term for students that completed their secondary schooling outside of South Africa or by writing non-South African examinations, such as the Cambridge O- and A-levels.

The ANOVA for the performance in the PGDA programme by the different examining bodies indicates that the null hypothesis cannot be accepted at the 1% level of significance and a difference in the performance means exist. The results of Scheffe's method identifies that a difference in performance exists between the following pairs:

- HoAss and HoRep students
- HoAss and HoDel students
- HoAss and DET students

These results are not surprising given the findings that were made earlier in this research on the performance between the different race groups. The means of all the groups are displayed below:

Groups	Count	Average	Variance
HoAss	461	56.26	7.0109
HoDel	13	49.04	5.6932
HoRep	69	51.17	5.9648
DET	22	49.86	6.1665
IEB	65	54.50	6.9543
FEA	13	54.28	8.8927
Total	*643*	*55.13*	*7.1757*

Mean PGDA performance between Matriculation Department

Exhibit 5.10.

As mentioned earlier, due to prior Nationalist governmental policies, black, and particularly Black, students were systematically discriminated against and under the Apartheid government received less educational funding per capita than white students. Naidoo et al (1998) identified the inequitable government spending on education under the apartheid government. Whilst previously 'Whites only' schools have been open to all races since 1991, various socio-economic and geographical factors have limited the opportunity of Black scholars to attend such schools.

Huysamen (2000) identified the differences in the qualifications of educators at House of Assembly and Department of Education and Training schools. The effect of the difference in the spend per capita and the quality of educator seem to have affected the performance of students in the Postgraduate Diploma in Accounting. Thus Matriculation Department is a significant characteristic of success in the Postgraduate Diploma in Accounting.

However, using school type as a variable for discrimination in an admissions policy is not advisable. Because a student may have attended a previously disadvantaged school, that alone is no reason to refuse admission. Students with equal academic performance at school level should

not be discriminated against with respect to admissions. However, if a student is not accepted on matriculation results, there is a possibility for them to be admitted to a tertiary institution based on an assessment of potential through a process such as the Commerce Academic Development Programme at UCT.

Further research should be performed to determine the predictive validity of school marks for students from traditionally Black schools. Huysamen (1999) has performed such research, but this has not been done in the context of a postgraduate accounting programme.

Gender

Research regarding performance along gender lines prior to 1990 (Mutchler et al 1987, Hanks and Shivasamy 1985, Fraser et al 1978 and Lipe 1989) indicated that females outperformed their male counterparts. However, research since 1990 (Carpenter et al 1993, Buckless et al 1991, Busch 1995, Negash 1997 and Huysamen 1999) indicates that there is no difference in performance along gender lines. This is an interesting trend, yet to draw any conclusions from this is presumptuous. These studies need to be replicated in order to notice a statistical change in the performance along gender lines.

The results of a t-test in this current research indicate that there is no statistical difference between the means in performance of Male and Female students in the Post Graduate Diploma in Accounting. Thus gender is not a characteristic that may contribute to success in the PGDA programme. When examining the performance of Male and Female students in the final undergraduate year, there is a statistically significant difference in the performance of Males and Females, with Females outperforming males. The means of the groups for undergraduate and PGDA performance are given below.

	PGDA		Undergraduate	
Groups	*Average*	*Variance*	*Average*	*Variance*
Male	54.79	6.756782	61.06	6.379928
Female	54.91	7.57851	62.42	7.144005

Mean PGDA performance between Male and Female students

Exhibit 5.11.

The difference that existed between Males and Females at the undergraduate level diminishes over the PGDA year and is statistically absent in the final performance in the PGDA year. Tyson (1989) noted that females placed less emphasis on grade performance than males, and this could be an alternate reason for Males having a relative improvement in performance over Females.

As the difference in performance is minimal in the final Undergraduate year and the PGDA year, no further investigation is needed on the differentiating effect the characteristic of gender will have on performance in the PGDA programme.

Only 20% of all registered Chartered Accountants in South Africa are female. It appears that based on academic performance, there is no reason why these figures are so low. However, only 37% of the total student cohort in this research are female and there is no trend indicating that this number is changing. Thus SAICA need to attract more Female students to the profession. This research has found that there is no academic reason for the currently low female representation of SAICA.

	1995	1996	1997	1998	1999	2000	2001
Female	32.45%	31.88%	41.67%	30.37%	36.62%	44.00%	41.83%
Male	67.55%	68.13%	58.33%	69.63%	63.38%	56.00%	58.17%

Percentage of PGDA enrolments between Males and Females - Exhibit 5.12.

Prior Exposure

The results of a t-test to determine whether Accounting as a matriculation subject is a characteristic of success, indicates that there is no difference in the performances means of Prior Exposure (PE) and Non Prior Exposure (NPE) students in the PGDA programme. There is also no difference in the performance means of the two groups at an undergraduate level.

The combined findings of Rowlands (1988) and van Rensburg et al (1998) indicated that PE students had a comparative advantage in the formative years of tertiary accounting courses, and that this advantage diminished over time. Van Rensburg et al found that PE students were at a comparative disadvantage in a second year accounting course. The trend that van Rensburg et al identified does not appear to persist into the postgraduate level.

However, minimum admissions criteria for the PGDA programme, and the nature of exams to identify strong candidates and eliminate weaker ones, could eliminate PE students that are performing poorly and thus only potentially successful students remain.

The nature of the school accounting syllabus is comparative to that of first year university, and thus Rowland's initial findings that PE students outperformed NPE students in first year accounting is expected. However, the nature of the accounting syllabus outcomes at the postgraduate level is significantly different to the school syllabus outcomes. The school syllabus is methodical and primarily bookkeeping in nature, whereas the postgraduate syllabus is conceptual and requires financial analysis, interpretations and applications of accounting statements, complex financial calculations and judgement. Thus English and Mathematics

proficiency are expected to be far more beneficial to students at the postgraduate level than prior exposure to school accounting may be.

These findings do not support an *academic* rationale for SAICA's Thuthuka initiative to increase accounting skills at a school level in order to produce more Black Chartered Accountants. However, the benefits that scholars exposed to the Thuthuka initiative receive are not limited to accounting knowledge. as numerical and literacy proficiencies are also enhanced through this programme.

Care must be exercised in focussing educational initiatives on school accounting proficiency. The findings of this research, and that of Rowlands (1988) and van Rensburg et al (1998), indicates that beyond first year accounting there is no beneficial effect from taking Accounting as a matric subject.

Prior exposure to practical accounting situations, as suggested by Moses (1987), would not be applicable in this research. The majority of students have entered University within one or two years of finishing secondary school, and on completion of their undergraduate year, they register for the PGDA in the following year. Thus there is little opportunity for these students to be exposed to full time work in an accounting or finance related field.

Some mature students may have had the opportunity to be exposed to an accounting occupation, but less than 10% of the cohort of students are older than 24 years of age. This would realistically be the only possible grouping to have had prior work exposure, and thus no further analysis is required due to the small size of this cohort.

Undergraduate Degree

The result of the ANOVA test for the difference in performance means of students that have different undergraduate degrees indicates that the null hypothesis cannot be accepted at the 1% level of significance. Scheffe's method for multiple comparisons indicates that there is a difference in performance between students who have a Business Science undergraduate degree and students who have a B Com or 'Other' degree. 'Other' being a non-accredited primary degree followed by a conversion course or management diploma. The means of the groups are displayed below.

Groups	*Count*	*PGDA Mean*	*Variance*	*Undergrad Mean*	*Change in mean*
BBUSSCI	335	58.54	6.251137	63.404206	-7.7%
BCOM	455	53.12	7.033813	60.420103	-12.1%
Other	189	53.11	6.370250	60.481034	-12.2%
Total	*979*	*54.97*	*7.12372*	*61.55735*	*-10.7%*

Mean PGDA and Undergraduate performance between degree type

and decrease in mean performance from Undergraduate year to PGDA year

Exhibit 5.13.

Analysing the performance of students in their final year undergraduate courses indicates that this difference existed prior to commencement of the PGDA programme. The performance means for the undergraduate year is 63,4% for Business Science students and 60,4% and 60,5% for B Com and 'Other' students respectively. Thus the relative decrease experienced in performance from the final undergraduate to the PGDA year is 7,7% for Business Science graduates and 12,1% and 12,2% for B Com and 'Other' students respectively.

As the 'Other' category consists of an intense one year diploma or conversion course, it is not comparable in structure to the full degrees of B Com and Business Science. Thus the focus of research will be on the difference in the performance between the degrees that are the more traditional means of entry, viz. the B Com and Business Science degrees.

The relatively lower decrease in performance of Business Science graduates indicate that they may be better prepared for the PGDA programme. In the PGDA programme, the Business Science graduates have the same workload as B Com graduates for the first time in their respective university careers. In the final year of undergraduate study, in addition to the courses taken by B Com students, Business Science students complete an Honours in Finance course (part dissertation and part coursework) and a full course in Business Strategy. This extra workload could have affected their performance in other undergraduate subjects and in the PGDA programme they have more time to dedicate to comparatively fewer subjects.

The syllabus for Management Accounting and Finance II (MAF), one of the four courses within the PGDA programme, includes many topics in business finance that Business Science students were exposed to during their Finance Honours and other undergraduate finance courses. This should give them a comparative advantage over B Com students in this course. However, the difference in mean performance between B Com and Business Science students for MAF II is 5,56%, and for the PGDA programme as a whole the difference is only 5,42%. It is clear that the MAF course individually does not significantly contribute to the difference in overall performance in the PGDA programme.

Nevertheless, by being previously exposed to some of the topics in the MAF syllabus, it is initially speculated that Business Science graduates may be able to devote less effort to MAF and concentrate their efforts on the other subjects within the PGDA programme. Thus this prior exposure to some of the topics covered in the PGDA programme could be a reason for the superior performance of Business Science students. However, the content of the Business Science degree must not be looked at in isolation. There could be prior conditions that would indicate that Business Science and B Com students differ in terms of academic ability.

Initial entrance requirements for the two degrees differ. For the 2005 academic year, the Business Science and B Com degrees require an applicant to have a minimum of 54 and 50 points[9] on the University of Cape Town's admission rating system (refer to page Chapter 3 for an explanation) respectively. This includes the inclusion of Mathematics and English twice in the calculation i.e.: a 'B' on Maths Higher grade will contribute 7 x 2 = 14 points. This 'doubling up' has been discussed in *Chapter 3: Data Collection and Transformation* and will again be referred to in the following section, *5.5 Regression analysis*.

Notwithstanding that students with sufficient points to enter into the Business Science degree may enrol in the B Com degree, it is speculated that the admissions policy could be a filtering procedure that results in having more academically able students being enrolled in the Business Science degree. Thus the difference in the performance in the PGDA programme could be a function of entrance selection criteria as opposed to a function of the undergraduate degree. Due to the unavailability of data, no significant comparison between average entrance points for Business Science and B Com graduates in the PGDA year was possible.

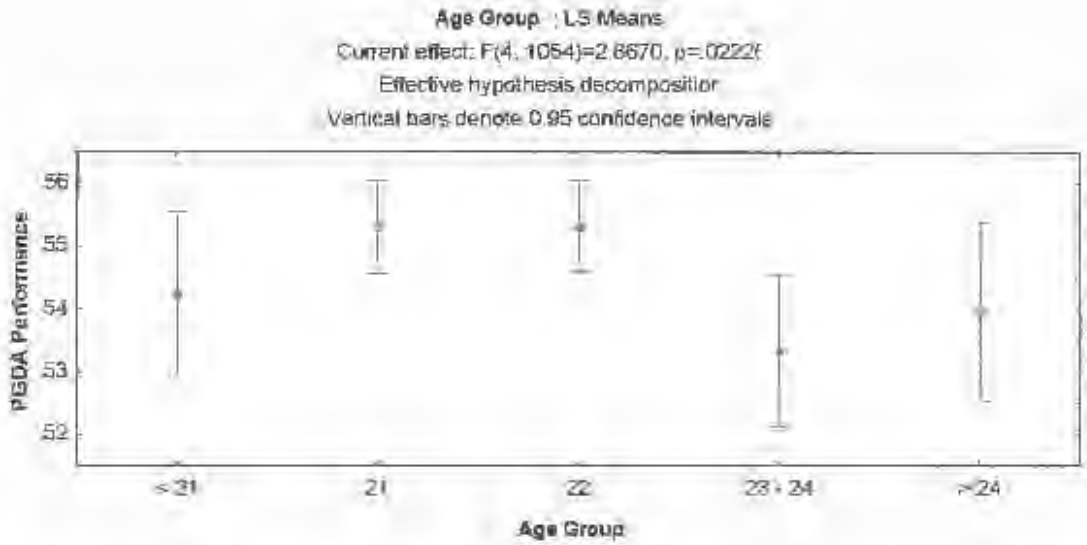
However, total faculty admission points were available for the 2000 and 2001 PGDA students. An analysis of the means indicates that there is a significant difference between the two main degrees. The mean faculty points for a Business Science student is 56,86 and for a B Com student it is 51,08. Ceteris paribus, this indicates that the average Business Science student is more academically capable than a B Com student. Thus whilst the nature of and content within the Business Science and B Com degrees may differ, this may not be a characteristic of successful performance in the PGDA programme.

Previous filtering methods and proven academic ability at the undergraduate entrance level may be the characteristic that makes Business Science graduates outperform B Com students. However, in the post-hoc analysis in the preceding pages, it is clear to see that while there may have been a pre-existing ability in Business Science students (as evidenced through *Exhibit 5.13*), the relative decline in mean performance is greatest in B Com and Other students.

Age

The results of the ANOVA test on performance differences between the different defined age groups, indicates that the null hypothesis cannot be accepted at the 5% level of significance, but can be accepted at the 1% level of significance. Scheffe's method fails to identify where these slight differences exist. The performance means are illustrated in the following diagram and included in the table below.

[9] These requirements were increased in 2002 from 52 points to 54 points for Business Science and from 48 points to 50 points for B Com applicants. This does not affect the findings of this research.



Mean PGDA performance between defined Age Groups

Exhibit 5.14a

Groups	Count	Average	Variance
< 21	112	54.24	6.799386
21	356	55.30	7.229285
22	364	55.32	6.767688
23 - 24	131	53.34	7.133883
> 24	96	53.96	7.493828
Total	*1059*	*54.83*	*7.06642*

Mean PGDA performance between defined Age Groups

Exhibit 5.14b

The slightly poorer performance of students younger than 21 years of age when entering the PGDA programme, as compared to those aged 21 and 22, could be a function of the undergraduate degree as opposed to age. Assume a student enters University at the age of 17 (accepted as the minimum school leaving age in South Africa). She now completes a Business Science degree of four years and enters the PGDA programme. She will now be 21 years of age.

Thus nearly all students in the '< 21' category should have completed only a three year B Com degree. In fact all of the students that had information regarding their undergraduate degree in the '< 21' category had completed B Com degrees. From the previous section on the relationship between performance and undergraduate degree, it was noted that B Com students perform slightly worse than Business Science graduates. This degree could be attributed to this slightly poorer performance.

Out of all students that were 21 or 22 years old on entering the PGDA programme, 45% were Business Science students, and 91% of all Business Science graduates who registered for the PGDA programme from 1995 - 2001 were 21 or 22 years of age. Refer to the table below:

	BBUSSCI	BCOM	Other	Total
< 21	0	53.80 102	5	53.80 107
21	59.51 108	53.40 206	53.63 20	55.39 334
22	58.31 196	51.60 100	51.58 40	55.29 336
23 -24	55.71 28	53.42 30	52.66 58	53.59 116
> 24	67.83 1	54.59 17	54.20 71	54.43 89
Total	58.54 335	53.12 455	53.11 199	

Matrix of the Mean PGDA performance between defined Age Groups and Degree Held

Exhibit 5.15

The mean performance of Business Science and B Com graduates in the combined 21 and 22 age groups (58,74% and 52,78% respectively) are not significantly different from their respective group's mean. Thus within the degree type, there appears to be no major difference in the performance between students from the 21 and 22 age groups, and the rest of the

population. There is however a larger proportion of Business Science than B Com graduates in this combined age category. 91% of all Business Science students fall into this age grouping, whilst only 67% of all B Com students fall into this group. It is thus speculated that as Business Science students have been determined to outperform B Com students, the undergraduate degree profile of students within the different age groups could be linked to the average performance within the age groups.

The hypothesis that the undergraduate profile of an age grouping is related to performance more than age itself, may also hold for the performance of students who entered the PGDA programme who where 23 years of age or older. Of all students who held 'Other' undergraduate degrees, 68% of them entered the PGDA programme when they were 23 years of age or older. This is expected as these students would have completed at least one other degree prior to their one year diploma or conversion course, and they may also have had some work experience. Out of the total students who were 23 years of age or older, 63% of them held 'Other' degrees or diplomas. As the undergraduate grouping 'Other' had a performance mean of 53,11% (refer *Exhibit 5.13)*, the average performance of students who entered the PGDA programme who were 23 years of age or older is expected to be lower than the total cohort mean of 54,83%. This hypothesis again appears to hold true, as the combined means of the students over 23 years of age is 53,60%.

Whilst there is a slight difference (not statistically significant) in the performance of the various defined age groups, the undergraduate degree profile across the age groups appears to be a very important characteristic of success, and thus age is not a significant characteristic of success in the PGDA programme.

5.3. Summary of findings

From the preliminary results, the following matrix indicates the results of which variables were determined to be significant characteristics of success, which were marginal characteristics of success and which were insignificant characteristics of success.

	Significant	Marginal	Insignificant
Age		X	
Education Department	X		
Gender		X	
Prior Exposure			X
Race	X		
Undergraduate degree	X		

Summary Matrix of findings

Exhibit 5.16.

As per the methodology, the variables that were identified as being statistically significant characteristics of success in the Postgraduate Diploma in Accounting will now be analysed further.

5.4. Subsequent analysis

Race and Matriculation Department

The results of Scheffe's method indicated that there was no difference in the performance means between Black, Indian and Coloured students. These race groups were all individually different from the performance of White students. It could thus be appropriate to group these students into one grouping. As previously mentioned in this research, 'black' refers to those race groups that were collectively discriminated against by the apartheid government, however in the testing phase of this research 'Black' has been used to identify African students, and thus to avoid confusion, 'Non-White' will now be used to describe this collective group.

Due to the history of secondary school education within South Africa (Naidoo et al 1998, Huysamen 1996), the race profile of South African matriculants (specifically those included in this research), should be closely correlated to the education department from where they matriculated.

Of the students for which there was information regarding their secondary schooling, all of the White students in the PGDA cohort completed their secondary schooling with either a House of Assembly, IEB or Foreign Examining Authority matriculation certificate. 75% of all Non-white students completed their secondary schooling with either a House of Representatives, House of Delegates or Department of Education and Training matriculation certificate[10]. Even though 25% of Non-white students completed their secondary schooling at institutions that were not previously disadvantaged, the majority of these students would have been exposed to inferior

education during their formative school years (refer discussion to the discussion in *Chapter 2: Literature Review*).

Thus it would be reasonable to assume that Race could be used as a proxy for educational department. The performance means of Non-white students and students from previously disadvantaged schools are very similar (50,67% and 50,63% respectively). The performance means of White students and students from House of Assembly, IEB and FEA schools are also comparable (56,13% and 56,00% respectively). Thus Race appears to be a good proxy for school type, and will be used for any further analysis in this research.

Undergraduate degree and Race

Thus, Undergraduate degree and Race are the remaining variables that are seen as significant characteristics of success in the PGDA programme. The following discussion will analyse these two variables together as potential characteristics of success.

A matrix of student Race, Undergraduate degree, PGDA Performance and number of observations is given below:

[10] These three school types received less funding per scholar from the previous government in South Africa (Naidoo et al 1998)

	White	Non-white	Total
BBUSSCI	58.72 311	56.19 24	58.54 335
BCOM	54.59 291	49.80 164	53.12 455
Other	53.79 138	51.26 51	53.11 189
Total	56.33 740	50.76 239	

Matrix of Mean PGDA performance between Degree Held and Race Group

Exhibit 5.17

ANOVA and t-tests were run to evaluate whether there was any difference in the performance within Degree in terms of Race and within Race in terms of Degree. The results are given below (full tabulated results are included in the *Appendices: Section A-4*):

Within each degree:

- ***BBUSSCI:*** Statistical difference exists in the PGDA performance of White and Non-white students
- ***B Com:*** Statistical difference exists in the PGDA performance of White and Non-white students
- ***'Other':*** Statistical difference exists in the PGDA performance of White and Non-white students

Within each Race group:

- ***White:*** Statistical difference exists in the PGDA performance between BBUSSCI, B Com and 'Other' graduates
- ***Non-white:*** Statistical difference exists in the PGDA performance between BBUSSCI, B Com and 'Other' graduates

It thus appears as if Race and Degree are strong characteristics of success in isolation. Neither the racial composition of graduates within a specific degree, nor the degree profile of a race group appears to be reasons why Race and Degree are successful characteristics.

Degree appears to be more important than Race when looking at *successful characteristics*, as the two highest performing groups are Business Science graduates. Yet, on the other hand, the two lowest performing groups are Non-white. Thus Race could be more important than Degree when looking at *poor performance*.

If we examine the secondary schooling profile of Non-white students in Business Science, we notice that most of them have attended HSB, FEA or HoAss schools – the three school types that White was used as a proxy for. Thus race does not appear to be a good proxy for school type for Business Science graduates.

Thus, ignoring Non-white Business Science graduates, which has the smallest number of observations in the above matrix, the table would indicate that White students outperform Non-white students, irrespective of what degree they may hold. There is no reason or any prior evidence to suggest that Non-white students perform worse at any academic level given equal educational opportunities from the initial stages of learning. Thus except for Business Science graduates, it appears that Race could be the main characteristic of success in the PGDA, and thus Matriculation Department being a proxy of Race.

Prior inequalities in the educational system that existed, and the effects of which still persist, can thus be seen as the main reason for differences in performance of accounting students at the

post graduate in level. It is suggested that initiatives need to be carried out at the earlier stages of a Non-white student's career, and to continue through to graduation or postgraduate level.

Thus SAICA's Thuthuka initiative to increase numerical and literacy skills of school learners and their continued nurturing throughout tertiary education (closely linked with UCT's Commerce Academic Development Programme) is well placed to increase the number of successful Black postgraduate accounting students and ultimately Chartered Accountants.

5.5. Regression analysis

Mathematical proficiency

An ordinary least squares regression with the dependant variable of PGDA performance and independent variable of Mathematics Points (as described in the methodology) produces the following regression summary

N=997	Dependent Variable: **PGDA Performance** R= .34906026 R^2= .12184307 Adj R^2= .12096050 F(1,995)=138.05 p<0.0000 Std.Error of est: 6.6030			
	B	Std.Err. of B	t(995)	p-level
Intercept	41.05190	1.199246	34.23141	0.000000
Maths Points	2.05607	0.174990	11.74982	0.000000

Regression Summary: PGDA performance and Mathematics points

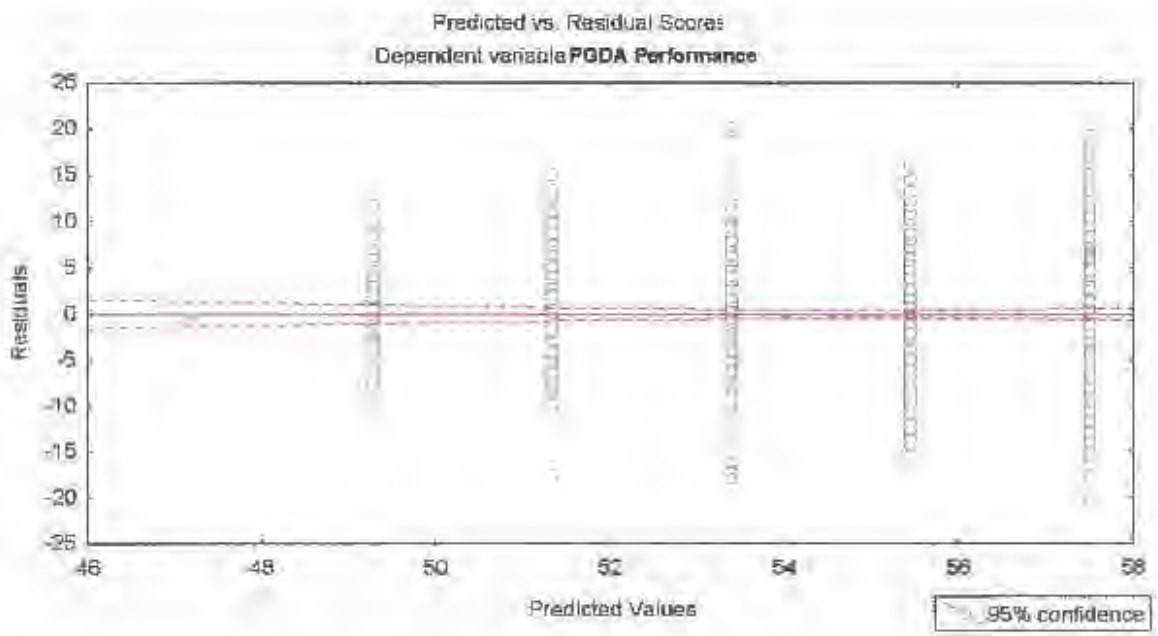
Exhibit 5.18

The F statistic of 138.05 and the corresponding p-value indicates that there is a significant positive relationship between Mathematics Points and performance in the PGDA programme at less than the 1% level, and that the value of the Beta (B) is not significantly different from the calculated value of 2,056. This implies that a differential of one matric symbol in Mathematics equates to a corresponding 2,056% change in mean PGDA performance.

However, the coefficient of determination, R^2 is only 0,122. This indicates that approximately 12% of the variation in the PGDA performance of students can be explained by Mathematics points. This is regarded as a relatively low R^2 value. However, matric exams were written at least four years before the PGDA exams were written, thus Mathematics marks are not expected to explain a significant proportion of the performance in the PGDA.

The regression summary can be utilised as a model to identifying performance potential as follows. A student who received a 'B' symbol on Higher Grade (7 points) Mathematics will have an expected performance in PGDA of 55,44% and a student who had a 'C' symbol is expected to receive 2,056 percentage points less and thus receive 53,39%. Due to the low R^2 value and in lieu of further testing to be completed below on the acceptability of such model, caution should be exercised before using these results.

According to the methodology, an investigation needs to be undertaken into the normality and variance of the residuals. An inspection of the following graph indicates that the residuals increase when there is an increase in the expected values.



Scatterplot Predicted Values vs Residuals for Mathematics

Exhibit 5.19.

This characteristic is called heteroscedasticity and is a violation of the assumption that the residuals are normally distributed. This means that the model must be assumed to be inadequate, and thus the results should not be used in setting admissions criteria. Even though we may not be able to rely on the models, the regression summary has produced some useful information.

English Proficiency

An ordinary least squares regression with the dependant variable of PGDA performance and independent variable of English Points (as described in the methodology) produces the following regression summary.

	Dependent Variable: **PGDA Performance** R= .33682169 R^2= .11344885 Adj R^2= .11252728 F(1,962)=123.10 p<0.0000 Std.Error of est: 6.6749			
N=964	B	Std.Err. of B	t(962)	p-level
Intercept	39.55847	1.410823	28.03930	0.000000
Eng Points	2.45897	0.221624	11.09521	0.000000

Regression Summary: PGDA performance and English points

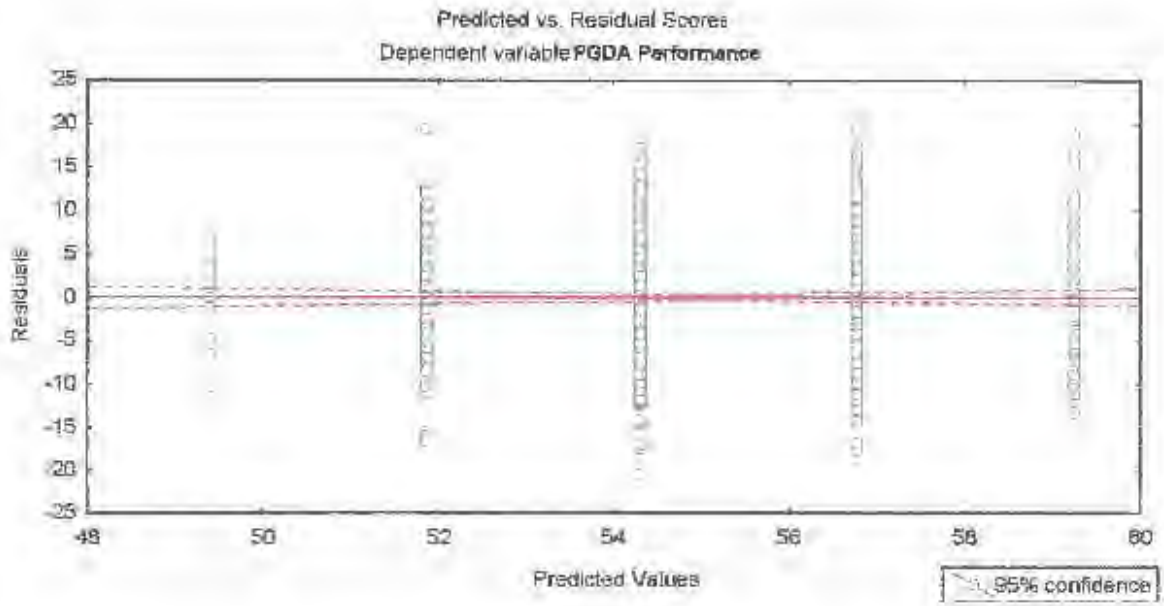
Exhibit 5.20

The F statistic of 123.10 and the corresponding p-value indicates that there is a significant positive relationship between English Points and performance in the PGDA programme at less than the 1% level, and that the value of the Beta (B) is not significantly different from the calculated value of 2,459.

The coefficient of determination, R^2 is 0,113. This is less than the R^2 for Mathematics points. This would indicate that there is more correlation in performance at the PGDA level for Mathematics points than for English points. This is not saying that Maths marks have a greater impact on success; it is saying that it explains more variation in performance.

However, the calculated Beta value for English points of 2,459 is higher than the Beta for Maths points of 2,056. This, however, is an indicator that performance in matric English has a greater impact on PGDA performance than matric Maths performance does.

An analysis of the residuals (below) indicates that the residuals are increasing as the predicted values increase. Thus, heteroscedasticity is also present in the regression equation for matric English performance and PGDA performance, and the model must be assumed to be inadequate.



Scatterplot: Predicted Values vs Residuals for English

Exhibit 5.21

Mathematics and English

Using Mathematics and English as independent variables and PGDA performance in a multiple regression, the following regression summary is produced.

N=953	Dependent Variable: **PGDA Performance** R= .42876866 R²= .18384256 Adj R²= .18212434 F(2,950)=107.00 p<0.0000 Std.Error of est: 6.3563					
	Beta	Std.Err. of Beta	B	Std.Err. of B	t(950)	p-level
Intercept			32.16316	1.585117	20.30332	0.000000
Maths Points	0.376197	0.030513	1.62923	0.179989	9.05181	0.000000
Eng Points	0.260057	0.030513	1.88267	0.220897	8.52284	0.000000

Regression Summary, PGDA performance and English and Mathematics points

Exhibit 5.22

Matriculation Maths and English performance together are positively correlated to performance in the PGDA programme. The R^2 value is less than the combined values of 0.12 and 0.11 respectively, which would indicate that there is some level of multi-collinearity between the variables. This is not unexpected as a more academically able student is expected to perform well in both Maths and English. This R^2 value is perhaps larger than expected, but it indicates that Maths and English points are individually strongly correlated to success in the PGDA programme.

The fact that these two variables individually contribute something to PGDA performance could be an indicator that the PGDA programme has both Numerical and Language components to it. Courses such as MAF and Accounting would definitely be considered more numerical. It is speculated that a student with superior numerical proficiency would possibly benefit in the

financial and costing components in the MAF course, whilst a student who was more proficient in English would possibly observe some benefit in the essay and explanatory type questions prevalent to a large degree in the Auditing course.

Thus this finding would lend support to the current admissions policy for acceptance into the Faculty of Commerce, whereby an applicant's school Mathematics and English scores are doubled. However, no research was possible to determine the effect that any other matriculation subjects may have on performance. This is an area for future research.

Again, the analysis of the residuals of the regression equation indicated that heteroscedasticity was present and the equation must be assumed to be inadequate.

Chapter 6

CONCLUSION

Findings

There is a growing demand for financial and accounting skills in the South African economy. As major suppliers of qualified personnel, tertiary institutions and professional bodies need to identify characteristics that would indicate academic success. These characteristics would assist organisations in setting admissions criteria and identifying areas where education initiatives need to be implemented.

From prior research, variables were identified as potential characteristics of success. These variables were examined in relation to performance in the Postgraduate Diploma in Accounting at the University of Cape Town. The findings of the research are discussed below.

This research investigated whether writing Accounting as a matriculation subject is a characteristic of success in the Postgraduate diploma in Accounting. This research has concluded that no difference in performance exists in the PGDA programme between those students who wrote Accounting as a matriculation subject and those who did not. This expands on the South African studies that have indicated that there is an initial, but diminishing, benefit in tertiary Financial Accounting performance by taking Accounting as a matriculation subject.

Age was determined to be a marginally successful characteristic for performance in the PGDA. However, on further analysis it was postulated that the degree profile, which in itself is a significantly successful characteristic, contributes more to success than the age of a student.

No difference was found in the performance of male and female students in the PGDA programme, but a slight difference existed at the undergraduate level (females slightly outperforming males.) Thus there is no academic reason to indicate why only 20% of SAICA's members are females. There are a disproportionately low number of females in the cohort investigated and there is no trend indicating that this is increasing.

Due to past governmental policies, there was an inequity in the level of funding and support given to the different Educational Departments that previously existed. Prior research indicated that the effects of this inequality affected the performance of secondary school learners and that the conditions persisted into undergraduate tertiary studies. This research has shown that these effects extend to postgraduate study and students who attended schools administered by previously disadvantaged Educational Departments performed significantly worse than other students in the PGDA programme.

Negash (1997) identified that white students outperform non-white students in a second year accounting programme. The findings of this research, in addition to confirming the results of prior studies, showed that white students outperform non-white students, indicating that the difference in performance in an accounting programme along racial lines is present at a postgraduate level.

Huysamen (2000), in a South African study found that performance difference between race groups diminished over time. This current research identified that this apparently does not hold true for the PGDA programme. The performance gap between white and non-white students

increases from undergraduate to PGDA level. The methodology used to identify this finding was not very robust, and thus care must be exerted when interpreting these results.

Initiatives need to be implemented to redress the effects these imbalances have on performance in tertiary, and specifically accounting postgraduate, studies. It is speculated that Commerce Academic Development Programme. at UCT and SAICA's Thuthuka project are well placed to affect some change.

The undergraduate degree that a student held was a significant characteristic of success. Business Science graduates outperformed other graduates at both the undergraduate and postgraduate level. The different structure and content of the Business Science degree compared to the B Com degree was postulated as being a reason for the different levels of success. Even though previous academic ability, as measured by faculty entrance points, may be the overriding explanation of the difference in performance, there was still a difference in the relative decrease in performance means from undergraduate level to PGDA between the two groups.

The admissions policy of the Commerce Faculty at UCT, stipulates that matriculation English and Mathematics carry twice as much weight as other school courses. In lieu of other measures, performance in English and Maths were used as proxies for Language and Numerical proficiency respectively. Both variables were significantly correlated to performance in the PGDA programme, with matric English performance contributing more to PGDA performance, but matric Mathematics explaining more of the variation.

However, the residuals of both regression equations were not normally distributed and exhibited heteroscedasticity qualities. This renders the models inadequate for use in setting admissions criteria, but the regression summary still produced some interesting information

These two variables in isolation respectively explained 11% and 12% of the variance in PGDA performance. However, when used in combination, they explained 18% of the variance. This indicates a low level of multi-collinearity and suggests that Numerical and Language proficiency individually contribute to performance in the Postgraduate Diploma in Accounting.

Summary

In summation, this research has investigated the cohort of students registered for the Postgraduate Diploma in Accounting course at the University of Cape Town from 1995 to 2001 and has found the following, race, secondary school education department and undergraduate degree, to be common success factors in academic performance.

White students outperformed non-white students, students who had a disadvantaged secondary schooling performed poorly compared to students whose schooling was not disadvantaged and Business Science graduates outperformed B Com and other graduates.

This research confirms the current admissions policy of doubling the matric scores for Mathematics and English, and not Accounting for entrance into UCT's Commerce Faculty undergraduate degrees.

It is hoped that the identification of the variables significantly affecting performance will assist the University of Cape Town in increasing the throughput of postgraduate accounting students and assist in changing the demographic profile of registered Chartered Accountants in South Africa.

Areas for further research

Trend analysis - Even though the student cohort is expected to be comparable across all the years, a trend analysis could be performed to determine if there are any trends developing. The findings of this current research identified a few trends that could be expanded on to identify any significant changes in the profile of successful postgraduate accounting students.

This is particularly pertinent to the goal of SAICA to increase the number of Black Chartered Accountants in South Africa. Such a study would be able to identify if there is an increase in Black students entering PGDA, and also determine whether these students were successful or not. Such an analysis could be used in conjunction with a survey or questionnaire to identify where student shortcomings potentially exist.

Analysis and prediction of student progression – this could take the form of a survival analysis whereby graduation/pass rates, academic exclusions and voluntary change in degree path could be quantified and analysed. A study of such a nature would also eliminate some of the limitations of the backward looking approach (as followed in this current research). Instead of merely quantifying the performance of various groups based on demographic variables, the variables could have a predictive validity in determining potentially successful students.

This predictive ability would also assist the Faculty in analysing the effectiveness and accuracy of entrance requirements. A sensitivity analysis, as used by Eckel and Johnson (1983), to determine the accuracy of setting entrance requirements could be performed in such a study.

Investigation into identified differences – as this current research addressed a wide range of characteristics, it was not feasible to perform exhaustive research into the reasons why differences existed. A limitation of the current research is that only demographic variables from a limited database were used. More detailed data collection and questionnaires for students could yield information that may determine why certain differences between groups existed. Future research could, for instance, examine reasons why females experienced a decrease in performance from undergraduate to postgraduate level relative to males.

Race and school comparisons – During this research a reasonable assumption was made that student race could be used as a proxy for educational department. Whilst this assumption may not have dramatically influenced the results of this research, it as an assumption that may warrant further research in isolation.

Miller (1992) speculated that the conditions that existed at Black schools prior to White schools being open to all races will persist until proven otherwise. Sufficient time has passed for an investigation to be carried out that will determine whether the effects of the apartheid governments systematic discrimination still persist at previously disadvantaged schools, and whether race can be used as a proxy for educational department in future research.

Chapter 7

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APPENDICES

A-1 Glossary and abbreviations used

CA	- Chartered Accountant
B Com	- Bachelor of Commerce degree
B BusSc	- Bachelor of Business Science degree ***(BBUSCI)***
DET	- Department of Education and Training
FEA	- Foreign Examining Authority
GDP	- Gross Domestic Product
GPA	- Grade Point Average: Common standard measure of academic achievement; used in America, Australia and many other countries worldwide
HoAss	- House of Assembly: previous regulatory body for Whites
HoDel	- House of Delegates: previous regulatory body for Indians
HoRep	- House of Representatives: previous regulatory body for Coloureds
HSRC	- Human Sciences Research Council
IEB	- Independent Examinations Board
MAF	- Management and Accounting Finance
Matric	- Common reference for final year of studies at a South African secondary school (accepted abbreviation of matriculation)
MBA	- Master of Business Administration
PE	- a student that wrote accounting as a subject in matric (Prior Exposure)
PGDA	- Postgraduate Diploma in Accounting
NPE	- a student that did not write accounting as a subject in matric (Non-Prior Exposure)
SAICA	- South African Institute of Chartered Accountants
Scholar	- learner at a secondary or primary school
Student	- learner at a tertiary institution
Technikon	- tertiary institution in South Africa that previously only offered diplomas
UCT	- University of Cape Town

A-2 Summary Statistics

PGDA Year	1995	1996	1997	1998	1999	2000	2001	Total
1st time passes	145	124	100	95	118	107	128	817
Total Enrolments	188	160	156	135	142	125	153	1059
Pass Rate	*77%*	*78%*	*64%*	*70%*	*83%*	*86%*	*84%*	*77%*
Mean Performance	54.57	55.34	52.40	53.07	56.53	57.07	55.24	54.83

Pass Rate and Mean Performance per year

Exhibit A-2.1

Groups	*Count*	*Average*	*Variance*
White	806	56.13	6.845
Black	83	49.82	5.584
Coloured	114	51.18	6.425
Indian	56	50.93	6.123
Total	*1059*	*54.83*	*7.066*

Mean Performance PGDA : Race

Exhibit A-2.2

Groups	*Count*	*Average*	*Variance*
Male	670	54.79	6.757
Female	389	54.91	7.579
Total	*1059*	*54.83*	*7.066*

Mean Performance PGDA : Gender

Exhibit A-2.3

Groups	*Count*	*Average*	*Variance*
PE	564	54.71	7.040
NPE	444	55.20	7.167
Total	*1008*	*54.93*	*7.097*

Mean Performance PGDA : Prior Exposure

Exhibit A-2.4

Groups	Count	Average	Variance
HoRep	69	51.17	5.965
HoAss	461	56.26	7.011
IEB	65	54.50	6.954
HoDel	13	49.04	5.693
DET	22	49.86	6.166
A Levels	13	54.28	8.893
Total	*643*	*55.13*	*7.176*

Mean Performance PGDA : Education Department

Exhibit A-2.5

Groups	Count	Average	Variance
BBUSSCI	335	58.54	6.251
BCOM	455	53.12	7.034
Other	189	53.11	6.370
Total	*979*	*54.97*	*7.124*

Mean Performance PGDA : Undergraduate degree

Exhibit A-2.6

Groups	Count	Average	Variance
< 21	112	54.24	6.799
21	356	55.30	7.229
22	364	55.32	6.768
23 - 24	131	53.34	7.134
> 24	96	53.96	7.494
Total	*1059*	*54.83*	*7.066*

Mean Performance PGDA : Age Groups

Exhibit A-2.7

A-3 Test Results

t-tests

	Male	*Female*
Mean	54.79	54.91
Variance	45.6541	57.43382
Observations	670	389
df	738	
t Stat	-0.25923	
P(T<=t) one-tail	0.397766	
t Critical one-tail	1.646922	
P(T<=t) two-tail	0.795533	
t Critical two-tail	1.963185	

t-test : Gender

Exhibit A-3.1.1

	PE	*NPE*
Mean	54.71	54.96
Variance	49.56585	50.42113
Observations	564	495
df	1037	
t Stat	-0.58086	
P(T<=t) one-tail	0.28073	
t Critical one-tail	1.646324	
P(T<=t) two-tail	0.561459	
t Critical two-tail	1.962253	

t-test : Prior Exposure

Exhibit A-3.1.2

ANOVA

ANOVA	***Race Group***						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*	*Accept?*
Between Groups	5826.963	3	1942.321	43.596	0.000	2.650	***Reject***
Within Groups	47003.522	1055	44.553				
Total	52830.485	1058					

Exhibit A-3.2.1

ANOVA	***Matriculation Department***						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*	*Accept?*
Between Groups	2795.968	5	559.194	11.771	0.000	2.260	***Reject***
Within Groups	30261.439	637	47.506				
Total	33057.407	642					

Exhibit A-3.2.2

ANOVA	***Undergraduate Degree***						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*	*Accept?*
Between Groups	6488.880	2	3244.440	73.399	0.000	3.040	***Reject***
Within Groups	43142.116	976	44.203				
Total	49630.996	978					

Exhibit A-3.2.3

ANOVA	***Age***						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*	*Accept?*
Between Groups	568.626	4	142.157	2.867	0.022	2.420	***Reject***
Within Groups	52261.859	1054	49.584				
Total	52830.485	1058					

Exhibit A-3.2.4

Scheffe's Method

Scheffe test;
Variable **PGDA Performance**
Error: Between MS = 49.584, df = 1054.0

	Age Group	< 21 54.241	21 55.301	22 55.316	23 - 24 50.338	> 24 53.957
1	< 21		0.749	0.736	0.911	0.999
2	21	0.749		1.000	0.115	0.600
3	22	0.736	1.000		0.108	0.586
4	23 - 24	0.911	0.115	0.108		0.980
5	> 24	0.999	0.600	0.586	0.980	

Scheffe's method : Age

Exhibit A-3.3.1

Scheffe test;
Variable **PGDA Performance**
Error: Between MS = 47.506, df = 637.00

	Education Department	HoRep 51.174	HoAss 56.260	IEB 54.503	HoDel 49.036	DET 49.864	FEA 54.262
1	HoRep		0.000	0.169	0.958	0.988	0.817
2	HoAss	0.000		0.593	0.017	0.003	0.959
3	IEB	0.169	0.593		0.237	0.191	1.000
4	HoDel	0.958	0.017	0.237		1.000	0.584
5	DET	0.988	0.003	0.191	1.000		0.645
6	A Levels	0.817	0.959	1.000	0.584	0.645	

Scheffe's method : Education Department

Exhibit A-3.3.2

Scheffe test;
Variable **PGDA Performance**
Error: Between MS = 44.553, df = 1055.0

	Race	Coloured 51.180	White 56.133	Indian 50.926	Black 49.817
1	Coloured		0.000	0.997	0.572
2	White	0.000		0.000	0.000
3	Indian	0.997	0.000		0.820
4	Black	0.572	0.000	0.820	

Scheffe's method : Race

Exhibit A-3.3.3

	Scheffe test; Variable **PGDA Performance** Error: Between MS = 44.203, df = 976.00			
	Degree Held	Other 53.111	BBUSSCI 58.541	BCOM 53.116
1	Other		0.000	1.000
2	BBUSSCI	0.000		0.000
3	BCOM	1.000	0.000	

Scheffe's method Undergraduate degree

Exhibit A-3.3.4

A-4 Subsequent Analysis

Undergraduate degree t-test

Business Science

	White	Non-white
Mean	58.72	56.19
Variance	39.25928	32.08771
Observations	311	24
df	333	
t Stat	-1.92222	
P(T<=t) one-tail	0.027716	
t Critical one-tail	1.649442	
P(T<=t) two-tail	0.055432	
t Critical two-tail	1.967113	

t-test : Race within Business Science

Exhibit A-4.1.1

B Com

	White	Non-white
Mean	54.99	49.80
Variance	48.46998	34.22803
Observations	291	164
df	453	
t Stat	-8.07445	
P(T<=t) one-tail	3.09E-15	
t Critical one-tail	1.648224	
P(T<=t) two-tail	6.17E-15	
t Critical two-tail	1.965214	

t-test : Race within B Com

Exhibit A-4.1.2

Other

	White	Non-white
Mean	53.79	51.28
Variance	40.60867	36.65144
Observations	138	51
df	187	
t Stat	-2.42767	
P(T<=t) one-tail	0.008072	
t Critical one-tail	1.653043	
P(T<=t) two-tail	0.016143	
t Critical two-tail	1.972731	

t-test : Race within Other

Exhibit A-4.1.3

Race ANOVA

White

ANOVA	***Undergraduate degree***						
Source of Variation	*SS*	*df*	*MS*	*F*	*P value*	*F crit*	*Accept?*
Between Groups	3198.337	2	1599.169	37.074	0.000	3.008	*Reject*
Within Groups	31790.052	737	43.134				
Total	34988.389	739					

Undergraduate Degree within White

Exhibit A-4.2.1

Non-white

ANOVA	***Undergraduate degree***						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*	*Accept?*
Between Groups	873.170	2	436.585	12.643	0.000	3.034	*Reject*
Within Groups	8149.759	236	34.533				
Total	9022.929	238					

Undergraduate Degree within Non-White

Exhibit A-4.2.2

A-5 Regression Results

N=997	Dependent Variable: **PGDA Performance** R= .34906026 R^2= .12184307 Adj R^2= .12096050 F(1,995)=138.05 p<0.0000 Std.Error of est: 6.6030			
	B	Std.Err of B	t(995)	p-level
Intercept	41.05190	1.199246	34.23141	0.000000
Maths Points	2.05607	0.174930	11.74868	0.000000

Regression summary: PGDA performance and Matric Mathematics points

Exhibit A-5.1

N=964	Dependent Variable: **PGDA Performance** R= .33682169 R^2= .11344885 Adj R^2= .11252728 F(1,962)=123.10 p<0.0000 Std.Error of est: 6.6749			
	B	Std.Err of B	t(962)	p-level
Intercept	39.55847	1.410823	28.03930	0.000000
Eng Points	2.45897	0.221624	11.09521	0.000000

Regression summary: PGDA performance and Matric English points

Exhibit A-5.2

N=953	Dependent Variable: **PGDA Performance** R= .42876866 R^2= .18384256 Adj R^2= .18212434 F(2,950)=107.00 p<0.0000 Std.Error of est: 6.3563					
	Beta	Std.Err of Beta	B	Std.Err of B	t(950)	p-level
Intercept			33.16318	1.585117	20.92033	0.000000
Maths Points	0.276197	0.030513	1.62923	0.179989	9.05181	0.000000
Eng Points	0.260057	0.030513	1.88257	0.220897	8.52284	0.000000

Regression summary: PGDA performance and Matric Mathematics and English points

Exhibit A-5.3