The Predictive Value of School Performance on the Success of Students in the Accountancy Stream at the University of Natal, Pietermaritzburg

By

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DECLARATION

I, Ingrid Ann Millar, hereby declare that this research work is my own original work and that all sources have been accurately reported and acknowledged. This thesis is being submitted in fulfillment of the requirements for the degree Masters in Commerce at the University of Kwazulu-Natal and has not previously been submitted at any university in order to obtain an academic qualification.

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ABSTRACT

Higher education in South Africa is currently undergoing enormous transformation with the traditional matric certificate being replaced by the new school leaving Further Education and Training Certificate (FETC). As a result the use of matric points as an entry requirement for prospective university students will no longer be possible with effect from 2008. The Education Ministry intends setting national admission criteria to which all of the country's universities and technikons would have to adhere. It is therefore an appropriate time to examine existing selection criteria and determine whether they achieve equity in the distribution of opportunities and provide fair chances of success to all those who wish to achieve their potential through higher education. The aim of this research is to find empirical evidence as to the predictive value, if any, of matric points on students' performance at university in the field of accountancy, and to establish whether a good mathematics result is a necessary prerequisite to studying accountancy as a major at university. In order to achieve this a longitudinal study using correlational and linear regression analyses was conducted on the results of two groups of students as they progressed from first year through to fourth year at the University of Natal, Pietermaritzburg.

The results showed that at the first and second-year levels there was indeed a positive linear relationship between the final marks of the first-year students and both the matric points held by those students and their matric mathematics results. The results of the linear regression analysis indicated that matric points are a stronger predictor of success in the first-year and second-year accounting course than the matric mathematics results.

At third and fourth-year levels, the analyses revealed a moderately positive linear relationship between performance in these two courses and the matric mathematics results. Interestingly, at this level matric mathematics became a more important predictor of performance than matric points.

While it may no longer be possible to use matric points as an entry requirement for university study due to the phasing out of the current matriculation certificate, it would seem obvious that some measure of high school performance would also benefit the selectors in providing access to those students most likely to succeed. This study has shown that school performance and mathematics ability, which have a significant impact on the performance of students in the accountancy programme at university, are important factors which cannot be ignored in whatever model is devised for selection.

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CHAPTER ONE
INTRODUCTION

1.1 Background to this Study

Higher education in South Africa is currently undergoing enormous transformation. This follows on from the changes that have already been implemented in primary and secondary education in the last few years (notably the introduction of the Outcomes Based education system). Some of the changes that have been tabled to take place in the next few years are radical, and will have a significant impact on higher education. One of these issues is the stated intention by the Minister of Education to eliminate the use of matric points as an entry requirement for prospective university students with effect from 2008. The Education Ministry intends setting national admission criteria to which all of the country's universities and technikons would have to adhere. This is in line with the current remodeling of the secondary education structure, with the traditional matric certificate being replaced by the new school leaving Further Education and Training Certificate (FETC). Potentially the FETC will increase the number of matriculants who are eligible for consideration for higher education from 13% to 52% of full-time school leaving examination candidates (Dawes, Yeld & Smith, 1999: 98). Furthermore, the Education Ministry intends to create a National Higher Education Information and Admission Service to facilitate the administration of student applications. It acknowledges that such a service will pose considerable design and implementation problems and therefore does not foresee this service being in operation in the short term (Government gazette, 1997: 29).

The South African White Paper on transformation of higher education (1997) identifies two of the aims of higher education as:

- Developing the individual's learning needs and aspirations by developing their intellectual abilities and aptitudes. Higher education is seen as an important vehicle to achieve equity in the distribution of opportunities and achievement among South African citizens.
- Providing the labour market with the high-level competencies and expertise necessary for the growth and prosperity of a modern economy. (Zaaiman, 1998: 31).

The Education Ministry's vision is to promote equity of access (opportunities) *and* fair chances of success (achievement) to all those that wish to realise their potential through higher education. A definition of success is not given, but for the purposes of this study is assumed to mean a pass in any particular course. The Minister of Education has proposed that students will need to be recruited from a wider distribution of social classes to ensure that the body of higher education students more accurately reflects the composition of the broader society. The higher education system in South Africa is currently characterised by low graduation rates and high student dropout rates. This raises the question: will increasing the higher education participation rate positively impact on the current poor student outflow rate? It would appear that the government's intention in changing the entry requirements and establishing a national norm is to increase equity of access. However, the danger of this is that the dual vision of education is being compromised in the attempts to increase access. In other words, it can be argued that it would be unfair to allow access (for the sake of equity) for students who do not have a fair chance of success. One needs to ask therefore if the selection criteria applied by universities ensures that firstly we are providing equal access and secondly, are we providing access to those students who have a fair chance of success? Historically, access to studying accountancy at university in South Africa has been limited to those students who have obtained a prerequisite number of matric points and a prerequisite minimum grade in matric mathematics, as these were believed to be an indicator of the students' potential for success.

South Africa's National Commission on Higher Education (NCHE) recommended in its 1996 report that the achievement of equity required a national target of a 30% participation rate to be set. In 2000 South Africa's gross higher education participation rate based on the 20 – 24 years age group was 15% if only universities and technikons were included, and 18% if technical colleges were also included. Both of these are considerably lower than those of developed countries (Pillay & Cloete, 2002: 56).

Among the challenges facing the higher education system as it attempts to satisfy the goals of national equity and development are:

- The participation rate in higher education in the relevant age group must increase
- The outflow of graduates from the system must improve

It has been argued that the desired increase in the participation rates is not possible given the current low output from the school system. The participation rate of 18% in 2000 equates to 700 000 students enrolled in public higher education institutions. The table below shows the gross participation rates and the potential higher education enrolments.

Gross participation rates		Head count enrolment in public higher education system
Actual 2000	18%	700 000
Forecast	20%	780 000
Forecast	25%	970 000
Forecast	30%	1 170 000

Table 1.1 Participation Rates and Potential Higher Education Enrolments (Pillay & Cloete, 2002: 57)

Addressing the issue of higher participation rates in higher education is an issue that could be examined entirely on its own. It is estimated that "about 40 000 school-leavers with full exemption and about 190 000 with matric but no exemption do not enter a public higher education system in the year after completing school. This is a considerable pool of potential entrants into the higher education system, which could, if it is tapped appropriately increase South Africa's higher education participation rates to levels close to the NCHE's proposed target of 30%." (Pillay & Cloete, 2002: 58). The question that one could pose is that if universities in South Africa continue to use matric performance as an entry requirement, are they doing so to provide access to *those who are considered to have a fair chance of success*, or is this requirement merely serving as a gate keeping tool? This question is particularly pertinent when one considers the option of raising the minimum matriculation points required in an attempt to ensure a high rate of success for those selected. Vehement antagonistics of using matriculation points have noted that "this is not solving the problem. This is an attempt to eliminate it by surgery, it is not addressing the reality that we face today" (Beard, 1991: 70). Some of the other issues identified by Zaaiman that need to be considered when selecting students are "increasing the numbers of applicants for post-secondary study; more heterogeneous students populations with respect to educational opportunity; problems with the identification of students with the potential to succeed despite previous educational disadvantage; the lack of students in science, engineering and technology programmes; under representation of female students from disadvantaged backgrounds in higher education; high failure and low retention rates; lack of transparency in selection practices; validated selection instruments and policies; and a lack of published research results on which to base new admissions policies and practices" (Zaaiman, van der Flier & Thijs, 1998: 98).

The relationship between performance at university and performance at high school is one that has received considerable attention. Much research had been conducted locally prior to 1994 on the impact that exposure to accounting at school had on first year students at universities. Hall concluded "that a student of relatively low academic ability (31 points) who has undertaken Accounting up to matric level is likely to survive the Accounting 1 course to the end of the year, whereas the student without matric Accounting will need to possess relatively high academic ability (35 points) to have a reasonable assurance of being in a position to write the year end examination" (1992: 163). Rowlands' study (1988) suggested that by the end of the first year of accounting studies, there is no significant difference in the performance of those students with previous exposure at high school and those students without. Both of these researchers, however, focused only on the value of matric accounting on student success at first year level. They did not examine the value of matric mathematics or the correlation between matric points and overall success in the Accounting field at university. Scholtz and Joubert (1985) examined the overall impact of school results on the performance of first year accounting students at the University of the Orange Free State. They narrowed their research to examine the variation in performance of those students who had, and those students that had not, studied accounting and mathematics at school. They concluded that "a pass in mathematics, preferably in the higher grade must be a prerequisite for Accounting at university level. (Our findings would seem to indicate that a mark of at least 60 percent on the higher grade level should be the minimum for registration of articles.)" In addition they noted that "those students who managed to pass first-year Accounting without any background of Accounting at school, were all strong on Maths" (1985: 190).

Prior to 1994 different standards existed at various high schools throughout South Africa as a result of the existence of provincially based educational bodies and examining boards drawn along racial lines. This meant that much of the research conducted up until this time concentrated on the historically white high school graduates within specific provinces. These variations in standards were confirmed by Mitchell and Fridjohn who concluded that "the Joint Matriculation Board and Indian Senior Certificate examinations produce students better equipped for university study than do the Transvaal Senior Certificate and, in some circumstances, the Natal Senior Certificate examinations" (1987:

555). This indicates that even the results of students within the same racial group were not necessarily comparable due to the differing standards of the provincial educational bodies.

The matriculation based points system at this moment in time (pre-1994) worked in the sense that it relied on the assumption that the secondary school system prepared students for university in a reasonably equitable manner. The obvious misconceptions of this assumption have in part been addressed by the merging of the various educational departments. There is no longer separate departments based on race and students nationwide write a common matriculation examination (with the exception of those students attending private schools who write the Independent Examinations Board, or IEB, matriculation examinations), however, this has by no means eliminated the discrepancies in educational offerings. Schools that operated under the former Department of Education and Training (traditionally black schools) and suffered the problems of under-qualified teachers, overcrowded classrooms and poverty, to mention a few, have not had these problems miraculously reversed. This means that while these students write the same matriculation examination, their preparation for those examinations is still not comparable. Since universities have opened to all students regardless of race, there has been a dramatic increase in demand for places by black students. Unfortunately these very students having been the product of inferior secondary schooling are ill-prepared for university, however, their matriculation results cannot be taken as a true reflection of their academic ability. This brings into question the reliability of using the matriculation results alone as an admission policy, as this will obviously lead to the unfair exclusion of a significant portion of black students from university. This issue of selecting educationally disadvantaged students is not one that is unique to South Africa and has received much attention in other countries as well.

There are other issues that exist which may cloud the whole issue of selection and which present challenges to the higher education institutions. One of the consequences of admitting students who are under-prepared for university are the potentially high failure rates and the subsequent impact on the annual government subsidies. Not only must selectors consider the academic criteria related to the questions of appropriate admissions policies and good selection packages, but they must also consider the economic impact of the public costs of tertiary education, the political issues of equality of rights and opportunities for tertiary education, and the psychological impact on students who may become demoralized by failure.

In the United States the Scholastic Aptitude Test (SAT) is widely used as an admission criterion. The validity of this admission criterion in terms of its predictive ability has been seriously questioned and as Shochet concludes "on purely statistical grounds there is no agreement as to whether the SAT overpredicts, underpredicts or simply does not predict for black students in the United States (Skuy et al, 1996: 111). The counter-argument to this is that the SAT is not intended to be used as a predictor of academic performance at university, but rather as a measure of current levels of academic achievement.

Research conducted in the United Kingdom by Mitchell (1985) also examined the effects of possessing school accounting qualifications on students' first level university accounting examination performance. While Mitchell concluded that it can be potentially rewarding to have studied accounting at school, he noted that "it is possible that Higher grade school accounting was not the only factor responsible for the pattern of results obtained" (1985: 85) and that "the possession of a greater general numerical ability by those who had taken accounting to this level at school could have contributed to the results" (1985: 85). In the United States, Eskew and Faley (1988) developed a model to explain the performance in the first year examination in financial accounting, by examining factors such as academic aptitude, past and present academic performance, effort and motivation, previous exposure to the same subject matter and exposure to more generally related subject matter areas. Their results suggested that these factors are significantly related to examination performance in the introductory accounting course. In particular their research findings revealed that contrary to previous findings, exposure to high school accounting not only facilitated student performance in the first part of the introductory accounting course, but throughout the course. With respect to general high school performance their study found that high school grades and university performance were highly intercorrelated (p146).

1.2 Objectives of This Study

The aim of this research is to find empirical evidence as to the predictive value, if any, of high school performance as measured by matric points on students' performance at university in the field of accountancy, and to establish whether a good mathematics result is a necessary prerequisite to studying accountancy as a major at university.

The objectives of this research are:

- To analyse the matric points of those students registered for the BComm degree at the UNP and who were registered for the Accounting 100 course in 1999 for the first time (hereafter referred to as the 1999 sample group) and who were registered for the Accounting 100 course in 2000 for the first time (hereafter referred to as the 2000 sample group).
- To analyse the matric mathematics results of the 1999 sample group and the 2000 sample group.
- To determine how many of the students in the 1999 and 2000 sample groups respectively proceeded to major in accountancy.
- To determine how many of the 1999 and 2000 sample groups respectively passed each successive year of study in accounting first time and to establish the rate of attrition of the 1999 sample group from 1999 through to 2002, and of the 2000 sample group from 2000 to 2003.

- To determine any correlation between the matric mathematics results and the pass rate of each successive year of study in Accounting for the 1999 and the 2000 sample groups respectively.
- To determine any correlation between the matric points and the pass rate of each successive year of study in Accounting for the 1999 and 2000 sample groups.

1.3 Research Questions

In this dissertation the following research questions will be addressed:

1) Is there any relationship between the performance in each successive year of study of those students (registered at the University of Natal in 1999 and 2000 for the first time) who chose to major in accountancy, and their high school performance as measured by the matric points that they achieved?
2) Is there any relationship between the performance in each successive year of study of those students (registered at the University of Natal in 1999 and 2000 for the first time) who chose to major in accountancy, and the matric mathematics result that they achieved?
3) Should high school performance and matric mathematics continue to be used as selection criteria by the new institution, the University of Kwazulu-Natal, formed through the merger of the University of Natal and the University of Durban Westville for students wishing to study accounting?

1.4 Research Hypotheses

The underlying hypotheses of this research are:

H_1 - There is a relationship between matric performance, as measured by matric points and achievement in matric mathematics, and the performance of students majoring in accountancy at the University of Natal, Pietermaritzburg.

H_0 - There is no relationship between matric performance, as measured by matric points and achievement in matric mathematics, and the performance of students majoring in accountancy at the University of Natal, Pietermaritzburg.

The performance of students majoring in accountancy at the University of Natal, Pietermaritzburg will be measured by examining a cross-section of year-end results obtained from two sample groups of students as they proceed from first year through to fourth (final) year.

1.5 Scope and Limitations of This Study

Matric mathematics and matric points essentially are intended as measurements of academic ability and predictors for success at university. The selection of students at the University of Natal into the BComm degree is based on these criteria. The 1999 sample group of Accounting 100 students comprised students registered for various degrees including the Bachelor of Commerce (BComm), the Bachelor of Social Science

(BSocSci), Bachelor of Science in Agriculture (BScAgric) and the Bachelor of Science Agricultural Management (BScAgricMgt). Entrance to the BComm degree was automatic for those students who had obtained a minimum of 32 matric points, and who had obtained a minimum of 40% on the higher grade or 60% on the standard grade for matric mathematics. Entrance to all degrees was subject to the overall discretion of the relevant Dean of the Faculty. Such discretion may have been applied where for example, an applicant does not have the requisite points or matric maths marks, however, the applicant is considered to have been so disadvantaged in the provision of high school education, that their matric results are not considered to be a fair reflection of their aptitude. In other words, their ability has been misrepresented as they may have the aptitude to succeed at university, but they have not been equipped with the necessary skills to do so. This discretion is by nature, subjective. Only BComm students will be included in the study.

Students attaining 50% or more in Accounting 100 and Accounting 300 may proceed to the successive year of study. However, a pass of 55% was required in Accounting 200 in order to be allowed to major in the subject. The aim of this was to ensure that those students who entered the third year had a reasonable chance of success, whilst discouraging those who were borderline from pursuing it on the grounds that they were less likely to succeed.

The population groups to be used will be obtained through purposeful selection of all students registered for the Accounting 100 course for the first time at the University of

Natal Pietermaritzburg in 1999 and in 2000 and who are registered for the BComm degree. Specifically excluded from the sample will be those students who are repeating the course, as their success is considered to be impacted upon by their previous exposure to the course.

The sample size will initially be approximately 250 students, however, this will be determined by the number of repeat students to be excluded from the sample. In addition, those students who completed their schooling outside of South Africa will also be excluded as their number of matric points and matric mathematics symbol cannot be determined. As this is a longitudinal study the population group will be diminished based on the rate of attrition and failure in each successive year of study.

The limitations of this study are as follows:

- For the purposes of this study the term "success" is used to indicate a pass in a particular course.
- Success at university is affected by numerous factors. Only the usefulness of matric performance will be examined as a predictor of that success. Distortions of the results may occur due to the impact of other factors, which will result in the null hypothesis being accepted.
- The factors influencing success are numerous and complex, and due to time constraints they cannot all be examined, and would need to be addressed by additional studies.

- Only students at the University of Natal will be included in the sample, and therefore it is questionable whether the results can be extrapolated to apply to other institutions in South Africa.

1.6 Research Methodology

The research for this study comprises the following:

(a) An assessment of relevant literature will provide information on what research has previously been conducted and the conclusions thereof.

(b) A review of relevant literature that will provide information on what the current practices are in South Africa in terms of admission requirements for the BCom accounting degree.

(c) A simple arithmetic analysis of year-end results for each successive year of study for students registered for the first year accounting course in 1999 and 2000. This analysis will show:

  - the rate of attrition, pass rate and average marks of students for each year of study.
  - the mean of the matric points of the students who passed each successive course in accounting.

(d) A statistical analysis of the results for each successive year of study for the 1999 sample group and the 2000 sample group respectively, using regression analysis and the Pearson's correlation analysis to determine whether any relationship between the variables exists, and if so, the strength of such relationships.

1.7 Organisation of the Remainder of this Study

Chapter one has introduced the background and purpose of the proposed study, a description of the questions to be answered by the study, the scope and limitations of the study and the proposed research methodology that will be applied in conducting the study.

In Chapter Two literature relevant to the study will be reviewed. The focus of this review will be to examine what research has been conducted in the past on the effects of school results on performance at university, both locally and internationally.

Chapter Three will examine the topic of selection, looking at the mechanisms involved and how best fair, effective and efficient selection can be achieved. A review of the various other factors that could be considered as predictors of academic performance are discussed in Chapter Four.

In Chapter Five a review of relevant literature to determine current practices at South African universities in terms of entry requirements is discussed.

Chapter Six will deal with the analysis of the results of the "1999 Sample Group" and the "2000 Sample Group". That is, the results of those students registered for Accountancy 100 in 1999 and 2000 that proceeded to major in Accountancy in 2001 and 2002 respectively, for each successive year of study.

A brief summary of the first five chapters, conclusions drawn and recommendations for future research will be presented in Chapter Seven.

CHAPTER TWO
PREVIOUS RESEARCH RELEVANT TO THIS STUDY

2.1 INTRODUCTION

After studying the existing literature it is evident that much research has been conducted on the effect of studying accounting at high school on the performance of students in the first year course of accounting. Other research has focused on the variety of factors that affect performance of accountancy major students at universities. Some researchers have examined the relationship between high school performance and performance at university in various other fields of study. However, very little research has looked specifically at the performance of Accountancy major students and the relationship between that performance and their high school results. A summary of the existing literature is provided below:

2.2 STUDIES IN SOUTH AFRICA

A distinction has been made between pre and post 1995 studies due to the integration of the departments of education for the different demographic groups, which took place during that year. Much of the pre-1995 research focused on historically white institutions with predominantly white students.

Pre 1995 Studies

The aim of Scholtz and Joubert's research was "to find the best indicators from school performances pointing to success in study in Accounting at university level" (1985: 190).

For the purposes of determining school performance matric Mathematics and Accounting results were used. The limitation of this research was that performance at university was focused entirely on performance in the first year course. The most interesting of their conclusions was that matric mathematics is a much better indicator of success in Accounting at the University of the Orange Free State than matric Accounting. "A good mark in Maths higher grade at school is virtually a guarantee of success in Accounting at first year level at UOFS. This, unfortunately, does not necessarily apply to Accounting" (1985: 90). Examining table 2.1 below it is apparent that merely attaining a pass on the higher grade for matric mathematics is no guarantee of success in the first year accounting course. Furthermore a standard grade pass was evidently insufficient for success in this course.

	Distinction Higher grade		Distinction Standard grade		Pass Higher Grade		Pass Standard grade		No Mathematics	
School Mathematics	9		4		118		57		10	
	June	Nov	June	Nov	June	Nov	June	Nov	June	Nov
UOFS Accounting:										
Distinction	4	4	1	-	2	-	-	-	-	-
Pass	5	5	-	2	57	60	11	10	1	-
Fail	-	-	3	2	59	58	46	47	9	10

Total: 198

Table 2.1: Comparison with mathematics at school (Scholtz and Joubert, 1985: 191).

	Distinction Higher grade		Distinction Standard grade		Pass Higher Grade		Pass Standard grade		No Accounting	
School Accounting	33		7		131		9		18	
	June	Nov	June	Nov	June	Nov	June	Nov	June	Nov
UOFS Accounting:										
Distinction	5	3	-	-	1	-	-	-	-	1
Pass	26	26	-	-	43	46	1	-	5	5
Fail	2	4	7	7	87	85	8	9	13	12

Total: 198

Table 2.2: Comparison with Accounting at school (Scholtz & Joubert, 1985: 191)

Table 2.2 reveals some interesting results regarding the relationship between school accounting and university performance. Noticeably, those students that studied accounting at school on the standard grade all failed the university first year course in accounting. In addition, only 35% of those students with a higher grade pass in matric accounting passed the first year accounting university course. 12% of the students with a higher grade distinction in matric accounting failed the first year university course. This is perhaps revealing of the significant differences between high school accounting and university accounting, where the former relies on method and procedure, whilst the latter course places greater emphasis on concepts and application. Conversely, of the 18 who had no matric accounting, 6 students passed the first year course.

Mitchell and Fridjhon (1987) examined the relationship between matriculation examination results from various educational authorities and university performance in the first year. The class of pass and average matriculation mark were used as measures of school performance, whilst university performance was measured in terms of the mean first year mark achieved by students. Their sample included over 14 000 students admitted to the University of the Witwatersrand over a five year period for different degrees, who had all written the matric examinations of five education authorities. Their results showed that the difference between the two marks varied according to the type of matriculation examination written. It is important to note that students who wrote the Department of Education and Training and Department of Coloured Affairs examinations were excluded from the study on the grounds that, in their opinion, "these two examinations are unrevealing of university potential" (1987: 555).

Jackson and Young (1988) devised a student selection model which they tested at the University of the Witwatersrand to determine if it could predict success among first-year biology students. The aim of this study was to determine the best predictors from a range of selected variables from the matriculation results (namely matric points, Biology and English symbols), and from National Institute of Personnel Research tests (NIPR) and diagnostic tests. Students in the sample were required to write a battery of tests which covered areas such as arithmetic reasoning, embedded problems, conceptual reasoning (the NIPR test battery); communication skills, biological knowledge and perceptive skills (the diagnostic test battery). Their findings showed that the matriculation Biology symbol, the matriculation points and the diagnostic test battery offered some measure of success in predicting the academic performance of first-year Biology students.

Research conducted by Fridman looked at whether secondary school accounting has an effect on the performance of students studying Accountancy at the University of the Witwatersrand. His research extended to include an examination of whether secondary school accounting interfered with the cognitive development of students' intellectual processes. Fridman's findings were drawn from a very small sample group, and were limited to the effect of performance in the first year accounting course. He concluded that students with matric Accounting performed better than students without matric accounting particularly in the initial stages of the course, however, that as the course progressed through the year the effect of high school Accounting became less pronounced. Fridman also concluded, "there is no significant difference between the groups as to their problem solving skills and intellectual abilities" (1987: iii).

Similarly, Rowlands' research confirmed the findings of previous research that students who had studied accounting at school enjoyed an advantage in the first year at university over those students who had not studied accounting at school, "but that this advantage declines as the first year progresses to the extent that by the end of the year there is no significant difference in the examination results of the two groups" (Rowlands & Jackson, 1990: 4). Rowlands expanded upon his initial research by canvassing the opinion of students as to whether an advantage was enjoyed by having studied accounting at school. This survey revealed that the majority of respondents indicated that with hindsight they would have taken accounting as a matric subject because of the advantages the students perceived this would have given them in the first year course.

On the other hand, Hall's research which examined the teaching of Accounting in secondary schools within the Natal education Department (NED), and the influence that exposure to Accounting at school had on the performance of students in the first year Accountancy course at the University of Natal, Durban revealed that students without matric Accounting had higher drop-out rates, lower pass rates and lower Accounting 1 marks than those students who had matric Accounting. This result was identified "despite the fact that there was no apparent difference in the academic ability of the two student groups" (Hall, 1992: iii).

There are a number of factors that may result in this apparent contradiction of findings. Firstly, one needs to consider that the conclusions of each of the above studies were drawn from the analyses of student data within one institution only, and that each institution drew matriculants from differing provincial education departments. While the content of matric Accounting may have been mostly comparable between provinces, the mode of delivery may have been significantly different. Hall noted that the Natal Education Department offered new subject packages from 1988, and that the "thinking approach" to teaching high school accounting had been adopted. He postulated that this might have had an effect on the quality of pupils electing to study accounting at school, and that the new approach allowed for students to be better equipped for studying accounting at university (Hall, 1992: 157).

A second factor to consider is whether the institutions involved in the above study offer an alternative course in the first year for those students not intending to major in accounting. The University of Natal, Durban introduced such a course in 1989. This had the effect of reducing the number of students with no matric accounting into the Accounting 1 course from 50% in 1988 to 25% in 1990.

In other fields of study, for example in the arts and sciences, research conducted by the HSRC in 1982 revealed that "the dominant picture to emerge from the wide range of statistical analyses was that school aggregate was the strongest single predictor of university performance" and that it "was the best predictor of final achievement" (Bokhurst, Foster & Lea, 1992: 60). Interestingly, Shochet's study in 1992 found that the matriculation aggregate was only a significant predictor for advantaged students. In his examination of disadvantaged students he observed that the matriculation aggregate was found to have a very low correlation to academic performance. Furthermore, he concluded that even in conjunction with other predictors, matriculation aggregate did nothing to enhance prediction of performance (cited in Skuy, Zolezzi, Mentis, Fridjhon & Cockcraft: 111).

Already before the merging of the education departments many parties were beginning to consider the possibility that using matriculation aggregates represented a discriminatory practice. One of the few studies conducted into the performance of black matriculants at this time was conducted by Potter and Jamotte in 1985 (cited in Beard, 1991: 65). They found low correlations between earlier school performance (grades 10 & 11) and final matriculation scores. They concurred that school results among black students were "dubious indicators of academic merit" (Beard: 66).

Post 1995 research

The majority of research that has been conducted in South Africa since 1995 has focused on the performance of students from previously disadvantaged backgrounds and who have subsequently entered traditionally white institutions.

Huysamen looked at the effects of a non disadvantaged university education on the university performance of students from a disadvantaged high school background and on the predictability of such performance. He conducted a longitudinal study of students studying a spectrum of courses over three years and found that first year results were better predictors of subsequent performance than were Matriculation results. In addition, he found support for the late blooming hypothesis that postulates that the university results of educationally disadvantaged students increasingly overlap from the first year to the final undergraduate year, with that of their educationally non-disadvantaged counterparts (2000: 146).

Zaaiman's research involved the evaluation and development of the University of the North Foundation Year (UNIFY) selection mechanism using empirical data extracted from 1994 to 1997. The UNIFY program is intended for educationally disadvantaged students with potential to succeed in the mathematics and natural sciences degrees. A secondary aim of his research was to identify general selection criteria which could be used in other programs. Zaaiman's research differed considerably from previous research in that the sample population consisted of ex-DET (Department of Education and Training) students. The results of this research showed that the ex-UNIFY students "consistently outperformed the direct entry non-UNIFY first-year students, many of whom had failed and were repeating first-year courses" in the BSc degree (1998: 174). In addition, Zaaiman stated that "the low pass rates of non-UNIFY students in the BSc 1 courses indicated that the entrance requirements of the Faculty of Mathematics and Natural Sciences were too low" (1998: 175). While this research did not focus on the predictive value of matric performance on performance at university, it did question the value of using DET Matric results as a predictor for performance on the UNIFY program. The main conclusion here was that "the Matric mathematics and physical science results are valid for the selection for an applicant who had similar educational opportunities. The Matric mathematics result was shown to be fair with respect to student background for the largely homogenous UNIFY student group...The use of Matric results in selection has to be evaluated by every institution for its own selection context" (1998: 176).

Pillay and Cloete (2002) examined co-operation scenarios between higher education institutions in the Eastern Cape in an attempt to meet the challenges presented by the Education Ministry. The authors identified three major challenges facing the South African Higher education system as it attempts to satisfy national equity and development goals:

1) the participation rate in higher education must increase

2) The qualifications and intended major patterns of the higher education system must move increasingly towards career-oriented qualifications in the fields of science, engineering and technology, and of business and management.

3) The outflow of graduates from the system must improve.

It has been argued that an increase in the participation rates in South Africa's higher education system are not possible, given the current low output from the school system as is depicted in figure 2.1 below.

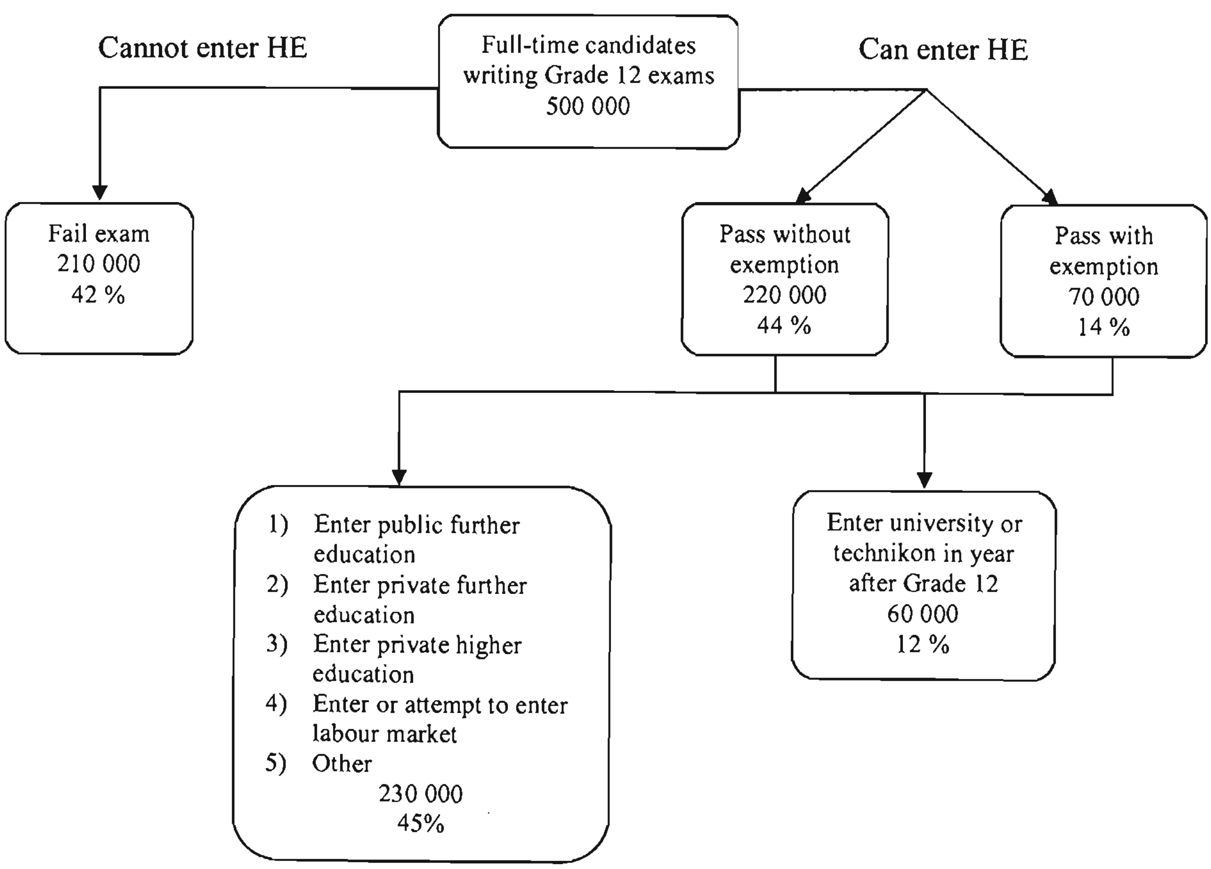

Figure 2.1: Outflows from the South African Public School System (Pillay & Cloete, 2002: 57)

Pillay and Cloete noted that in the Eastern Cape "more than 70 000 students emerge from the schooling system each year but without access to higher education, either because of a poor matriculation pass or because they have failed the examination" (2002: 5). These researchers suggest that higher education should be targeting these students by attracting students with potential into higher education programs, but with pre-degree courses to prepare them for traditional higher education courses.

Improved access could be achieved by providing quality foundation courses that are credit bearing and clearly articulated with existing academic programs. For example, in the 1990's East London College offered a one-year foundation program for entry into Rhodes University i.e. collaboration should take place between colleges and universities.

Their study reveals that in 2000 only one half of all matriculants in the Eastern Cape took mathematics. Table 2.3 reveals that only 37% of the 42 026 students who wrote the matric mathematics examinations passed, of which only 3% were on the higher grade. "These figures suggest that an overwhelming majority of candidates who sit for the matric examination each year in the province are excluded from access to a range of higher education programmes, especially in engineering and sciences, medicine and commerce" (Pillay & Cloete, 2002: 52).

SUBJECT AND GRADE	CANDIDATES WROTE	CANDIDATES PASSED	% PASS
Maths HG	1 437	1 084	75
SG	40 589	14 427	36
Science HG	2 240	992	44
SG	23 337	10 284	44
Biology HG	19 689	4 046	21
SG	40 510	15 981	39

Table 2.3: Matriculation Pass Rate in Eastern Cape in 2000. (Pillay & Cloete, 2002: 52)

The higher education system is characterised by poor student outflows due to low graduation rates and high student dropout rates. Data for 2000 and 2001 academic years indicate that about 90 000 of the 600 000 registered in universities and technikons did not re-register in 2001 i.e. about 15 % drop out rate (those that had not completed their qualification). Only 14% of students enrolled in 2000 graduated at the end of the year.

While their research is not specific to the current research being undertaken by the author, it does indicate the problems of access and performance, and raises the question as to whether school performance is relative to performance at university.

These findings strongly suggest that the possession of high school accounting provides an advantage for first year accounting students at university, however, none of them prove conclusively that a good result in high school accounting is a predictor for success for those students wishing to major in accounting. Students entering university with high school accounting are more likely to do well in the first year and "students who do well in the first year at university course are more likely to choose accounting as a major subject for their degrees and thereafter enter the profession" (Rowlands, 1998: 6).

A study conducted by Skuy, Zolezzi, Mentis, Fridjhon and Cockcraft (1996) in the Faculty of Commerce at the University of the Witwatersrand examined the value of a dynamic approach to assessment, together with the assessment of megacognition and learning approaches and strategies. In addition, the study aimed to examine the relative value of various conventional predictors including matriculation for disadvantaged versus advantaged students. The findings of this study were that the matriculation results and other conventionally used criteria for university selection are not adequate predictors of academic performance for either advantaged or disadvantaged students. They concluded that there is a strong need for an alternative approach to selection, including the review of alternative entry programmes (1996: 117).

Dawes, Yeld and Smith (1999) conducted a study to find a reliable means of selection to higher education that maximized the use of the matriculation examination while effectively widening access for historically disadvantaged students in a cost-effective and logistical manner. They proposed adopting a procedure whereby the matriculation aggregate obtained by applicants at a particular school are used to derive a rank for that school, and assign an indicator (expressed as a percentile) to each applicant which reveals his/her position on that rank for that exam. Such an indicator was termed a place-on-exam (PoE) indicator (1999: 98). The advantage of using this indicator is that individuals do not become victims of their circumstances, but rather are assessed in terms of their relative position to others who have received the same educational opportunities. In addition, the PoE provides a measure of relative merit which is independent of differences between schools, provinces and years. The conclusions of the study were that there was a strong suggestion that the PoE is a useful indicator of subsequent academic performance at university, however, the usefulness was only applicable to those students who matriculated in the year immediately prior to admission to university (1999: 103).

2.3 STUDIES IN THE UNITED KINGDOM

In the United Kingdom, selection of students into higher education is based on applicants' A-level school results, and in some cases the use of interviewing.

A study conducted at the University of Edinburgh in 1985 by Mitchell, looked at the effects of possessing a school accounting qualification had on the examination performance of first level accounting students at university. Among the conclusions drawn from this research was the fact that it can be potentially rewarding to have studied accounting at school. The main advantage of school accounting derives from the extra experience and practice which school accounting provides in the technical and computational aspects of the subject. Mitchell noted, in response to students who studied accounting at higher grade and showed significantly better performance than those with ordinary grade accounting, that "the possession of a greater numerical ability by those who had taken accounting to this level at school could have contributed to the results" and that “it is possible that higher grade school accounting was not the only factor responsible for the pattern of results obtained” (1985: 85).

In 1984 the department of Education and Science in the United Kingdom researched the possible applications the American Student Potential Program (SPP) in British education. SPP is an assessment technique involving extensive interviewing specifically designed for use in education but based on work in the management field. It assesses personal effectiveness or ‘enterprise skills’ i.e. critical thinking, initiative, leadership, planning skills, and interpersonal skills. In Britain these skills have been identified as vocational qualities that underlie skill and knowledge and ensure ‘competence’. SPP was designed to identify those qualities believed to be associated with success in American higher education. The British research did not conclude that SPP predicted success in education or training, neither did it conclude the reverse.

The British review of SPP found that existing alternative entry processes fail to ensure a substantial recruitment of non-traditional entrants, and there is evidence that concern about costs and quality discourage wider access. "“It is questionable how far other selection tools in use in British education (like ‘A’ level scores) are used for predictive, rather than gatekeeping purposes” (Otter, 1989: 3) A major barrier to access to higher education for adults and non-traditional entrants is the issue of entry selection procedures which fail to recognise relevant experience and potential. It has been argued that existing approaches to this issue are either expensive (access courses and accreditation of prior learning), or too subjective and unreliable to be used on a large scale (informal interview processes). As a result, caution, financial pressures and a concern to maintain quality (defined by traditional 'A' level criteria), all combine to exclude non-traditional learners from higher education. Otter comments that "the principal admission tool in use in higher education, the 'A' level point score, is also seriously limited as a predictor of success in terms of degree classification and is used in most institutions, not as a predictive tool, but as a mechanism for controlling the entry flow of students" (1989: 36).

2.4 STUDIES IN THE UNITED STATES OF AMERICA

Most colleges and universities in the United States use high school grades (referred to as GPA or grade point average) as their primary selection criteria. In addition to this, many institutions rely on external entrance examinations like the Scholastic Aptitude Test (SAT) or American College Testing Program (ACT) as the second most important criteria for selection.

US researchers, Manski and Wise, have found that "how selective an institution is in its admission policy is a measure of quality for many students" (cited in Paulsen, 1990: 28). On average the attractiveness of college increases with this measure of quality. However, generally students prefer to attend a college where the average aptitude of students is equal to, or only moderately exceeds their own aptitude. A typical student "would be most likely to choose the college with an average SAT score about 100 points higher than his own. He would be less likely to choose a school with a higher average, and also less likely to choose a school with a lower average...a student does not necessarily prefer the highest quality school" (Paulsen, 1990: 28)

Cheng and Saemann's study focused on the impact of accounting courses on the retention and attraction of high quality students to the accounting major. This was achieved by addressing two questions: is the pool of students studying accounting at university high quality relative to the general population and whether or not analytical aptitude is more important than verbal aptitude in studying accountancy. To assess student quality, the SAT scores were taken into consideration together with the grades for high school Mathematics and English. The results of their study reflect that students who majored in Accountancy tended to be stronger in analytical skills than in verbal skills (1997: 500).

Baldwin & Howe found that high school bookkeeping experience facilitated student performance only in the early stages of a first college-level accounting course; the reverse was true in the later stages of the course (cited in Eskew & Faley, 1988: 138). Bergin found that high school accounting experience had no significant differential effect on performance in a first college-level financial accounting course (cited in Eskew & Faley, 1988: 139). The aim of Eskew & Faley's research was to develop some kind of model to explain student performance in the first year financial accounting examination. They concluded that pre-college exposure to accounting was helpful throughout the first college-level accounting course (one semester course), and that ability (measured by SAT scores) and high school grades are significantly related to examination performance in this introductory course.

Turner, Holmes and Wiggins (1997: 285) examined a wide variety of factors associated with grades in intermediate accounting including gender, intended major, introductory accounting results and whether or not the course was being repeated. Their findings revealed that the cumulative grade point average "provides an indicator of both the student's innate abilities and that student's work ethic".

2.5 STUDIES CONDUCTED IN OTHER COUNTRIES

In Colombia the ICFES score is frequently used as the main admission criterion for University entrance. The ICFES is the Colombian national examination , the Instituto Colombiano para el Fomento de la Educacion Superior, which examines four major areas: Science (biology, chemistry and physics), social sciences, language (verbal aptitude and Spanish), and mathematics (mathematical attitude and mathematical knowledge). A study conducted at The Universidad de los Andes examined the relationship between the ICFES scores and students academic performance. Two different analyses were carried out. The first analysis examined what was termed the "probability of success at the university" (Ardila, 2001: 413). This was defined as the probability that a student would obtain a professional degree. This study was conducted across all twelve of the university's faculties. The minimum ICFES score necessary for entry to university depends on the specific faculty, but on average is 290 out of 400 points. The findings revealed a positive relationship between the total ICFES scores and the probability of graduating with a degree. "The probability of success was more than

80% in every faculty when students obtained an ICFES score equal to or higher than 380 (out of 400). However, there were differences among the faculties" (Ardila, 2001: 413).

The second analysis examined the correlation between the ICFES scores and academic performance. Academic performance was further defined in terms of the students' grade point average (GPA) in the first semester and then the students' GPA over their entire university career. The conclusions drawn from this analysis were that there was a small significance between the ICFES scores and academic performance, however, the predictive value of the ICFES scores depended largely upon what faculties and what scores were included in the analysis. Furthermore, the total ICFES scores were of less value than the scores on the individual subtests of the ICFES examination. "Whereas some subtest scores (e.g. mathematics) were good predictors in most faculties, others (e.g. biology) were weak predictors in virtually all academic areas." (Ardila, 2001: 415).

In Jamaica, the business sector is increasingly requiring prospective employees to hold certification in some courses. This has led to a rapid increase in the demand for tertiary education. The Mona campus of the University of the West Indies has seen an increase in full time enrolments over the eight year period 1984 to 1992 of 28 percent and a 51 percent increase in part-time enrolments. A large majority of the part-time enrolments are students who have not been able to enter university in the traditional manner. The traditional method of entry to the University of the West Indies is by firstly obtaining a place in a traditional grammar high school (approximately only one in six pupils are given this opportunity), and secondly by passing 5 or more O Levels and 2 or more A levels. A study was conducted at the Mona campus due to the great concern over the very high failure rate of the part –time students. The conclusions of this study were that "The failure rate of part-time students is almost twice that of full timers (32 versus 18 percent). Using student level course grades and information from admissions records, we estimate that less than half of this difference is explained by differences in pre-entry qualifications, demographic characteristics and choice of major, leaving an unexplained difference of 9 percentage points. We attribute this remaining difference to two factors: different (lower) levels of motivation and greater time constraints for part-time students" (Handa & Gordon, 1999: 288)

The education system in Malaysia consists of the primary, secondary and tertiary levels. At the secondary level, there are academic schools, national religious schools and technical schools. The students in the national religious and academic schools are assessed in the national examination called the Malaysia Certificate of Education or SPM, while students at the technical schools are assessed in the national Malaysia Certificate of Education – Vocational examination, the SPMV. The results of these examinations are extremely important as they determine entry to the post-secondary level of education (pre-university). Students' entry to university in Malaysia is dependant upon the results obtained in the post-secondary phase, which comprises three programs: the matriculation program, the Malaysian Higher School Certificate (STPM) and the certificate program. At the Faculty of Business and Accounting at the University of Malaya, "the entry requirement for degree in business administration and accounting is based on the students' result obtained in the matriculation programme and the Malaysian Higher School Certificate (STPM) (Alfan & Othman, 2005: 332).

Studies conducted at post-secondary level in Malaysia by Onn in 1999 revealed that the relationship between socio-economic status and performance in the accounting paper was insignificant (cited in Alfan & Othman, 2005: 333). Ho's research also revealed that academic performance was related to the attitude of students towards the work, interest, time, perception of parental support, and teachers' influence and socio-economic status (Alfan & Othman, 2005: 333). A study carried out at the University of Malaya by Isa *et.al.* found that students with good grades for English tend to outperform those students with poor secondary school English grades (cited in Alfan & Othman, 2005: 333). While Tho's research revealed that "the students' performance in the first year accounting course measured by the result they obtained is dependant on their performance in STPM Economics and mathematics (cited in Alfan & Othman, 2005: 333). Alfan & Othman's own research (2005) confirmed the latter's findings in that they stated that "the students' performance in the degree of business and accounting programme is closely related to their performance prior to entering the university especially in subjects like mathematics in the SPM level and economics in the STPM level" (2005: 340). They did also conclude however, that there are other variables that could influence students' performance at University.

CHAPTER THREE

FAIR, EFFECTIVE AND EFFICIENT SELECTION

3.1 INTRODUCTION

The need for selection and the kind of selection that takes place at tertiary institutions will be determined by the socio-political situation in a country. In South Africa, as in many other countries, the applicants are increasingly coming from heterogeneous backgrounds rather than from homogeneous ones. Selection is a critical process as it should aim to ensure that those students who have a reasonable chance to succeed in an academic program are identified. Furthermore it can be argued that selection plays an important role in identifying those individuals who will proceed to finding success in their future careers. Student attrition carries with it the consequences of wasted time, money and human resources and an efficient selection process should aim to minimise these wastages. Selecting effectively will benefit the students, the faculty, the corporate environment and ultimately society. The purposes of selection should be to identify those students who possess a particular configuration of characteristics required to achieve academic and career success. Proper selection has the potential to improve academic success and to decrease the financial strain on tertiary institutions as a result of student attrition. Furthermore, selection must ensure that it is unbiased as it must not place one group of students at an advantage or disadvantage. Selection must therefore be effective, efficient and fair and must serve the purposes of higher education. The main purposes of higher education as described in the White Paper on the transformation of higher education are:

1. To meet the learning needs and aspirations of individuals by developing their intellectual abilities and aptitudes. Higher education is seen as a key allocator of life chances and an important vehicle to achieve equity in the distribution of opportunity and achievement among South African citizens.
2. To address the development needs of society and provide the labour market with the high-level competencies and expertise necessary for the growth and prosperity of a modern economy.
3. To contribute to the socialisation of enlightened, responsible and constructively critical citizens.
4. To contribute to the creation, sharing and evaluation of knowledge in all fields of human understanding through research, learning and teaching. (Education White Paper 3, 1997: 8).

Selection goals should be clearly identified as they will guide the selection process. Specific goals should include identifying the type of student to be selected, the programme for which selection is undertaken and the required success rate of students.

It has already been noted that the Education Ministry wishes to increase the higher education participation rate in South Africa. This is particularly challenging given that higher education in South Africa is currently characterized by high drop out rates and low graduation rates. Given these outcomes which the education ministry wishes to achieve, it is necessary that South African universities apply selection criteria that ensure

- Equity of access
- Access to students who have a fair chance of success and thereby will be able to feed the job market
- Access to students with reasonable aptitude to ensure that high standards of research, learning and teaching can be accomplished.

Maxwell (cited in Zaaiman, 1998: 31) states that the term equity implies a fair, impartial and unbiased assessment of relevant qualities and capabilities during selection. Currently there is an inequitable distribution of access and opportunity for students with respect to race, gender, class and geography in South Africa.

Satisfying the requirements of equity and effectiveness in a just, efficient and acceptable way is difficult. This is especially true in a country where past injustices have left members of certain population groups more disadvantaged than others. The selection of students with the highest probability to succeed may lead to under-representation by the disadvantaged groups. The selection of more disadvantaged students through the process of affirmative action may lead to a smaller probability of success in the selected group, and the rejection of qualified, privileged applicants. "The selection practitioner must find the optimal fit between fairness and effectiveness for the required situation" (Zaaiman, 1998: 32).

The selection process should be examined in the light of the stated objectives to ensure that the best fit is found between fairness and effectiveness. An effective selection system ensures that the desired outcomes are achieved. An efficient system is one that works well, without unnecessary duplication or waste, in an affordable and sustainable manner, given the logistical constraints of time and the number of applicants. Ideally, selection needs to take place in such a way that all legal aspects are considered, and that the process is deemed to be ethical and fair. The mechanisms of the selection process include selection tests, selection policies and selection procedures. Selection tests (if used) are intended to identify those applicants who are likely to be successful. Selection policies are designed to ensure that the selected student group is the actual group for which the program is intended. An example of such a policy may be ensuring that students who have been educationally disadvantaged are selected for any access or alternative entry programme. The selection procedures involve the practical implementation of the selection system including advertising, preparation for selection, testing and decision processes. It is necessary to explore whether or not these mechanisms are valid in terms of achieving the purposes of higher education in a fair, efficient, effective, legal and ethical manner. A discussion of these concepts follows.

3.2 VALIDITY

Before one examines the fairness and efficiency of the selection process, it would be beneficial to determine the extent to which selection methods have been tested and to understand whether or not such testing is in itself valid. Certain criteria need to be employed to facilitate the selection process. The most widely used criterion is that of previous performance which is universally held to be one of the most reliable indicators of performance. Such indicators, for example, examination results, are extremely useful to decision makers. Laurillard explains this in the example of making a decision about the employment of a graduate,

"...it is very useful to have had a collection of academics distil their experience of a student's abilities into a single number. Although it gives a rather incomplete picture of the student, it would be impossibly inefficient if every employer had to go through the same procedure as every examiner. But, unfortunately, the very properties that make indicators of performance useful - the fact that they reduce a complexity of subjective judgments to a single objective measure, and the fact that they are context-free (e.g. degree class is taken as an indicator of ability to do research, to teach, or to practice a variety of other professions) - these very properties also call into question the validity of the indicators themselves" (cited in Billing, 1979: 187).

When selectors use the "objective measures" described by Laurillard above, there are certain underlying assumptions that come into play. Firstly is the assumption that there is some aspect of the individual, for example, intelligence, that is stable and quantifiable. The problem with this assumption is that any one individual proves this assumption incorrect when they achieve high results in one course, and perform poorly in another course. Individuals' abilities thus vary greatly according to the context within which they are operating.

Another assumption is that these "objective measures" carry with them a degree of invalidity. When selection takes place it is probable that "in using the various objective indicators that surround us, we take account of their inherent invalidity; knowing that they are neither stable nor generalizable, we interpret the numbers according to our understanding of the relevant system" (Billing, 1979: 189). This would be the case when selectors bear in mind that the matric results of students from varying education authorities are not necessarily comparable.

Other selection methods currently in use by various institutions including entrance examinations, references and interviews should also be examined in terms of their validity as selection criteria. References are not frequently relied upon as selection criteria because of their perceived invalidity. They may be poor predictors because they are not easily quantifiable and also because applicants are likely to only include those references which they know will be positive and beneficial. They therefore are not necessarily objective, however, this could be overcome by using a standardized form which referees are required to complete.

The use of selection tests or entrance examinations is intended to eliminate the differences that exist due to the diverse preparation by secondary schools of university applicants. Usually such tests will consist of a language component, an abstract reasoning component and a content-specific component such as mathematics. While the aim of such tests is to achieve fairness and equity, the validity of such tests is questionable. This is because it is very difficult to develop a test that is context-free and that is not dependant on prior learning and experience. As Miller (1992) noted "The problem is that a measuring instrument must be neutral and must not itself influence that which is being measured. A crude example serves to illustrate the point. If the test requires the testee to read the items, then reading proficiency, which certainly is dependant on prior learning and experience, will contribute to the test performance even though the test is not intended as a reading test" (p.99). Because such a test therefore depends on prior learning, it is inevitable that students from different secondary schools will produce different results. It could be argued then that these different test results, whilst accurate in the sense that they correlate with performance at university, demonstrate that the test is unfair, if it is used as the primary basis of selection of students irrespective of their educational backgrounds.

A way around this problem has been the use of the 'Dean's discretion', whereby matric points are used for the majority of students, but different criteria are used for other students, particularly those from the previously disadvantaged groups. In the case of the latter, a quota system may be adopted whereby candidates with potential are identified. The procedure for identifying such potential is at best subjective and opens the door to criticism of fairness in allowing entry to students who have a much lower probability of success at university. However, the problem of developing a test that can accurately predict or measure potential is monumental and, until such a test is developed, proponents of a differential selection system will argue that despite the apparent inequity of such a system it goes some way to redressing the inequities that existed in the past in South Africa, and from which many applicants are still suffering.

In a study conducted by Levine, Knecht & Eisen to evaluate a number of interviewing methods among nursing students, it was found that none of the interviews significantly correlated with academic performance (cited in Wilson, 1999: 184). At the School of Nursing at the University of Missouri-Kansas City, admissions in the early 1990's were based on the academic criteria of previous performance (Grade point averages) and on the non-academic criteria of interviews, references and essays. While the use of interviews was perceived as aiding in the selection onto postgraduate courses, the process was found to be subjective and inefficient.

By finding and implementing an optimal combination of valid and practical predictors the effectiveness and fairness of the selection mechanism will be maximized. So, for example, use of group membership may be used as a predictor if it adds significantly to the predictive validity of a test.

3.3 EFFECTIVENESS

An effective selection system is one that achieves the desired outcomes, i.e. the selection goals. In other words a highly effective selection mechanism will ensure that a high percentage of successful students are selected, and that as few of the potentially successful students are rejected as possible. These goals must be clearly identified in order to determine the effectiveness of the system. Examples of such goals include the type of student being selected, the programme selected for and the success rate required.

The social and financial costs of selecting the wrong students are high. Selection should therefore aim to reduce the number of false positives (students selected who fail) and false negatives (students not selected who would have passed). An effective selection mechanism will select a high percentage of successful students and reject as few potentially successful students as possible. Factors that should increase the effectiveness of a selection test include high predictive validity, selecting top-down instead of at random above a cut-off score, and a large applicant pool that is varied in ability level around the required ability.

It would be greatly unjust to evaluate the effectiveness of a selection system in isolation. It is proposed that due to the change in selection goals in South Africa, particularly with respect to achieving equity and a higher participation rate, that not only the selection methods should be reviewed. If course designs and structures remain unchanged then redesigning the selection process to ensure greater equity and more students with access to university, is only going to result in higher drop out rates and lower graduation rates. What needs to be addressed is that academic departments embrace the goals of the education ministry, by introducing mechanisms that will assist previously disadvantaged students, thereby providing them with a greater chance of success. Many institutions have already made advances in this direction through the introduction of access programmes.

3.4 EFFICIENCY

An efficient selection system operates optimally under the existing practical and logistical constraints, such as financial constraints, time limitations, applicant numbers and available resources, without unnecessary duplication and waste in an affordable and sustainable manner. Selection methods could be evaluated in terms of their ability to predict later academic performance in comparison to the costs of selection. One system will be more efficient than another when the productivity benefits of those selected minus the costs involved in the selection, are greater for that selection mechanism than for the other.

One aspect of efficiency is the cost of selection. – referred to as 'utility'. Formal selection utility models are complex and have limited application in practice. If all applicants are selected the utility would be negative because of the unnecessary costs involved. Conversely where only applicants who are most likely to succeed are selected the utility of the selection model is positive.

Several researchers have supported the notion of interviewing as a selection technique. While this may increase the number of students identified who are likely to succeed, the time constraints deem it inefficient to do so, particularly in a course that attracts a large number of applicants, such as a first year accounting course. The use of interviewing may be more beneficial in selecting students into senior or post-graduate courses, because of the smaller number of applicants or places available on the course. Even so, the question of fairness may arise if an applicant is rejected on the grounds of a poor interview, when their previous performance is acceptable. In practice then, the requirements of fairness and effectiveness are subject to the requirement of efficiency.

With the abolition of the use of matric results as a prerequisite for entry to university in the near future, some other more efficient selection system will have to be adopted. One possibility is the use of entrance examinations. The advantage of this is that it can be administered en masse and allows all applicants to be measured by the same yardstick. Unfortunately what it does not take into account is the standard of preparation applicants have received through their secondary school education.

3.5 SELECTION ETHICS

Fair, effective and efficient selection requires institutional accountability to all parties affected. This includes all applicants, the successful selected students, the program for which they have been selected, the school system from which the applicants emerge, and the working community.

For all applicants, not being selected generates feelings of rejection and disappointment that can lead to a sense of inferiority and injustice among applicants. Non-selection may result in an applicant having to change their intended course of study, which can impact on their career plans, or changing to an alternative institution which may have serious financial implications if it involves a geographical move away from home. Therefore selecting a student carries as much responsibility as rejecting one. By declining 'at risk' applicants, it can be argued that the stress of failure by students can be avoided, thereby allowing them the opportunity to pursue a career better suited to their academic ability.

Given the current pressure that is being placed on institutions in South Africa to achieve equity on the basis of race and gender, it is tempting to select more previously disadvantaged students into a course above previously advantaged individuals. However, the high failure rate and corresponding low progression rates of under prepared black students reflects a failure to support disadvantaged students adequately after admission. It would be unethical to admit students for the benefit of the institution and not for the good of the students themselves. It is imperative therefore that equity of access must be complemented by a consideration of the equity outcomes. In order to prevent a 'revolving door' syndrome occurring whereby increased access leads to failure and/or drop out rates, attention needs to be paid to the articulation gap between the preparedness of school leavers and the demands of the higher educational programmes for which they wish to study.

Morrow, in his discussion of access, distinguished between formal and epistemological access (cited in Zaaiman, 1998: 37). Formal access means the ability to gain entrance to a programme. Epistemological access concerns learning how to become a participant in academic practice. Not only does the level of the program impact on the further achievement by the selected student, but the level of selected student will impact on the quality of the program. He also emphasises the student's responsibility to be an active participant in the academic process. "A recognition of previous disadvantage does not imply an entitlement to success. Both institution and student have to carry the responsibility of eventual achievement" (Zaaiman, 1998: 37).

There is undeniably a link between socio-economic status and educational disadvantage, which cannot be solved by simply removing barriers to application to entry. The question that can be asked is if access for students from working class backgrounds is widened, can these students be retained? Haque states "in fact, universities may be exacerbating the 'disadvantaged position' of some minority ethnic and lower social class groups because they have not sufficiently examined issues relating to access to university, or monitored students' retention and performance once they are in the university system" (cited in Walker, Matthew & Black, 2004.: 45).

An ethical approach to selection involves the institution's responsibility to select students with an adequate chance of success. It is suggested then that selection should be seen as an implicit contract to teach at that student's level. It is therefore vital that selection mechanisms be closely coupled to the program selected for and selected students must be able to claim adequate support to be able to succeed. It is obvious then that issues of selection and access are closely related to issues of retention and success. .

Another ethical aspect is the effect that tertiary institutions' selection mechanisms have on secondary schooling. Access policies that convey scepticism about the validity of matriculation results can undermine the aspirations and ambitions of both teachers and learners in the school system. Selection based solely on matric results can also be negative if it serves to encourage rote-learning and exam-training type of school education to ensure good final results. A selection system would be positive if it encourages insight and the application of subject-related knowledge. In the Unites States coaching for entrance exams has become problematic in that wealthier homes typically have greater access to such coaching. This situation further disadvantages already disadvantaged students. Coaching can have a place as long as it is accessible to all applicants, and it teaches them the knowledge, skills and abilities needed to succeed in further education. "Responsible selection requires institutional accountability to all those affected: the applicants, the selected students, the programme selected for, as well as to the school system that prepares the applicants" (Zaaiman, 1998: 37).

3.6 LEGAL ASPECTS

Internationally

Internationally, the provision of basic education is seen as a basic human right. According to the United Nations' Universal Declaration of Human Rights of 1948, higher education should be accessible to all on the basis of merit. In the Unites States the Civil Rights Act of 1964 prohibits discrimination on the grounds of race, colour, sex, religion or national origin. The need for affirmative action to ensure equal participation by minorities and women was accepted by a ruling known as Executive Order 11246. While most institutions initially adopted affirmative action policies, such practices have been challenged in the courts. Two landmark rulings impacted significantly on admissions policies in the United States: In Brown vs. Board of Education equal access to education for racial minorities was mandated in 1954. In the Bakke case the court found that universities cannot use racial quota system to discriminate against students from the major population group to enhance minority performance (Zaaiman, 1998: 38). There has been much attention focused on affirmative action policies in American higher education institutions in the last few decades and, subsequently two of the largest American state universities have abolished their affirmative action admissions system and have introduced a race-blind admissions policy. Furthermore, the Californian law now requires even more weight to be placed on test scores.

In the United Kingdom, higher education institutions have a legal obligation to ensure that admissions policies do not contravene the Sex Discrimination Act (1973) or the Race Relations Act (1976). There is a strong emphasis on selection being based on merit, while selection on the basis of race or gender is deemed unlawful. It is illegal to correct imbalances using a quota system if this involves discrimination against members of the majority group (Zaaiman, 1998: 38).

South Africa

In December 1997 the Higher Education Act 101 of 1997 replaced the Universities Act, No. 61 of 1955, the Tertiary Education Act No. 66 of 1988 and the Technikons Act No. 125 of 1993. In terms of this act the responsibility and accountability for selection of higher education students is placed firmly at institutional level and admission policies must provide appropriate measures for redress of past inequalities and may not unfairly discriminate in any way.

The Higher Education Act is based on the 1996 Constitution of the Republic Of SA, which contains a bill of rights which specifically prohibits any form of discrimination, whether direct or indirect, against anyone on the grounds of race, gender, pregnancy, marital status, ethnic or social origin, colour, sexual orientation, age, disability, religion, belief, culture, language and birth to mention a few. Consequently applicants are now empowered to challenge selection decisions in court. The Constitution lays the basis for the future evaluation of selection mechanisms, which means that in future selection decisions can be challenged in court if deemed unconstitutional.

S37 of the Higher Education Act describes regulations with respect to admissions to public higher education institutions.

Summary of Section 37 of the Higher Education Act 101 of 1997

37. Admission to public higher education institutions.

1. Subject to this act, the council of a public higher education institution, after consulting the senate, determines the admissions policy of the institution.
2. This policy must be published and made available on request. (This requirement ensures the transparency of admissions policies.)
3. The admissions policy must provide appropriate measures for redress of past inequalities and may not unfairly discriminate in any way. (This requirement connects directly with the Constitution's Bill of Rights as discussed above.)

4. The council of an institution may, with the agreement of the senate,
    a. determine entrance requirements for particular programmes of higher education;
    b. determine the number and manner of selection of students who may be admitted for particular programmes;
    c. determine minimum requirements for readmission for study; and
    d. refuse readmission to a student who fails to satisfy such minimum requirements for readmission.

Responsibility and accountability for selection of students for higher education are thus placed at institutional level by the Higher Education Act.

(Source: Zaaiman, 1998: 42)

The Higher education Act 101 of 1997 sees the introduction of the Council on Higher Education (CHE) which is a statutory body that has been established to provide independent strategic advice to the Minister of Education on matters relating to the transformation and development of Higher Education in South Africa, and to manage quality assurance and quality promotion in the higher education sector.

Each of the public universities has a private act which specifies general rules, and statutes, which specify specific rules with regard to the functioning of the institution. These private acts and statutes have been permitted to continue to be applied in so far as the rulings are consistent with the new Higher Education Act. One of the principles on which the Education White Paper 3 – A Programme for Higher Education

Transformation (1997) is based is that of institutional autonomy. Paragraph 1.24 of the White Paper states that:

"the principle of institutional autonomy refers to a high degree of self-regulation and administrative independence with respect to student admissions, curriculum, methods of teaching and assessment, research, establishment of academic regulations and the internal management of resources generated from private and public sources. Such autonomy is a condition of effective self-government. However, there is no moral basis for using the principle of institutional autonomy as a pretext for resisting democratic change or in defence of mismanagement. Institutional autonomy is therefore inextricably linked to the demands of public accountability" (Education White Paper 3: 13).

According to the principle of public accountability institutions are answerable for their actions and decisions to their own governing bodies, as well as to the external community.

In terms of the previous Universities Act of 1955, the minimum statutory requirement for entry to universities was the possession of a Senior Certificate with exemption (matric exemption). The Education White Paper 3 of 1997 states that "the Ministry is committed to ensuring that the minimum statutory requirement for entry to all higher education programmes will in future be a pass in the proposed Further Education and Training Certificate (FETC). Institutions will continue to have the right to determine entry requirements as appropriate beyond the statutory minimum" (Education White Paper 3: 29). The Further Education and Training Certificate referred to is scheduled to come into operation with effect from 2008. Furthermore, the White Paper stipulates that while institutions have the right to exercise other 'appropriate' selection criteria, this right must be exercised bearing in mind that selection criteria should be sensitive to the educational backgrounds of potential students.

3.7 FAIRNESS

For selection to be deemed fair, it must be seen to be acceptable to the community that the institution serves i.e. the potential students and their parents, community organisations, bursary providers and the employers of graduates. In order to determine the fairness of the selection process it is necessary to take into account the context of the selection. "One can expect the definition of fairness in the South African context to be closely connected to the principles of equity and redress mentioned above. Yet, it is easier to defend the use of a selection mechanism that has been shown to be psychometrically valid. The evaluation of selection fairness should thus include qualitative and social-ethical analyses, as well as quantitative and empirical analyses" (Zaaiman, van der Flier & Thijs, 1998: 98). The use of matric results alone as selection criteria may be argued as being unfair as it does not take into account the personality, socio-economic background or motivation of the potential candidate. In fact many antagonists of relying solely on matric scores believe that this is an elitist system which is biased in favour of those students with excellent secondary school education. This is particularly true in the South African context where quantitative selection (using matric scores) does not offer historically disadvantaged students an equal opportunity for entry to tertiary institutions, unless such students have had the benefit of being educated in secondary schools of high calibre. It is important that a balance is found between giving an equal chance of admission to educationally disadvantaged students, while at the same time ensuring that students are not being admitted to inevitable failure. Many of these superior secondary schools were traditionally white. As more and more non-whites are entering these schools, it could be argued that such candidates however, no longer fall into the category of "previously disadvantaged". The shortcomings of using quantitative selection is widely recognised in South Africa, as many institutions now offer bridging or 'access' programmes directly aimed at students from previously disadvantaged backgrounds who do not have the required knowledge or skills for traditional entry.

Admitting students purely on the basis of achieving quotas that more accurately reflect the broader society and which achieve the desired increased participation rates could arguably also be considered unfair in two respects. Firstly, there is the potential for a 'revolving door' syndrome which could develop whereby students are admitted in greater numbers, however, are not academically prepared to succeed at university and are excluded a year or two down the line. This is obviously unfair on those students who have been misguided into believing that they can pursue a particular career, only to find that they are unable to continue along that path. Secondly, it is unfair to those students who are denied access to the institutions who potentially are capable of success, but who fall out of the required quota group.

Some institutions, in an attempt to be fair to previously educationally disadvantaged students, offer additional support to registered students. An example of this is the mentorship programme currently being implemented at the University of Kwazulu Natal (UKZN). Due to the shortage of black chartered accountants in South Africa, black and coloured postgraduate students in the School of Accountancy at UKZN have been given the opportunity of participating in a mentorship programme, whereby a Chartered Accountant within the community is interacting with them on a one to one basis to deal with problems that they are experiencing in their honours year. While the majority of the target group have participated in the programme, there are individuals who are opposed to it as they feel that they do not want to be treated any differently to other students.

Inaccurate selection or selection for the wrong reasons would be unfair, as it would allow students who do not have a reasonable chance of success access to university. Not only is this unfair to the student who subsequently fails, but it is also unfair to the community who pays the taxes that funds the institution, and to organisations who provide bursaries or scholarships to those students. Therefore, in order to be fair, selection must be accurate. One way of improving the level of accuracy of selection is for the institution to intervene in the process of learning so that students who have a higher chance of failure are afforded every opportunity to overcome the predictions of their failure.

The perceived fairness of a selection mechanism depends on the context in which the selection occurs. A selection mechanism can be psychometrically valid but unacceptable to the community. The evaluation of selection fairness should include qualitative, social-ethical, and quantitative (empirical) components. Fairness refers to the way predictors are used in a selection situation and implies more than the statistical properties of a selection mechanism. Selection involves selection instruments, selection policies and selection procedures. Evaluating the fairness of a selection mechanism must imply an evaluation of both the instruments and the policies.

When the issue of the fairness of selection mechanisms is questioned the terms 'adverse impact', 'discrimination' and 'bias' are often used. The term 'adverse impact' refers to the situation where proportionately fewer individuals from one group are selected than from another group. This term is also sometimes referred to as the 4/5ths rule or the 80% rule and can be demonstrated as follows: If an applicant group of say 2 200 contains two subgroups, Group A with 2 000 male applicants, and Group B with 200 female applicants. If 100 applicants from Group A are selected, the selection rate would be 5%. If 20 female applicants from Group B are selected, the selection rate for Group B would be 10%. The selection rate for Group A would be less than 4/5ths (5%/10% = 0.50) of the selection rate of Group B. In such a situation the selection mechanism would be deemed to have had an adverse impact on Group A. In both America and in the United Kingdom demonstrated adverse impact can lead to legal action if the selection affected a group whose rights were covered by law. In South Africa if the same principles were applied such groups are those mentioned in the Constitution (race, gender, marital status, age, disability, and religion to mention a few).

Discrimination refers to the process of identifying differences. In a purely statistical sense discrimination is a neutral term that relates to distinguishing between different characteristics within and between data sets. However, in South Africa, the term 'discrimination' usually has a negative connotation that is value-laden and inevitably is used to describe situations wherein certain individuals are consistently treated more negatively than other individuals. The selection procedure by nature requires distinguishing between different characteristics of applicants in order to identify those most likely to succeed. The danger in selection then lies in drawing the line between identifying those candidates who are considered less likely to succeed, whilst ensuring that more applicants of one particular group are not rejected than in another group. In such a situation it needs to be established whether the discrimination has been based on purely statistical grounds or whether unfair discrimination has occurred. Both the Constitution and the Higher Education Act use the terms 'unfair discrimination', which can occur either directly or indirectly. An example of direct unfair discrimination happens when certain characteristics, such as gender or race, are used as part of the selection decision. Indirect discrimination occurs when the selection predictor is easier for one group than another group, and the performance differences on the selection test cannot be justified.

In general terms 'bias' can be defined as "an opinion or influence that strongly favours one side in an argument or one item in a group or series" (Pollard, 1994: 75). In the context of selection, it is possible that the selection mechanisms possess some degree of bias when one group is treated differently from another group without justification. Should such bias exist it is inevitable that the unfair discrimination is inherent in the selection tests. For selection purposes it is possible to distinguish between predictive bias and internal test bias. If a predictor systematically either overestimates or underestimates the performance of members of a group then it is biased. Zaaiman describes predictive bias as "the differential predictive validity of a test for the performance of different subgroups" (Zaaiman, 1998: 45). Furthermore, he asserts that in order to evaluate predictive bias it is necessary for the criterion to be known or to be assumed to be unbiased. The difference between the measure of performance and the actual ability or worth of an individual in a particular subject would indicate the criterion bias. This assumption is difficult to prove as it is not always possible to evaluate criterion bias because real differences between performance and ability may exist.

Internal test bias happens when a theoretical construct is measured differently for different subgroups during testing. Test results can be compared against the results of other known measures of the same construct to determine if test bias exists. One can also examine whether the relationship between each item and the total test is the same for all groups to determine the level of bias (if any) of specific items within various groups.

Fairness can be defined in terms of equality of opportunity. In education one can establish equal opportunity in two ways: individualism or position of equal outcomes. The former concerns selection based on individual merit i.e. selecting those individuals with the highest predicted performance or merit. The latter evaluates equal opportunity in terms of the performance of groups rather than individuals. It is possible to distinguish between qualified and unqualified individualism. Selection policies that are implemented in terms of the philosophy of qualified individualism assume that the only relevant predictors of success are neutral, such as previous educational performance and measures of ability and motivation. According to this theory every applicant has an equal chance for selection because access is open to all who have the ability and motivation regardless of background. The proponents of unqualified individualism recognise that the predictive value of tests may vary for different subgroups. An example of this is the recognition given to the advantages or disadvantages of the socio-economic and educational background of applicants, thereby finding the best combination of predictors for each individual. In other words, unqualified individualism provides some compensation for potentially biased predictors.

The position of equal outcomes focuses on the desired outcomes in terms of equal access to the system, equal attainments through the system, equal participation in the system, or equal opportunities after completion of the programmes. Fair selection therefore does not require predictive validity of future performance. Very often this position will result in a trade-off between selection effectiveness and the desire to attain specific social goals. An affirmative action policy would be an example of such a philosophy. In South Africa, as a result of educational discrepancies that have occurred due to previous apartheid policies, such a system is regarded by many as the most fair selection philosophy. The danger of this thinking though is that in widening access to higher education there is the inevitable devaluation of qualifications. Expanded access to higher education does not necessarily imply greater fairness or equality in the provision of opportunity. In Kenya, it was found that students from wealthier socio-economic backgrounds attended higher quality institutions, while students from poorer socio-economic backgrounds attended lower quality institutions. Employers therefore used the quality of institutions as a sorting device in recruitment. In the United States there has been a significant loss of confidence in higher educational qualifications and the importance of attending the more prestigious institutions has served to widen the gaps that exist between socio-economic backgrounds. "Mass education has thus led to an illusion of empowerment through education rather than real empowerment" (Zaaiman, 1998: 48).

Equality of opportunity possibly should mean that everyone should have an equal chance at proving ability to succeed. The University of the North conducted research to investigate the selection of students into their mathematics and science foundation year. This foundation programme is specifically designed to give students who are educationally disadvantaged an opportunity to enter higher education. Disadvantaged students are defined as those who have had inadequate access to quality educational services resulting in a lack of opportunity to fully develop his/her academic potential. Disadvantage is a relative concept in selection practices, as an applicant's level of disadvantage has to be evaluated in relation to the other applicants. The quality of an applicant's previous educational opportunity can be compared to that which can be regarded as optimal for educational progress and success. In addition there may be differing levels of educational opportunity within specific applicant pools. Therefore to be able to evaluate the fairness of the selection process it is imperative to have knowledge of the actual levels of disadvantage within applicant pools. One of the selection principles that were identified during this research is the notion that selection should be seen as a contract to teach at the selected students' level (Zaaiman, van der Flier & Thijs, 1998: 98). In other words students need to be adequately supported during their academic programme in order to ensure that they have a fair opportunity to both enter and succeed in higher education. Many institutions are already operating programmes such as foundation/access courses, mentorship programmes and supplementary tutorial programmes. A sound knowledge of the student's background will aid this process and provide sufficient support for students after admission.

Shochet is an advocate of dynamic assessment techniques whereby the learning potential of applicants is measured as opposed to measuring past performance at secondary school in order to predict future performance. He found that "it is not only unfair to rely on static measures of intellectual functioning, but also inaccurate, in that the test was predictively invalid for the more modifiable disadvantaged students" (cited in Skuy et al, 1996: 111). Furthermore Shochet's findings confirmed Feuerstein's theory of intelligence being developed through cognitive structures and processes of learning. Feuerstein believes that where individuals have been deprived of mediated learning experiences, the cognitive effects of such deprivation can be reversed by providing appropriate mediated learning experiences later (cited in Skuy et.al, 1996: 111). In other words, in order to be fair to educationally disadvantaged students who have been admitted to university, it is necessary for university staff to change their old paradigms, and find effective ways of providing support to these students to ensure their success at university.

The University of Kwazulu Natal introduced a type of dynamic assessment in the form of their Teach-Test-Teach programme in the early 1990's. An underlying premise of this programme was that "education provides learning opportunities that alter the very abilities which are treated as fixed in conventional tests or measurements. On the basis of student performance thus far, we can state with confidence that such a dynamic basis yields positive results, both as regards selection , and educational development once students are at university" (Griesel, 1991: 21). While this programme proved to be promising with students enrolling through it graduating in the minimum time, it was considered to be resource-intensive and only effective with a limited number of students. Possible ways of overcoming these problems are being explored. An important observation from this programme is the fact that student potential can only be measured once realised. Griesel commented that "there is no 'magic measure' which can capture the 'potential' academic ability of students (and hence predict their success at university) without the creation of opportunities for learning, and opportunities for the development of potential" (Griesel, 1991: 28).

3.8 COMMENTS

The selection process at tertiary level is a very complex issue, and yet, an extremely crucial one. An efficient selection process must ensure that access is granted to students who are likely to succeed, in an equitable manner, thereby providing graduates for the job market. Furthermore, for institutions to remain competitive on an international level, these students must be contributors to an environment that fosters high levels of research, learning and teaching. In addition, for the selection process to be both effective and efficient, it is important that the selection tools employed are valid as predictors of future performance.

What further complicates the process of selection is that due consideration must be given to the ethical and legal issues. An ethical approach, on the part of the institution, requires teaching at the student's level in order to provide every student with a fair chance of success. For this reason, issues of selection and access should not be seen in isolation, but rather incorporated in the formulation of policies regarding retention and success. Many institutions are recognising this fact in responding to the need to provide equal access to all students regardless of their previous educational advantage or disadvantage and now provide additional support to students. Examples of this include foundation programmes, mentorship programmes and dynamic assessments. This recognition of the fact that students who have been previously educationally disadvantaged may be afforded the opportunity to succeed at university level through continuous mediated learning experiences is key to achieving the goals of the education ministry.

CHAPTER FOUR

PREDICTORS OF ACADEMIC PERFORMANCE

4.1 INTRODUCTION

In an attempt to ensure that access is being provided to those students with a fair chance of success at University, it is necessary to consider all the factors that influence success. If these factors can be identified, it would be of enormous value to be able to quantify the extent to which these factors may be indicative of future performance. That is to say, to what extent do these factors act as predictors of academic achievement? A study of student retention notes that the relationship between recruitment, admissions, and retention is a pertinent but, until recently, neglected phenomenon (Lenning, Beal, and Sauer, 1980, cited in Fulton, 1989: 42). Students are more likely to stay in university if they make informed decisions based on a sense of their personal and academic needs, on the one hand, and a knowledge of the institution and its programs, on the other. Post-secondary institutions need to provide students with adequate institutional and program information so that they can make decisions that will best allow their educational needs to be met.

Understanding the factors that are potentially predictors of academic achievement and integrating these into the selection program alone is insufficient to ensure that a greater level of academic success is attained. One also needs to bear in mind the influence of factors subsequent to enrolment which cannot be determined during the selection process, which will ensure the retention of students. It is imperative to also pay attention to how the students selected (i.e. those that have a fair chance of success) are to be retained. Factors such as teaching methods, motivation for learning, personality factors, gender and age may all impact on the performance of students. A discussion of these factors together with the more obvious factors such as academic skills, prior learning and learning potential follows.

4.2 ACADEMIC SKILLS AND ABILITY

Even in South Africa where significant changes have taken place in education through the integration of the education departments and the change to an outcomes based education system, the matriculation results have continued to be relied upon as a predictor of academic performance. This is partly due to the fact that it is a quantifiable measure of previous academic learning. Arguably it does not reflect the skills that students possess or the potential for achievement at university.

Previous research in South Africa on factors associated with academic performance has found that the final school aggregate is the single strongest predictor of success. A review of twelve South African studies conducted between 1957 and 1977 reported that "they all found that success at school did to a fairly large degree extend to achievement at university, particularly first year achievement" (Stoker, 1985, cited in Bokhurst *et al*, 1992: 59). The limitation of these findings today is that most of these studies were conducted at white, mainly Afrikaans-speaking institutions. Subsequently Shochet found in his study of students at the University of the Witwatersrand that the matriculation rating was only a significant indicator of performance for advantaged students. The correlation between school and university performance of disadvantaged students was found to be very low. He commented that "even in combination with other predictors, matriculation aggregate did nothing to enhance prediction" (cited in Bokhurst, Foster & Lea, 1992: 60). Concern has been raised in recent years regarding the validity of matric scores as predictors of academic achievement at tertiary levels because of the level of 'coaching' that occurs at secondary school level, where learners are directed towards memorizing and reproducing facts.

In the United Kingdom the value of A levels has been criticized because they are perceived as being overspecialized, the potential bias that may exist due to unequal access to teaching resources, the reliability of grading and because of the pedagogical style of secondary education. Furthermore there is concern that by continuing to use A-levels as entry criteria, the pool of potential entrants is severely restricted. The issues of unequal teaching resources and reliability of grading are factors which challenge the fairness of the selection process. Fairness is an issue that concerns most admissions officers who acknowledge that in the United Kingdom there are sharp school, regional and social class differences in A level achievement and thus they may be poor predictors of academic achievement (Berdahl, Moodie & Spitzberg, 1991: 38). On the other hand admissions officers are concerned about maintaining standards, and despite the discrepancies in A-level achievements, the A-levels are still seen as the main guarantee of standards. These same principles seem to be applicable in South Africa as well, where there are differences in matric results that can be clearly identified in terms of school, regional and social class differences. Furthermore, the use of matric results has continued to be relied upon to be the single most important predictor of success and the main guarantee of maintaining standards. There is however, much controversy in academic circles surrounding the perceived declining credibility of matriculation results. This has arisen since the government announced its intentions of increasing the participation rate at tertiary institutions, and the high school completion rate. It is questionable whether the remarkable increases in the matriculation pass rate over the last few years is a direct result of increased access to teaching resources or of a lowering of standards at secondary level. This is of concern to university educators and the introduction of entrance examinations at all institutions may go some way to allay these fears of declining standards at matriculation level.

Widening access to university can be achieved by lowering the entry requirements. However, it is interesting to note that maintaining certain minimum entry criteria is viewed not only as ensuring that academic standards are maintained, but is also seen as a key indicator of departmental and institutional quality. Berdahl *et al* notes that "admissions officers do not see it in their interests for teaching as well as research purposes to allow standard offers or entrants' points scores to sink below the highest achievable level" (1991:40).

In the United States high school aggregates may be considered as a predictor of academic performance, however, the unstandardized nature of these results renders this as a less reliable factor. Instead, standardized examinations scores such as the SAT and IQ scores are considered to be more reliable predictors of academic success at higher educational institutions. Research in the United States conducted at urban colleges shows that the students attending urban colleges are predominantly from lower socio-economic backgrounds and minority group origins. These same students often have not performed very well on their standardized examinations and usually have the minimum satisfactory high school average. However, the study suggests that these students may overcome the previous disadvantages of their educational background through the possession of a positive self-concept of ability. "Though research repeatedly has shown that academic performance measurement such as the SAT, academic placement examinations and high school average have been better predictors of college success, this research suggests that ASC (academic self-concept) may be a positive force in overcoming past disadvantages. In fact, ASC proved to be more influential in predicting GPA (grade point average) than the traditional academic performance measurements" (Gerardi, 2005: 299). The SAT then, is considered to be the most reliable cognitive predictor of academic performance regardless of race or ethnicity. However, all of these scores (SAT, GPA and high school grades) are related to socio-economic status and family background. According to Hanford (Hanford, 1982, cited in Fulton, 1989: 49) "the measurement of academic aptitude and achievement represents only one dimension of an individual's capacity for growth and education in the broadest understanding of that term".

4.3 GENDER

One of the factors that has frequently been examined as a potential predictor of academic performance is that of gender. An examination of previous research in this area reveals some conflicting results. Fraser, Lytle and Stolle's research conducted in the late 1970's concluded that female accounting students performed slightly better than male accounting students, although the results were not statistically significant (cited in Mutchler, Turner & Williams, 1987: 104). These findings were confirmed by Hanks and Shivaswamy in 1985, who similarly found that female students outperformed their male counterparts in a first year cost accounting course (cited in Mutchler *et al,* 1987: 105). Mutchler *et al* conducted research over an 18 year period from three different institutions in the United States. They concluded that the female students performed better on average than the male students over the eighteen year period. While no significant effects from the institutions were noted, there were differences attributable to the gender of the instructor and the gender of the student. They found that on average, female instructors had a tendency to award higher grades to both male and female students than male instructors. While their research clearly indicates that females outperform males, the results do not tell us why this is so (Mutchler *et.al*, 1987: 108).

Several reasons have been postulated to explain the difference between female and male student performance. Ferber proposed that in order to overcome the stereo-typical image that accounting is a male-dominated profession, female students may strive to outperform their male counterparts in order to be accepted (cited in Mutchler *et.al*, 1987: 108).

Cancian (1982: 179) maintains that females are more success oriented and career motivated earlier in their tertiary education than males, and consequently may be more focused than male students.

Another possible reason for females outperforming males is because of the mathematical skills that enhance success in accounting. While more males are inclined to study mathematics at university level, female students who do elect to register for mathematics courses tend to outperform the male students. Deboer postulates that this may be due to the fact that male students recognize the importance of studying mathematics for their future career prospects, and that this is the primary reason why they register for these courses. Female students on the other hand, are more motivated to take university level mathematics if their previous performance in mathematics is high. As a result the female students who do take university mathematics courses tend to have a higher mathematical aptitude than the male students registered for the same courses (1984: 102).

None of the previous research undertaken in the area of the effect of gender on the performance of students reveals that females are inherently more intelligent than males. The results simply indicate that differences in performance do exist to a lesser or greater degree and that the many reasons for this are interrelated. The implications of this therefore are that the way in which accounting is taught can be adapted to take into account these differences. However, gender itself does not appear to be a reliable predictor of success at University.

4.4 AGE

An examination of the success of non traditional entrants to university showed that age was a strong predictor of academic success (Cantwell, Archer & Bourke, 2001: 232). The University of Newcastle, Australia offers an access programme for younger students who do not meet the traditional entry criteria called Newstep. Cantwell *et al* found that younger students who entered university via non-traditional means (access programmes) performed significantly worse than other students. With these latter students it is possible that immaturity and a negative attitude towards studying contributed to their poor performance. Cantwell noted that the older students "indicated deep and achieving approaches to learning, that is, they wanted to understand the material and do well in the course. Newstep students, on the other hand, showed a surface approach of wanting to pass with a minimum of effort, an approach they may have carried to the degree level" (Cantwell *et. al.*, 2001: 232). Cantwell et al concluded that the most important finding of their research was that non-traditional entry is relatively more successful when combined with mature age students, and is relatively unsuccessful when combined with younger students. They also found that the success of mature age students was independent of socio-economic status and area of study (Cantwell *et al*, 2001: 233).

Conscientiousness appears to be higher in older students, although it is not known whether this is because of maturity or because of environmental circumstances. It is suggested that older students may have a higher motivation to complete their studies. This could be in part because older students may have chosen to study because of the necessity for higher qualifications in order to secure better job positions. In addition, older students, very often have additional family responsibilities which while making study time more difficult, may motivate them to be disciplined, conscientious and determined to succeed.

4.5 PERSONALITY

Using non-cognitive measures such as personality to predict academic performance is desirable because these measures can complement commonly used predictors such as high school grades, without sharing their limitations, such as adverse impact of race, gender or differing secondary school offerings. In order for personality to affect performance it must be displayed through specific behaviours. There has been a considerable amount of research conducted to determine the relationship between personality and academic performance. The extent of this research has been varied with some studies measuring the correlation between performance and the personality traits individually, while other studies assessed the traits together. It has been found that different patterns of validity exist when assessed together than when correlated individually, and hence it has been suggested that all five personality traits should be included in any studies to determine the incremental validity of personality traits over existing predictors, such as high school grades (Conard, 2006: 340). In recent years, researchers such as Chamorro-Premuzic & Furnham in 2003, Goff & Ackerman in 1992, and Martin & Diefendorff in 2003, have attempted to establish links between college (university) performance and what is termed the Big Five personality traits (cited in

Martin, Montgomery & Saphian, 2006: 425). These five personality traits and their relationship with academic performance are discussed below.

4.5.1 Conscientiousness

A positive relationship between conscientiousness and university grades has been the most consistent finding of research. This has been found to be true regardless of the nature of the assessment and is not surprising as it is associated with dutifulness, need for achievement and work ethic. "The primary traits associated with conscientiousness (e.g. diligence, dependability, and self-discipline) appear to be conducive to higher performance in academic settings (Martin *et. al*, 2006: 425). A study conducted by Moutafi, Furnham and Paltiel investigated the relationship between personality traits and psychometric intelligence. They concluded that conscientiousness and extroversion could be used to predict scores on numerical, verbal and abstract reasoning mental abilities (2005: 1021). In Conard's study it was found that conscientiousness predicted three academic outcomes (GPA, course performance, and attendance), incrementally over academic ability and other traits (Conard, 2006: 343). She concluded that "a one standard deviation increase in conscientiousness translated into a 0.11 increase in GPA and a 2% increase in course performance, even after controlling for SAT" (2006: 343). It has been found that conscientiousness is only moderately consistent over time in the 18-22 year olds age group and is higher in older adults (Roberts & DelVecchio cited in Conard, 2006: 344). While it is not apparent whether these differences are due to maturity or environmental factors, it may be undesirable to refuse entry to students who will become more conscientious and hence better performers. It would therefore be possible to use this personality trait as a compensatory measure when their high school results are lower. It has recently been suggested by Chamorro-Premuzic, Furnham & Moutafi that conscientiousness may serve as a compensatory function for students of lower cognitive ability (cited in Martin *et. al*, 2006: 430). This would confirm the argument presented by Moutafi, Furnham and Paltiel that in highly competitive environments (both work and academic) comparatively less intelligent people learn to become more conscientious to compensate for their ability (cited in Furnham, Chamorro-Premuzic, 2004: 953).

4.5.2 Extroversion

An examination of the relationship between extroversion and academic performance has yielded contradictory findings, with some commentators reporting a positive relationship (Chamorro-Premuzic & Furnham, 2003: 335), whereas other researchers revealed a negative relationship (Goff & Ackerman, 1992: 551). Variables such as age, level of education and type of assessment appear to play a crucial role in the measurement of this correlation, and may even determine the sign of this correlation. Martin *et al* suggest another possible reason for these differences is the ambiguous nature of the extroversion construct itself. "It is possible that these various aspects of extroversion relate differentially to academic performance. High levels of dominance or ambition may contribute to greater task engagement toward getting better grades. On the other hand, students high in Sociability may devote a disproportionate amount of time and resources to socializing rather than studying" (Martin *et al*, 2006: 425). Research conducted by Martin, Montgomery and Saphian however, did not find support for the supposition that ambition and academic performance are positively related (Martin *et. al*, 2006: 430). The type of assessment may play an important role in determining the effects of the extroversion personality trait on performance. It is generally accepted that introverts have an advantage over extroverts with respect to better study habits, the ability to consolidate learning and less distractibility and it is evident from previous research that when students are assessed by long, written examinations introverts will tend to outperform extroverts.

4.5.3 Neuroticism

The remaining three Big Five personality traits of neuroticism, agreeableness and openness to experience have not been shown to have a positive relationship to academic performance. Martin *et al* (2006: 426) notes that other researchers have found the relationships between these factors and academic performance to be non-significant as predictors of academic performance. Neuroticism may lead to certain states such as anxiety and fear which would be counterproductive for academic success because of their negative impact on exam performance. It is also possible that applicants for university may perform poorly on any psychometric testing or entrance examinations because of their high levels of anxiety. In a study conducted by Moutafi, Furnham And Tsaousis it was found that neuroticism was not significantly related to intelligence when the sample group included low-anxiety individuals, however, there was a significant correlation between neuroticism and intelligence when the sample group tested consisted of high-anxiety individuals. When the test anxiety was partialled out, it was found that neuroticism did not significantly correlate with intelligence (2006: 587). Neuroticism is also associated with negative physical responses such as racing heart, perspiration and gastric disturbances which may result in absenteeism or poor performance in academic settings. Furthermore, it has been found that neuroticism is related to poor self-concept and an under-estimation of one's intelligence. This creates an unfortunate cycle for the neurotic individual who does not have a high level of confidence in his/her own ability, is therefore anxious when participating in any form of assessment, and consequently under-performs.

4.5.4 Agreeableness

There is very little discussion on the personality trait of agreeableness and its relationship with academic performance or intelligence in the literature reviewed. This is possibly because it has been suggested that there is very little correlation with intelligence (Furnham, Zhang & Chamorro-Premuzic, 2006: 121). Furthermore, the major components of agreeableness which include compliance, modesty and trust do not appear to impact on actual intelligence. It is suggested that such characteristics may induce students to demonstrate behaviours which are typical of conscientiousness, due to the willingness to please and be compliant. This suggestion has not however, been tested.

4.5.5 Openness to Experience

It has repeatedly been found that openness to experience is the personality factor which has been the most influential on intelligence (Furnham, Zhang & Chamorro-Premuzic, 2006: 120). Moutafi, Furnham and Paltiel's study of the predictive value of personality factors on intelligence revealed that openness was a significant predictor of verbal ability only, and not numerical or abstract reasoning abilities (2005: 1029). In a study conducted by Furnham and Chamorro-Premuzic (2004: 952) it was found that low openness scores were significant predictors of success in the statistics examination. While openness is usually significantly correlated to intelligence, the nature of statistics is such that it requires hypothetical-deductive thinking. Openness is more associated with creative, inductive thinking. These results therefore highlight that it is important to establish what attributes of various personality traits would be advantageous to the study of specific subjects. This is particularly important to be aware of as the skills required for success in psychology for example, may not be the same skills that are necessary to perform well in the accounting field.

4.6 OTHER FACTORS

There are a number of other factors which have been argued to be potential predictors of academic performance, namely class attendance, family background, and socio-economic factors. In terms of class attendance research suggests (Farsides & Woodfield, 2003 cited in Conard, 2006: 340) that this has a strong correlation to academic performance. Farsides and Woodfield (cited in Conard, 2006 : 340) found that the personality traits of conscientiousness and agreeableness were significantly negatively related to tutor-recorded absence, and that absence, as a predictor, contributed to prediction of final grades over IQ and Big Five traits.

According to Coleman, the link between educational achievement and family background is undeniable, and furthermore, family background differences account for far more variations in educational achievement than school differences. "Altogether, the sources of inequality of educational opportunity appear to lie first in the home itself and the cultural influences immediately surrounding the home; then they lie in the schools' ineffectiveness to free achievement from the impact of the home, and the schools' cultural homogeneity which perpetuates the social influences of the home and its environs" (cited in Walker, Matthew & Black, 2004: 44). In South Africa, both socio-economic status and educational opportunity are closely related to racial group membership. With the implementation of affirmative action and the unified education department, one would expect to see this fact change as greater opportunities are afforded to those members of the previously disadvantaged groups.

Historically students from middle-class backgrounds have filled more places at tertiary institutions and achieved better results than students from working class families. Reid (1992: 108) identified that the middle-classes, while only making up 35% of the population, made up 80% of undergraduates in the United Kingdom. This trend does not appear to have changed in more recent years as indicated by the UK government figures for 1997 – 1998 which show that 14% of young people from unskilled backgrounds, 19% from semi-skilled, and 80% from professional backgrounds entered higher education (Walker *et al*, 2004: 44). Even though the few successful applicants who are from lower socio-economic backgrounds may have been selected in based on the same entry criteria as the middle classes, their subsequent performance does not match that of their counterparts. It is suggested that a reason for this may be the fact that these students may feel alienated because of their background. Individuals who are highly integrated on social and academic levels have a greater level of commitment and persistence at university. When students arrive from schools where there are few or no other people at the university they may feel isolated and do not commit to the university nor do they see graduation as a realistic goal.

CHAPTER FIVE

CURRENT SOUTH AFRICAN PRACTICE

5.1 INTRODUCTION

In order to establish the extent to which the findings from this research can be applied to other institutions in South Africa, it is necessary to establish what current practices at these institutions are. An examination of information available on South African institutions websites and in the relevant handbooks was undertaken to establish the existing admission criteria in operation for prospective Accountancy major students. Specifically it was intended to establish whether all South African Universities use matric points and matric maths results as selection criteria. If not, it is necessary to determine what other criteria are used. It is also important to establish whether or not different criteria are utilized for prospective accounting major students versus the general BComm students.

In terms of the Higher Education Act 101 of 1997 the current minimum requirement for entry to universities in South Africa is the possession of a matric certificate with exemption. In addition, many South African universities rely predominantly on matric scores for the admission of students. The most widely used system for the selection of students into higher education is the points system. Most universities in South Africa calculate matric points as indicated in Table 5.1 below. For example, a student with two A's, two B's and two C's, all on the higher grade, would obtain a matric score of 42 points. Some institutions employ their own unique system of weighting matric scores. Where different points system have been used by various institutions details of these have been disclosed in Appendix A.

	Number of Points	
Matric Symbol	**Higher Grade**	**Standard Grade**
A	8	6
B	7	5
C	6	4
D	5	3
E	4	2
F	3	1

Table 5.1: Calculation of Matric Points

5.2 RESEARCH METHODOLOGY

A review of literature available in the form of handbooks and websites provided information from fifteen South African universities. A list of these institutions is included in Appendix A. Subsequent to the start of this research project, the University of Natal and the University of Durban Westville have merged to form the University of Kwa-Zulu Natal. Since the data collected in this research was from the former University of Natal, Pietermaritzburg campus, these institutions have been treated separately in order to remain consistent with the empirical data examined in chapter 6.

5.3 DETAILED RESULTS

From a preliminary examination of the information available it was found that eight universities have different entry requirements for those students intending to major in accounting compared to those students registered for other BCom degrees. An examination of the differences between the entry requirements for all BCom degrees revealed that seven of these institutions require that accounting major students have attained higher marks in matric mathematics. At two institutions prospective accounting major students are required to have more matric points than other BCom students, while one institution required that accounting major students should also have attained a minimum of 60% as an average for their matric marks.

An examination of the minimum matric points required for entry to the BCom degree shows considerable variation between institutions (refer Table 5.2). Only ten of the fifteen universities studied use matric points as an entry requirement. Four of these institutions determine their matric points on a different basis to the University of Natal, Pietermaritzburg and have been excluded in the following discussion for this reason. Details of these alternative systems are disclosed in Appendix A. While some institutions require as few as 17 matric points, others require as many as 48 points. What is important to note from this information is that the matric points system has been adopted in the past as an attempt to reduce to a single numeric value the performance of applicants at secondary school. While the value of comparing the use of the precise requirement between institutions has little value due to the large discrepancies in both the calculation of the points and the determination of what is the meaningful number of points to be used as an indication of future performance, it could be argued that adopting some type of points system is beneficial within an institution to rank the applicants. This is what Dawes, Yeld and Smith (1999) attempted to achieve through their proposed application of the place-on-exam (PoE) indicator. The proposed procedure requires using the total raw scores obtained by each individual for all their subjects at each school. This would then enable a ranking to be determined for each school. Every individual would then be assigned an indicator (expressed as a percentile) to reveal his/her place on the rank. The main advantage of such a system is that it protects individuals from being discriminated against due to circumstance by ensuring that the previous performance of applicants are compared to those who have had similar educational opportunities(p98). In terms of this proposal it is apparent that an underlying assumption is that previous performance at school is a predictor of performance at university.

	Number of Universities	%
None	5	33.3 %
17	1	6.7 %
28	1	6.7 %
32	1	6.7 %
35	1	6.7 %
36	1	6.7 %
48	1	6.7 %
Some other system	4	26.5 %
	15	

Table 5.2 Present minimum requirements, in terms of matric points, for entry to the BComm degree at the fifteen South African institutions included in this study.

A very telling observation to be made from the available information is that thirteen of the fifteen institutions analysed have a minimum matric mathematics requirement for entry to the BCom degree. Furthermore, one institution does not have a minimum maths requirement for entry to the BCom degree, however, has a minimum mathematics requirement for those students wishing to major in accounting. Table 5.3 shows the various maths requirements for the BComm degree. While there are still differing opinions on what is considered to be a prerequisite for success at university, the consensus seems to be that holding a mathematics qualification is a necessity for success in the BComm degree, and in accounting in particular. It is apparent from the results that three of the institutions with the lowest mathematics requirements for the BComm degree require higher mathematics grades for their prospective accounting major students. A further three institutions require a minimum pass of 60 % on the higher grade for those students registering for the accounting major programme. This further supports the view that mathematics skills are regarded as essential for success in the accounting stream.

	Number of Universities	%
HG 40 % or SG 50 %	5	33.3 %
HG 40 % or SG 60 %	4	26.7 %
HG 50 % or SG 60 %	2	13.3 %
HG 60 % only	1	6.7 %
SG 60 %	1	6.7 %
No maths requirement	2	13.3 %
	15	100 %

Table 5.3 Minimum matric maths requirement for the BComm degree

Some institutions do employ additional entry requirements such as a minimum matric score for English which remains the predominant medium of instruction at tertiary institutions in South Africa. Furthermore, three institutions still place importance on the possession of matric accounting as a prerequisite for entry to the accountancy programme. The emphasis is very much on performance at secondary school, with the implication being that this is the most reliable predictor of performance at university.

5.4 LOOKING FORWARD

In view of the fact that the Education Ministry has advocated the use of some other system than the matric points system to gain access to University, it is useful to determine the extent to which South African Universities are already employing other selection criteria. It would appear from the information available to prospective students on the relevant websites that none of these institutions use interviews as a selection tool. Currently only two universities require prospective students to sit an entrance examination in order to determine their chances of performing in the Accounting degree. The University of Pretoria does use entrance examinations only if candidates do not meet the minimum entry requirements in terms of mathematics and English or Afrikaans scores, provided they have obtained a certain minimum number of matric points (www.up.ac.za; 02/10/06).

The University of Johannesburg has published its entry requirements (which it states are still under consideration) with effect from 2009 when the current matriculation certificate will be replaced by the FETC. It states that entry to a Bachelor's degree will be a level 3 (40 – 49%) achievement in Mathematics, and a level 4 (50 – 59%) achievement in English or Afrikaans and an admissions test. This is in addition to the gazetted minimum requirement of a National Senior Certificate (NSC) with level 4 (50 – 59%) achievement in at least 4 subjects from a designated list (http:/www.uj.ac.za/DESIGN_print.asp?page+detail&id=4186&). It is apparent from this that while the government will have successfully eliminated the use of matric points as a selection mechanism, institutions may still rely considerably on high school performance as an entry requirement.

5.5 COMMENTS

Most institutions recognize that the use of matric results is of some value in selecting students who are most likely to succeed into the BComm Accounting degree. This value however, has not been accurately measured, which is evident in the wide range of differing requirements for entry to various institutions. For prospective students wishing to pursue a career in accounting this lack of consistency may be rather confusing. The discrepancies in entrance requirements by universities may be perceived as displaying a lack of confidence in the results achieved by students at secondary level. It is apparent that selectors in the accounting field concur that having strong mathematics skills is necessary to ensure success in accounting at university.

It is inevitable, as with any new system, that it may be difficult to ascertain what levels of performance at secondary school will be required to indicate that applicants have the requisite skills and knowledge base to adequately prepare them for success at university. For example, it may be difficult to establish what a higher grade 'C' for mathematics on the present matriculation system equates to in the new FETC certificate. It may therefore be advantageous for institutions to consider introducing entrance tests at this stage as the new FETC is being phased in. Such tests should be used in conjunction with, and not instead of, the high school results. This notion is supported by research conducted in the United States which shows that while the Scholastic Achievement Test scores (SAT) are valid predictors of success, this predictability can be improved when used in conjunction with high school grade point averages (Dawes, Yeld and Smith, 1999: 100).

CHAPTER SIX

ANALYSIS OF ACCOUNTANCY RESULTS

6.1 BACKGROUND

Recent changes in the higher education system in South Africa have compelled tertiary institutions to re-examine their selection procedures in order to ensure that fair opportunities are provided to all potential students who have a chance to succeed at university. It is not only necessary to identify what are deemed fair opportunities, but also to examine the status quo, so that the best benefits from the existing structures can be retained. One of the primary considerations in selecting students is that they must possess the particular configuration of characteristics required to achieve academic and career success. Historically this configuration has been deemed to comprise a minimum matriculation mathematics mark, and a minimum matriculation aggregate measured on a points basis. With effect from 2008, the current matriculation or senior certificate will be replaced by the Further Education and Training Certificate. The latter carries with it different criteria in terms of grades required in order to be awarded this certificate. While the senior certificate will no longer exist, the Further Education and Training Certificate will still reflect a measure of the performance of candidates at secondary school. The purpose of this study is firstly to determine if there is any empirical evidence to support the notion that high school performance (whether measured by the Senior Certificate or the Further Education and Training Certificate) has any value as a predictor of performance at University. Secondly, the study is intended to examine whether the practice that has been widely used by tertiary institutions of insisting on high school mathematics as a prerequisite knowledge set for studying accountancy at this level - and hence by implication as a predictor of performance - is valid or not.

6.2 RESEARCH METHODOLOGY

6.2.1 Identification of the Sample Group

The 1999 and 2000 sample groups of Accounting 100 students comprised 411 and 346 students respectively, registered for various degrees including the Bachelor of Commerce (BComm), the Bachelor of Social Science (BSocSci), Bachelor of Science in Agriculture (BScAgric) and the Bachelor of Science Agricultural Management (BScAgricMgt). The target population group that was finally used was obtained through purposeful selection of all students registered for the Accounting 100 course for the first time at the University of Natal Pietermaritzburg in 1999 and 2000 and who were registered for the BComm degree. Those students who were repeating the course (150 in 1999, and 119 in 2000) were eliminated from the sample as their success was considered to be impacted upon by their previous exposure to the course. Of the remaining students, there were 29 students in 1999 and 10 students in 2000 in the first year accounting classes who were registered for degrees other than a Bachelor of Commerce who were specifically excluded from the sample on the grounds that they were unlikely to continue to study accounting at university beyond the first year level. Furthermore, those students who completed their schooling outside of South Africa (17 in 1999, and 5 in 2000) were also excluded as their number of matric points and matric mathematics symbol could not be determined. The initial sample size therefore comprised 215 students registered for the BCom degree for the first time in 1999 and 211 students in 2000. As this was a longitudinal study, whereby observations were taken on the same students at different points in time (first-year, second-year, third-year and fourth-year), the population group diminished based on the rate of attrition and failure in each successive year of study.

Students attaining 50% or more in Accounting 100 and Accounting 300 may proceed to the successive year of study. However, a pass of 55% is required in Accounting 200 in order to be allowed to major in the subject. The aim of this is to ensure that those students entering the third year have a reasonable chance of success, whilst discouraging those who are borderline from pursuing it on the grounds that they are less likely to succeed.

At the time that the data was obtained the University of Natal offered one full year-long course at first-year level that was compulsory for all students registered for a B.Com. degree. This course catered for all students regardless of their previous exposure to accounting at secondary school. This University did not follow the practice of some institutions to offer separate courses for the two groups of students i.e. those with previous exposure to accounting at secondary school, and those with no prior accounting knowledge.

Several other institutions provide different accounting courses that cater firstly for those students who have no intention of majoring in accounting. Such a course may be less financial accounting orientated and may focus on more general management accounting issues. Alternative strategies adopted by other institutions include offering bridging courses or additional lectures and tutorials to assist those students who have not studied accounting at high school. At the University of Natal, all students who are registered for a BCom degree are required to obtain credits for the first year accounting course, regardless of their intended major.

Entrance to the BComm degree at the University of Natal was automatic for those students who had obtained a minimum of 32 matric points, and who had obtained a minimum of 40% on the higher grade (Higher Grade 'E') or 60% on the standard grade (Standard Grade 'C') for matric mathematics. Table 5.2.1.1 indicates how the matric points were calculated at the University of Natal, Pietermariztburg.

	Number of Points	
Matric Symbol	**Higher Grade**	**Standard Grade**
A	8	6
B	7	5
C	6	4
D	5	3
E	4	2
F	3	1

Table 6.2.1.1: Calculation of Matric Points at University of Natal, Pietermaritzburg

6.2.2 Data collection

Data was obtained from two main sources. Firstly the student management system (SMS) was accessed to obtain the initial data pertaining to number of students registered for each course in 1999 through to 2003. This system provided data including number of students registered, student numbers (which were used as an indication of year of intake), demographical data (gender, race, matric score, home language and age), and degree for which students were registered. In addition the actual results for each course in each year 1999 to 2003 inclusive were also obtained from the SMS.

Secondly, a request was made to the data management information (DMI) department to provide details of the matric mathematics results for the first-year students registered for the BCom degree in 1999 and 2000. This information was supplied in spreadsheet format. Only the symbol achieved by students was provided as the actual marks obtained by students were not available.

6.2.3 Design

Simple arithmetic analyses of year-end results for each successive year of study for students registered for the first year accounting course in 1999 and 2000 were performed to determine the rate of attrition and the pass rate for each year of study and the mean of the matric points of the students who passed each successive course in accounting.

A statistical analysis of the results for each successive year of study for the 1999 sample group and the 2000 sample group was performed, using a one-tailed Pearson's Product

Moment Correlation test to determine the relationships between student performance at university and high school results. Multiple linear regression and chi squared analyses were also performed to verify the magnitude of the relationships between the variables and the level of association respectively. For this purpose the Statistical Package for Social Sciences (SPSS) program, version 11.5, was utilised to provide the relevant analyses.

6.3 GENERAL CONCLUSIONS

One of the most significant observations that could be made about the composition of the matric mathematics results held by students in the two sample groups is the notable absence of successful students in the fourth year accounting classes who held standard grade passes in this subject. This is as a direct result of the attrition over the four-year life of the program of those students who initially registered for the first-year course with standard grade mathematics. Furthermore, it is obvious from the detailed results presented below that those students who were allowed to enter the BCom degree without the prescribed minimum matric mathematics requirement, were not able to proceed successfully beyond the first-year course.

An initial examination of the relationship between matric points and the accounting results from the two sample groups revealed that there were 36 students in the 1999 group and 21 students in the 2000 group that registered for the first-year accounting course who did not possess the minimum prerequisite of 32 matric points. Of these, only seven proceeded to the accounting 200 course in both sample groups, while only one proceeded (and was unsuccessful) to the third year course for the 1999 sample group and two from the 2000 sample group (only one of these passed). None of these students entered the fourth-year programme.

Scatter diagrams produced from all the courses in the two sample groups showed varying degrees of positive relationships between performance at university and the two variables of matric points and matric mathematics. In most courses it was found that matric points were more strongly positively related to university performance. This was confirmed by the results of the correlation analyses performed. Histograms showing the spread of the three variables, namely university results, matric mathematics and matric points revealed bell-shaped curves (except in the fourth-year courses) and justified the performance of regression analyses. These can be examined in Appendix four, together with tables of all the results of the statistical analyses performed. These results are discussed in detail in the following sections.

6.4 DETAILED RESULTS

Tables reflecting the detailed results are contained in Appendix B (1999 sample group) and Appendix C (2000 sample group). A discussion of these results on a year-by-year basis follows.

6.4.1 First year accounting results

The attrition rate of 60% in the 1999 sample group (refer to Table 6.4.1.1 below) was very high at first year level. There are a number of potential reasons for this. Firstly, while the sample initially included all those students who were registered for the BCom degree for the first time (i.e. no repeat students) there was no certainty at this stage how many of those students intended to major in accounting. It can be expected that there would be a significant number of students who never intended to major in accounting, but however, were required to register for the first-year course as this is a compulsory course for the completion of a BCom degree. Such students would include those intending to major in other commerce subjects such as economics, marketing, finance, information systems and law to name a few. Secondly, there would be some students who at the beginning of the year thought that accounting was the subject in which they intended to major, however, subsequently changed their minds. This may be because they had never studied accounting before and therefore did not know what it was like and had merely made their initial choice based on possible career options. Alternatively, their exposure to other subjects at university of which they had not had any prior knowledge may have influenced their decision to change majors. There would also be some students who may have wanted to continue studying accounting, but who had realised that it was simply too difficult for them to pursue beyond first-year level. The third, and possibly most obvious, reason for the high attrition rate is the number of students that failed the first-year accounting course.

	Acc 100 Final Mark		Matric Points		Matric Mathematics	
	1999	2000	1999	2000	1999	2000
N = Number of students in class	206	201	206	201	206	201
Mean	51.23	57.99	36.59	37.50	8.30	8.51
Std Error of Mean	.956	.936	.361	.361	.162	.141
Median	50	58	36	37	9	9
Mode	40	54	33*	34	10	9
Std. Deviation	13.720	13.267	5.299	5.238	2.377	2.050
Variance	188.25	176.01	28.075	27.442	5.651	4.203
Range	72	76	25	27	10	11
Minimum	23	20	23	23	2	1
Maximum	95	96	48	50	12	12
Rate of Attrition	60 %	40 %	-	-	-	-
Pass Rate	53 %	79 %	-	-	-	-

* Multiple modes exist. The smallest value is shown.

Table 6.4.1.1 Academic achievement profile of first-year BCom students at the University of Natal, Pietermaritzburg for the 1999 and 2000 sample groups

There is quite a noticeable difference between the attrition rates in the 1999 sample group (60%) and the 2000 sample group (40%). A closer examination of the range of matric scores as shown in Table 6.4.1.1 reveals that in the 1999 sample group the lowest matric score was 23 while the highest score was 48. In the 2000 sample group the lowest matric score was also 23 points, however, the highest score was 50 points. This raises the question of whether or not the matric score had an impact on the lower attrition rate in the 2000 sample group compared to the 1999 sample group. This needed to be investigated further, and is discussed below.

The pass rate as shown in Table 6.4.1.1 in the first year accounting course in the 1999 sample group was considerably lower (53%) than the pass rate in the first year accounting course in the subsequent year (79 %). One of the possible reasons for this was that the entire course was restructured at the commencement of 2000. While the syllabus remained essentially the same, different course materials and staff were introduced. The mode of assessment saw the introduction of more written application type questions and less multiple choice questioning techniques. Furthermore, supplementary lectures took place to assist those students who were previously academically disadvantaged (this included those students who had not studied accounting at school level). A second reason for the lower pass rate was the presence of a greater number of students (38) in the 1999 sample group who had matric points of less than the required 32 points. If this is compared to the 2000 sample group, only 21 students were admitted to the BCom degree who did not meet the minimum requirement in terms of matric points. A third possible explanation is the fact that 15 students were allowed to register for the Accounting 100 course in 1999 who had a matric mathematics symbol of a standard grade 'D' or lower. In the 2000 sample group, only five students who did not possess the minimum matric mathematics requirement were allowed to register for the Accounting 100 course.

An examination of the matric mathematics results and the pass rates at each successive year reveals some interesting trends. Table 6.4.1.2 and Table 6.4.1.3 show a detailed analysis of matric mathematics results and the corresponding performance in the financial accounting programmes for the 1999 and 2000 sample groups respectively. From the two groups it is evident that only one student that had attained a standard grade distinction achieved a distinction in a financial accounting course at university. Furthermore, no other students who entered university with a standard grade pass in mathematics achieved distinctions in the university accountancy courses. In the 1999 sample group, the dean's discretion had been applied to allow a number of students who had obtained standard grade D's, E's and F's to register for the first year course. Only three out of these 14 students passed the course, although only one proceeded (unsuccessfully) to the Accounting 200 course. In the 2000 sample group, only three students with matric mathematics below the required minimum were allowed to register for the first-year accounting course, of which only one was able to proceed to the second-year course and failed that course. Furthermore, of the 63 students with standard grade mathematics who were registered for the Accounting 100 course in the 1999 sample group (51 students in the 2000 sample group), only 8 (2000: 13) proceeded to enter the third-year financial accounting programme, with only one (2000: 5) of these students passing the course. The low pass rates for students who even possessed a standard grade C symbol lends support to the view that matric mathematics is an important predictor of success in the accounting programme at university.

Acc 100	HG Distinction	HG B	HG C	HG D	HG E	SG Distinction	SG B	SG C	SG D	SG E	SG F	Total
	15	**18**	**39**	**35**	**36**	**21**	**14**	**14**	**5**	**3**	**6**	**206**
Distinction	4	2	4	0	0	0	0	0	0	0	0	10
Pass	10	15	23	16	13	8	6	5	1	1	1	99
Fail	1	1	12	19	23	13	8	9	4	2	5	97
	15	18	39	35	36	21	14	14	5	3	6	206

Acc 200	HG Distinction	HG B	HG C	HG D	HG E	SG Distinction	SG B	SG C	SG D	SG E	SG F	Total
	9	**13**	**24**	**12**	**10**	**6**	**7**	**4**	**-**	**1**	**-**	**86**
Distinction	2	1	3	0	0	0	0	0	-	0	-	6
Pass	6	9	16	11	7	5	4	2	-	0	-	60
Fail	1	3	5	1	3	1	3	2	-	1	-	20
	9	13	24	12	10	6	7	4	-	1	-	86

Acc 300	HG Distinction	HG B	HG C	HG D	HG E	SG Distinction	SG B	SG C	SG D	SG E	SG F	Total
	7	**7**	**16**	**8**	**5**	**3**	**4**	**1**	**-**	**-**	**-**	**51**
Distinction	1	0	0	0	0	0	0	0	-	-	-	1
Pass	5	6	12	5	1	0	1	0	-	-	-	30
Fail	1	1	4	3	4	3	3	1	-	-	-	20
	7	7	17	8	5	3	4	1	-	-	-	51

Acc 400	HG Distinction	HG B	HG C	HG D	HG E	SG Distinction	SG B	SG C	SG D	SG E	SG F	Total
	4	**5**	**9**	**4**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**23**
Distinction	1	0	0	0	0	-	-	-	-	-	-	1
Pass	3	4	7	3	0	-	-	-	-	-	-	17
Fail	0	1	2	1	1	-	-	-	-	-	-	5
	4	5	9	4	1							23

Table 6.4.1.2: Comparison of High School Mathematics results with University Results for the 1999 sample group

Acc 100	HG Distinction	HG B	HG C	HG D	HG E	SG Distinction	SG B	SG C	SG D	SG E	SG F	Total
	12	**20**	**38**	**45**	**35**	**16**	**17**	**15**	**2**	**0**	**1**	**201**
Distinction	10	2	2	2	0	1	2	0	0	0	0	11
Pass	2	15	33	38	20	14	10	6	1	0	0	148
Fail	0	2	3	5	15	1	5	9	1	0	1	42
	12	20	39	47	38	16	18	16	2	0	1	201

Acc 200	HG Distinction	HG B	HG C	HG D	HG E	SG Distinction	SG B	SG C	SG D	SG E	SG F	Total
	9	**17**	**26**	**35**	**15**	**11**	**11**	**1**	**1**	**-**	**-**	**126**
Distinction	4	2	1	1	0	1	2	0	0	-	-	11
Pass	5	14	22	29	12	6	6	0	0	-	-	94
Fail	0	1	3	5	3	4	3	1	1	-	-	21
	9	17	26	35	15	11	12	1	1	-	-	127

Acc 300	HG	HG	H	HG	HG	SG	SG	SG	SG	SG	SG	Total
	Distinction	**B**	**G**	**D**	**E**	**Distinction**	**B**	**C**	**D**	**E**	**F**	
	9	**13**	**18**	**26**	**7**	**6**	**7**	**-**	**-**	**-**	**-**	**86**
Distinction	2	0	0	0	0	0	0	-	-	-	-	2
Pass	7	13	16	17	2	5	5	-	-	-	-	65
Fail	0	0	2	9	5	1	2	-	-	-	-	19
	9	13	18	26	7	6	7	-	-	-	-	86

Acc 400	HG	HG	HG	HG	HG	SG	SG	SG	SG	SG	SG	Total
	Distinction	**B**	**C**	**D**	**E**	**Distinction**	**B**	**C**	**D**	**E**	**F**	
	9	**8**	**14**	**6**	**1**	**4**	**3**	**-**	**-**	**-**	**-**	**45**
Distinction	1	0	0	0	0	1	0	-	-	-	-	2
Pass	7	6	9	1	0	0	2	-	-	-	-	25
Fail	1	2	5	5	1	3	1	-	-	-	-	18
	9	8	14	6	1	4	3	-	-	-	-	45

Table 6.4.1.3: Comparison of High School Mathematics results with University Results for the 2000 sample group

While the descriptive analysis above would appear to indicate that a relationship exists between university performance and both matric points and matric mathematics results, this observation needed to be verified statistically. Scatter diagrams were prepared to initially confirm whether such relationships did indeed exist. Figure 6.4.1.1 shows the positive linear relationship between the matric points obtained by students and the final accounting 100 results achieved.

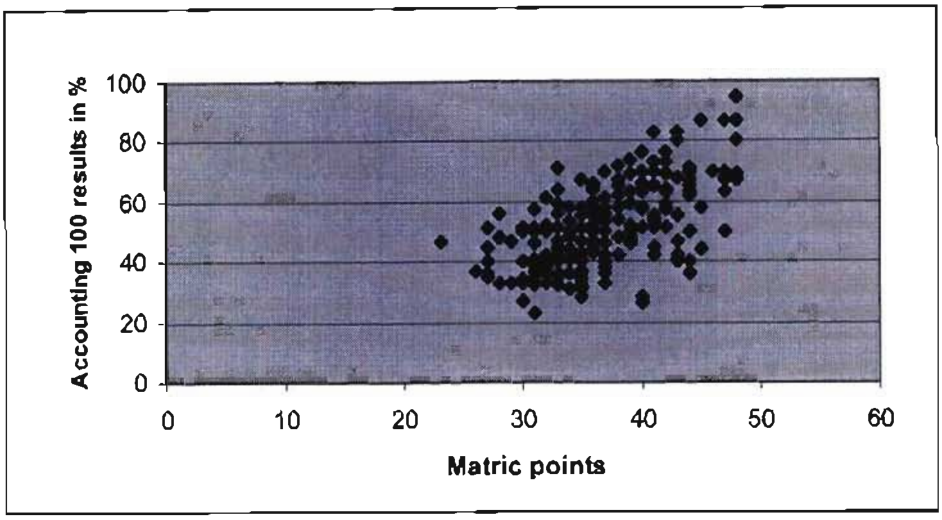

Figure 6.4.1.1 Scatter diagram illustrating relationship between Matric Points and Accounting 100 results for the 1999 sample group (n = 206; r = 0.592)

In order to determine if a relationship could be observed between accounting results and the matric mathematics results it was necessary to firstly convert the mathematics symbols obtained by students into numeric values. For this purpose a scale of one to twelve was devised whereby '1' referred to the weakest score reflected in the sample group, and '12' represented the strongest score reflected in the sample group. In other words, a student that had scored a Standard Grade 'G' symbol was graded as a '1', while students that scored a Higher Grade 'A' symbol was graded as an '12'. This is reflected in Table 6.4.1.5 below, which also indicates what the matric symbols equate to in percentages.

Matric Symbol	% Equivalent	Numeric Value Assigned
Higher Grade A	> 80 %	12
Higher Grade B	70 – 79 %	11
Higher Grade C	60 – 69 %	10
Higher Grade D	50 – 59 %	9
Higher Grade E	40 – 49 %	8
Standard Grade A	> 80 %	7
Standard Grade B	70 – 79 %	6
Standard Grade C	60 – 69 %	5
Standard Grade D	50 – 59 %	4
Standard Grade E	40 – 49 %	3
Standard Grade F	34 – 39 %	2
Standard Grade G	30 – 33 %	1

Table 6.4.1.4 Matric Mathematics symbols and their equivalents

The scatter diagram shown in Figure 6.4.1.2 also reveals a positive linear relationship between the final Accounting 100 result and the matric mathematics scores of the students in the sample group. The preliminary evidence of a positive linear relationship provided adequate support to conduct correlation analyses on these variables to determine the strength of these relationships. The Pearson's correlation test revealed that the positive relationship between the accounting 100 final mark in the 1999 sample group and the number of matric points is moderately strong ($r = 0.59$, $p = 0.001$), and this relationship is significant at the 5% level. Therefore the higher the number of matric points that a student has attained the more likely the student is to perform well in this course. The r of 0.59 showed that 35% of the variance in the accounting marks was as a result of the variation in the matric points. The associated probability level of 0.001 showed that such a result is highly unlikely to have arisen by sampling error.

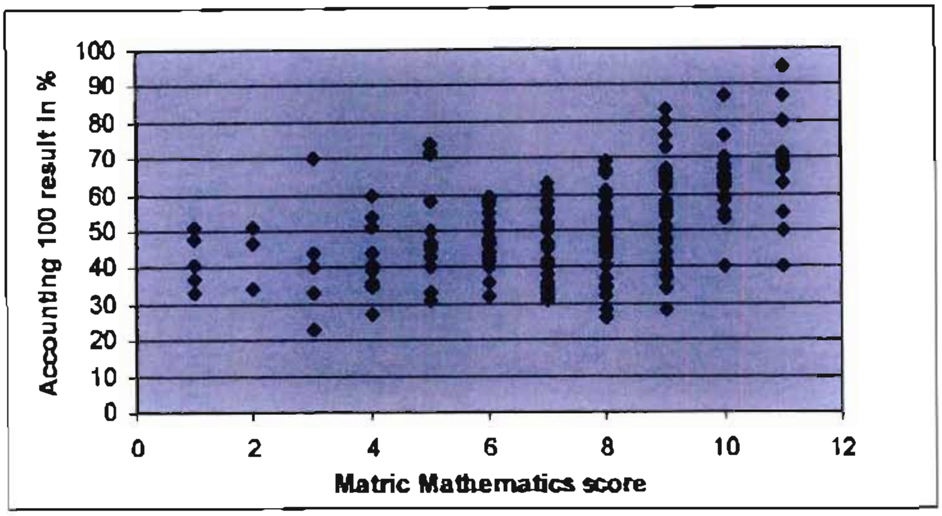

Figure 6.4.1.2 Scatter diagram illustrating relationship between matric mathematics scores and Accounting 100 results for the 1999 sample group (n = 206; r = 0.488)

Similarly, an analysis of the relationship between Accounting 100 final results from the 1999 sample group and the matric mathematics symbols achieved by those same students revealed a positive relationship. This relationship was moderately positively related and significant at the 5% level (r = 0.49, p = 0.001). Therefore students who held higher symbols for matric mathematics were more likely to perform well in this course. The r of 0.49 showed that 23 % of the variance in the accounting marks was as a result of the variation in the matric mathematics symbols.

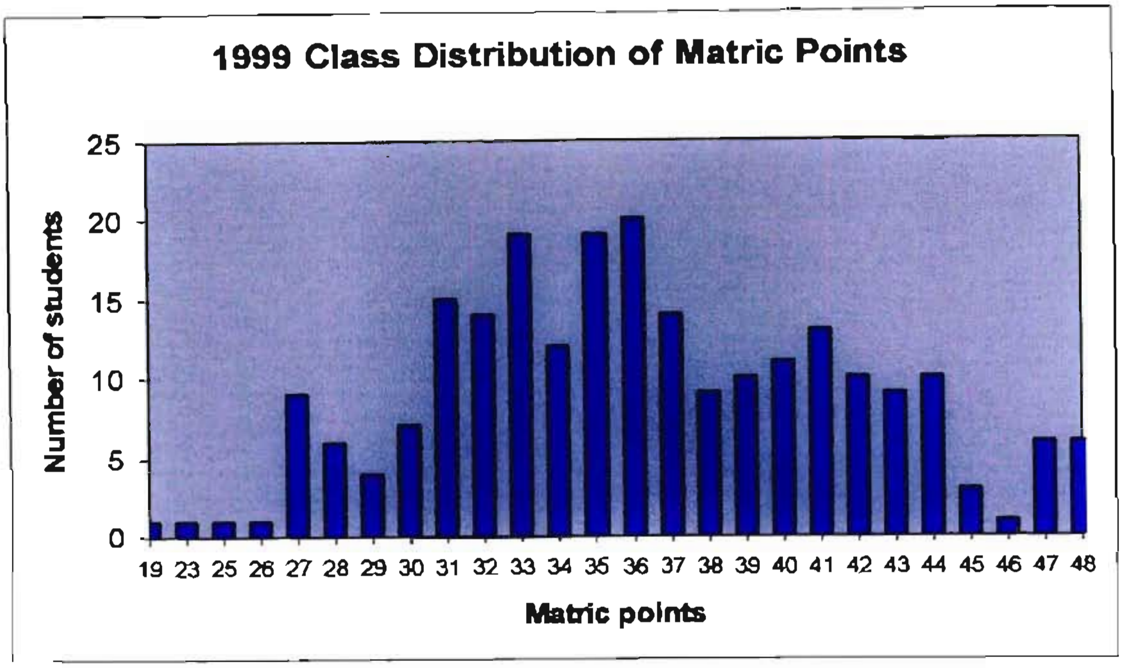

Figure 6.4.1.3 Distribution of matric points for BCom students registered for Accounting 100 for the first time in 1999.

Figure 6.4.1.3 shows the distribution of matric points for the sample group of students that were registered for the Accounting 100 course in 1999. This diagram indicates that the matric points of the Accounting 100 class from the 1999 sample group was normally distributed and justifies the use of multiple linear regression being carried out to determine the effect of matric points and matric mathematics results on the final Accounting 100 marks. Table 6.4.1.6 shows a summary of the results of this analysis. This relationship between matric mathematics, matric points and the final accounting 100 results for the 1999 sample group is expressed in the following equation:

$$\textit{Accounting 100 Final Mark} = -2.685 + 1.22MP + 1.12MM$$

Where MP = Matric points and MM = matric mathematics.

Together, matric points and matric mathematics accounted for 37% of the variances in the final Accounting 100 result. Considered in isolation, this may not appear to indicate a considerable portion of the variances, however, bearing in mind that there are numerous factors which impact on the performance of students at university this represents the combined impact of only two aspects of high school performance. The regression plane was significantly different from zero (F = 60.30, p = 0.001). Both matric points and matric mathematics related positively to the final Accounting 100 result. The regression coefficient for matric points was 1.22 (95% CI = 0.85 – 1.58); and for matric mathematics it was 1.12 (95% CI = 0.30 – 1.94). Since the confidence limits did not encompass a negative value, it can be concluded that the population regression coefficients for both matric points and matric mathematics are positive (matric points - $t = 6.60$; $p = 0.001$/ matric mathematics – $t = 2.71$, $p = 0.007$). The standardized regression coefficients show that while matric points is a slightly stronger predictor than matric mathematics, both variables are positively and significantly related to success in the first year accounting course and are valid variables in the regression model.

	R	R square	Adjusted R Square	Std error of the Estimate
	.610	.373	.367	10.920

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Regression	14382.503	2	7191.251	60.303	.000
Residual	24208.313	203	119.253		
Total	38590.816	205			

Coefficients

	Unstandardized coefficients		Standardized Coefficients	t	Sig.
	B	Std. error	Beta		
(Constant)	-2.685	5.380		-.499	.618
Matric Points	1.215	.184	.471	6.603	.000
Matric Maths	1.120	.414	.193	2.706	.007

Table 6.4.1.5 Summary table of results for linear regression analysis of the Accounting 100 course for the 1999 sample group

A strong positive relationship (r = 0.61, p = 0.001) between the Accounting 100 final mark of the 2000 sample group and the number of matric points was revealed by the Pearson's correlation test. This relationship is significant at the 5% level. Therefore again it is evident (refer Figure 6.4.1.4) that the higher the number of matric points that a student has attained the more likely the student is to perform well in this course. The r of 0.61 showed that 37% of the variance in the accounting marks was as a result of the variation in the matric points. The associated probability level of 0.001 showed that such a result is highly unlikely to have arisen by sampling error. Similarly, an analysis of the relationship between Accounting 100 final results and the matric mathematics symbols achieved by those same students in the 2000 sample group revealed a positive relationship (refer Figure 6.4.1.5). This relationship was moderately positively related and significant at the 5% level ($r = 0.52$, $p = 0.001$). Therefore students who held higher symbols for matric mathematics were more likely to perform well in this course. The r of 0.52 showed that 27 % of the variance in the accounting marks was as a result of the variation in the matric mathematics symbols. Bearing in mind, that it is recognized that other factors play an important role in the performance of students at university (refer to chapter 4), these two factors of matric points and matric mathematics account for a significant amount of the variance in the accounting 100 final results.

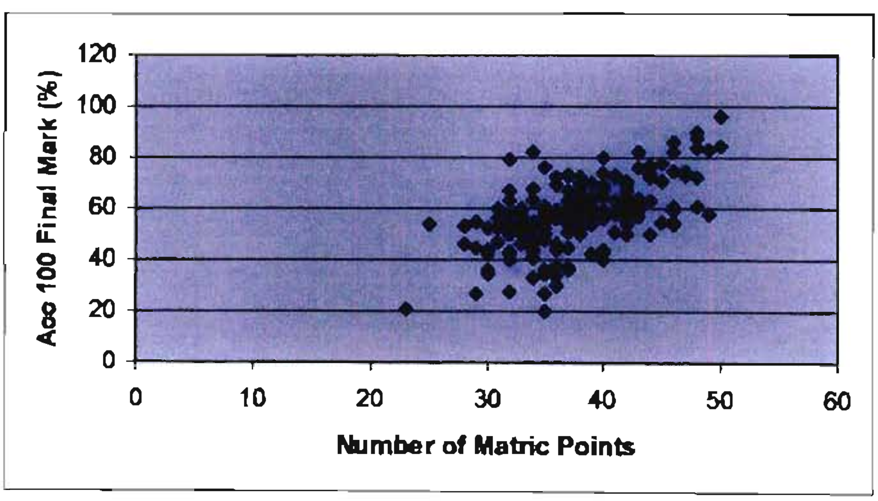

Figure 6.4.1.4 Scatter diagram illustrating relationship between Matric Points and Accounting 100 results for the 2000 sample group ($n = 201$; $r = 0.607$)

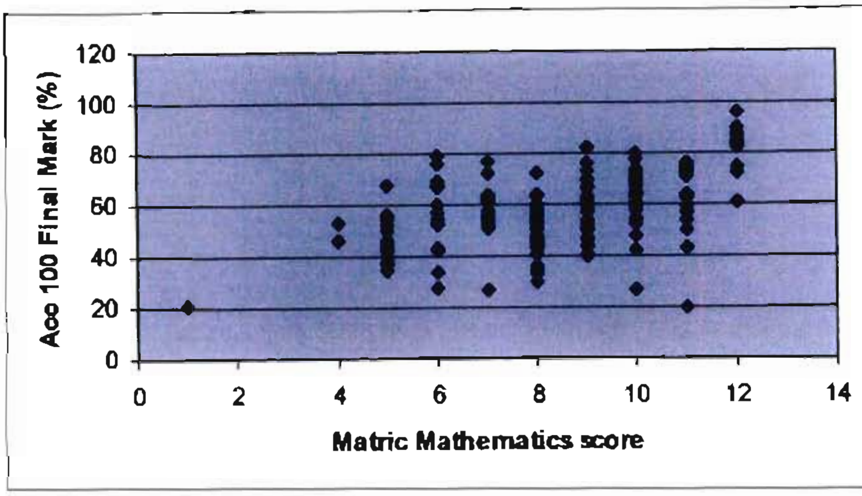

Figure 6.4.1.5 Scatter diagram illustrating relationship between matric mathematics scores and Accounting 100 results for the 2000 sample group (n = 201; r = 0.519)

Linear regression analyses of the first-year accounting course from the 2000 sample group revealed that together, matric points and matric mathematics accounted for 38% of the variances in the final Accounting 100 result (refer Table 6.4.1.7). Again this represents a substantial portion of the variances. The regression plane was significantly different from zero (F = 61.16, p = 0.001). Both matric points and matric mathematics related positively to the final Accounting 100 result. The regression coefficient for matric points was 1.24 (95% CI = 0.83 – 1.64); and for matric mathematics it was 1.12 (95% CI = 0.06 – 2.18). Since the confidence limits did not encompass a negative value, it can be concluded that the population regression coefficients for both matric points and matric mathematics are positive (matric points - $t = 5.99$; $p = 0.001$/ matric mathematics – $t = 2.08$, $p = 0.039$). The standardized regression coefficients show that as with the 1999 sample group results, while matric points is a slightly stronger predictor than matric mathematics, both variables are positively and significantly related to success in the first year accounting course. The significance level of matric points and matric mathematics in this linear regression model (p = 0.000 and p = 0.039 respectively) shows that the model is significant at the 5% level and that the two independent variables are valid in this model. The multiple regression formula that can be derived from the statistical results would be expressed as:

$$\textit{Acc 100 Final mark} = 1.812 + 1.24\,MP + 1.12\,MM$$

In other words, the final mark for a student registered for the first-year accounting course in 2000 could be predicted as being 1.812 plus 1.24 times their number of matric points, plus 1.12 times their matric mathematics mark.

	R	R square	Adjusted R Square	Std error of the Estimate
	.618	.382	.376	10.483

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Regression	13442.205	2	6721.102	61.158	.000
Residual	21759.775	198	109.898		
Total	35201.980	200			

Coefficients

	Unstandardized coefficients		Standardized Coefficients	t	Sig.
	B	Std. error	Beta		
(Constant)	1.812	5.509		.329	.743
Matric Points	1.236	.206	.485	5.990	.000
Matric Maths	1.117	.538	.168	2.078	.039

Table 6.4.1.6 Summary table of results for linear regression analysis of the Accounting 100 course for the 2000 sample group

The diagnostics were also carried out on the Accounting 100 model for the 1999 and the 2000 sample groups respectively to check the validity of the model. This was done through an examination of the residuals. Firstly, a histogram was looked at to confirm the normality of the residuals. The plot (refer Figure B.5.1, Appendix B and Figure C.5.1, Appendix C) indicated a normal curve about the histogram of the residuals. Next the Normal P-P plot was studied (refer Figure B.5.2, Appendix B and Figure C.5.2, Appendix C) and appeared to confirm that the residuals were normally distributed. The scatterplot of the residuals and the dependant variable (refer Figure B.5.3, Appendix B, and Figure B.5.3, Appendix C) reflected a random scattering about zero. All three diagnostics indicated that the model would be an adequate representation of the dependant variable.

The chi-squared test was conducted with the higher grade matric mathematics results. The number of students with standard grade mathematics decreased at a greater rate than the number of students with higher grade mathematics from first-year through to fourth-year, with the result being that there were insufficient students within the standard grade group to reliably perform a chi-squared analysis of those students with standard grade mathematics.

The results showed that for the group of students with higher grade mathematics in the 1999 sample group, the x^2 value was 41.07, DF = 8 and the associated probability value was 0.001. This means that if the null hypothesis was true, such a value would occur rarely. Thus it can be accepted that there is a significant difference between the observed and the expected frequencies, and one can conclude that the Accounting 100 final marks in the 1999 sample group are dependant on the higher grade matric mathematics results. Detailed results of the chi-squared test are included in Appendix B.

The results of the chi-squared test for the higher grade mathematics scores and the final accounting 100 results of the 2000 sample group revealed a x^2 value of 109.075, DF = 8 and an associated probability of 0.001. These results were significant at the 5% level, and indicate that there is a strong association between matric mathematics and first–year performance in the 2000 accountancy programme. Detailed results of the chi-squared tests for the 2000 sample group are included in Appendix C.

6.4.2 Second-year accounting courses

A cursory examination of the composition of the students registered for the second-year accounting courses revealed that the matric score with the highest frequency in the 1999 sample group was 36 points, while in the 2000 sample group more students who had achieved 38 points were registered. Furthermore the rate of attrition declined from 41% in 1999 to 32% in the 2000 sample group, while the pass rate increased marginally from 77% in the 1999 sample group to 83% in the 2000 sample group (refer table 5.4.2.1). This would appear to be indicative of a positive relationship between matric points and performance in the second-year accounting course. This view is supported by the evidence provided in the scatter diagram shown in Figure 6.4.2.1.

	Acc 200 Final Mark		Matric Points		Matric Mathematics	
	1999	2000	1999	2000	1999	2000
N = Number of students in class	86	126	86	126	86	126
Mean	56.19	58.93	38.83	38.84	9.14	9.06
Std Error of Mean	1.373	1.053	0.531	0.445	0.22	0.154
Median	55	58.50	39.50	39	10	9
Mode	55	55*	36	38	10	9
Std. Deviation	12.729	11.823	4.921	4.995	2.036	1.729
Variance	162.04	139.79	24.216	24.951	4.145	2.988
Range	66	67	21	25	9	8
Minimum	27	27	27	25	3	4
Maximum	93	94	48	50	12	12
Rate of Attrition	41 %	32 %	-	-	-	-
Pass Rate	77 %	83 %	-	-	-	-

* Multiple modes exist. The smallest value is shown.

Table 6.4.2.1 Academic achievement profile of second-year BCom students at the University of Natal, Pietermaritzburg for the 1999 and 2000 sample groups

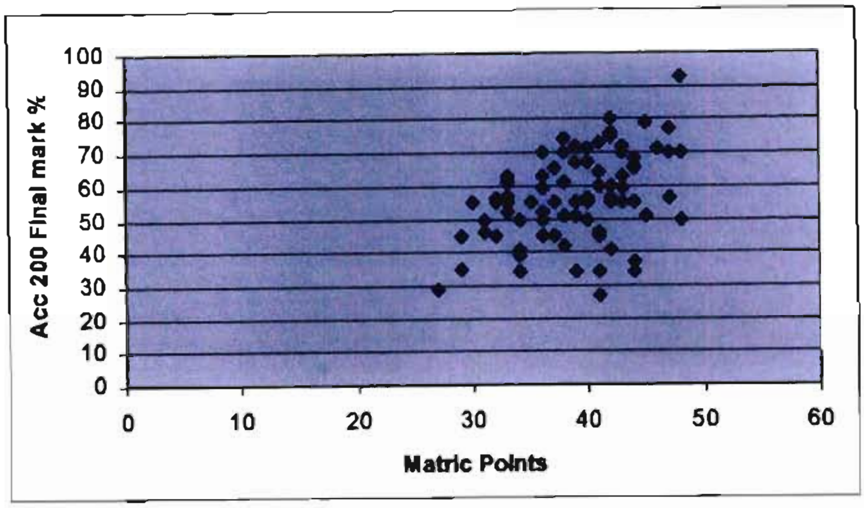

Figure 6.4.2.1 Scatter diagram illustrating relationship between Matric Points and Accounting 200 results for the 1999 sample group (n = 86; r = 0.43)

The relationship between performance in the second-year accounting course and matric points in the 1999 sample group (refer Figure 6.4.2.1), as indicated through Pearson's correlation analysis, was moderately positive ($r = 0.43$; $p = 0.001$) and significant at the 5% level. The r of 0.43 would indicate that 19% of the variance in the performance of the students in the Accounting 200 programme for the 1999 sample group could be accounted for by the variation in the matric points. Such a result is highly unlikely to have arisen from sampling error as is evidenced by the associated probability level of 0.001. This was comparable to the results of the correlation tests performed using the data from the second-year course students in the 2000 sample group (refer Figure 6.4.2.2). Here a moderately positive relationship could also be identified ($r = 0.45$, $p = 0.001$) that was significant at the 5% level. In this case, 20% of the variance in the Accounting 200 final mark could be explained by the variance in the matric points. In both years, the positive relationship indicated that the more matric points that a student possesses, the greater the likelihood of that student performing well in the second-year accounting course.

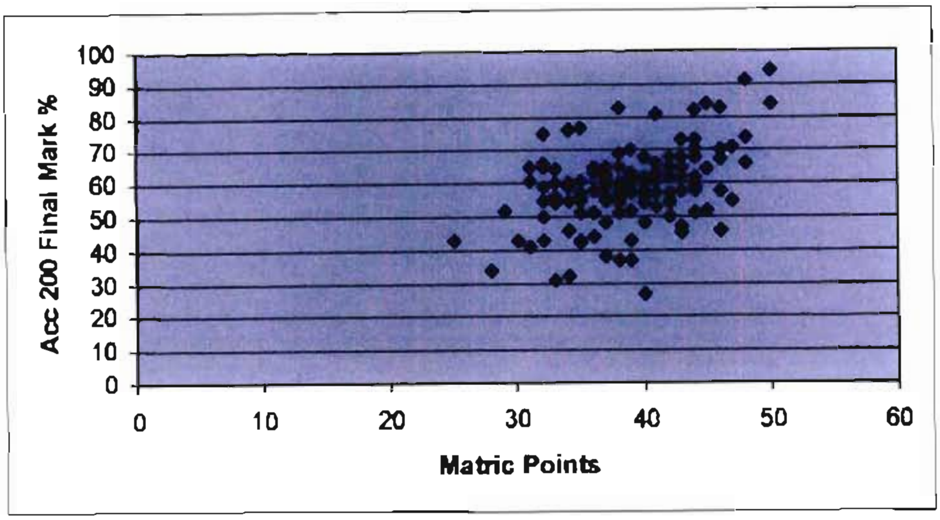

Figure 6.4.2.2 Scatter diagram illustrating relationship between Matric Points and Accounting 200 results for the 2000 sample group (n = 126; r = 0.445)

In both the 1999 and 2000 sample groups there was only one student in each year that was registered for the Accounting 200 course who did not have the required minimum for entry to the BCom degree. Both of these students were unsuccessful in the second-year accounting course. The relationship between matric mathematics and performance in the second-year accounting course as indicated in Figure 6.4.2.3 and Figure 6.4.2.4 for the 1999 and 2000 sample groups respectively was not as obvious. In the 1999 sample group, the relationship, while still positive, was moderately weak ($r = 0.34$; $p = 0.001$). However, it was still significant at the 5% level. In this instance only 12% of the variance in the second-year accounting results could be explained by variances in the matric mathematics results of those students. As the relationship was still positive, it is possible to state that the higher the matric mathematics results of a student the more likely that student was to do well in the second-year accounting course, however, the university performance in this course was not as strongly dependant on matric mathematics as it was on matric points. In the 2000 sample group, the relationship was a moderately positive one (r = 0.423; p = 0.001), which again was significant at the 5% level. The r of 0.42 showed that 18% of the variance in the Accounting 200 final mark was as a result of the variance in the matric mathematics score. In both years, the associated probability level was 0.001, and again indicated that these results were unlikely to have arisen from sampling errors.

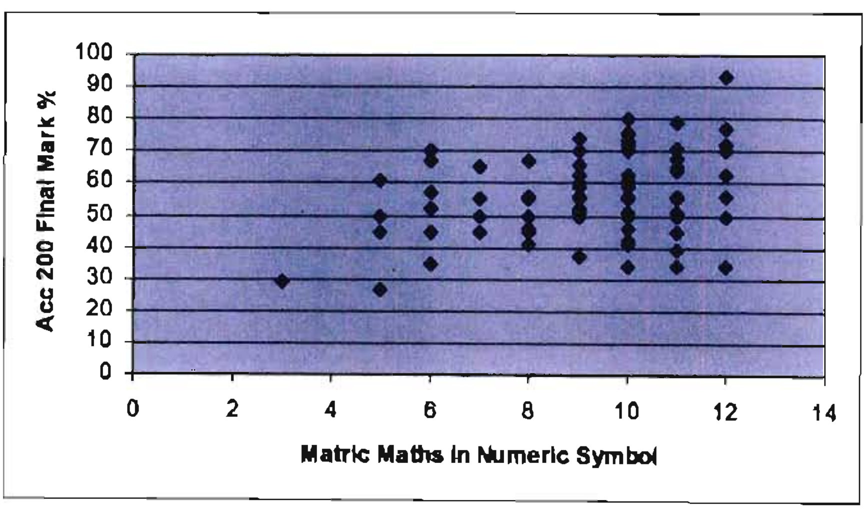

Figure 6.4.2.3 Scatter diagram illustrating relationship between Matric Mathematics scores and Accounting 200 results for the 1999 sample group (n = 86; r = 0.34)

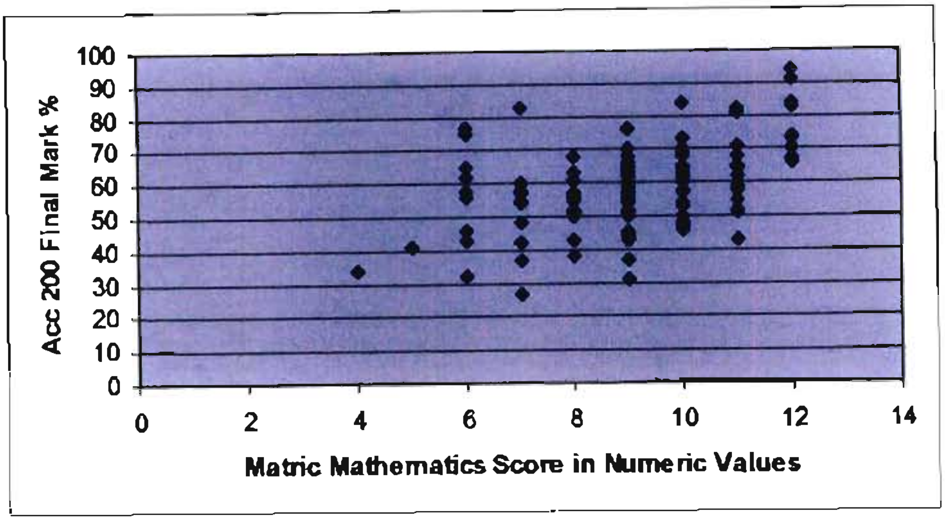

Figure 6.4.2.4 Scatter diagram illustrating relationship between Matric Mathematics scores and Accounting 200 results for the 2000 sample group (n = 126; r = 0.423)

The results of the multiple linear regression analysis that was carried out to determine the effect of matric points and matric mathematics results on the final Accounting 200 marks for the 1999 sample group is reported in Table 6.4.2.2. Together, matric points and matric mathematics accounted for 18% of the variances in the final Accounting 200 result. The regression plane was significantly different from zero (F = 10.08, p = 0.001). The regression coefficient for matric points was 0.92 (95% CI = 0.28 – 1.55); and for matric mathematics it was 0.79 (95% CI = - 0.74 – 2.33) which indicates that the relationship between performance in the second-year course and the two variables was positive. Since the confidence limits for the matric points did not encompass a negative value, it can be concluded that the population regression coefficients for the matric points are positive (matric points - t = 2.87; p = 0.005). The confidence limits for matric mathematics, however, did include a negative value and therefore it is not certain that the population regression slope would be negative or positive (t = 1.03; p = .308).

Furthermore the associated probability of 0.308 indicates that there is a likelihood of such a result arising from sampling error, assuming that the null hypothesis is true, of 31 in 100. Statistically then, the null hypothesis cannot be rejected for this sample group. From an educational perspective however, it is important to note that the beta value of 0.792 for matric mathematics indicates that there is still a positive impact on the performance of the second-year students by their matric mathematics scores. The standardized regression coefficients show that matric points are positively and significantly related to success in the second-year accounting course and, are a stronger predictor than matric mathematics. In this instance, only the matric points was found to be significant at the 5% level ($p = 0.005$). The multiple regression equation that can be derived from the statistical data to describe the relationship between the Accounting 200 final mark in the 1999 sample group, and matric points and matric mathematics is as follows:

$$\textit{Accounting 200 Final mark} = 13.399 + 0.92\,MP + 0.79\,MM$$

	R	R square	Adjusted R Square	Std error of the Estimate
	.442	.195	.176	11.554

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Regression	2692.172	2	1346.086	10.083	.000
Residual	11080.851	83	133.504		
Total	13773.023	85			

Coefficients

	Unstandardized coefficients		Standardized Coefficients	t	Sig.
	B	Std. error	Beta		
(Constant)	13.399	9.975		1.343	.183
Matric Points	.916	.319	.354	2.866	.005
Matric Maths	.792	.772	.127	1.026	.308

Table 6.4.2.2 Summary table of results for linear regression analysis of the Accounting 200 course from the 1999 sample group

Linear regression analyses of the second-year accounting course from the 2000 sample group revealed that together, matric points and matric mathematics accounted for 21% of the variances in the final Accounting 200 result (refer Table 6.4.2.3). The multiple regression equation that can be derived from the statistical data to describe the relationship between the Accounting 200 final mark in the 2000 sample group, and matric points and matric mathematics is as follows:

$$\textit{Accounting 200 Final mark} = 18.116 + 0.69\,MP + 1.53\,MM$$

The regression plane was significantly different from zero (F = 17.88, p = 0.001). Again both matric points and matric mathematics related positively to the final Accounting 200 result and were significant at the 5% level. The regression coefficient for matric points as 0.69 (95% CI = 0.19 – 1.20) showing a positive impact on the performance of the second-year students; and for matric mathematics it was 1.53 (95% CI = 0.06 – 2.99). Since the confidence limits did not encompass a negative value, it can be concluded that the population regression coefficients for both matric points and matric mathematics are positive (matric points - $t = 2.70$; $p = 0.008$/ matric mathematics – $t = 2.06$, $p = 0.041$). The standardized regression coefficients show that matric mathematics is a stronger predictor than matric points and that both variables are positively and significantly related to success in the second-year accounting course.

	R	R square	Adjusted R Square	Std error of the Estimate
	.475	.225	.213	10.491

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Regression	3936.251	2	1968.126	17.881	.000
Residual	13538.106	123	110.066		
Total	17474.357	125			

Coefficients

	Unstandardized coefficients		Standardized Coefficients	t	Sig.
	B	Std. error	Beta		
(Constant)	18.116	7.357		2.463	.015
Matric Points	.694	.257	.293	2.703	.008
Matric Maths	1.530	.742	.224	2.064	.041

Table 6.4.2.3 Summary table of results for linear regression analysis of the Accounting 200 course from the 2000 sample group

The diagnostics were also carried out on the Accounting 200 model for the 1999 and the 2000 sample groups respectively to check the validity of the model. This was done through an examination of the residuals. Firstly, the normality of the residuals was confirmed through an examination of the relevant histograms. The plots (refer Figure B.5.4, Appendix B and Figure C.5.4, Appendix C) indicated a normal curve about the histogram of the residuals. Next the Normal P-P plots were studied (refer Figure B.5.5, Appendix B and Figure C.5.5, Appendix C) and appeared to confirm that the residuals were normally distributed. The scatterplot of the residuals and the dependant variable (refer Figure B.5.6, Appendix B, and Figure C.5.6, Appendix C) reflected a random scattering about zero. The diagnostics indicated that the model would be an adequate representation of the dependant variable.

The chi-squared test used to measure the level of association between the higher grade matric mathematics results and performance in the Accounting 200 course for the 1999 sample group revealed a x^2 value of 5.389, DF = 8 and an associated probability of 0.715. (Refer Table B6.4, Appendix B).

The results of the chi-squared test for the higher grade mathematics scores and the final Accounting 200 results of the 2000 sample group revealed a x^2 value of 26.365, DF = 8 and an associated probability of 0.001. These results were significant at the 5% level, and indicate that there is a strong association between matric mathematics at the higher grade and second–year performance in the accountancy programme of the 2000 sample group. Detailed results of the chi-squared tests for the 2000 sample group are included in Appendix C.

6.4.3 Third-year accounting courses

The pass rate at third year course levels saw a considerable increase from 61% to 78%. This corresponded with a decline in the rate of attrition from 55% in the 1999 sample group to 48% in the 2000 sample group. The mean of the Accounting 300 final mark also increased from 48.98 % in the 1999 sample group to 52.80 % in the 2000 sample group. The apparent negative relationship between the pass rate and the rate of attrition would lend support to the view that a major reason for attrition could be explained by the poor performance of students.

The difference between the matric points obtained by students in the 1999 and 2000 sample groups respectively was minimal, although there were two students from the 2000 sample group who had obtained 50 points. An interesting observation is the fact that only one student in the 1999 sample group and one student in the 2000 sample group had fewer than the required 32 points for entry to the BCom degree. The relationship between matric points and the third–year accounting results of the 1999 sample group was found to be positively and moderately strongly related ($r = 0.58$, $p = 0.001$). This relationship is significant at the 5% level. This can be observed in Figure 6.4.3.1. A comparison of the third-year accounting results for the 2000 sample group revealed that the relationship was moderately positive ($r = 0.45$; $p = 0.001$) and again, significant at the 5% level. In other words, the r of 0.58 in the 1999 sample group indicated that 34 % of the variance in the results of the Accounting 300 course for the 1999 sample group could be explained by variances in the matric points of the group, while the r of 0.45 in the 2000 sample group showed that only 20 % of the variance in the results of the group could be explained by variances in the matric points of the students in that group (refer to Figure 6.4.3.2). In both years the associated probability of p = 0.001 indicated that the results were highly unlikely to have arisen from sampling error.

	Acc 300 Final Mark		**Matric Points**		**Matric Mathematics**	
	1999	2000	1999	2000	1999	2000
N = Number of students in class	51	86	51	86	51	86
Mean	48.98	52.80	39.98	39.70	9.47	9.36
Std error of Mean	1.381	0.912	0.633	0.517	.0254	0.179
Median	50	51.50	40	40	10	9
Mode	50	50	40	42*	10	9
Std. Deviation	9.864	8.461	4.519	4.792	1.815	1.659
Variance	97.3	71.596	20.420	22.966	3.294	2.751
Range	48	63	18	19	7	6
Minimum	27	24	30	31	5	6
Maximum	75	87	48	50	12	12
Rate of attrition	55 %	48 %	-	-	-	-
Pass Rate	61 %	78 %	-	-	-	-

* Multiple modes exist. The greatest value is shown.

Table 6.4.3.1 Academic achievement profile of third-year BCom students at the University of Natal, Pietermaritzburg for the 1999 and 2000 sample groups

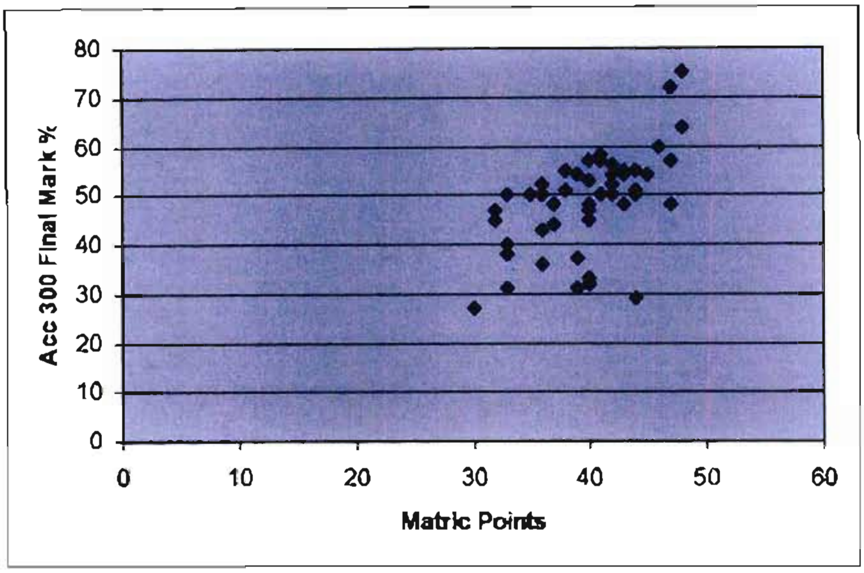

Figure 6.4.3.1 Scatter diagram illustrating relationship between Matric Points and Accounting 300 results for the 1999 sample group (n =51 ; r = 0.58)

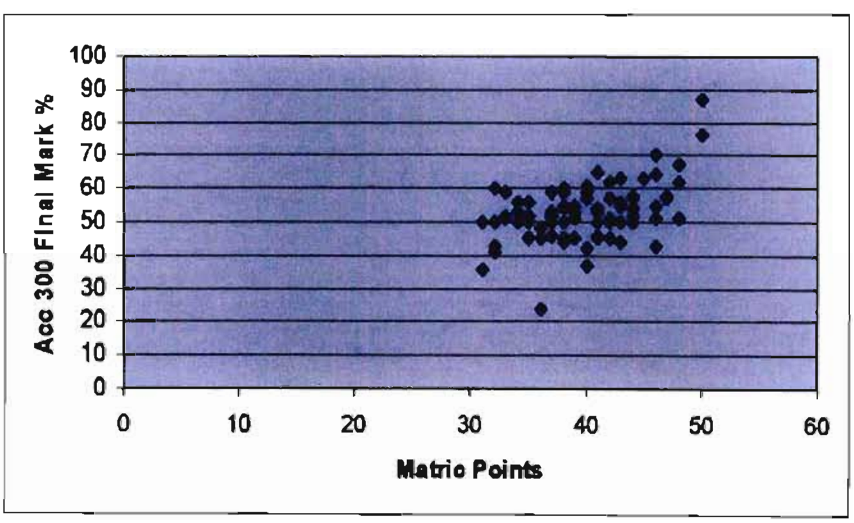

Figure 6.4.3.2 Scatter diagram illustrating relationship between Matric Points and Accounting 300 results for the 2000 sample group (n =86 ; r = 0.445)

Perhaps the most telling observation to be made from an examination of the matric mathematics results and the performance of students in the third-year accounting courses from both the 1999 and the 2000 sample groups is the absence of any students who did not hold the prerequisite minimum mathematics score for entry to the BCom degree. In other words, there were no students who were ranked lower than 5 on their mathematics score in the sample groups at third-year level. The relationship between these two variables in the 1999 group, as can be observed in Figure 6.4.3.3, was shown to be moderately positively related (r = 0.554; p = 0.001).

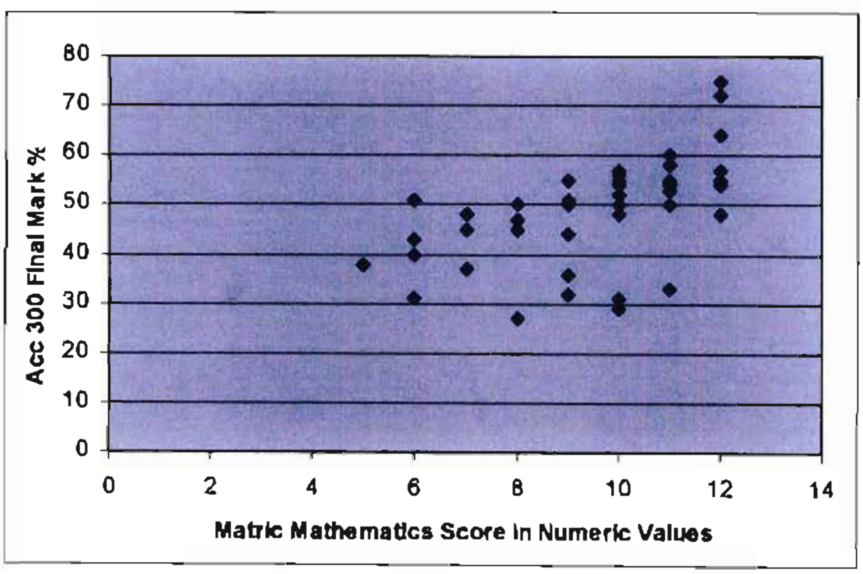

Figure 6.4.3.3 Scatter diagram illustrating relationship between Matric Mathematics scores and Accounting 300 results for the 1999 sample group (n =51 ; r = 0.554)

In the 2000 group, this relationship between matric mathematics and performance in the third-year accounting course was also moderately positively related (r = 0.478; p = 0.001). While the r of 0.55 in the 1999 sample group and the r of 0.48 in the 2000 sample group indicate that 31 % and 23 % of the changes in the Accounting 300 results of the

1999 and 2000 sample groups respectively could be accounted for by changes in the matric mathematics scores of the respective groups, it does not indicate that the matric mathematics score could predict performance in the university course. These results however, are still statistically significant at the 5% level as an indication of the positive relationship between these two variables.

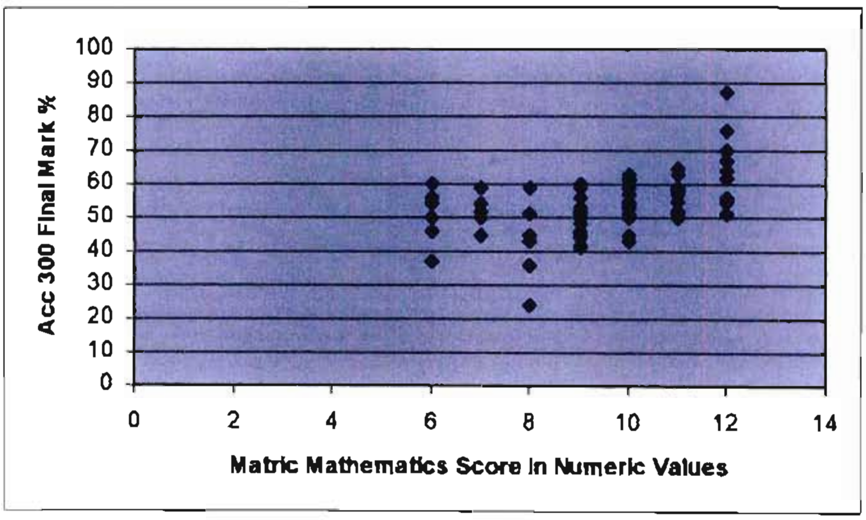

Figure 6.4.3.4 Scatter diagram illustrating relationship between Matric Mathematics scores and Accounting 300 results for the 2000 sample group (n = 86; r = 0.478)

The results of the multiple linear regression analysis that was carried out to determine the effect of matric points and matric mathematics results on the final Accounting 300 marks for the 1999 sample group is reported in Table 6.4.3.2. The multiple regression equation that can be derived from the statistical data to describe the relationship between the Accounting 300 final mark for the 1999 sample group, and matric points and matric mathematics is as follows:

$$\textit{Accounting 300 Final mark} = 0.585 + 0.83\,MP + 1.62\,MM$$

Together, matric points and matric mathematics accounted for 36% of the variances in the final Accounting 300 result. This represents a considerable proportion of the impact on third-year performance. The regression plane was significantly different from zero (F = 14.99, p = 0.001). The regression coefficient for matric points was 0.83 (95% CI = 0.15 – 1.50); and for matric mathematics it was 1.62 (95% CI = -0.06 – 3.30). The standardized regression coefficient show that matric mathematics is positively and significantly related to success in the third-year accounting course and, is a stronger predictor than matric points. Since the confidence limits for the matric points did not encompass a negative value, it can be concluded that the population regression coefficients for the matric points are positive (matric points - $t = 2.47$; $p = 0.017$). It is not certain whether the population regression slope for matric mathematics would be positive or negative as the confidence limits for matric mathematics did include a negative value, although the lower limit was very close to zero ($t = 1.95$; $p = 0.058$).

	R	R square	Adjusted R Square	Std error of the Estimate
	.620	.385	.359	7.898

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Regression	1870.931	2	935.465	14.997	.000
Residual	2994.050	48	62.376		
Total	4864.980	50			

Coefficients

	Unstandardized coefficients		Standardized Coefficients	t	Sig.
	B	Std. error	Beta		
(Constant)	.585	10.008		.058	.954
Matric Points	.827	.335	.379	2.470	.017
Matric Maths	1.621	.833	.298	1.945	.058

Table 6.4.3.2 Summary table of results for linear regression analysis of the Accounting 300 course for the 1999 sample group

In the 2000 sample group, 24% of the variances in the final Accounting 300 result could be accounted for by a combination of matric points and matric mathematics scores, as revealed by the linear regression analyses of the 2000 sample group's third-year accounting data (refer table 6.4.3.3). The multiple regression equation that can be derived from the statistical data to describe the relationship between the Accounting 300 final mark for the 2000 sample group, and matric points and matric mathematics is as follows:

$$Accounting\ 300\ Final\ mark = 21.559 + 0.40\ MP + 1.66\ MM$$

The regression plane was significantly different from zero (F = 11.23, p = 0.001). The regression coefficient for matric points was 0.40 (95% CI = -0.06 – 0.85). While the confidence interval was quite narrow, it included a negative value. It therefore cannot be established with certainty whether or not the population regression slope would be positive or negative (matric points: t = 1.73; p = 0.087). Matric mathematics had a regression coefficient of 1.66 (95% CI = 0.35 – 2.97) showing a much stronger impact on performance than matric points. Since the confidence limits did not encompass a negative value, it can be concluded that the population regression coefficients for matric mathematics are positive (matric mathematics: t = 2.52, p = 0.014). Furthermore, these results are statistically significant at the 5% level, and therefore the null hypothesis can be rejected.

The validity of the model was checked by carrying out the diagnostics on the Accounting 300 model for the 1999 and the 2000 sample groups respectively. This was done through an examination of the residuals. Firstly, histograms were scrutinised to confirm the normality of the residuals. The plots (refer Figure B.5.7, Appendix B and Figure C.5.7, Appendix C) indicated a normal curve about the histogram of the residuals. Next the Normal P-P plot was studied (refer Figure B.5.8, Appendix B and Figure C.5.8, Appendix C) and appeared to confirm that the residuals were normally distributed. A random scattering about zero was reflected in the scatterplots of the residuals and the dependant variable (refer Figure B.5.9, Appendix B, and Figure C.5.9, Appendix C). All three diagnostics indicated that the model would be an adequate representation of the dependant variable.

	R	R square	Adjusted R Square	Std error of the Estimate
	.505	.255	.237	7.389

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Regression	1554.033	2	777.016	14.232	.000
Residual	4531.607	83	54.598		
Total	6085.640	85			

Coefficients

	Unstandardized coefficients		Standardized Coefficients	t	Sig.
	B	Std. error	Beta		
(Constant)	21.559	6.687		3.224	.002
Matric Points	.395	.228	.224	1.733	.087
Matric Maths	1.662	.659	.326	2.522	.014

Table 6.4.3.3 Summary table of results for linear regression analysis of the Accounting 300 course for the 2000 sample group

The chi-squared test used to measure the level of association between the higher grade matric mathematics results and performance in the Accounting 300 course for the 1999 sample group revealed a x^2 value of 7.967, DF = 4 and an associated probability of 0.093. Although these results strongly suggest an association between performance in the third-year course and matric mathematics at the higher grade, the associated probability does not provide evidence of this relationship being significant for the population, and therefore it is not possible to reject the null hypothesis.

The results of the chi-squared test for the higher grade mathematics scores and the final accounting 300 results of the 2000 sample group revealed a x^2 value of 17.136, DF = 4 and an associated probability of 0.002. These results were significant at the 5% level, and confirm the results of the correlation analysis, and indicate that there is a strong association between matric mathematics at the higher grade and third–year performance in the 2000 accountancy programme.

6.4.4 Fourth-year accounting courses

A year on year comparison shows that the 2000 sample group outperformed the 1999 sample group, except in the final year. However, while only 24 out of the original 215 (11.2%) in the 1999 sample group proceeded to major in accounting, 45 out of the 211 students (21.2%) in the 2000 sample group proceeded to major in accounting. At fourth year level, the pass rates dropped from 78% to 60%. In order to find some possible explanation for the lower pass rate at the fourth year level of the 2000 sample group, it is necessary to examine the matric points and the matric mathematics results of the two groups. Despite the fact that the maximum of matric scores increased from 48 in the 1999 sample group to 50 in the 2000 sample group, (refer Table 6.4.4.1), the range of scores was narrower in the 1999 sample group than in the 2000 sample group. In addition, the minimum number of matric points held by any student in the 1999 sample group was 35 points while in the 2000 sample group it was only 32 points (the minimum requirement for entry to the BCom degree). The mean of the matric points was also only marginally higher in the 1999 group (42 points) than in the 2000 group (41.11 points).

The moderately positive relationship (r = 0.468; p = 0.001) between matric points and the fourth-year accounting results of the 1999 group can be identified in Figure 6.4.4.1. Figure 6.4.4.2 shows the moderately weak relationship (r = 0.387; p = 0.001) between these same two variables for the 2000 group

	Acc 400 Final Mark		**Matric Points**		**Matric Mathematics**	
	1999	2000	1999	2000	1999	2000
N = Number of students in class	23	45	23	45	23	45
Mean	53.09	49.91	42	41.11	10.30	9.87
Std Error of Mean	2.316	1.931	0.744	0.730	.0230	0.263
Median	50	51	42	41	10	10
Mode	50	51*	42	42	10	10
Std. Deviation	11.107	12.951	3.568	4.900	1.105	1.766
Variance	123.36	167.72	12.727	24.010	1.221	3.118
Range	51	57	13	18	4	6
Minimum	32	30	35	32	8	6
Maximum	83	87	48	50	12	12
Pass Rate	78 %	60 %	-	-	-	-

* Multiple modes exist. The smallest value is shown.

Table 6.4.4.1 Academic achievement profile of fourth-year BCom students at the University of Natal, Pietermaritzburg campus for the 1999 and 2000 sample groups

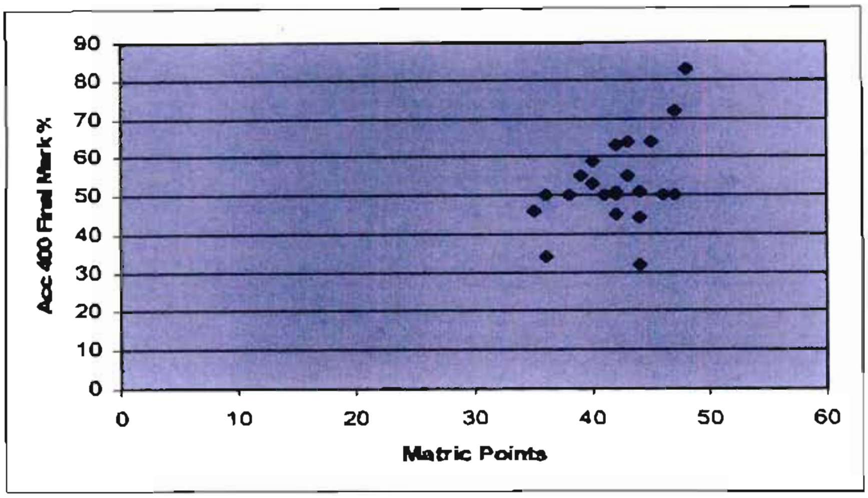

Figure 6.4.4.1 Scatter diagram illustrating relationship between Matric Points and Accounting 400 results for the 1999 sample group (n = 23; r = 0.468)

In this case, the r of 0.47 in the 1999 group indicated that 22 % of the changes in the Accounting 400 final results were due to changes in the matric points of this group. Even though the r of 0.39 in the 2000 group would imply that only 15 % of the variances in the Accounting 400 final results are as a result of variances in the matric points of the students in that group, this co-variance is still statistically significant at the 5% level.

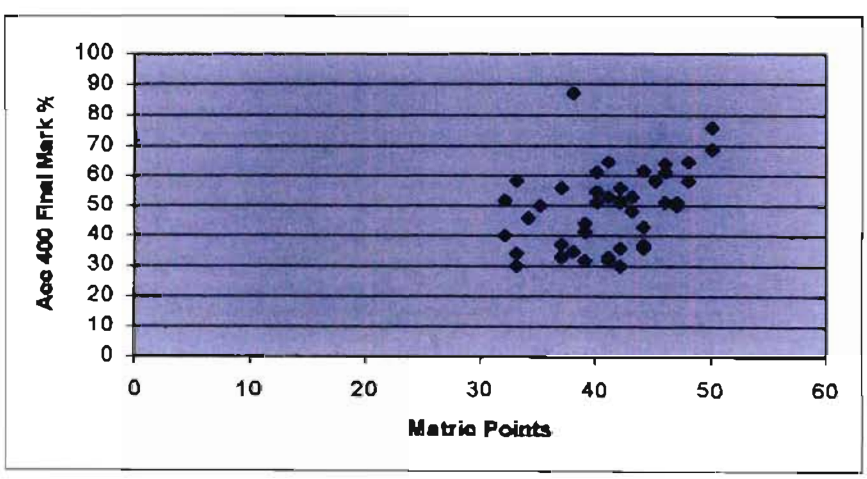

Figure 6.4.4.2 Scatter diagram illustrating relationship between Matric Points and Accounting 400 results for the 2000 sample group (n = 45; r = 0.387)

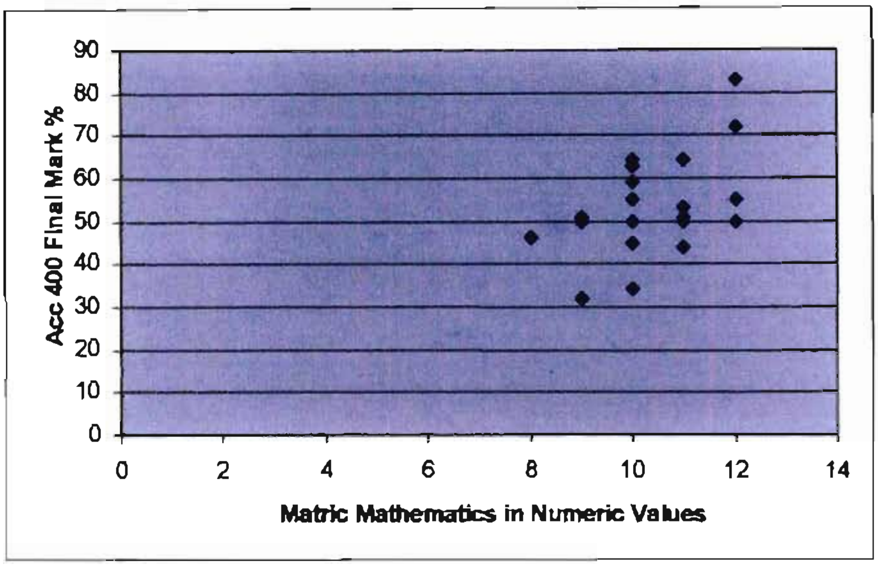

Figure 6.4.4.3 Scatter diagram illustrating relationship between Matric Mathematics scores and Accounting 400 results for the 1999 sample group(n = 23; r = 0.501)

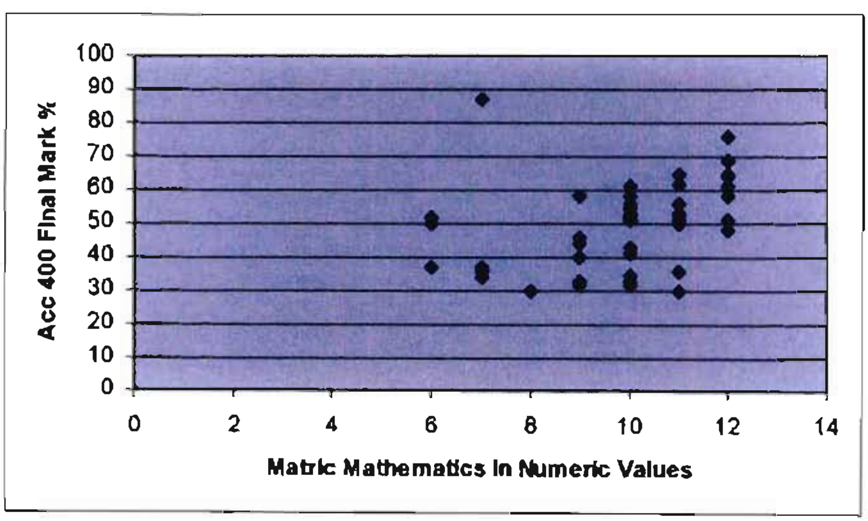

Figure 6.4.4.4 Scatter diagram illustrating relationship between Matric Mathematics scores and Accounting 400 results for the 2000 sample group(n = 45; r = 0.349)

The Pearson's correlation analysis of the relationship between matric mathematics and the final Accounting 400 results showed a moderate positive relationship in the 1999 sample group (r = 0.50; p = 0.001) and a moderately weak, but positive, relationship in the 2000 sample group (r = 0.35; p = 0.001). In both years these results were significant at the 5% level. These two relationships are demonstrated in the scatter diagrams in Figures 6.4.4.3 and 6.4.4.4 respectively. In both years, the associated probability of 0.001 provided strong evidence that the results were highly unlikely to have arisen from sampling error.

	R	R square	Adjusted R Square	Std error of the Estimate
	.534	.285	.214	9.849

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Regression	773.924	2	386.962	3.989	.035
Residual	1939.902	20	96.995		
Total	2713.826	22			

Coefficients

	Unstandardized coefficients		Standardized Coefficients	t	Sig.
	B	Std. error	Beta		
(Constant)	-14.127	25.196		-.561	.581
Matric Points	.759	.781	.244	.972	.342
Matric Maths	3.428	2.521	.341	1.360	.189

Table 6.4.4.2 Summary table of results for linear regression analysis of the Accounting 400 course for the 1999 sample group

The results of the multiple linear regression analysis that was carried out to determine the effect of matric points and matric mathematics results on the final Accounting 400 marks for the 1999 sample group is reported in Table 6.4.4.2. The multiple regression formula that can be derived from the statistical results would be expressed as:

$$\textit{Acc 400 Final mark} = 8.748 + 0.76\,MP + 3.43\,MM$$

Together, matric points and matric mathematics accounted for 21% of the variances in the final Accounting 400 result. The regression plane was only slightly different from zero (F = 3.99, p = 0.035). Both matric points and matric mathematics related positively to the final Accounting 400 result. The regression coefficient for matric points was 0.76 (95% CI = -0.87 – 2.39); and for matric mathematics it was 3.43 (95% CI = -1.83 – 8.69). The confidence limits for both matric mathematics and matric points did include a negative value and therefore it is not clear whether or not the relationship between matric mathematics and fourth year accounting results for the population would be positive (matric mathematics: t = 1.36; p = .189/ matric points: t = 0.97; p = 0.342). The standardized regression coefficients show that matric mathematics is positively related to success in the fourth-year accounting course in the 1999 sample group and, is a stronger predictor than matric points, however, the p values for both matric points and matric mathematics (p = 0.342 and, p = 0.189) show that these results are not statistically significant at the 5% level, and therefore in this case the null hypothesis should not be rejected. From an educational perspective, the regression coefficient for matric mathematics of 3.43 indicates that despite the high p value, matric mathematics has had a strong impact on the variances of the performance of the fourth-year accounting results and should not be ignored.

	R	R square	Adjusted R Square	Std error of the Estimate	
	.400	.160	.120	12.149	
Analysis of Variance (ANOVA)					
	Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Regression	1180.667	2	590.334	4.000	.026
Residual	6198.977	42	147.595		
Total	7379.644	44			
Coefficients					
	Unstandardized coefficients		**Standardized Coefficients**	**t**	**Sig.**
	B	**Std. error**	**Beta**		
(Constant)	8.748	15.522		.564	.576
Matric Points	.744	.540	.281	1.378	.175
Matric Maths	1.073	1.498	.146	.716	.478

Table 6.4.4.3 Summary table of results for linear regression analysis of the Accounting 400 course for the 2000 sample group

Linear regression analyses of the fourth-year accounting course from the 2000 sample group revealed that together, matric points and matric mathematics accounted for only 12% of the variances in the final Accounting 400 result (refer Table 6.4.4.3). The regression plane was slightly different from zero (F = 4.00, p = 0.026). Again both matric points and matric mathematics related positively to the final Accounting 400 result. The regression coefficient for matric points was 0.74 (95% CI = -0.35 – 1.83); and for matric mathematics it was 1.07 (95% CI = -1.95 – 4.10). Since the confidence limits for both matric points and matric mathematics did encompass a negative value, there is no certainty that the population regression coefficients for both matric points and matric mathematics are positive (matric points - t =1.38; p = 0.175/ matric mathematics – t = 0.72, p = 0.478). The multiple regression formula that can be derived from the statistical results would be expressed as:

$$Acc\ 400\ Final\ mark = 8.748 + 0.74\ MP + 1.07\ MM$$

The standardized regression coefficients show that as with the 1999 sample group's results, while matric mathematics is a stronger predictor than matric points, both variables are positively related to success in the fourth-year accounting course. However, once again, as the probability values of matric points (p = 0.175) and matric mathematics (p = 0.478) do not present a significance at the 5% level, the null hypothesis cannot be rejected.

The diagnostics were also carried out on the Accounting 400 model for the 1999 and the 2000 sample groups respectively to check the validity of the model. This was done through an examination of the residuals. Firstly, a histogram was looked at to confirm the normality of the residuals. The plot (refer Figure B.5.10, Appendix B and Figure C.5.10, Appendix C) indicated a normal curve about the histogram of the residuals. Next the Normal P-P plot was studied (refer Figure B.5.11, Appendix B and Figure C.5.11, Appendix C) and appeared to confirm that the residuals were normally distributed. The scatterplot of the residuals and the dependant variable (refer Figure B.5.12, Appendix B, and Figure C.5.12, Appendix C) reflected a random scattering about zero. All three diagnostics indicated that the model would be an adequate representation of the dependant variable.

6.5 COMMENTS

The results of all the analyses performed, as discussed above, indicate that there is indeed a significant relationship between the dependant variable (university performance as measured by the results in each course) and the independent variables of matric mathematics and matric points. It is therefore not possible, on the strength of these results, to fail to reject the null hypothesis when comparing the results of the first and second-year accounting results. While the independent variables may only explain variances of between 12 % and 37 % of the changes in the exam results of students at university, it is widely recognized that there are numerous factors which affect performance at university. In addition, the relationship between all these factors is highly complex and individualistic. Given this understanding of the complexity of performance at university, these percentages are statistically significant. The results lead to the conclusion that the variables co-vary (are correlated). Despite the fact that the results of the linear regression analysis on the third and fourth-year results would suggest that the null hypothesis cannot be rejected, it is still apparent from the regression coefficients which indicate very positive relationships that both variables do have an impact on performance and they should not be ignored. A possible explanation for the differences in the associated probabilities of the first and second-year courses compared to the third and fourth-year courses, is the fact that because of the rate of attrition, and because this is a longitudinal study, the sample group has diminished in size from year to year. In addition, it is apparent from the data presented in Tables 5.4.1.2 and 5.4.1.3 that the range of matric mathematics ability has also diminished from year to year, with the noticeable absence of students in the fourth-year accounting class for the 1999 sample group with standard grade mathematics, and only seven such students in the same class for the 2000 sample group. These factors would have had the effect of weakening the apparent impact of matric mathematics results on the performance of students in the senior levels as indicated by the statistical tests as the group becomes more homogeneous in terms of its mathematical performance. A limitation of this study is that the existence of a correlation does not imply causation. This is because one variable has not been manipulated to determine the impact on the other variable. The relationship is merely being observed and the conclusion is that such a relationship should not be ignored.

CHAPTER SEVEN

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

7.1 SUMMARY

Through the restructuring of higher education in South Africa, the government has found a model, which includes the introduction of a common matriculation examination with effect from 2008, which will enable all South African applicants to be measured comparably. This model is successful in that it will effectively eliminate the discrepancies which up until a decade ago arose from different education departments based on racial groupings. An important aspect of the aims of these changes is that higher education is seen by the education ministry as being an important vehicle to achieve equity in the distribution of opportunities and provide fair chances of success to all those who wish to achieve their potential through higher education. The question of whether current selection criteria ensure equity and fair chances must be asked. Even though the Further Education and Training Certificate has resulted in the standardization of syllabi and examinations, there are still sharp differences that occur between various secondary schools in terms of facilities, resources and teacher qualifications and experience. Until these issues have been addressed some students will continue to be disadvantaged educationally, and consequently still may not perform well in the final school leaving exams.

Much research has been conducted to examine the relationship between university performance and high school performance, particularly with respect to the first-year programmes. In accounting it has been found, for example, that the possession of high school accounting was advantageous for the first-year course only and, in some instances only for the first half of the year. In South Africa, post 1995 research has focused predominantly on the disparities between previously educationally disadvantaged students performance and that of their advantaged counterparts. Huysamen found support for the late blooming hypothesis that postulates that the university results of the educationally disadvantaged students increasingly overlap from first-year through to their final undergraduate year, with that of the educationally advantaged students (2000: 146). Much of the recent research in South Africa has indicated support for a more interactive approach to selection and teaching, whereby granting access to educationally disadvantaged students should be seen as a contract to teach at their level. Adopting such an approach will ensure that selection is indeed affording the successful applicants with a fair chance of success.

Selection is not an administrative process that should be conducted in isolation. It should be effective in identifying those students who have a reasonable chance of success, thereby decreasing the rate of attrition and reducing the associated inefficiencies of wasted resources. While promoting equity, it should be implemented in such a way that there is no bias in placing one group of students above another, in an unethical or illegal manner. This presents an enormous challenge for tertiary institutions.

There are numerous factors which influence performance at university. It is important to not only understand the nature of these factors, and the possibility that they represent quantifiable indicators or predictors of future success, but also to try to integrate them into the selection process. Discussions on retention emphasise that these factors need to be addressed on an ongoing basis while the students are enrolled at university. What may not be apparent as a predictor of performance when an applicant is applying for enrolment, may become of significant importance once the applicant is enrolled in the system. The issue of retention is a complex one that is not included in the scope of this study.

Worldwide there is a strong emphasis on academic skills and ability as measured through previous performance. Historically institutions in South Africa have relied on matric performance as an indication of a prospective student's potential to perform at university. Matric performance has in most instances been measured through a combination of matric points and the attainment of certain minimum grades in various subjects, and with regard to accountancy programmes, particularly in mathematics. Other factors which have been investigated as predictors of success are age, gender, personality, family background, socio-economic status and class attendance. All of these indicate that performance is contingent upon a wide variety of factors and is very complex.

The foregoing case study of individual students at an individual institution is intended to make readers aware of the important factors at work and how they interrelate. They can help one to understand the patterns of influence in one place so that it is possible to make more sense of these patterns in other contexts.

7.2 CONCLUSIONS

Eliminating the use of a points system as a selection tool, does not necessarily ensure that the government's aim of achieving equity of access has been successful. This would only become effective if all students at secondary school level are exposed to the same offerings. Introducing a common national certificate ensures that the final results of students are comparable, however, it does not take into account the impact of previous disadvantage for example, or even current disadvantages that students may be exposed to in terms of inferior resources and facilities. Selection is not an end in itself. By identifying students that are most likely to succeed on the basis of preparedness for studying at tertiary level alone, students who have been previously disadvantaged will be precluded from admission to higher education. Therefore to achieve fairness, it is necessary to attempt to identify those students who have been educationally disadvantaged and provide support programmes subsequent to admission in order to ensure their success. Access does not simply mean entering university, but from the students perspective it implies the opportunity to make use of and develop the skills and abilities necessary to successfully complete an academic qualification. For the institution it involves supporting the aspirations of any person to obtain the highest level of education and training commensurate with his or her potential. It would therefore only be fair to students who have been selected into a programme for which their prior schooling has not adequately prepared them to be provided with some kind of workshop or counselling on life and study skills to assist them to better integrate into campus life.

University admissions ignore non-ability variables e.g. student motivation and optimism. Students with only average ability but who are highly motivated are more likely to perform as well as the students who have a high ability but who are less likely to strive for achievement. A student who possesses low matric scores and who lacks the motivation is very likely to not succeed at university.

The results of the statistical analyses in this study reveal that at first year level there was indeed a positive linear relationship between the final marks of the first-year students and the matric points held by those students. The correlation analyses showed the strength of this relationship to be strong, with an average of 36% of the variances in the performance of the first-year students being accounted for by the matric points. The results of the linear regression analysis indicated that matric points are a stronger predictor of success in the first-year accounting course than the matric mathematics results.

At second-year level, a positive linear relationship between matric points and the performance of students in the second-year accounting course was evident and the correlation analyses proved that the strength of this association was moderately positive. Furthermore, on average 19% of the variances could be accounted for by changes in the matric points. Matric points were found, through linear regression, to be positively and significantly related to performance in the accounting 200 course and a better predictor of performance than matric mathematics.

The correlation analyses of the third-year sample groups found that the relationship between matric points and performance in the third-year accounting course was positive and moderately related. This relationship was also identified as being positive and moderately related at fourth–year level for the 1999 sample group, but only moderately weak for the fourth-year students of the 2000 sample group. These results all serve to confirm the fact that there is indeed a relationship between performance at each successive year at university in the accountancy stream and matric points, and that this relationship is positive, and particularly strong at first and second-year level.

An examination of the results of the statistical analyses of the relationship between matric mathematics scores and performance at university revealed that at first-year level a positive linear relationship did exist, which was moderately positive. The chi squared test showed that there is a strong association between performance in the first-year accounting course and matric mathematics, and that the final results of the first-year accounting students were dependant on their matric mathematics results. At second-year level the relationship again was found to be moderately positive. Linear regression analysis on one of the sample groups found that there is a strong association between performance in the second-year accounting course and the high school mathematics results of those students.

At third and fourth-year levels, the correlation analyses showed that there was definitely a moderately positive linear relationship between performance in these two courses and the matric mathematics results. Interestingly, at this level matric mathematics became a more important predictor of performance than matric points. The chi squared analyses revealed a very strong association between matric mathematics and performance in Accounting 300 for both sample groups. The conclusion that can be drawn from this summary of the results of the analyses of data is that there is indeed a relationship between matric mathematics and performance at university in each successive year of study in the accountancy programme, and that this relationship is positive, and particularly strong at third and fourth-year levels.

While it may no longer be possible to use matric points as an entry requirement for university study due to the phasing out of the current matriculation certificate, it would seem obvious that some measure of high school performance would also benefit the selectors in providing access to those students most likely to succeed. However, it must be noted that despite the fact that matric mathematics and matric points account for a significant proportion of the variances in the performance of accountancy students at university, there is still a large proportion of the variances that are not explained by these two variables. It may be of greater value to devise some form of additional entry criteria, for example submitting applicants to a battery of entrance tests that will provide more information about their potential to succeed at university. This study has shown that school performance and mathematics ability, which have a significant impact on the performance of students in the accountancy programme at university, are important factors which cannot be ignored in whatever model is devised for selection.

7.3 RECOMMENDATIONS

There has been considerable reference in literature to the fact that selection and retention are inter-related and there is therefore scope for future research to examine student retention in the accountancy programmes. It would be extremely beneficial to be able to identify what factors play a significant role in retaining accountancy major students. This would be of particular value in the South African context where affirmative action has resulted in a high demand for black chartered accountants. Identifying the factors that impact on the retention of black students would allow institutions to increase their output of black chartered accountants. Many institutions are already attempting to meet this skills shortage by offering access programmes to those students who are educationally disadvantaged and who would not gain entrance through the normal selection process. It would therefore also be highly beneficial to conduct research into the success of such access programmes.

It has been suggested that it may be advantageous for universities in South Africa to consider the possibility of using entrance examinations in order to enhance the usefulness of high school grades as predictors of future performance. There is scope for much research to be conducted in this area. Example of skills that are currently used by institutions that already use entrance tests are language skills, communication, numeracy, problem solving and logic. It would be of enormous benefit to examine what format such examinations should take, and the content of such entrance examinations that would enable institutions to identify applicants who have the necessary skills to succeed at university.

Finally, as students who have passed through the new secondary schooling system enter university it would be advantageous to explore how these entrants perform at tertiary level. In order to keep pace with developments and ensure that universities can improve and maintain their selection procedures continuous research in this field is necessary.

APPENDIX A

TABLES OF DATA ACCUMULATED FROM ANALYSIS OF SOUTH AFRICAN UNIVESITY ADMISSIONS INFORMATION

INSTITUTIONS INCLUDED IN THE ANALYSIS

1	University of Johannesburg
2	University of Fort Hare
3	University of the Free State
4	University of Pretoria
5	University of Potchefstroom
6	University of South Africa
7	University of Venda
8	University of Natal, Pietermaritzburg
9	University of Zululand
10	University of North West
11	University of Witwatersrand
12	Rhodes University
13	University of Cape Town
14	Stellenbosch University
15	University of Port Elizabeth

ALTERNATIVE METHODS OF CALCULATING MATRIC SCORE

RAND AFRIKAANS UNIVERSITY

RAU M Score	RSA HG	RSA SG	
8			
7			
6 ½	A + + + (95 % +)		
6	A + + (90 -94 %)		
5 ½	A +	A + + + (95 % +)	
5	A	A + + (90 -94 %)	
4 ½	B +	A +	
4	B	A	

3 ½	C +	B +	
3	C	B	
2 ½	D +	C +	
2	D	C	
1 ½	E +	D +	
1	E	D	
½		E +	

Table A.1 Calculation of RAU 'M' Score (www.rau.ac.za)

UNIVERSITY OF THE WITWATERSRAND

The present minimum number of matric points required for automatic entry is 23. this is calculated on the following system, and awards more points for English on the higher grade:

Matric Symbol	English (Higher Grade)	Maths (Higher Grade)	Other Subjects (Higher Grade)	Other Subjects (Standard Grade)
A	8	8	6	4
B	7	7	5	3
C	6	6	4	2
D	3	5	3	1
E	2	4	2	
F	1	1	1	

Table A.2 Calculation of matric points for entry to the University of the Witwatersrand

UNIVERSITY OF PORT ELIZABETH

For direct entry into BComm degree at UPE a student needs an average matric mark of 55 as calculated below:

1. ALLOCATE MARKS AS FOLLOWS:		
HG Marks	A	85
	B	75
	C	65
	D	55
	E	45
	F	35
	G	25
	GG	20
	H	15
SG Marks	HG Marks X 0.75	
Second Languauge taken on HG	HG Marks X 0.75	
Second Language taken on SG	HG Marks X 0.75^2	
LG Marks	HG Marks X 0.75^2	
2. COMPUTE THE AVERAGE		

Table A.3 Computation of matric average score at UPE

Symbol	HG Mark	SG Mark
A	8	6
B	7	5
C	6	4
D	5	3
E	4	2
F	3	1

Table A.4 Computation of matric average score at UFS

HG Subjects	A= 5	B = 4	C = 3	D = 2	E = 1
SG Subjects	A = 4	B = 3	C = 2	D = 1	E = 0

Points are awarded for the six best subjects on the grade 11 or 12 school report.
Table A.5 Computation of matric average score at University of Pretoria

Name of institution	UNP	Stellenbosch	UPE	UCT	Rhodes	Wits
Minimum Matric requirement	yes	yes	yes	yes	yes	yes
Different Admission criteria for Acc major students	no	yes	yes	no	no	yes
Details of additional criteria	-	Matric exemption; Matric average of 60%	Different maths requirement	-	-	Different points and maths requirements
Matric points required for Bcom	32	-	55%*	48	36	23
MP req for Acc major if different						26
Maths symbol for Bcom						
HG	40	40	40	60	50	40/60 for CA
SG	60	60	60	n/a except to pds*	60	60/ n/a for CA
Maths symbol for Acc major						
HG						60
SG						-
Entrance exam	no	no	yes	yes		no
Are other selection criteria used	no	no	no	yes	no	yes
If yes, details	-	-	-	Increase weighting of matric scores for English and Maths	-	Pass in English HG E

Name of institution	Univ of North west	Univ of Zululand	Univ of Johannes-burg	Univ of Potchef-stroom	Univ of Venda	Univ of the Free State	Univ of Fort Hare	Univ of Pretoria	Unisa
Minimum Matric requirement	yes	no	yes	matric exemption	matric exemption	matric exempn	matric exempn	yes	yes
Different Admission criteria for Acc major students	no	no	yes	yes	no	yes	yes	yes	-
Details of additional criteria	-	-		more stringent maths requiremen t	-	Require matric accounting min HG C; diff maths reqt	more stringent maths reqt	More MP; more stringent maths reqt	-
Matric points required for Bcom	17	none	M score = 14		-	28		M score = 14	-
MP req for Acc major if different					-	-	35	M score = 17	
Maths symbol for Bcom									
HG	50		40	40	40		40	40	-
SG	60		50	50	50	60	-	50	-
Maths symbol for Acc major									
HG			D	50	40	60	40	60	40
SG			C	60	50	-	50	-	50
Entrance exam	no	no		no	no		no	only if do not have min entry reqts	no
Are other selection criteria used	no	no	yes	yes	yes		yes	yes	no

If yes, details	-	-	Eng HG D/ SG C; Acc HG D/ SG C	Acc 60% SG/ 50% HG	Must attain HG E or SG D for any one of the fwg subjects: Maths, Acc, Bus Econ, Econ		Eng SG E	HG 40% for Eng or Afr	

APPENDIX B

TABLES OF DATA ACCUMULATED FROM 1999 SAMPLE GROUP

DETAILED RESULTS OF STATISTICAL ANALYSES

Accounting 100 1999

	Mean	Std. Deviation	N
Acc 100 final Mark	51.23	13.720	206
Matric Points	36.71	5.316	206
Matric maths	8.32	2.365	206

Table B.1 Descriptive statistics of Accounting 100 class from 1999 sample group

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	23	1	.5	.5	.5
	26	1	.5	.5	.9
	27	6	2.8	2.8	3.7
	28	5	2.3	2.3	6.0
	29	3	1.4	1.4	7.4
	30	7	3.2	3.3	10.7
	31	15	6.9	7.0	17.7
	32	12	5.6	5.6	23.3
	33	19	8.8	8.8	32.1
	34	11	5.1	5.1	37.2
	35	17	7.9	7.9	45.1
	36	19	8.8	8.8	54.0
	37	14	6.5	6.5	60.5
	38	9	4.2	4.2	64.7
	39	10	4.6	4.7	69.3
	40	11	5.1	5.1	74.4
	41	12	5.6	5.6	80.0
	42	9	4.2	4.2	84.2
	43	9	4.2	4.2	88.4
	44	10	4.6	4.7	93.0
	45	3	1.4	1.4	94.4
	46	1	.5	.5	94.9
	47	6	2.8	2.8	97.7
	48	5	2.3	2.3	100.0
	Total	215	99.5	100.0	
Missing	System	1	.5		
Total		216	100.0		

Table B.2 Analysis of matric points of Accounting 100 class from 1999 sample group

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	23	1	.5	.5	.5
	26	1	.5	.5	1.0
	27	1	.5	.5	1.5
	28	2	.9	1.0	2.4
	31	2	.9	1.0	3.4
	32	3	1.4	1.5	4.9
	33	7	3.2	3.4	8.3
	34	4	1.9	1.9	10.2
	35	4	1.9	1.9	12.1
	36	7	3.2	3.4	15.5
	37	3	1.4	1.5	17.0
	38	2	.9	1.0	18.0
	39	1	.5	.5	18.4
	40	14	6.5	6.8	25.2
	41	6	2.8	2.9	28.2
	42	6	2.8	2.9	31.1
	43	3	1.4	1.5	32.5
	44	6	2.8	2.9	35.4
	45	4	1.9	1.9	37.4
	46	5	2.3	2.4	39.8
	47	10	4.6	4.9	44.7
	48	5	2.3	2.4	47.1
	50	12	5.6	5.8	52.9
	51	10	4.6	4.9	57.8
	52	4	1.9	1.9	59.7
	53	3	1.4	1.5	61.2
	54	2	.9	1.0	62.1
	55	6	2.8	2.9	65.0
	56	4	1.9	1.9	67.0
	57	3	1.4	1.5	68.4
	58	9	4.2	4.4	72.8
	59	3	1.4	1.5	74.3
	60	1	.5	.5	74.8
	61	2	.9	1.0	75.7
	62	2	.9	1.0	76.7
	63	5	2.3	2.4	79.1
	64	5	2.3	2.4	81.6
	65	4	1.9	1.9	83.5
	66	2	.9	1.0	84.5
	67	5	2.3	2.4	86.9
	68	2	.9	1.0	87.9
	69	3	1.4	1.5	89.3
	70	6	2.8	2.9	92.2

	71	2	.9	1.0	93.2
	72	1	.5	.5	93.7
	73	2	.9	1.0	94.7
	74	1	.5	.5	95.1
	76	2	.9	1.0	96.1
	80	2	.9	1.0	97.1
	83	2	.9	1.0	98.1
	87	3	1.4	1.5	99.5
	95	1	.5	.5	100.0
	Total	206	95.4	100.0	
Missing	System	10	4.6		
Total		216	100.0		

Table B.3 Analysis of Accounting 100 final marks from 1999 sample group

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	7	3.2	3.3	3.3
	3	3	1.4	1.4	4.7
	4	5	2.3	2.3	7.0
	5	15	6.9	7.0	14.0
	6	14	6.5	6.5	20.5
	7	21	9.7	9.8	30.2
	8	38	17.6	17.7	47.9
	9	36	16.7	16.7	64.7
	10	43	19.9	20.0	84.7
	11	18	8.3	8.4	93.0
	12	15	6.9	7.0	100.0
	Total	215	99.5	100.0	
Missing	System	1	.5		
Total		216	100.0		

Table B.4 Analysis of matric mathematics scores of Accounting 100 students from the 1999 sample group

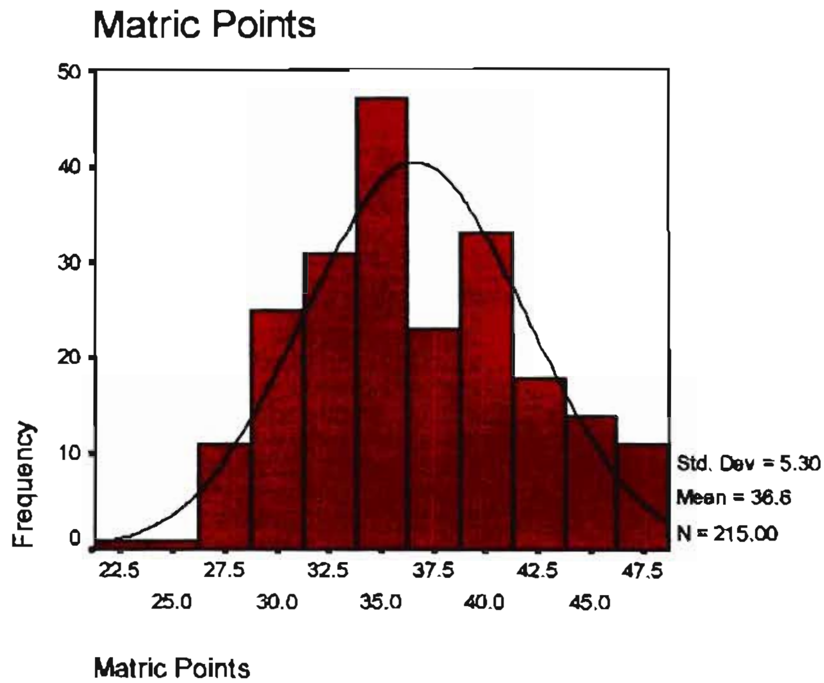

Figure B.1 Frequency distribution of matric points of Accounting 100 class from 1999 sample group

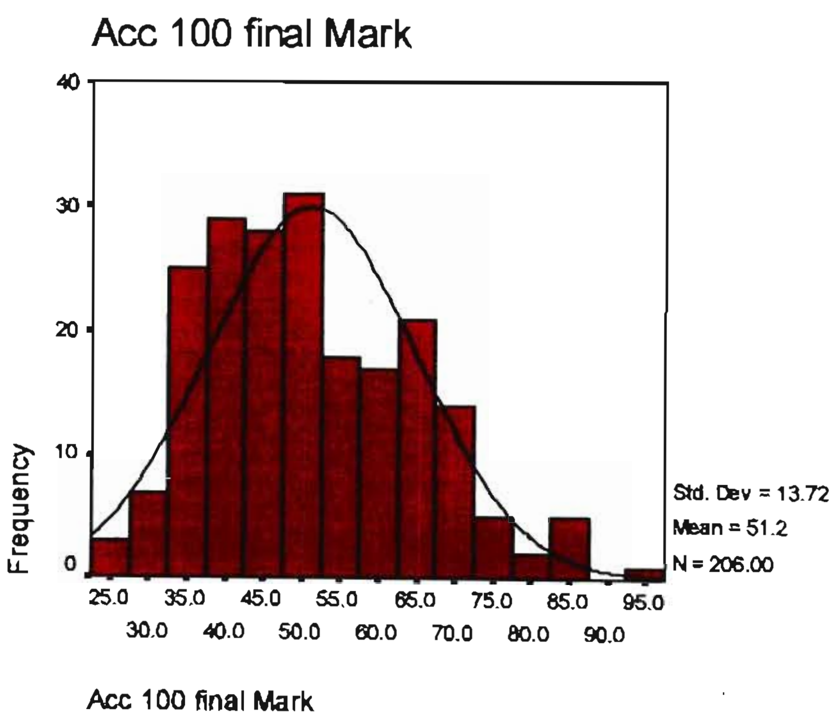

Figure B.2 Distribution of Accounting 100 final marks for 1999 Accounting 100 class

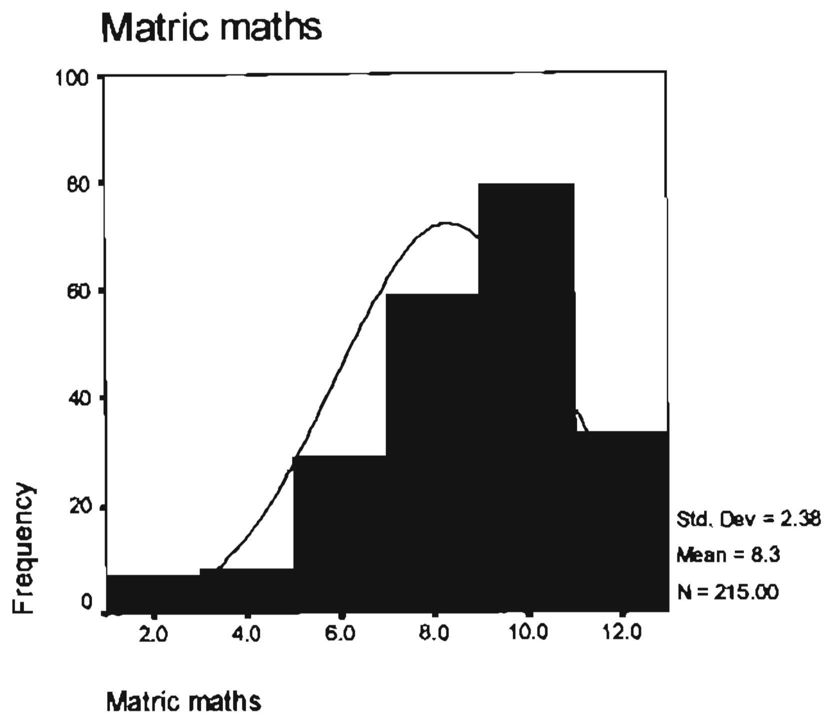

Figure B.3 Distribution of matric mathematics scores of 1999 Accounting 100 class

		Acc 100 final Mark	Matric Points	Matric maths
Pearson Correlation	Acc 100 final Mark	1.000	.592(**)	.488(**)
	Matric Points	.592(**)	1.000	.626(**)
	Matric maths	.488(**)	.626(**)	1.000
Sig. (1-tailed)	Acc 100 final Mark	.	.000	.000
	Matric Points	.000	.	.000
	Matric maths	.000	.000	.
N	Acc 100 final Mark	206	206	206
	Matric Points	206	206	206
	Matric maths	206	206	206

** Correlation is significant at the 0.01 level (1-tailed).

Table B.5 Results of correlational analysis of the 1999 Accounting 100 class

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.610(a)	.373	.367	10.920	.373	60.303	2	203	.000

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14382.503	2	7191.251	60.303	.000(a)
	Residual	24208.313	203	119.253		
	Total	38590.816	205			

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-2.685	5.380		-.499	.618	-13.293	7.923
	Matric Points	1.215	.184	.471	6.603	.000	.852	1.578
	Matric maths	1.120	.414	.193	2.706	.007	.304	1.935

a Predictors: (Constant), Matric maths, Matric Points

b Dependent Variable: Acc 100 final Mark

Table B.6 Results of multiple linear regression analysis of the 1999 Accounting 100 class

Accounting 200 1999

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	27	1	1.2	1.2	1.2
	29	2	2.3	2.3	3.5
	30	1	1.2	1.2	4.7
	31	3	3.5	3.5	8.1
	32	3	3.5	3.5	11.6
	33	5	5.8	5.8	17.4
	34	4	4.7	4.7	22.1
	35	1	1.2	1.2	23.3
	36	10	11.6	11.6	34.9
	37	3	3.5	3.5	38.4
	38	5	5.8	5.8	44.2
	39	5	5.8	5.8	50.0
	40	8	9.3	9.3	59.3
	41	7	8.1	8.1	67.4
	42	8	9.3	9.3	76.7
	43	5	5.8	5.8	82.6
	44	6	7.0	7.0	89.5
	45	2	2.3	2.3	91.9
	46	1	1.2	1.2	93.0
	47	3	3.5	3.5	96.5
	48	3	3.5	3.5	100.0
	Total	86	100.0	100.0	

Table B.2.1 Analysis of matric points of Accounting 200 class from 1999 sample group

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	27	1	1.2	1.2	1.2
	29	1	1.2	1.2	2.3
	34	4	4.7	4.7	7.0
	35	1	1.2	1.2	8.1
	37	1	1.2	1.2	9.3
	39	1	1.2	1.2	10.5
	41	2	2.3	2.3	12.8
	42	1	1.2	1.2	14.0
	45	6	7.0	7.0	20.9
	46	2	2.3	2.3	23.3
	50	8	9.3	9.3	32.6
	51	3	3.5	3.5	36.0

52	2	2.3	2.3	38.4
55	12	14.0	14.0	52.3
56	6	7.0	7.0	59.3
57	1	1.2	1.2	60.5
59	3	3.5	3.5	64.0
60	2	2.3	2.3	66.3
61	2	2.3	2.3	68.6
63	3	3.5	3.5	72.1
64	1	1.2	1.2	73.3
65	2	2.3	2.3	75.6
66	1	1.2	1.2	76.7
67	2	2.3	2.3	79.1
68	1	1.2	1.2	80.2
70	5	5.8	5.8	86.0
71	2	2.3	2.3	88.4
72	2	2.3	2.3	90.7
73	1	1.2	1.2	91.9
74	1	1.2	1.2	93.0
75	1	1.2	1.2	94.2
76	1	1.2	1.2	95.3
77	1	1.2	1.2	96.5
79	1	1.2	1.2	97.7
80	1	1.2	1.2	98.8
93	1	1.2	1.2	100.0
Total	86	100.0	100.0	

Table B.2.2 Analysis of Accounting 200 final marks from 1999 sample group

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	E - SG	1	1.2	1.2	1.2
	C - SG	4	4.7	4.7	5.8
	B - SG	7	8.1	8.1	14.0
	A - SG	6	7.0	7.0	20.9
	E - HG	10	11.6	11.6	32.6
	D - HG	12	14.0	14.0	46.5
	C - HG	24	27.9	27.9	74.4
	B - HG	13	15.1	15.1	89.5
	A - HG	9	10.5	10.5	100.0
	Total	86	100.0	100.0	

Table B.2.3 Analysis of matric mathematics scores of Accounting 200 students from the 1999 sample group

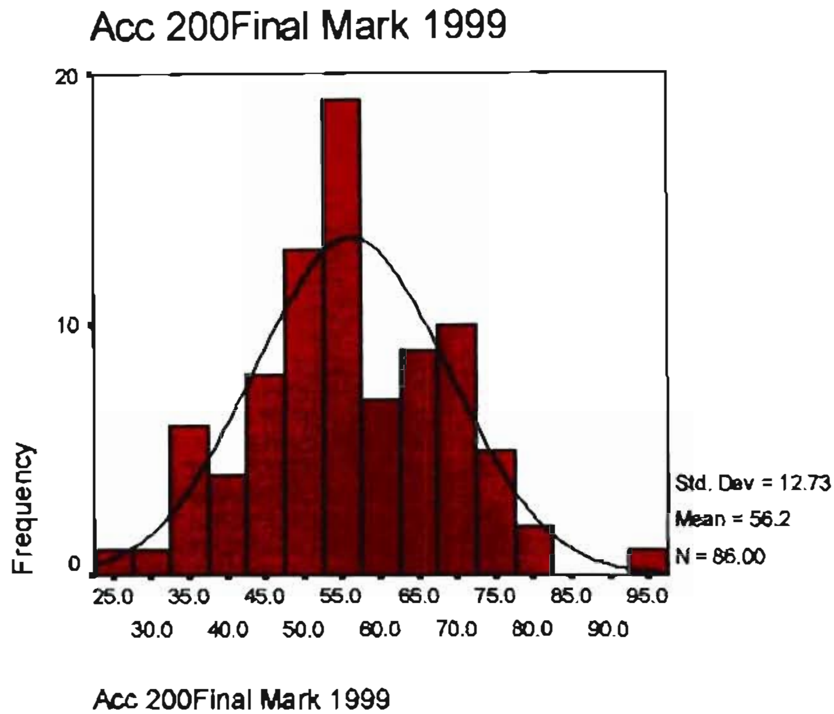

Figure B.2.1 Distribution of Accounting 200 final marks for the 1999 sample group

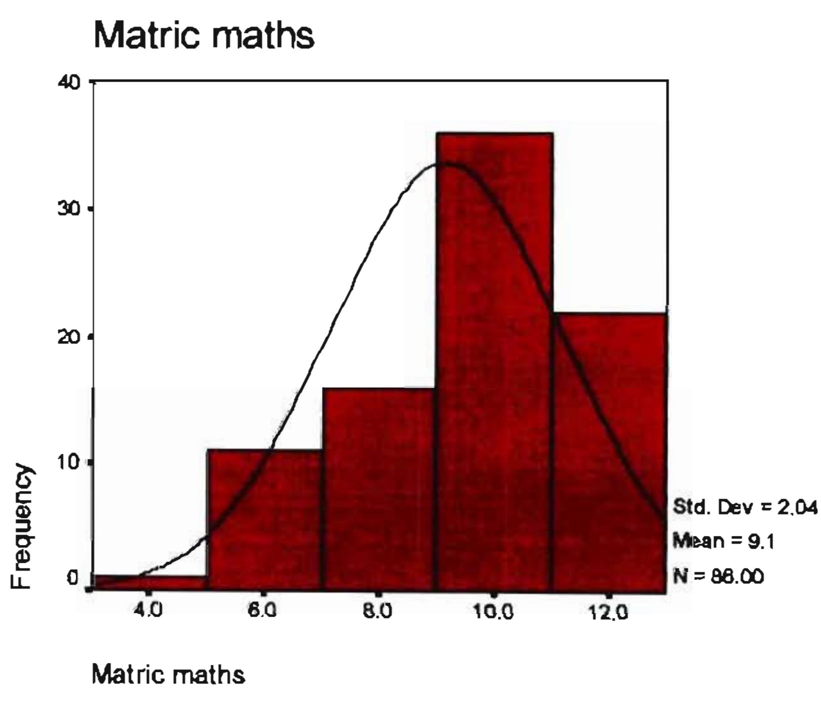

Figure B.2.2 Distribution of matric mathematics scores of 1999 Accounting 200 class

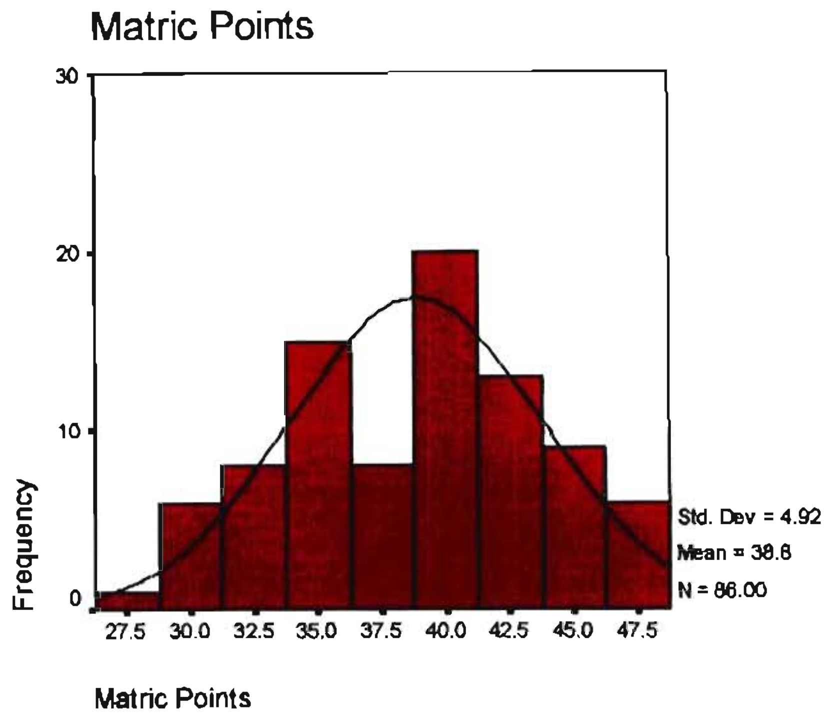

Figure B.2.3 Distribution of matric points of 1999 Accounting 200 class

	Mean	Std. Deviation	N
Matric Points	38.83	4.921	86
Acc 200Final Mark 1999	56.19	12.729	86
Matric maths	9.14	2.036	86

Table B.2.4 Descriptive statistics of Accounting 200 class from 1999 sample group

		Matric Points	Acc 200Final Mark 1999	Matric maths
Matric Points	Pearson Correlation	1	.430(**)	.604(**)
	Sig. (1-tailed)	.	.000	.000
	N	86	86	86
Acc 200Final Mark 1999	Pearson Correlation	.430(**)	1	.340(**)
	Sig. (1-tailed)	.000	.	.001
	N	86	86	86
Matric maths	Pearson Correlation	.604(**)	.340(**)	1
	Sig. (1-tailed)	.000	.001	.
	N	86	86	86

** Correlation is significant at the 0.01 level (1-tailed).

Table B2.5 Results of correlational analysis of the 1999 Accounting 200 class

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.442(a)	.195	.176	11.554	.195	10.083	2	83	.000

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2692.172	2	1346.086	10.083	.000(a)
	Residual	11080.851	83	133.504		
	Total	13773.023	85			

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	13.399	9.975		1.343	.183	-6.441	33.240
	Matric Points	.916	.319	.354	2.866	.005	.280	1.551
	Matric maths	.792	.772	.127	1.026	.308	-.744	2.328

a Predictors: (Constant), Matric maths, Matric Points
b Dependent Variable: Acc 200Final Mark 1999

Table B.2.6 Results of multiple linear regression analysis of the 1999 Accounting 200 class

ACCOUNTING 300 1999

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	30	1	2.0	2.0	2.0
	32	2	3.9	3.9	5.9
	33	4	7.8	7.8	13.7
	35	1	2.0	2.0	15.7
	36	5	9.8	9.8	25.5
	37	2	3.9	3.9	29.4
	38	2	3.9	3.9	33.3
	39	3	5.9	5.9	39.2
	40	7	13.7	13.7	52.9
	41	3	5.9	5.9	58.8
	42	6	11.8	11.8	70.6
	43	4	7.8	7.8	78.4
	44	4	7.8	7.8	86.3
	45	1	2.0	2.0	88.2
	46	1	2.0	2.0	90.2
	47	3	5.9	5.9	96.1
	48	2	3.9	3.9	100.0
	Total	51	100.0	100.0	

Table B.3.1 Analysis of matric points of Accounting 300 class from 1999 sample group

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	27	1	2.0	2.0	2.0
	29	1	2.0	2.0	3.9
	31	2	3.9	3.9	7.8
	32	1	2.0	2.0	9.8
	33	1	2.0	2.0	11.8
	36	1	2.0	2.0	13.7
	37	1	2.0	2.0	15.7
	38	1	2.0	2.0	17.6
	40	1	2.0	2.0	19.6
	43	1	2.0	2.0	21.6
	44	1	2.0	2.0	23.5
	45	2	3.9	3.9	27.5

47	2	3.9	3.9	31.4
48	4	7.8	7.8	39.2
50	9	17.6	17.6	56.9
51	2	3.9	3.9	60.8
52	2	3.9	3.9	64.7
53	1	2.0	2.0	66.7
54	4	7.8	7.8	74.5
55	4	7.8	7.8	82.4
56	1	2.0	2.0	84.3
57	3	5.9	5.9	90.2
58	1	2.0	2.0	92.2
60	1	2.0	2.0	94.1
64	1	2.0	2.0	96.1
72	1	2.0	2.0	98.0
75	1	2.0	2.0	100.0
Total	51	100.0	100.0	

Table B.3.2 Analysis of Accounting 300 final marks from 1999 sample group

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	C - SG	1	2.0	2.0	2.0
	B - SG	4	7.8	7.8	9.8
	A - SG	3	5.9	5.9	15.7
	E - HG	5	9.8	9.8	25.5
	D - HG	8	15.7	15.7	41.2
	C - HG	16	31.4	31.4	72.5
	B - HG	7	13.7	13.7	86.3
	A - HG	7	13.7	13.7	100.0
	Total	51	100.0	100.0	

Table B.3.3 Analysis of matric mathematics scores of Accounting 300 students from the 1999 sample group

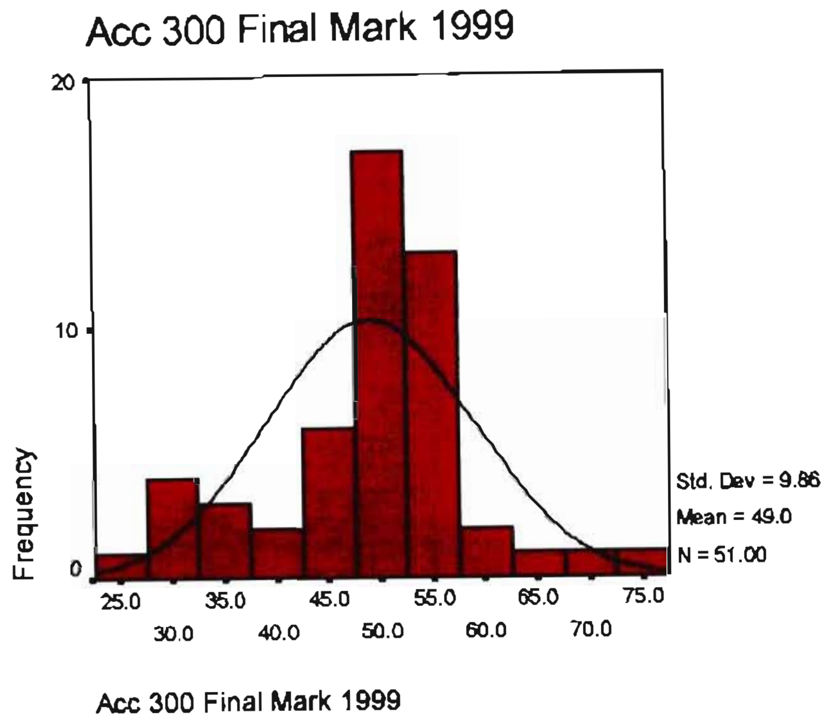

Figure B.3.1 Distribution of Accounting 300 final marks for the 1999 sample group

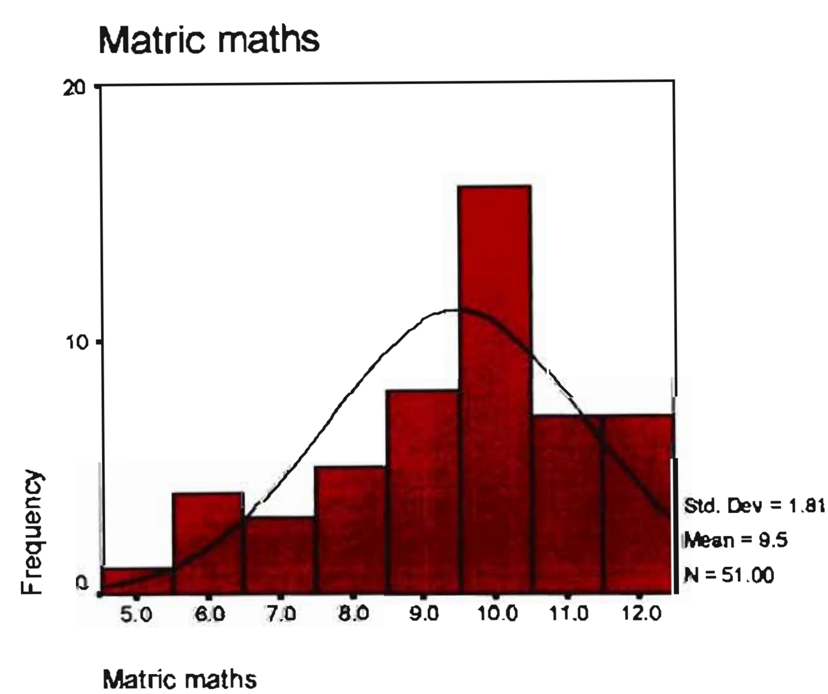

Figure B.3.2 Distribution of matric mathematics scores of 1999 Accounting 300 class

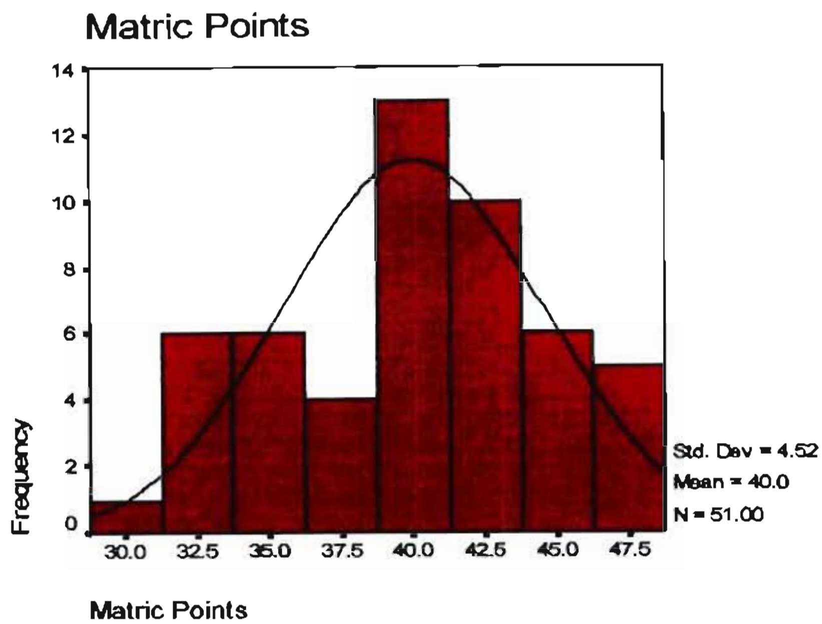

Figure B.3.3 Distribution of matric points of 1999 Accounting 300 class

	Mean	Std. Deviation	N
Matric Points	39.98	4.519	51
Acc 300 Final Mark 1999	48.98	9.864	51
Matric maths	9.47	1.815	51

Table 7.4 Descriptive statistics of Accounting 300 class from 1999 sample group

		Matric Points	Acc 300 Final Mark 1999	Matric maths
Matric Points	Pearson Correlation	1	.580(**)	.674(**)
	Sig. (1-tailed)	.	.000	.000
	N	51	51	51
Acc 300 Final Mark 1999	Pearson Correlation	.580(**)	1	.554(**)
	Sig. (1-tailed)	.000	.	.000
	N	51	51	51
Matric maths	Pearson Correlation	.674(**)	.554(**)	1
	Sig. (1-tailed)	.000	.000	.
	N	51	51	51

** Correlation is significant at the 0.01 level (1-tailed).

Table B.3.5 Results of correlational analysis of the 1999 Accounting 300 class

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.620(a)	.385	.359	7.898	.385	14.997	2	48	.000

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1870.931	2	935.465	14.997	.000(a)
	Residual	2994.050	48	62.376		
	Total	4864.980	50			

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.585	10.008		.058	.954	-19.537	20.707
	Matric Points	.827	.335	.379	2.470	.017	.154	1.499
	Matric maths	1.621	.833	.298	1.945	.058	-.055	3.296

a Predictors: (Constant), Matric maths, Matric Points

b Dependent Variable: Acc 300 Final Mark 1999

Table B.3.6 Results of multiple linear regression analysis of the 1999 Accounting 300 class

ACCOUNTING 400 1999

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	35	1	4.3	4.3	4.3
	36	2	8.7	8.7	13.0
	38	1	4.3	4.3	17.4
	39	1	4.3	4.3	21.7
	40	2	8.7	8.7	30.4
	41	1	4.3	4.3	34.8
	42	5	21.7	21.7	56.5
	43	2	8.7	8.7	65.2
	44	3	13.0	13.0	78.3
	45	1	4.3	4.3	82.6
	46	1	4.3	4.3	87.0
	47	2	8.7	8.7	95.7
	48	1	4.3	4.3	100.0
	Total	23	100.0	100.0	

Table B.4.1 Analysis of matric points of Accounting 400 class from 1999 sample group

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	32	1	4.3	4.3	4.3
	34	1	4.3	4.3	8.7
	44	1	4.3	4.3	13.0
	45	1	4.3	4.3	17.4
	46	1	4.3	4.3	21.7
	50	7	30.4	30.4	52.2
	51	2	8.7	8.7	60.9
	53	1	4.3	4.3	65.2
	55	2	8.7	8.7	73.9
	59	1	4.3	4.3	78.3
	63	1	4.3	4.3	82.6
	64	2	8.7	8.7	91.3
	72	1	4.3	4.3	95.7
	83	1	4.3	4.3	100.0
	Total	23	100.0	100.0	

Table B.4.2 Analysis of Accounting 400 final marks from 1999 sample group

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	E - HG	1	4.3	4.3	4.3
	D - HG	4	17.4	17.4	21.7
	C - HG	9	39.1	39.1	60.9
	B - HG	5	21.7	21.7	82.6
	A - HG	4	17.4	17.4	100.0
	Total	23	100.0	100.0	

Table B.4.3 Analysis of matric mathematics scores of Accounting 400 students from the 1999 sample group

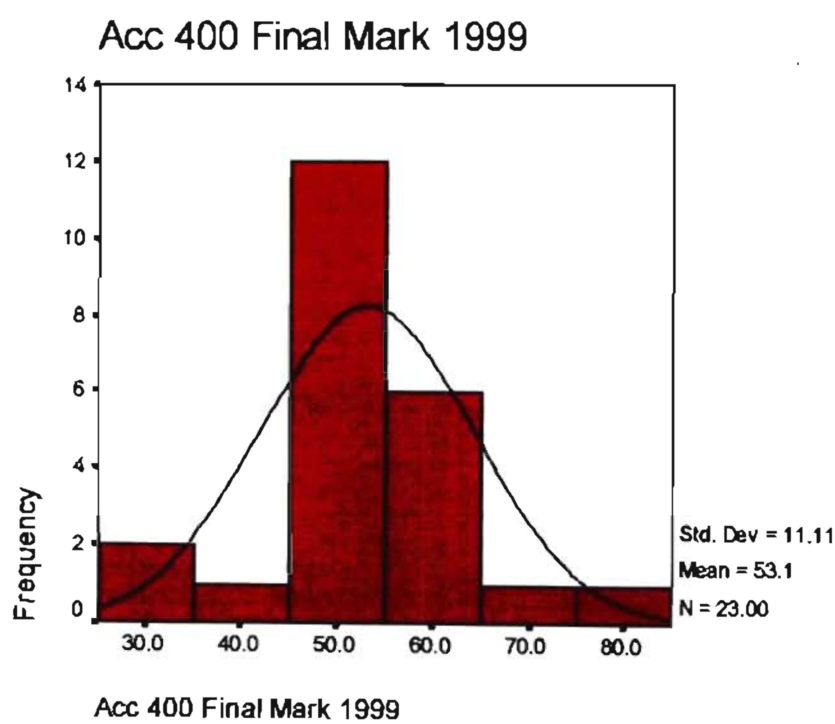

Figure B.4.1 Distribution of Accounting 400 final marks for the 1999 sample group

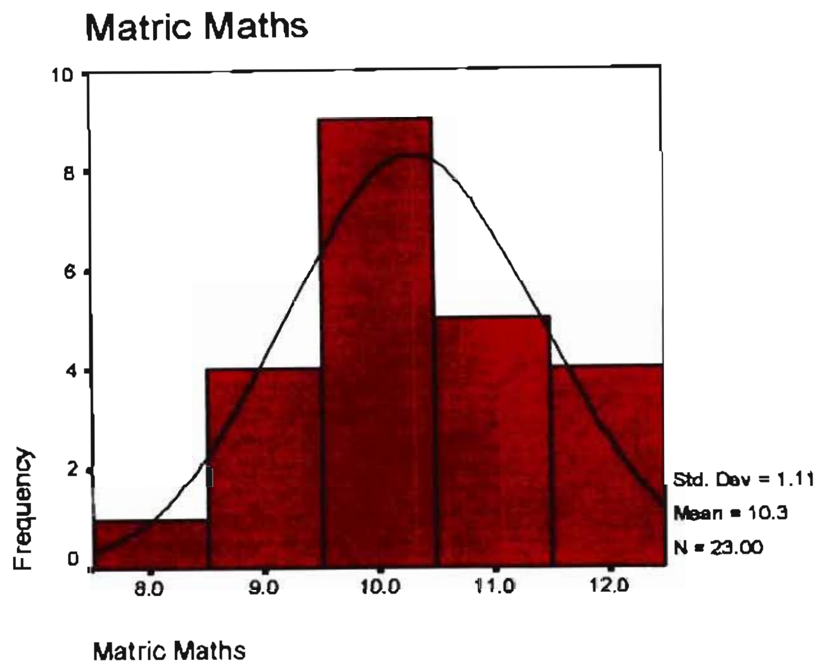

Figure B.4.2 Distribution of matric mathematics scores of 1999 Accounting 400 class

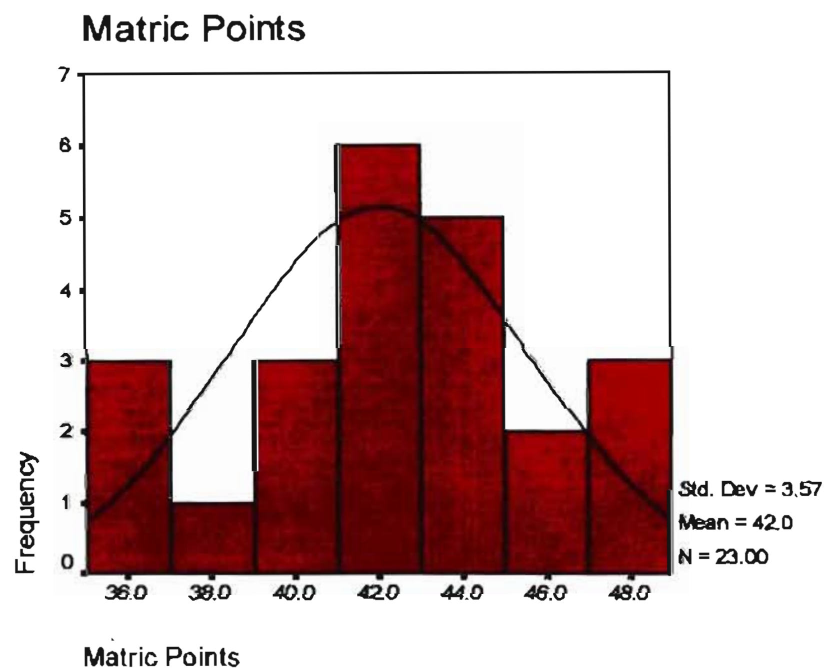

Figure B.4.3 Distribution of matric points of 1999 Accounting 400 class

	Mean	Std. Deviation	N
Matric Points	42.00	3.568	23
Acc 400 Final Mark 1999	53.09	11.107	23
Matric Maths	10.30	1.105	23

Table B.4.4 Descriptive statistics of Accounting 400 class from 1999 sample group

		Matric Points	Acc 400 Final Mark 1999	Matric Maths
Matric Points	Pearson Correlation	1	.468(*)	.657(**)
	Sig. (1-tailed)	.	.012	.000
	N	23	23	23
Acc 400 Final Mark 1999	Pearson Correlation	.468(*)	1	.501(**)
	Sig. (1-tailed)	.012	.	.007
	N	23	23	23
Matric Maths	Pearson Correlation	.657(**)	.501(**)	1
	Sig. (1-tailed)	.000	.007	.
	N	23	23	23

* Correlation is significant at the 0.05 level (1-tailed).
** Correlation is significant at the 0.01 level (1-tailed).

Table B.4.5 Results of correlational analysis of the 1999 Accounting 400 class

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.534(a)	.285	.214	9.849	.285	3.989	2	20	.035

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	773.924	2	386.962	3.989	.035(a)
	Residual	1939.902	20	96.995		
	Total	2713.826	22			

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-14.127	25.196		-.561	.581	-66.685	38.431
	Matric Points	.759	.781	.244	.972	.342	-.870	2.388
	Matric Maths	3.428	2.521	.341	1.360	.189	-1.830	8.686

a Predictors: (Constant), Matric Maths, Matric Points
b Dependent Variable: Acc 400 Final Mark 1999

Table B.4.6 Results of multiple linear regression analysis of the 1999 Accounting 400 class

DIAGNOSTIC REGRESSION MODELS

Accounting 100

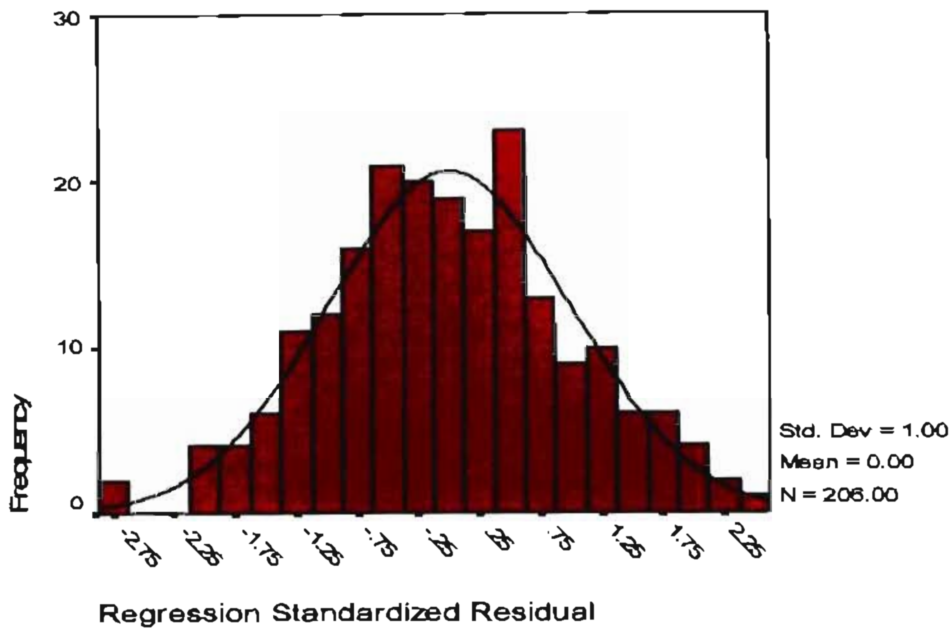

Figure B.5.1 Histogram showing frequency of Regression Standardized Residual of the 1999 Accounting 100 class, with the Accounting 100 final mark as the dependant variable

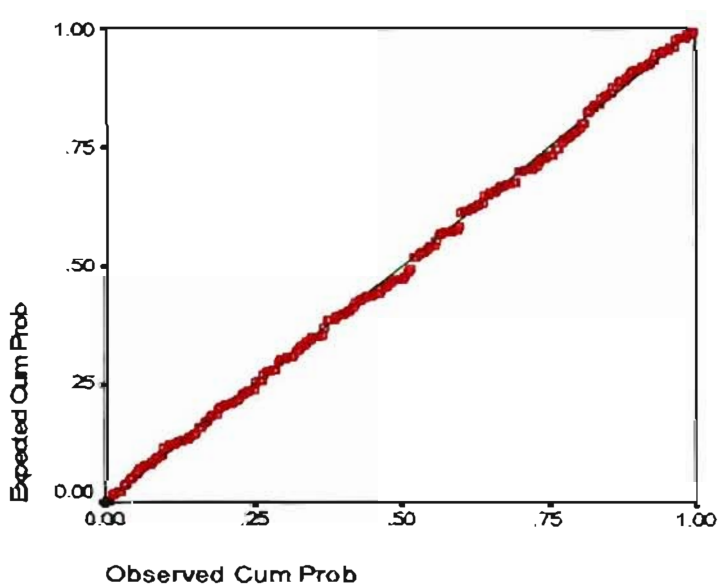

Figure B.5.2 Normal P-Plot of Regression Standardized Residual of the 1999 Accounting 100 class with the Accounting 100 final mark as the dependant variable

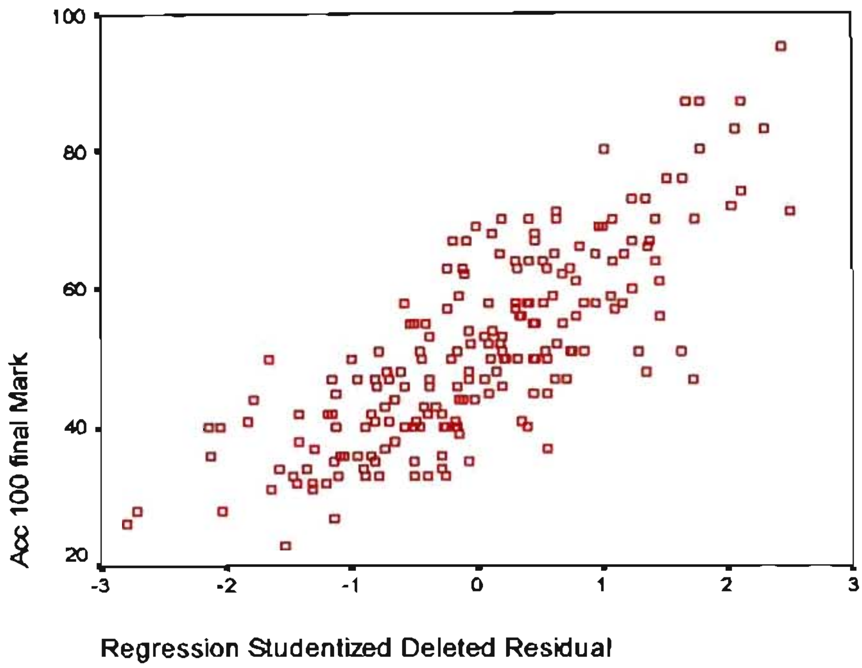

Figure B.5.3 Scatterplot of Regression Standardized residual with Accounting 100 final mark as dependant variable

Accounting 200

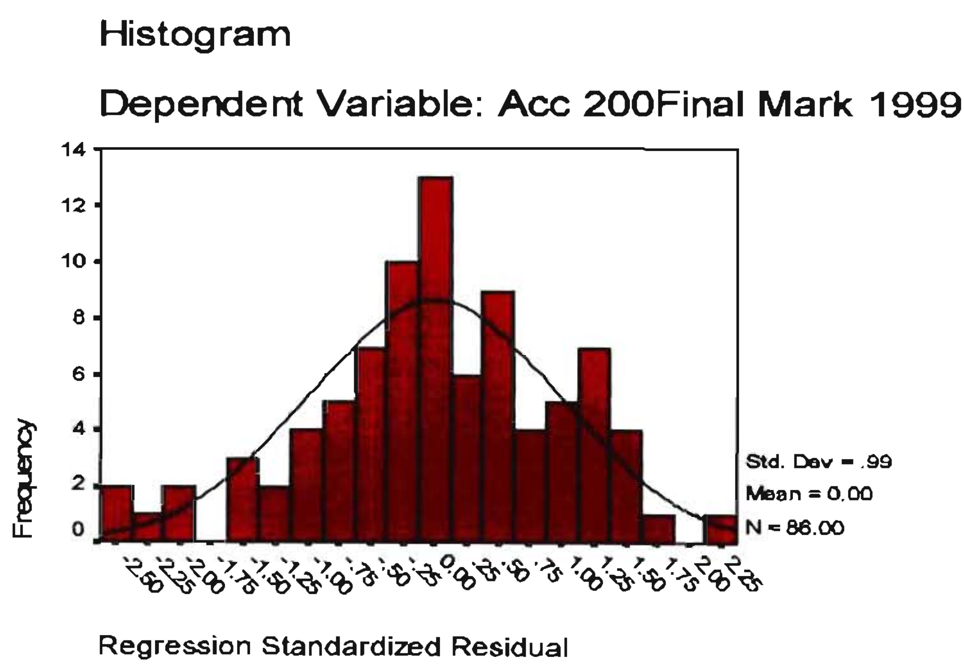

Figure B.5.4 Histogram showing frequency of Regression Standardized Residual of the 1999 Accounting 200 class, with the Accounting 200 final mark as the dependant variable

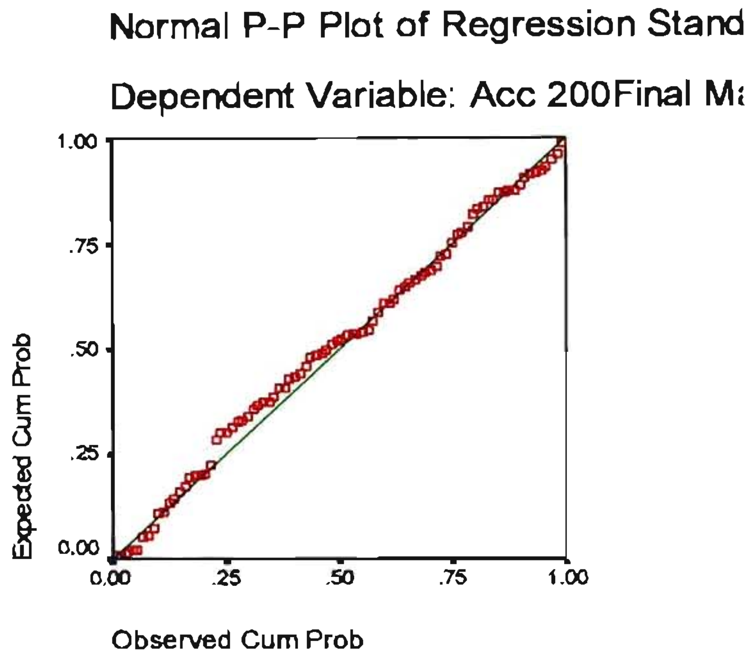

Figure B.5.5 Normal P-Plot of Regression Standardized Residual of the 1999 Accounting 200 class with the Accounting 200 final mark as the dependant variable

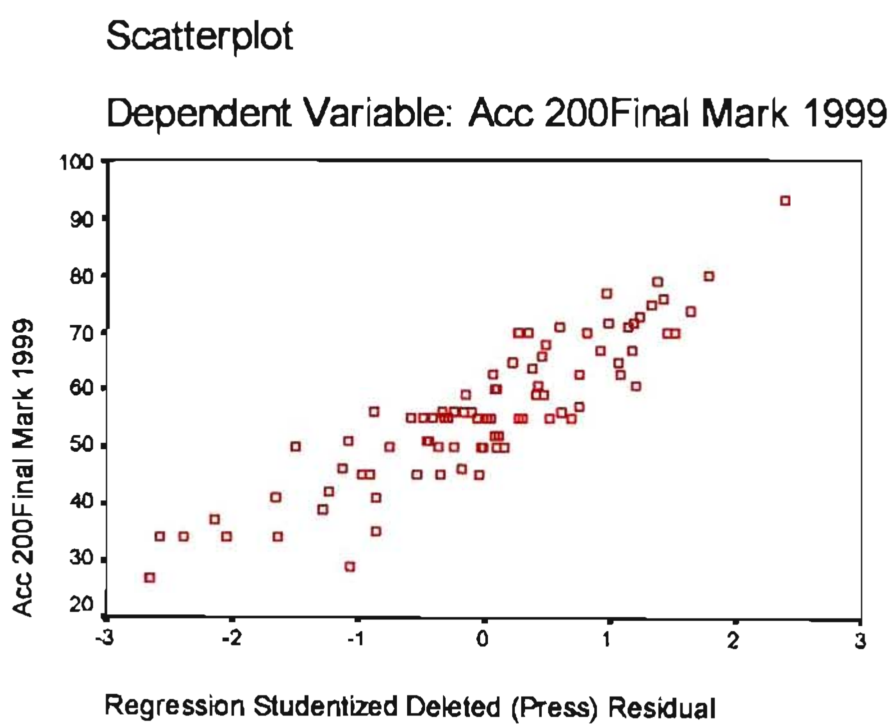

Figure B.5.6 Scatterplot of Regression Standardized residual with Accounting 200 final mark as dependant variable

Accounting 300

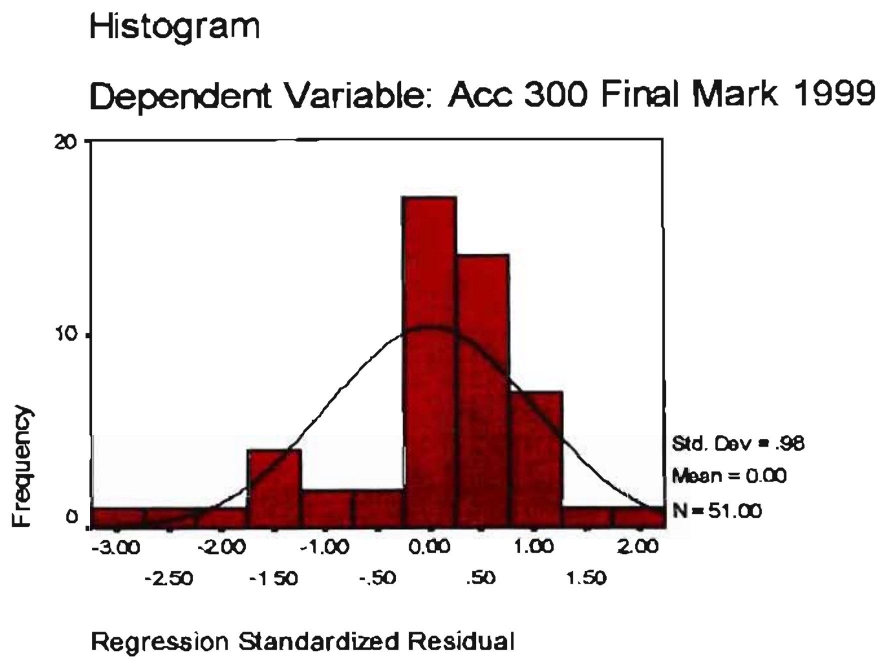

Figure B.5.7 Histogram showing frequency of Regression Standardized Residual of the 1999 Accounting 300 class, with the Accounting 300 final mark as the dependant variable

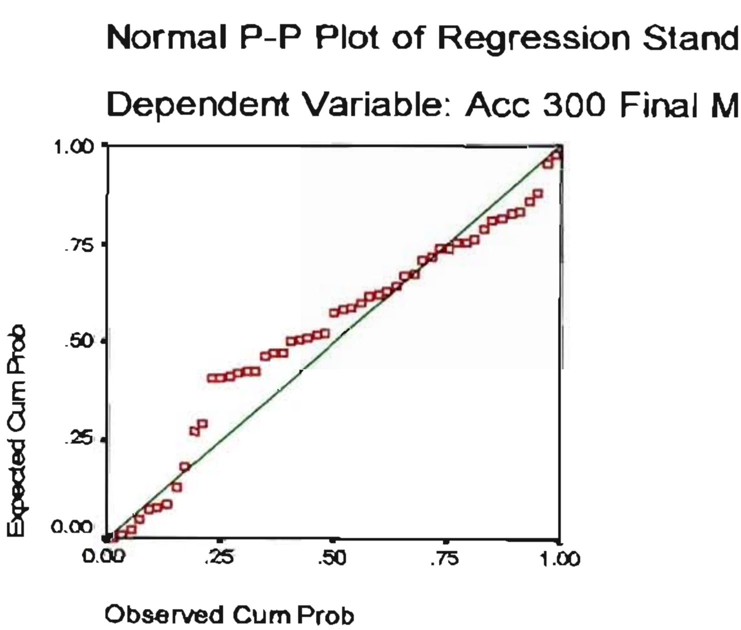

Figure B.5.8 Normal P-Plot of Regression Standardized Residual of the 1999 Accounting 300 class with the Accounting 300 final mark as the dependant variable

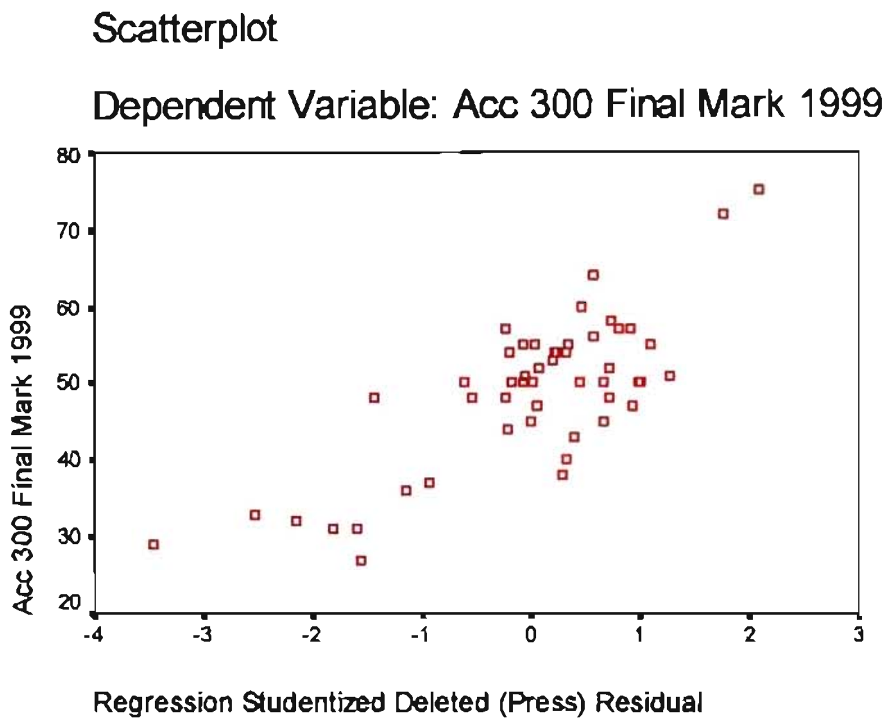

Figure B.5.9 Scatterplot of Regression Standardized residual with Accounting 300 final mark as dependant variable

Accounting 400

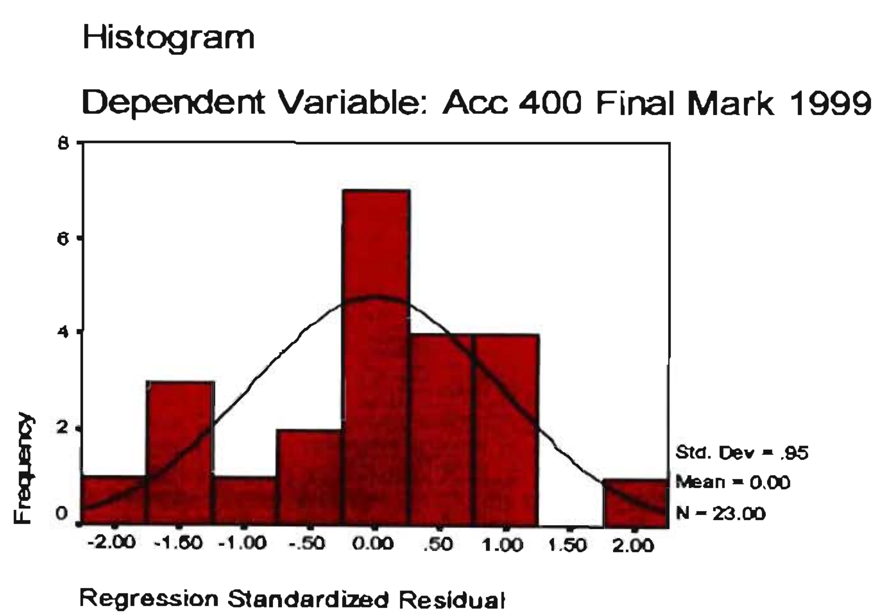

Figure B.5.10 Histogram showing frequency of Regression Standardized Residual of the 1999 Accounting 400 class, with the Accounting 400 final mark as the dependant variable

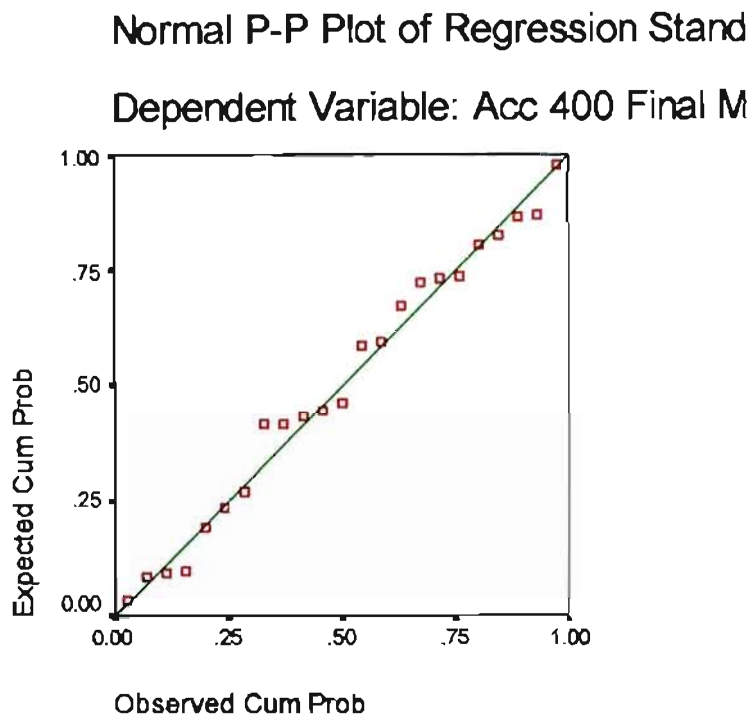

Figure B.5.11 Normal P-Plot of Regression Standardized Residuals of the 1999 Accounting 400 class with the Accounting 400 final mark as the dependant variable

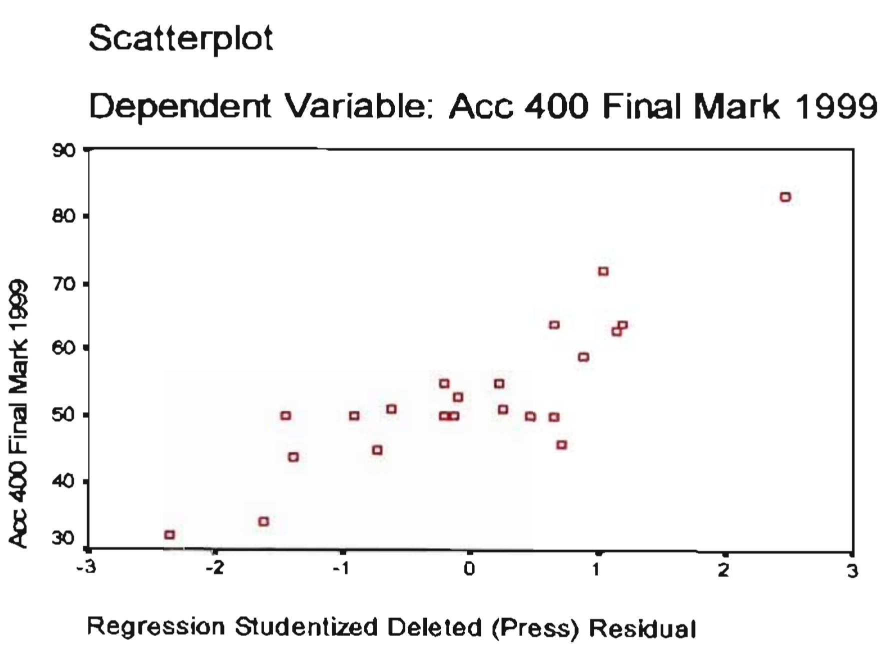

Figure B.5.12 Scatterplot of Regression Standardized residuals with Accounting 400 final mark as dependant variable

CHI-SQUARED MEASURES OF ASSOCIATION:

Accounting 100

		Acc 100 final Mark			Total
		Distinction	Pass	Fail	
Matric Maths HG	A	4	10	1	15
	B	1	16	1	18
	C	3	24	12	39
	D	0	16	19	35
	E	0	13	23	36
Total		8	79	56	143

Table B6.1 Matric Maths HG * Acc 100 final Mark Crosstabulation

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	41.070(a)	8	.000
Likelihood Ratio	43.124	8	.000
Linear-by-Linear Association	33.405	1	.000
N of Valid Cases	143		

a 5 cells (33.3%) have expected count less than 5. The minimum expected count is .84.

Table B6.2 Chi-Square Tests

Accounting 200

		Acc 200Final Mark			Total
		Distinction	Pass	Fail	
Matric Maths HG	A	1	7	1	9
	B	0	10	3	13
	C	1	18	5	24
	D	0	11	1	12
	E	0	7	3	10
Total		2	53	13	68

Table B6.3 Matric Maths HG * Acc 200Final Mark Crosstabulation

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.389(a)	8	.715
Likelihood Ratio	5.688	8	.682
Linear-by-Linear Association	.739	1	.390
N of Valid Cases	68		

a 10 cells (66.7%) have expected count less than 5. The minimum expected count is .26.

Table B6.4 Chi-Square Tests

Accounting 300

		Acc 300 Final Mark		Total
		Pass	Fail	
Matric Maths HG	A	6	1	7
	B	6	1	7
	C	12	4	16
	D	5	3	8
	E	1	4	5
Total		30	13	43

Table B6.5 Matric Maths HG * Acc 300 Final Mark Crosstabulation

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.967(a)	4	.093
Likelihood Ratio	7.636	4	.106
Linear-by-Linear Association	5.851	1	.016
N of Valid Cases	43		

a 8 cells (80.0%) have expected count less than 5. The minimum expected count is 1.51.

Table B6.6 Chi-Square Tests

APPENDIX C

TABLES OF DATA ACCUMULATED FROM 2000 SAMPLE GROUP

ACCOUNTING 100 2000

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	23	1	.5	.5	.5
	25	1	.5	.5	.9
	26	1	.5	.5	1.4
	28	2	.9	.9	2.4
	29	4	1.9	1.9	4.3
	30	6	2.8	2.8	7.1
	31	6	2.8	2.8	10.0
	32	16	7.5	7.6	17.5
	33	12	5.7	5.7	23.2
	34	19	9.0	9.0	32.2
	35	16	7.5	7.6	39.8
	36	14	6.6	6.6	46.4
	37	16	7.5	7.6	54.0
	38	12	5.7	5.7	59.7
	39	12	5.7	5.7	65.4
	40	12	5.7	5.7	71.1
	41	9	4.2	4.3	75.4
	42	15	7.1	7.1	82.5
	43	7	3.3	3.3	85.8
	44	8	3.8	3.8	89.6
	45	4	1.9	1.9	91.5
	46	7	3.3	3.3	94.8
	47	2	.9	.9	95.7
	48	5	2.4	2.4	98.1
	49	2	.9	.9	99.1
	50	2	.9	.9	100.0
	Total	211	99.5	100.0	
Missing	System	1	.5		
Total		212	100.0		

Table C.1 Frequency analysis of matric points of Accounting 100 class from 2000 sample group

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20	1	.5	.5	.5
	21	1	.5	.5	1.0
	27	2	.9	1.0	2.0
	28	1	.5	.5	2.5
	30	1	.5	.5	3.0
	33	1	.5	.5	3.5
	34	1	.5	.5	4.0
	35	2	.9	1.0	5.0
	36	3	1.4	1.5	6.5
	37	1	.5	.5	7.0
	38	1	.5	.5	7.5
	40	2	.9	1.0	8.5
	41	2	.9	1.0	9.5
	42	4	1.9	2.0	11.4
	43	4	1.9	2.0	13.4
	44	4	1.9	2.0	15.4
	45	2	.9	1.0	16.4
	46	5	2.4	2.5	18.9
	47	2	.9	1.0	19.9
	48	2	.9	1.0	20.9
	50	8	3.8	4.0	24.9
	51	4	1.9	2.0	26.9
	52	9	4.2	4.5	31.3
	53	3	1.4	1.5	32.8
	54	11	5.2	5.5	38.3
	55	8	3.8	4.0	42.3
	56	6	2.8	3.0	45.3
	57	7	3.3	3.5	48.8
	58	9	4.2	4.5	53.2
	59	10	4.7	5.0	58.2
	60	4	1.9	2.0	60.2
	61	6	2.8	3.0	63.2
	62	4	1.9	2.0	65.2
	63	9	4.2	4.5	69.7
	74	4	1.9	2.0	90.0
	75	2	.9	1.0	91.0
	76	4	1.9	2.0	93.0
	77	1	.5	.5	93.5
	78	1	.5	.5	94.0
	79	1	.5	.5	94.5
	80	1	.5	.5	95.0
	82	3	1.4	1.5	96.5
	83	1	.5	.5	97.0
	84	1	.5	.5	97.5

	85	1	.5	.5	98.0
	86	1	.5	.5	98.5
	88	1	.5	.5	99.0
	90	1	.5	.5	99.5
	96	1	.5	.5	100.0
	Total	201	94.8	100.0	
Missing	System	11	5.2		
Total		212	100.0		

Table C.2 Frequency analysis of final Accounting 100 marks from the 2000 sample group

		Frequency	Percent	Valid Percent	Cumulativ e Percent
Valid	G - standard grade	1	.5	.5	.5
	E - standard grade	2	.9	.9	1.4
	D - standard grade	2	.9	.9	2.4
	C - standard grade	16	7.5	7.6	10.0
	B - standard grade	18	8.5	8.5	18.5
	A - standard grade	16	7.5	7.6	26.1
	E - higher grade	38	17.9	18.0	44.1
	D - higher grade	47	22.2	22.3	66.4
	C - higher grade	39	18.4	18.5	84.8
	B - higher grade	20	9.4	9.5	94.3
	A - higher grade	12	5.7	5.7	100.0
	Total	211	99.5	100.0	
Missing	System	1	.5		
Total		212	100.0		

Table C.3 Analysis of matric mathematics scores of Accounting 100 students from the 2000 sample group

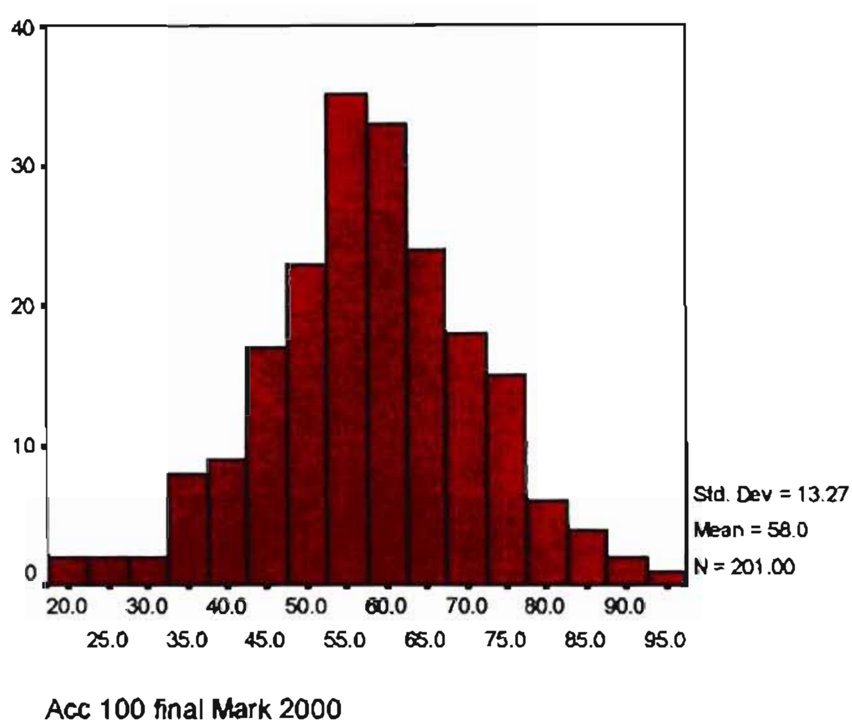

Figure C.1 Distribution of Accounting 100 final marks for the 2000 sample group

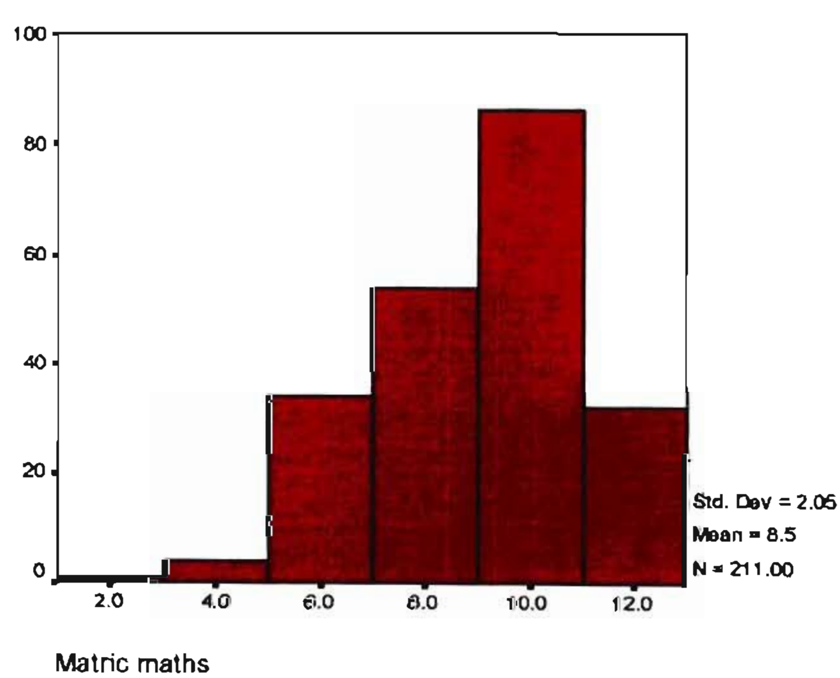

Figure C.2 Distribution of matric mathematics scores of 2000 Accounting 100 class

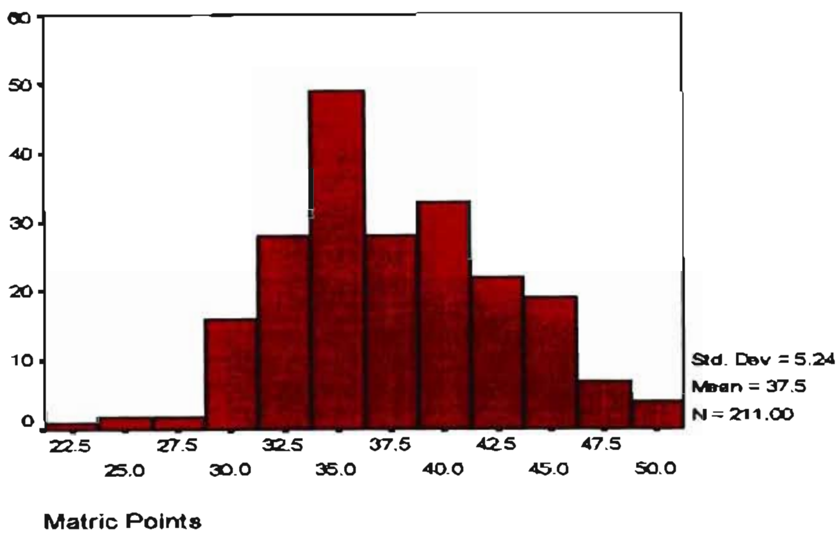

Figure C.3 Distribution of matric points of 2000 Accounting 100 class

	Mean	Std. Deviation	N
Matric Points	37.50	5.238	211
Acc 100 final Mark 2000	57.99	13.267	201
Matric maths	8.51	2.050	211

Table C.4 Descriptive statistics of Accounting 100 class from 2000 sample group

		Matric Points	Acc 100 final Mark 2000	Matric maths
Matric Points	Pearson Correlation	1	.607(**)	.724(**)
	Sig. (1-tailed)	.	.000	.000
	N	211	201	211
Acc 100 final Mark 2000	Pearson Correlation	.607(**)	1	.519(**)
	Sig. (1-tailed)	.000	.	.000
	N	201	201	201
Matric maths	Pearson Correlation	.724(**)	.519(**)	1
	Sig. (1-tailed)	.000	.000	.
	N	211	201	211

** Correlation is significant at the 0.01 level (1-tailed).

Table C.5 Results of correlational analysis of the 2000 Accounting 100 class

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.618 (a)	.382	.376	10.483	.382	61.158	2	198	.000

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13442.205	2	6721.102	61.158	.000(a)
	Residual	21759.775	198	109.898		
	Total	35201.980	200			

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	1.812	5.509		.329	.743	-9.051	12.675
	Matric Points	1.236	.206	.485	5.990	.000	.829	1.643
	Matric maths	1.117	.538	.168	2.078	.039	.057	2.178

a Predictors: (Constant), Matric maths, Matric Points
b Dependent Variable: Acc 100 final Mark 2000

Table C.1.6 Results of multiple linear regression analysis of the 2000 Accounting 100 class

ACCOUNTING 200 2000

	Mean	Std. Deviation	N
Acc 200Final Mark 2000	58.93	11.823	126
Matric Points	38.84	4.995	126
Matric Maths	9.06	1.729	126

Table C.2.1 Descriptive statistics of Accounting 200 class from 2000 sample group

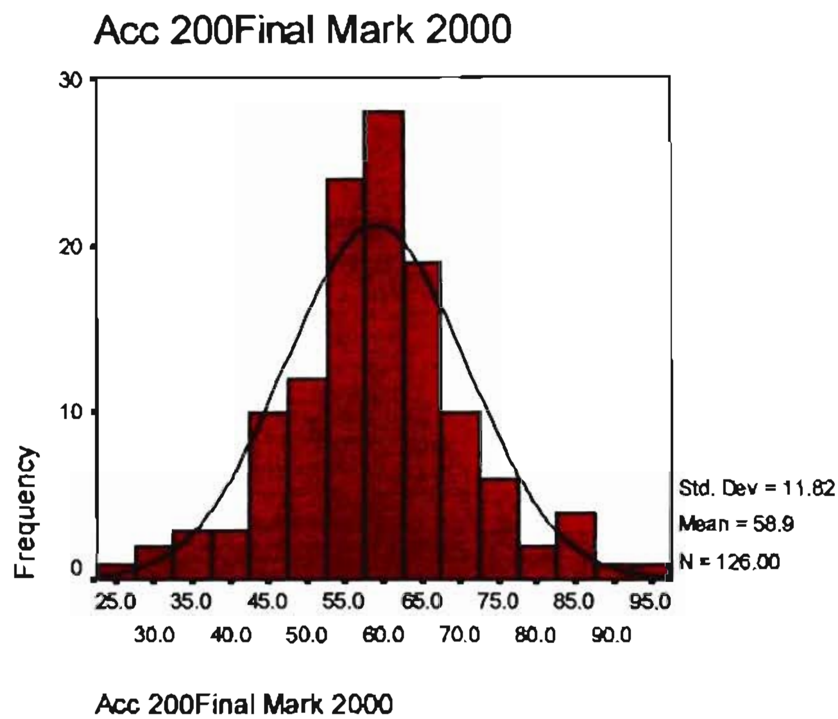

Figure C.2.1 Distribution of Accounting 200 final marks for the 2000 sample group

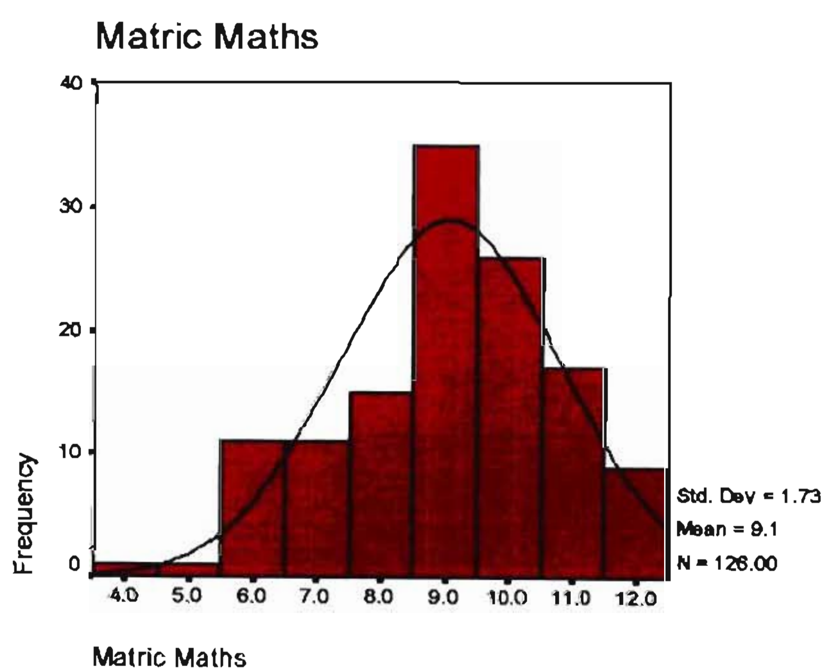

Figure C.2.2 Distribution of matric mathematics scores of 2000 Accounting 200 class

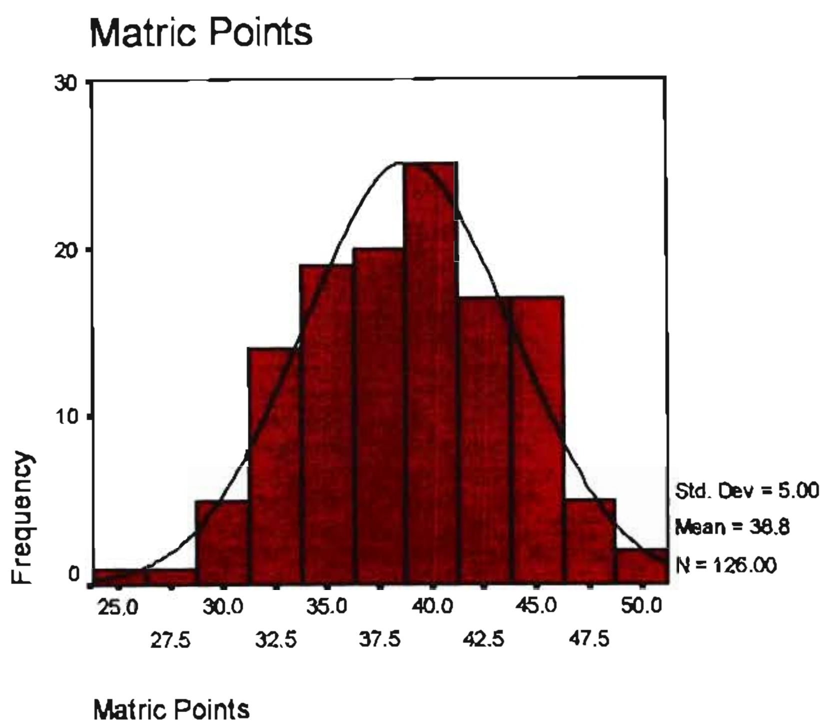

Figure C.2.3 Distribution of matric points of 2000 Accounting 200 class

		Acc 200Final Mark 2000	Matric Points	Matric Maths
Pearson Correlation	Acc 200Final Mark 2000	1.000	.445	.423
	Matric Points	.445	1.000	.681
	Matric Maths	.423	.681	1.000
Sig. (1-tailed)	Acc 200Final Mark 2000	.	.000	.000
	Matric Points	.000	.	.000
	Matric Maths	.000	.000	.
N	Acc 200Final Mark 2000	126	126	126
	Matric Points	126	126	126
	Matric Maths	126	126	126

Table C.2.2 Results of correlational analysis of the 2000 Accounting 200 class

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.475(a)	.225	.213	10.491	.225	17.881	2	123	.000

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3936.251	2	1968.126	17.881	.000(a)
	Residual	13538.106	123	110.066		
	Total	17474.357	125			

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	18.116	7.357		2.463	.015	3.554	32.678
	Matric Points	.694	.257	.293	2.703	.008	.186	1.202
	Matric Maths	1.530	.742	.224	2.064	.041	.062	2.998

a Predictors: (Constant), Matric Maths, Matric Points
b Dependent Variable: Acc 200Final Mark 2000

Table C.2.3 Results of multiple linear regression analysis of the 2000 Accounting 200 class

ACCOUNTING 300 2000

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	31	2	2.3	2.3	2.3
	32	5	5.8	5.8	8.1
	33	4	4.7	4.7	12.8
	34	4	4.7	4.7	17.4
	35	4	4.7	4.7	22.1
	36	3	3.5	3.5	25.6
	37	7	8.1	8.1	33.7
	38	8	9.3	9.3	43.0
	39	5	5.8	5.8	48.8
	40	5	5.8	5.8	54.7
	41	6	7.0	7.0	61.6
	42	8	9.3	9.3	70.9
	43	5	5.8	5.8	76.7
	44	7	8.1	8.1	84.9
	45	1	1.2	1.2	86.0
	46	5	5.8	5.8	91.9
	47	2	2.3	2.3	94.2
	48	3	3.5	3.5	97.7
	50	2	2.3	2.3	100.0
	Total	86	100.0	100.0	

Table C.3.1 Analysis of matric points of Accounting 300 class from the 2000 sample group

Acc 300 Final Mark 2000

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	24	1	1.2	1.2	1.2
	36	1	1.2	1.2	2.3
	37	1	1.2	1.2	3.5
	41	1	1.2	1.2	4.7
	42	1	1.2	1.2	5.8
	43	2	2.3	2.3	8.1
	44	2	2.3	2.3	10.5
	45	7	8.1	8.1	18.6
	46	2	2.3	2.3	20.9
	48	1	1.2	1.2	22.1
	50	18	20.9	20.9	43.0
	51	6	7.0	7.0	50.0

52	4	4.7	4.7	54.7
53	4	4.7	4.7	59.3
54	3	3.5	3.5	62.8
55	4	4.7	4.7	67.4
56	3	3.5	3.5	70.9
57	5	5.8	5.8	76.7
58	2	2.3	2.3	79.1
59	5	5.8	5.8	84.9
60	2	2.3	2.3	87.2
61	1	1.2	1.2	88.4
62	2	2.3	2.3	90.7
63	2	2.3	2.3	93.0
64	1	1.2	1.2	94.2
65	1	1.2	1.2	95.3
67	1	1.2	1.2	96.5
70	1	1.2	1.2	97.7
76	1	1.2	1.2	98.8
87	1	1.2	1.2	100.0
Total	86	100.0	100.0	

Table C.3.2 Analysis of Accounting 300 final marks from the 2000 sample group

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	B - SG	7	8.1	8.1	8.1
	A - SG	6	7.0	7.0	15.1
	E - HG	7	8.1	8.1	23.3
	D - HG	26	30.2	30.2	53.5
	C - HG	18	20.9	20.9	74.4
	B - HG	13	15.1	15.1	89.5
	A - HG	9	10.5	10.5	100.0
	Total	86	100.0	100.0	

Table C.3.3 Analysis of matric mathematics scores of Accounting 300 students from the 2000 sample group

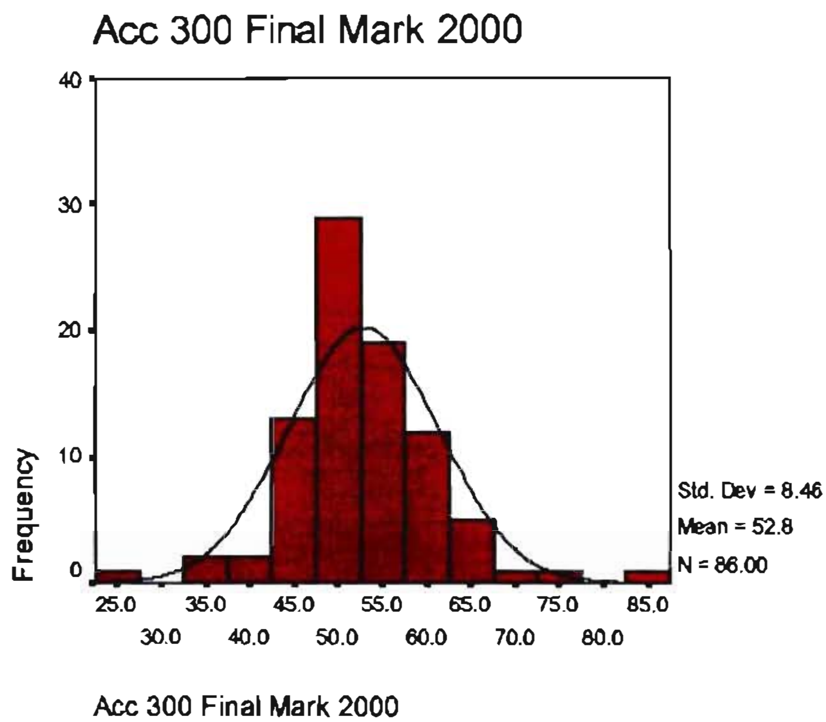

Figure C.3.1 Distribution of Accounting 300 final marks for the 2000 sample group

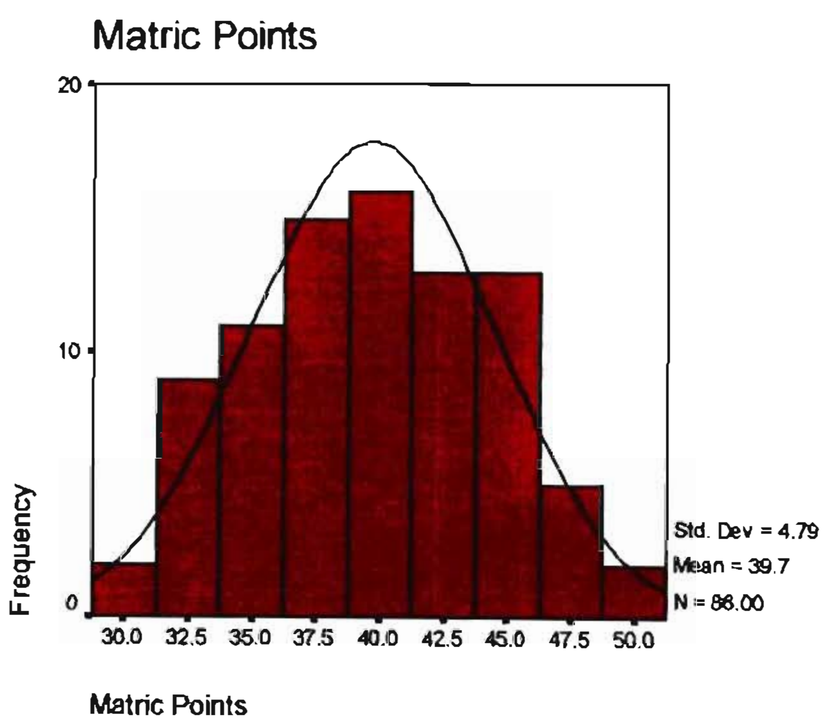

Figure C.3.2 Distribution of matric points of the 2000 Accounting 300 class

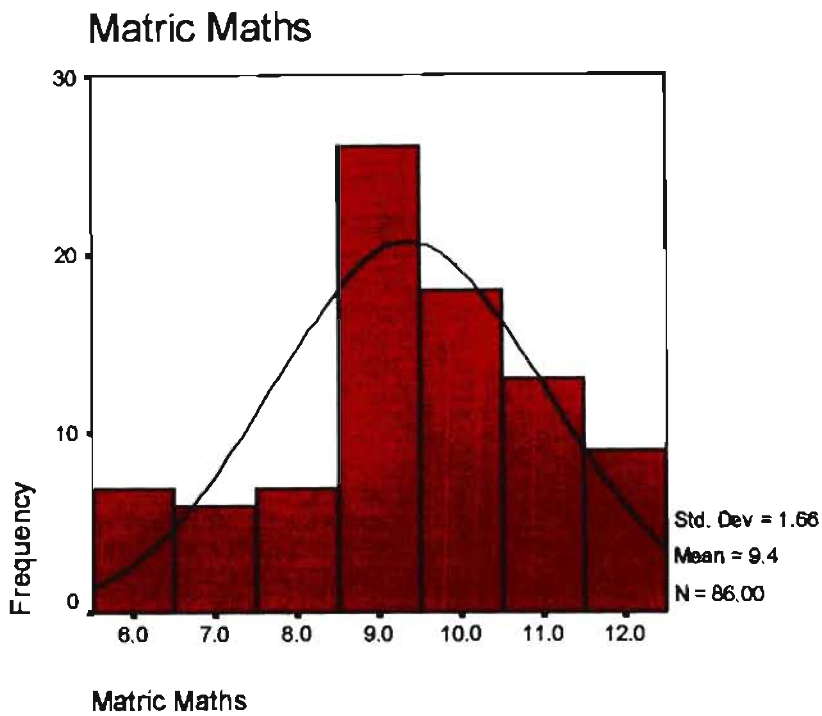

Figure C.3.3 Distribution of matric mathematics scores of the 2000 Accounting 300 class

Descriptive Statistics

	Mean	Std. Deviation	N
Matric Points	39.70	4.792	86
Acc 300 Final Mark 2000	52.80	8.461	86
Matric Maths	9.36	1.659	86

Table C.3.4 Descriptive statistics of Accounting 300 class from 2000 sample group

		Matric Points	Acc 300 Final Mark 2000	Matric Maths
Matric Points	Pearson Correlation	1	.445(**)	.680(**)
	Sig. (1-tailed)	.	.000	.000
	N	86	86	86
Acc 300 Final Mark 2000	Pearson Correlation	.445(**)	1	.478(**)
	Sig. (1-tailed)	.000	.	.000
	N	86	86	86
Matric Maths	Pearson Correlation	.680(**)	.478(**)	1
	Sig. (1-tailed)	.000	.000	.
	N	86	86	86

** Correlation is significant at the 0.01 level (1-tailed).

Table C.3.5 Results of correlational analysis of the 2000 Accounting 300 class

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.505(a)	.255	.237	7.389	.255	14.232	2	83	.000

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1554.033	2	777.016	14.232	.000(a)
	Residual	4531.607	83	54.598		
	Total	6085.640	85			

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	21.559	6.687		3.224	.002	8.259	34.858
	Matric Points	.395	.228	.224	1.733	.087	-.058	.849
	Matric Maths	1.662	.659	.326	2.522	.014	.351	2.973

a Predictors: (Constant), Matric Maths, Matric Points
b Dependent Variable: Acc 300 Final Mark 2000

Table C.3.6 Results of multiple linear regression analysis of the 2000 Accounting 300 class

ACCOUNTING 400 2000

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	32	2	4.4	4.4	4.4
	33	3	6.7	6.7	11.1
	34	1	2.2	2.2	13.3
	35	1	2.2	2.2	15.6
	37	4	8.9	8.9	24.4
	38	2	4.4	4.4	28.9
	39	3	6.7	6.7	35.6
	40	3	6.7	6.7	42.2
	41	4	8.9	8.9	51.1
	42	5	11.1	11.1	62.2
	43	2	4.4	4.4	66.7
	44	4	8.9	8.9	75.6
	45	1	2.2	2.2	77.8
	46	3	6.7	6.7	84.4
	47	2	4.4	4.4	88.9
	48	3	6.7	6.7	95.6
	50	2	4.4	4.4	100.0
	Total	45	100.0	100.0	

Table C.4.1 Analysis of matric points of Accounting 400 class from 2000 sample group

Acc 400 Final Mark 2000

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	30	2	4.4	4.4	4.4
	32	2	4.4	4.4	8.9
	33	2	4.4	4.4	13.3
	34	1	2.2	2.2	15.6
	35	1	2.2	2.2	17.8
	36	2	4.4	4.4	22.2
	37	2	4.4	4.4	26.7
	40	1	2.2	2.2	28.9
	41	1	2.2	2.2	31.1
	43	1	2.2	2.2	33.3
	44	1	2.2	2.2	35.6

46	1	2.2	2.2	37.8
48	1	2.2	2.2	40.0
50	2	4.4	4.4	44.4
51	4	8.9	8.9	53.3
52	2	4.4	4.4	57.8
53	2	4.4	4.4	62.2
55	1	2.2	2.2	64.4
56	3	6.7	6.7	71.1
58	4	8.9	8.9	80.0
61	2	4.4	4.4	84.4
62	1	2.2	2.2	86.7
64	1	2.2	2.2	88.9
65	2	4.4	4.4	93.3
69	1	2.2	2.2	95.6
76	1	2.2	2.2	97.8
87	1	2.2	2.2	100.0
Total	45	100.0	100.0	

Table C.4.2 Analysis of Accounting 400 final marks from 2000 sample group

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	B - SG	3	6.7	6.7	6.7
	A - SG	4	8.9	8.9	15.6
	E - HG	1	2.2	2.2	17.8
	D - HG	6	13.3	13.3	31.1
	C - HG	14	31.1	31.1	62.2
	B - HG	8	17.8	17.8	80.0
	A - HG	9	20.0	20.0	100.0
	Total	45	100.0	100.0	

Table C.4.3 Analysis of matric mathematics scores of Accounting 400 students from the 2000 sample group

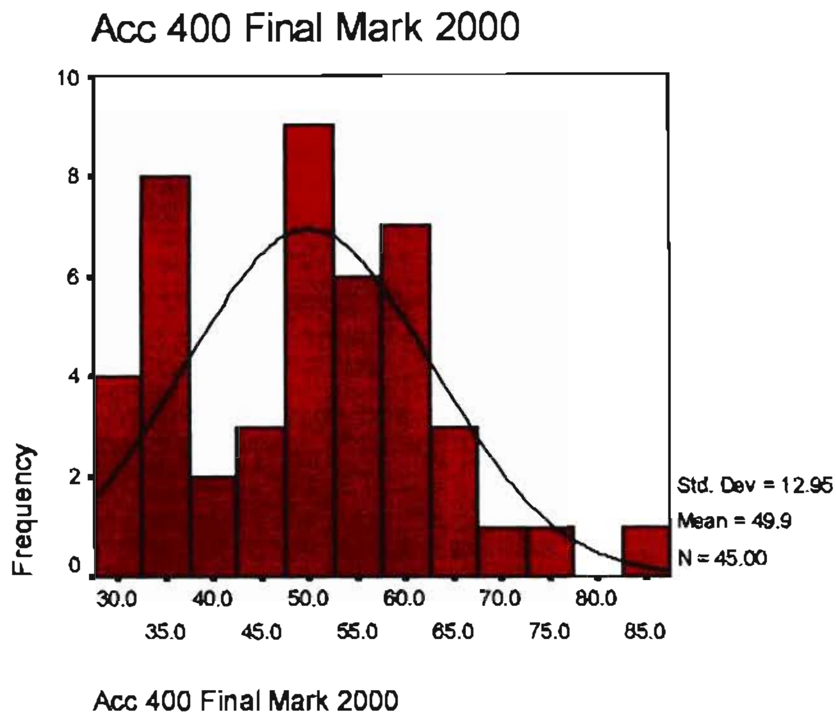

Figure C.4.1 Distribution of Accounting 400 final marks from 2000 sample group

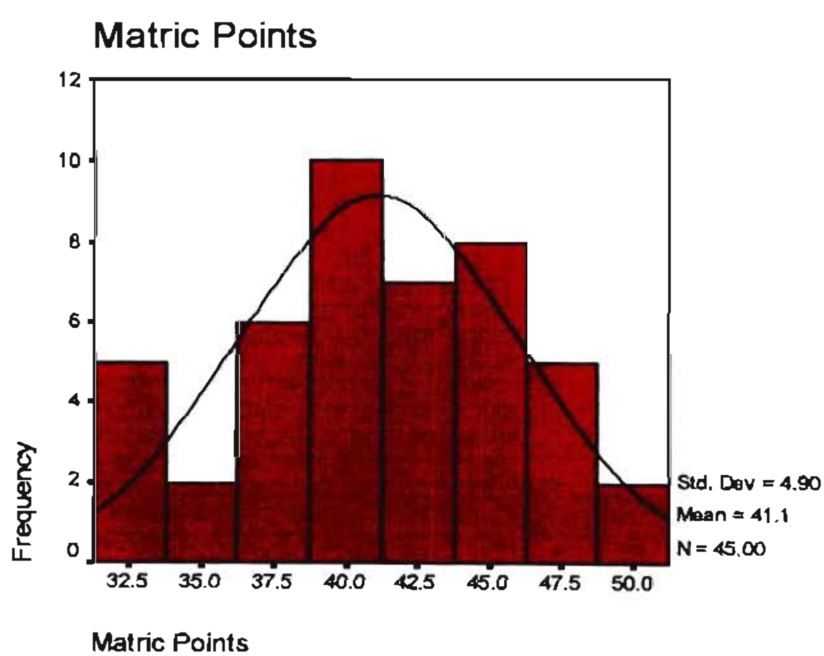

Figure C.4.2 Distribution of matric points of 2000 Accounting 400 class

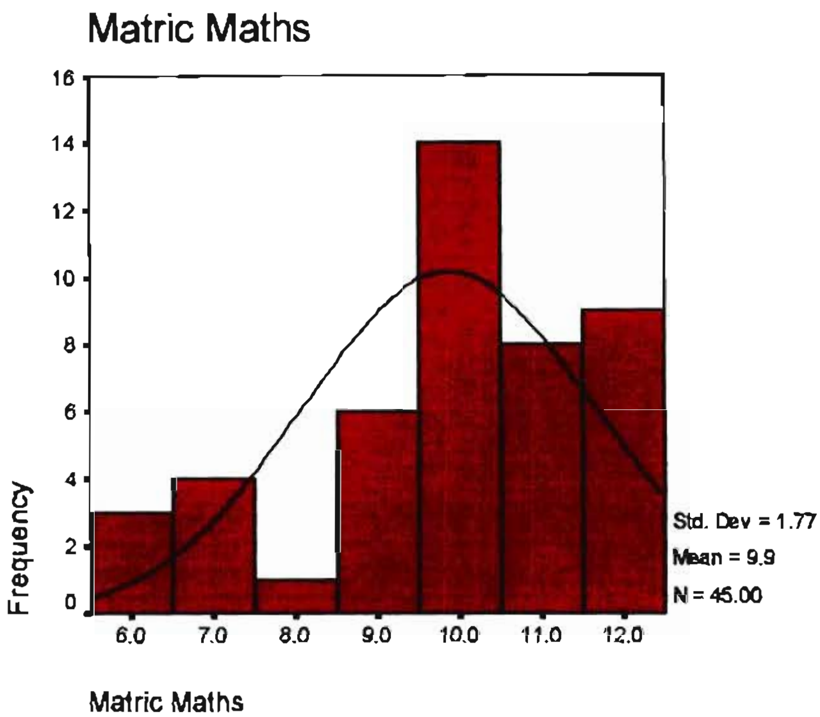

Figure C.4.3 Distribution of matric mathematics scores of 2000 Accounting 400 class

	Mean	Std. Deviation	N
Matric Points	41.11	4.900	45
Acc 400 Final Mark 2000	49.91	12.951	45
Matric Maths	9.87	1.766	45

Table C.4.4 Descriptive statistics of Accounting 400 class from 2000 sample group

		Matric Points	Acc 400 Final Mark 2000	Matric Maths
Matric Points	Pearson Correlation	1	.387(**)	.721(**)
	Sig. (1-tailed)	.	.004	.000
	N	45	45	45
Acc 400 Final Mark 2000	Pearson Correlation	.387(**)	1	.349(**)
	Sig. (1-tailed)	.004	.	.009
	N	45	45	45
Matric Maths	Pearson Correlation	.721(**)	.349(**)	1
	Sig. (1-tailed)	.000	.009	.
	N	45	45	45

** Correlation is significant at the 0.01 level (1-tailed).

Table C.4.5 Results of correlational analysis of the 2000 Accounting 400 class

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.400(a)	.160	.120	12.149	.160	4.000	2	42	.026

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1180.667	2	590.334	4.000	.026(a)
	Residual	6198.977	42	147.595		
	Total	7379.644	44			

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	8.748	15.522		.564	.576	-22.576	40.071
	Matric Points	.744	.540	.281	1.378	.175	-.345	1.833
	Matric Maths	1.073	1.498	.146	.716	.478	-1.950	4.095

a Predictors: (Constant), Matric Maths, Matric Points

b Dependent Variable: Acc 400 Final Mark 2000

Table C.4.6 Results of multiple linear regression analysis of the Accounting 400 class from the 2000 sample group

<u>**DIAGNOSTIC REGRESSION MODELS**</u>

Accounting 100

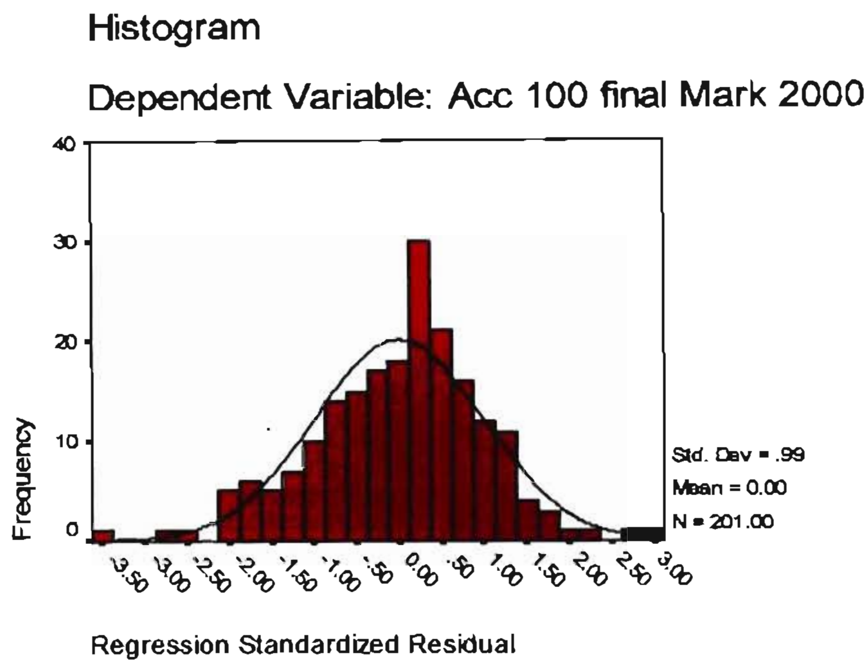

Figure C.5.1 Histogram showing frequency of Regression Standardized Residuals of the 2000 Accounting 100 class, with the Accounting 100 final mark as the dependant variable

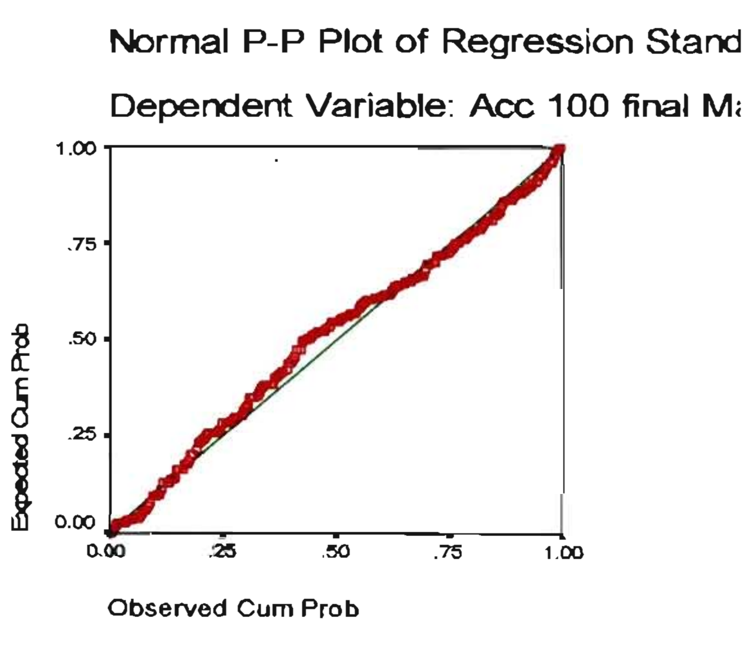

Figure C.5.2 Normal P-Plot of Regression standardized residuals of the 2000 Accounting 100 class, with Accounting 100 final mark as the dependant variable

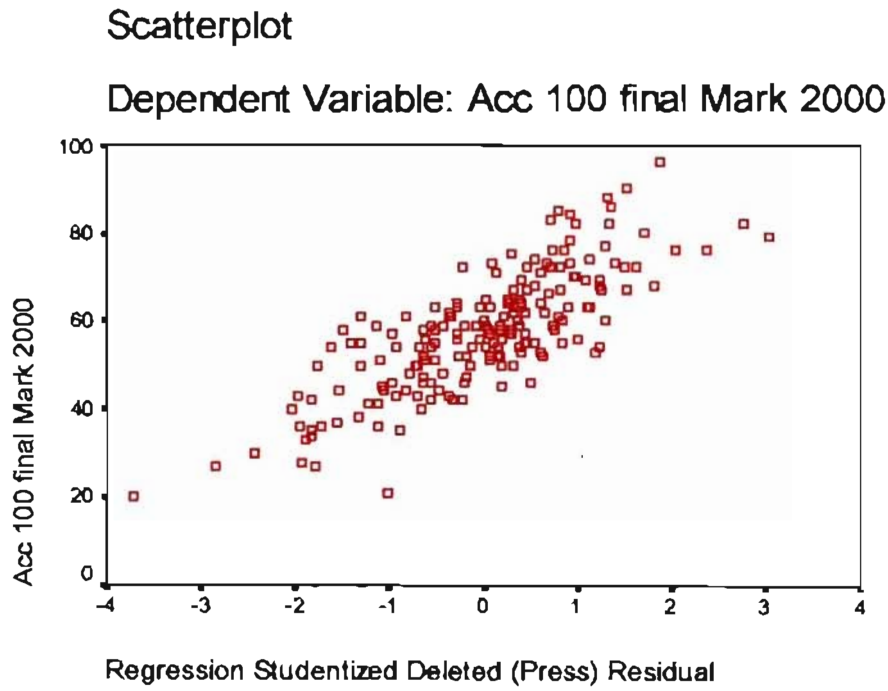

***Figure C.5.3** Scatterplot of Regression Standardized residual with Accounting 100 final mark as dependant variable*

Accounting 200

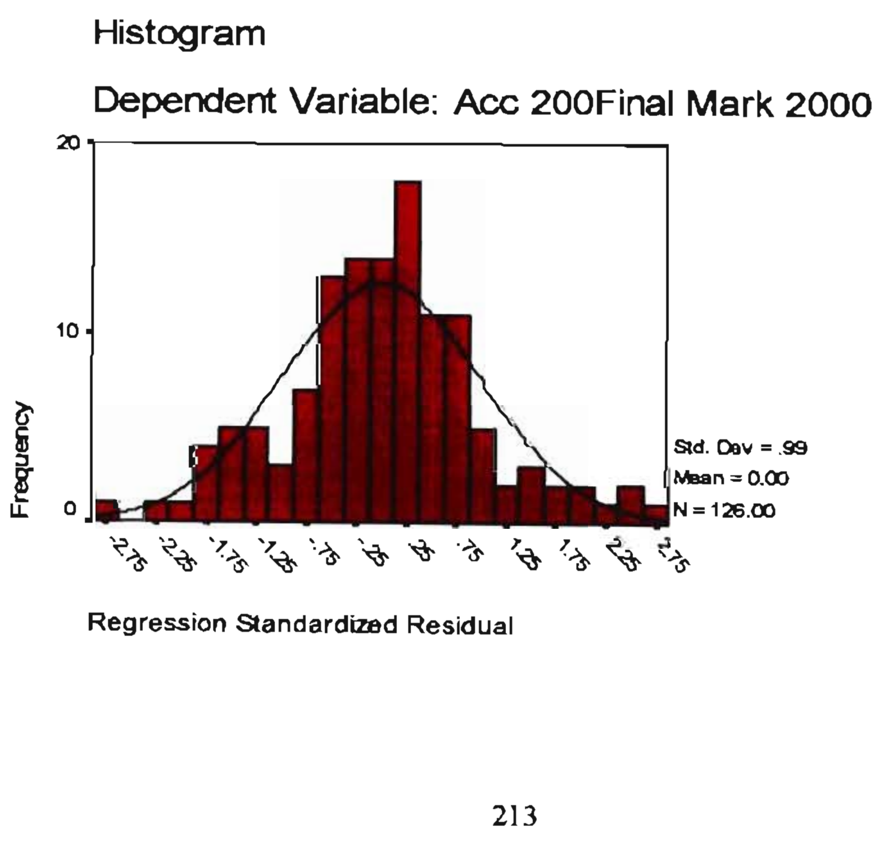

Figure C.5.4 Histogram showing frequency of Regression Standardized Residuals of the 2000 Accounting 200 class, with the Accounting 200 final mark as the dependant variable

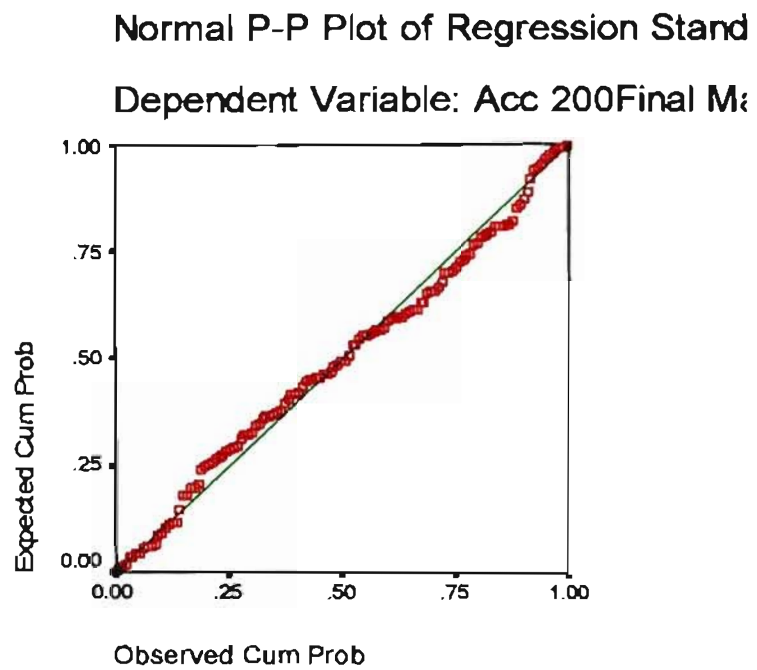

Figure C.5.5 Normal P-Plot of Regression standardized residuals of the 2000 Accounting 200 class, with Accounting 200 final mark as the dependant variable

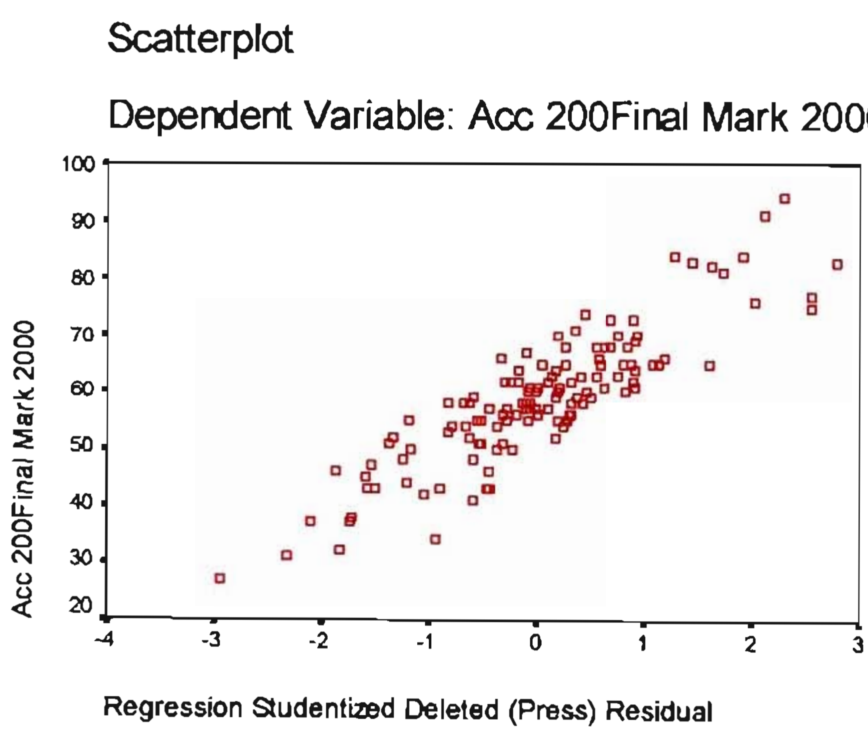

Figure C.5.6 Scatterplot of Regression Standardized residual with Accounting 200 final mark as dependant variable

Accounting 300

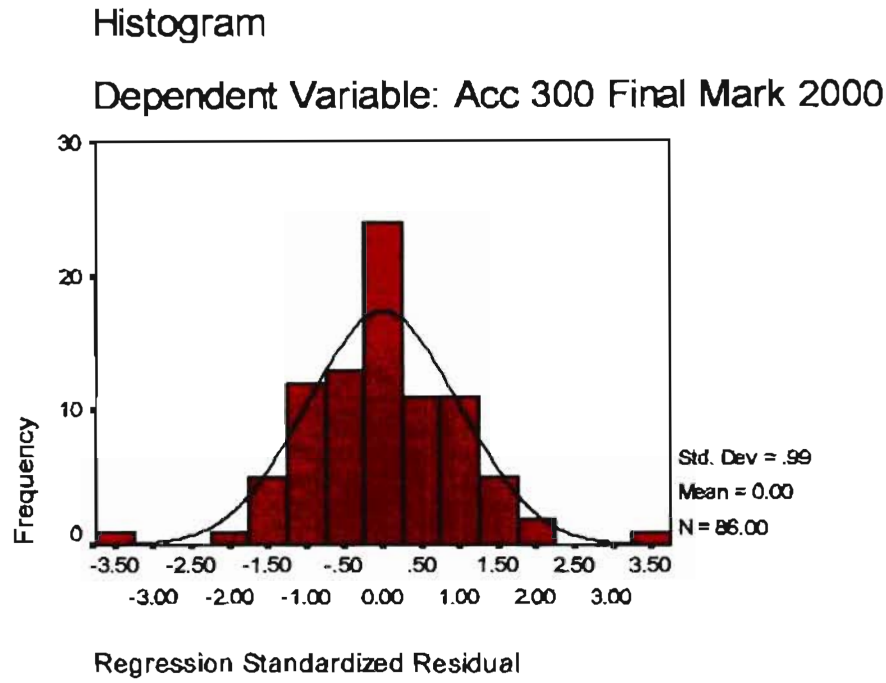

Figure C.5.7 Histogram showing frequency of Regression Standardized Residuals of the 2000 Accounting 300 class, with the Accounting 300 final mark as the dependant variable

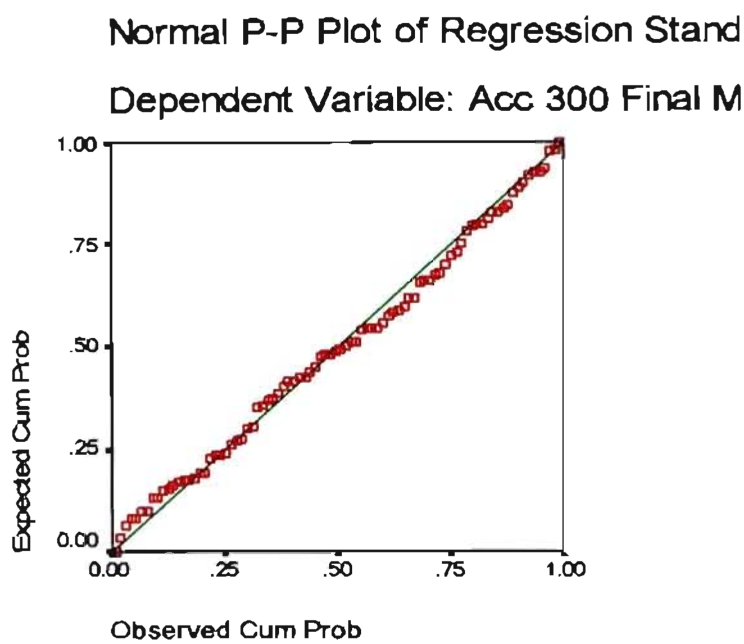

Figure C.5.8 Normal P-Plot of Regression standardized residuals of the 2000 Accounting 300 class, with Accounting 300 final mark as the dependant variable

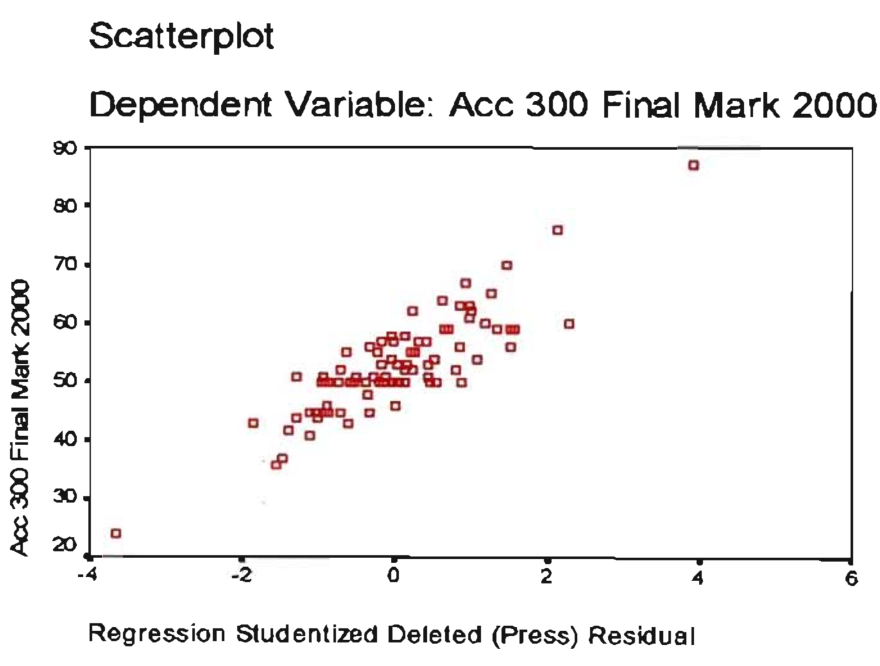

Figure C.5.9 Scatterplot of Regression Standardized residual with Accounting 300 final mark as dependant variable

Accounting 400

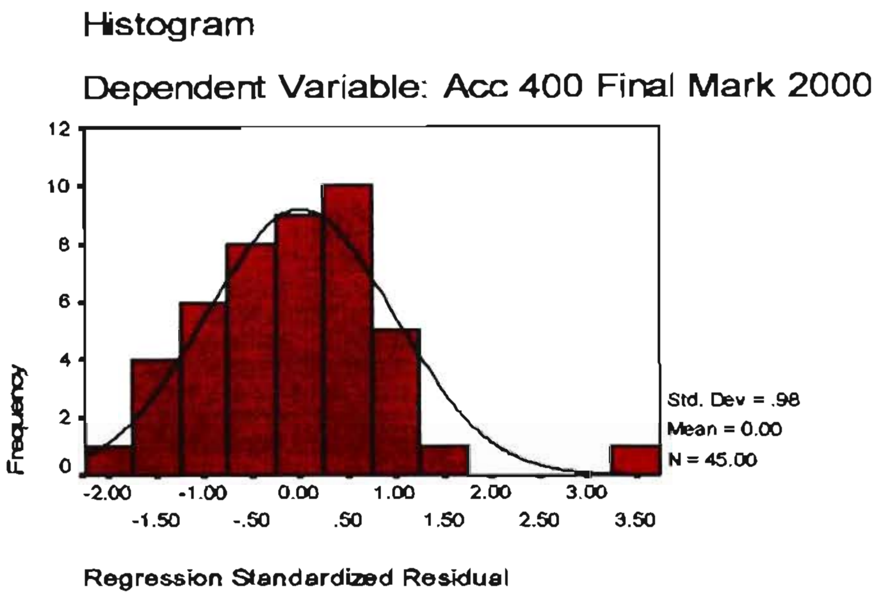

Figure C.5.10 Histogram showing frequency of Regression Standardized Residuals of the 2000 Accounting 400 class, with the Accounting 400 final mark as the dependant variable

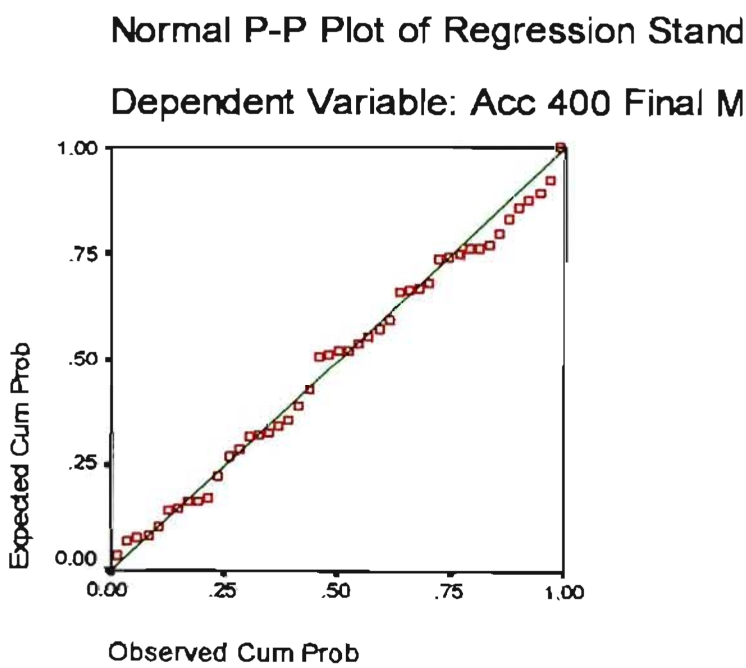

Figure C.5.11 Normal P-Plot of Regression standardized residuals of the 2000 Accounting 400 class, with Accounting 400 final mark as the dependant variable

Scatterplot

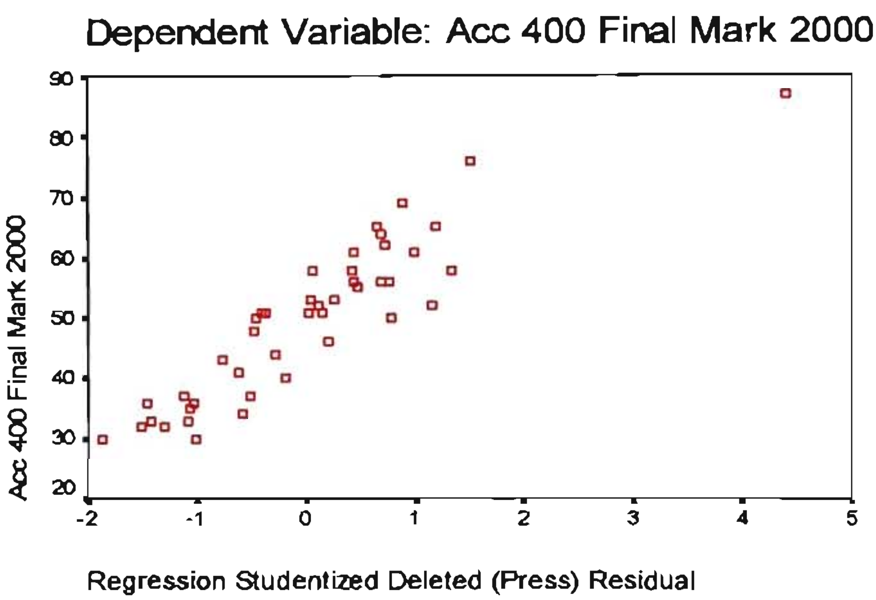

Figure C.5.12 Scatterplot of Regression Standardized residual with Accounting 400 final mark as dependant variable

CHI-SQUARED MEASURES OF ASSOCIATION

Accounting 100

		ACC100FI			Total
		Distinction	Pass	Fail	
MATRICMA	A	9	3	0	12
	B	0	18	2	20
	C	1	34	3	38
	D	1	39	5	45
	E	0	20	15	35
Total		11	114	25	150

Table C6.1 MATRICMA * ACC100FI Crosstabulation

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	109.075(a)	8	.000
Likelihood Ratio	64.517	8	.000
Linear-by-Linear Association	36.827	1	.000
N of Valid Cases	150		

a 7 cells (46.7%) have expected count less than 5. The minimum expected count is .88.

Table C6.2 Chi-Square Tests

Accounting 200

		ACC200HG			Total
		Distinction	Pass	Fail	
MATRICM	A	4	5	0	9
	B	2	14	1	17
	C	1	22	3	26
	D	0	30	5	35
	E	0	12	3	15
Total		7	83	12	102

TableC6.3 MATRICM * ACC200HG Crosstabulation

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	26.365(a)	8	.001
Likelihood Ratio	20.514	8	.009
Linear-by-Linear Association	13.285	1	.000
N of Valid Cases	102		

a 10 cells (66.7%) have expected count less than 5. The minimum expected count is .62.

TableC6.4 Chi-Square Tests

Accounting 300

		ACC300HG		Total
		Pass	Fail	
MATRICM	A	8	1	9
	B	13	0	13
	C	16	2	18
	D	17	9	26
	E	2	5	7
Total		56	17	73

Table C6.5 MATRICM * ACC300HG Crosstabulation

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	17.136(a)	4	.002
Likelihood Ratio	18.484	4	.001
Linear-by-Linear Association	12.036	1	.001
N of Valid Cases	73		

a 4 cells (40.0%) have expected count less than 5. The minimum expected count is 1.63.

Table C6.6 Chi-Square Tests

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