# A contextual investigation into selected factors associated with student performance in Financial Accounting 1 at a South African tertiary institution

by

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*Declaration*

This work has not been previously submitted in whole, or in part, for the award of any other degree. It is my own work. Each significant contribution to, and quotation in, this dissertation from the work, or works, of other people has been attributed, and has been cited and referenced.

SIGNATURE DATE 31 March 2005

Signed by candidate

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## ABSTRACT

In South Africa, applicants to Higher Education come from diverse socio-economic, language and educational backgrounds. Within this context many researchers (e.g. Yeld 2001; Cliff 2003) suggest that school-leaving results may not adequately reflect the entry-level abilities of many students to be successful in Higher Education.

Against this backdrop, the matric aggregate and the matric results in Accounting or Mathematics comprise the main selection criteria for admission to three Accounting National Diploma courses at the Cape Technikon. The main question that this study therefore attempted to answer was whether matric Accounting HG or SG is a good predicator of success in Financial Accounting 1. The following sub-questions were also asked: Is performance in Financial Accounting 1 linked to other academic variables, like matric aggregate and matric Mathematics HG or SG, and to other measurable influences like home language, gender, and age? Using the ex post facto research method, all the aforementioned data was collected from the technikon records. Eight null hypotheses were formulated and tested for approximately 300 students registered for Financial Accounting 1 during each of the years 1998-2002.

Based on the results of the ANOVA analyses, Mann-Whitney tests (Maths SG), t-tests (gender) and Pearson product-moment correlation (age), it was concluded that for all five years there is a statistically significant relationship between the Financial Accounting 1 marks of students and the variables Matric Accounting HG scores, Matric Accounting SG scores, Matric aggregate scores and Home language, although the latter result is possibly borderline significant and might need further investigation. The higher the students' above-mentioned matric scores, the higher the subsequent Financial Accounting 1 marks are likely to be.

The regression analysis results for each year showed that the Matric Accounting/Maths *grade*, the Matric Accounting/Maths *symbol* and the Matric *aggregate* (except in 2002) are consistently significant in predicting a student's Financial Accounting 1 mark. This

study therefore implies that Matric Accounting and Matric aggregate are good predictors of success in Financial Accounting 1, particularly for the top students, irrespective of their educational background, and should continue to be taken into account in selection planning for the accounting courses. However, due to - for example - poor schooling, many students have been historically under-prepared to meet the demands of Higher Education and their matric results cannot be related reliably to their subsequent performance at this level. For these students, the use of auxiliary tests of potential (e.g. the Alternative Admissions Research Project tests used at the University of Cape Town) may be important instruments in the future to supplement their matric results in determining whether they should be admitted into Higher Education or not.

Furthermore, the regression analysis showed that the above-mentioned significant independent variables account for less than 50% of the variance in the Financial Accounting 1 results, emphasizing the influence of other unknown variables on Financial Accounting 1 performance. This might be even more relevant for students from disadvantaged educational backgrounds whose matric results may not have been a reflection of their initial potential, and whose subsequent success in Higher Education could be influenced by many factors in addition to their matric results. The significance of these additional factors would need to be confirmed by further investigation.

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## LIST OF ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| AARP | Alternative Admissions Research Project |
| ANOVA | Analysis of Variance |
| CADP | Commerce Academic Development Programme |
| Cnf | confidence |
| GPA | Grade Point Average (American equivalent of South African Matriculation average percentage) |
| HG | Higher Grade |
| IQ | Intelligence Quotient |
| Matric | Matriculation |
| n, N | sample size |
| PTEEP | Placement Test in English for Academic Purposes |
| p | probability |
| r | correlation coefficient |
| SAT | previously Scholastic Aptitude Test, now used to refer to a set of standardised college entrance examinations in the USA |
| sd | standard deviation |
| SG | Standard Grade |
| ss | sum of squares |
| UK | United Kingdom |
| USA | United States of America |
| VAT | Value Added Tax |
| Wits | University of the Witwatersrand |
| ZPD | Zone of Proximal Development |

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# CHAPTER 1

# INTRODUCTION

This chapter describes the research problem, the purpose of the research, the background to the research and the importance of the research. It also introduces the research questions, a clarification of terms, aims of the study, hypotheses to be tested and the research approach, as well as the list of dependent and independent variables. Furthermore, it describes the assumptions of the study, the delineation of the research and organization of the rest of the dissertation.

## 1.1 Background to the problem

In the Faculty of Business Informatics at the Cape Technikon[1], a polytechnic-type tertiary education institution in South Africa, the process through which students are selected for admission into the National Diploma courses in Cost and Management Accounting, Internal Auditing and Financial Information Systems places heavy emphasis on school-leaving examination performance, especially in Accounting and Mathematics. Within the diverse context of the South African schooling system - with its collection of provincial examining authorities and its inconsistent standards and end-results - this selection process poses serious challenges in terms of measuring student potential (as will be detailed in chapter 2 of this thesis) and, consequently, in terms of selection and admission criteria. Only a small minority of borderline students are required to write an admissions/aptitude test or to undergo psychometric testing as an admissions measure, in addition to their matriculation results.

Financial Accounting 1 is a compulsory subject for all students enrolled for the National Diploma courses in Cost and Management Accounting, Internal Auditing and Financial Information Systems described above.

[1] At the beginning of 2005, the Cape Technikon merged with the Peninsula Technikon and the new institution is called the Cape Peninsula University of Technology.

The general admission requirements of the institution include:

- A Senior Certificate[2] (with five subjects) or an equivalent qualification, with a D[3]+ aggregate.
- Higher grade[4] passes in two of the eleven official languages, of which one must be either English or Afrikaans, with at least one of the languages being a first language.

A specific admission requirement for each of the three courses mentioned above is that students must have passed Accounting in the school-leaving examination (hereafter referred to as "matriculation", "matric" or the "matric exam"). In it, they must have obtained a score of at least 40% (an E+ symbol) on the higher grade (HG) or a score of at least 60% (a C+ symbol) on the standard grade (SG). In the absence of a mark for Matric Accounting, the mark attained in Matric Mathematics has been accepted as a substitute.

Various research investigations have been conducted internationally on predicting Accounting marks at Higher Education institutions. In the USA, Baldwin and Howe (1982) and Bergin (1983) compared the performance in Introductory Financial Accounting of students who had studied Accounting at high school and those who had not. They found that prior study of high school Accounting enhanced student performance on early examinations only, and Bergin (1983:26) suggested that students who had studied Accounting at high school became under-achievers later in the course, possibly because they had not increased their study effort when the Accounting material became unfamiliar or more difficult.



[2] The Senior Certificate (also referred to as Matriculation Certificate) is the national school-leaving certificate.
[3] The symbol refers to the percentage attained in the Senior Certificate, with A indicating 80-100%, B 70-79%, C 60-69%, D 50-59%, E 40-49%, F 33.3-40%, FF 30-33%, G 20-29%, and H 0-19%.
[4] Higher grade, as opposed to standard grade, involves a wider scope of subject matter and requires higher order thinking skills with a display of insight into the subject matter by learners being imperative for success.

In a study of 227 Financial Accounting 1 students at Rhodes University in South Africa, Rowlands (1988) also found that students with prior exposure to Accounting only enjoyed an advantage in the initial stages of the course. This advantage declined over the year to the extent that their year-end examination scores were not significantly different from those of students who had no prior exposure to Accounting.

More recently, Van Rensburg, Penn and Haiden (1998) reported similar results in research conducted on 1217 first-year Accounting students at the University of Natal in South Africa. Their findings revealed that matric Accounting improved the final Accounting 1 mark of a student by more than can be attributed to chance. However, they found that prior Accounting exposure explained less than 5% of the variation in the Accounting 1 marks, and that the matric aggregate symbol was a relatively stronger predictor of success in Accounting 1. They also found that students who had no prior exposure to Accounting performed better in the second-year Accounting exams than those who had prior exposure. They consequently asserted that the major contributors to university success were those factors omitted from the analysis, for example, how well the students actually studied during their university year (Van Rensburg, Penn & Haiden, 1998:93).



## 1.2 Purpose of the study and statement of the problem

As was pointed out in the previous section, the matric exam results are presently the main or sole criteria used as means of selection to the above-mentioned courses at the Cape Technikon. Consequently this research is aimed at establishing whether these results are reliable and sufficient selection criteria, or whether there is a need to introduce additional means of assessing student potential for success in Accounting courses in the Faculty of Business Informatics at this institution.

It has become evident to the researcher that some students admitted to the technikon, who have passed Accounting in matric, subsequently do not perform as well as expected in Financial Accounting 1. This raises the question of whether performance in

matric Accounting is in fact a good predictor of subsequent success in Financial Accounting 1. Accounting requires good numeric and comprehension skills, so it is reasonable to expect that a good mathematics background and proficiency in the languages of instruction should be an advantage to Financial Accounting 1 students. Since resources for tertiary education are scarce, and since there is an ever-increasing demand for Accounting places at tertiary institutions, it is important that a better understanding is gained of the factors that are associated with student performance in Accounting, in an attempt to select and admit students who have the ability to succeed in this field.

Before being admitted to a tertiary institution, an applicant is assessed in a variety of ways (for example, on the basis of matriculation results, an admissions test or an interview) in an attempt to establish the applicant's potential ability to succeed at a chosen course of study. Although many factors could, and will, influence the actual and subsequent performance of the applicant (Halberg, Halberg & Sauer, 2001), it is reasonable for the institution to award places to those applicants whose previous assessment results reflect that they possess the potential ability to succeed.

Some valid concerns have been raised around the issue of using matriculation results alone as an assessment tool for measuring student potential, and as a basis for deciding whether an applicant will be selected for Higher Education or not (Mehl & Gerwel, 1992; Ronda, 1999; and Yeld, 2001). Since the matric exam is an achievement/performance test, its primary purpose is to test the understandings of students in terms of the knowledge and skills taught at high school (Yeld, 2001:56). Because of the huge disparities that still exist in the South African education system, some students have been afforded completely inadequate opportunities to learn. In this context, achievement tests like the matric exam do not necessarily provide accurate information about the potential ability of many applicants to succeed at a tertiary level.

If the results of this investigation reveal that performance in the selected matric examinations are not significantly related statistically to student performance in Financial

Accounting 1, the Faculty of Business Informatics would have to identify other methods of assessing student potential for selection purposes, to enable them to supplement the information provided by the matric exam. One option could be to investigate the possibility of using non curriculum-aligned tests of fundamental skills and abilities, in conjunction with the matric results. Another option could be to assess the personality of an applicant, since the personal disposition of an applicant will greatly affect his/her chances of success in a new and challenging environment (Yeld, 2001:44).

### 1.3 Clarification of concepts

The concept "academic aptitude" is central to this investigation. The Educational Resources Information Centre (ERIC) Thesaurus (online ref) defines the term "academic aptitude" as an individual's potential ability to perform in scholastic or educational activities. This can be contrasted with "academic ability", which refers to actual academic competence, and with "academic achievement", which refers to measured academic achievement. Hallberg, Hallberg and Sauer (2001:1) define the term "academic aptitude" as a set of foundational characteristics, both innate and learned, which allow students to complete tasks, learn certain skills, and discern values. These will be expanded on in chapter 2.

### 1.4 The research questions and their importance

Given what has been presented before, the main research question is as follows:

Is a student's prior Accounting knowledge (as indicated by a pass in matric Accounting HG or SG) a good predicator of subsequent success in Financial Accounting 1 at the Cape Technikon?

Sub questions:

Is performance in Financial Accounting 1 linked to other academic variables, like academic aptitude (as indicated by matric aggregate) and mathematics background (as indicated by a pass in matric Mathematics), as well as to certain measurable influences like home language (indicating proficiency in English/Afrikaans, the language of instruction for Financial Accounting 1), gender and age?

The main reason for asking these questions is to investigate whether it is sufficient for the institution to use the school-leaving examination results as the sole means of selection to a course, or whether additional means of assessing student potential need to be introduced. Other important reasons are to possibly reduce the future dropout rate of students in Accounting/Accounting courses by recommending early interventions like counselling (based on the evidence supplied by this study); and to improve cost effectiveness in the faculty by being able to better identify those students who have a good chance of being successful.



### 1.5 The aims of the research

The research aims to establish whether the selected demographic/biographic categorical and matric variables are significant predictors of success in Financial Accounting 1, and whether the matric variables should therefore continue to be considered as important selection criteria for the National Diploma courses in Cost and Management Accounting, Internal Auditing and Financial Information Systems at the Cape Technikon.

### 1.6 Hypotheses

In chapter 3, eight null hypotheses are formulated in detail and presented in order to

- Firstly, test the statistical significances of the relationships between student performance in Financial Accounting 1 and various academic variables, such as their prior performances in Matric Accounting HG or SG, Matric aggregate and Matric Mathematics HG or SG; and

- Secondly, test the statistical significance of the relationships between student performances in Financial Accounting 1 and various demographic/biographic variables, like their home languages, gender and ages.

## 1.7 Limitations of the study

Much has been written on the factors that are associated with student success in Higher Education. For example, Hallberg, Hallberg and Sauer (2001:1-5) identified eight social factors which they found to be key elements of academic aptitude essential to academic success:

- Personal responsibility and control - taking personal responsibility for one's success must be coupled with taking the necessary control to accomplish it.

- Internal and external competition - to provide motivation to excel beyond one's peers.

- Individual task precision/meticulousness – high achievers possess persistence and conscientiousness with regard to completing tasks. According to Tinto (1975, cited in Hallberg *et al.*, 2001:3) other things being equal, task commitment can be directly related to persistence in college.

- Personal expectations – successful students have their own expectations and goals with regard to assignments, fields of study, and future careers.

- Wellness – it has been found that personal and institutional stress, anxiety and depression are factors that hamper one's academic success.

- Personal time management – using one's time efficiently is an important ingredient in how successful one will be in Higher Education.

- Family involvement – the encouragement and participation of one's family is an important factor for a student's success in Higher Education.

- College involvement – there is a strong correlation between an individual's college involvement (like living on campus, part-time campus jobs, friendship-support, extra-curricular activities, college faculty interaction) and success. Tinto (2002) also reiterated the importance of college involvement, with the emphasis he places on the impact of learning communities on student success. In learning communities, students are gathered into groups (a set of peers) that move through a series of courses together. This enables them to develop a network of supportive peers, which helps them in their transition to Higher Education. By learning in collaborative groups, students learn from each other and assume responsibility for the learning of others, which enhances their chances of success.

The current research will, however, collect direct data on none of the above eight *social* factors as possible influences on student performance in Higher Education; it will be limited to prior academic (*cognitive*) performance and *categorical* variables only, as possible predictors of success. Consequently, the main study includes only the academic and demographic/biographic variables outlined in 1.6 above. The significant influence of other qualitative factors on the performance of a first-year student are also summed up by Pym (2002:4) who emphasizes: "It would seem that the complexities of each individual student's own particular history and background, as well as their personal adaptation, life skills and financial stability in the first year, are crucial factors that also impact on success rate". In phase 2 of this present investigation, however, direct data obtained during the explanatory interviews with Higher Education Accounting experts may be consistent with the influential contextual or social factors identified by Hallberg, Hallberg and Sauer (2001).

The second limitation of the current investigation is that it will be confined to student performance at only one South African tertiary institution, namely the Cape Technikon.

Finally, this study will focus on student performance in only one subject, namely Financial Accounting 1, taken by all students enrolled in three courses offered by the Faculty of Business Informatics. To be even more useful, at a later date the study could be extended to investigate the relationship between the same matric exam variables and student performance in Financial Accounting 2 and Financial Accounting 3.

## 1.8 Assumptions underlying the study

The data on which this study is based have been extracted from the operational database of the Cape Technikon. Firstly the study assumes that the data pertaining to the matric results and biographical information of students have been accurately captured from their application documentation onto the technikon database. Secondly it assumes that the data pertaining to the performance in Financial Accounting 1 is reliable and has been captured accurately, initially by lecturers, and then by the examinations department onto the technikon database. Thirdly it assumes that no errors occurred in the extraction and tidying up processes, and the data on which the analysis is based are therefore dependable. There has been rigorous checking of scores and details by the researcher in order to ensure that the data obtained for the final samples are accurate.



## 1.9 Research approach

The main research approach adopted in this study is the ex post facto research method. Furthermore, the study employs mainly a quantitative methodological approach to perform various statistical analyses of the data. The data has been classified into one dependent variable and several independent variables. The dependent (or response)

variable is the end-of-year Financial Accounting 1 score for each student. The independent (or predictor) variables are the following for each student:

- Matric aggregate score (grouped into A&B, C, D and E-H);
- Score for matric Accounting HG or SG (grouped into A&B, C, D and E-H);
- Score for matric Mathematics HG or SG (grouped into A&B, C, D and E-H);
- Home language (grouped into English, Afrikaans and Other);
- Gender;
- Age (in years).

In the discussion of the research findings in Chapter 5, the reasons for selecting these independent variables are explained. The statistical analysis of the above-mentioned data includes:

- Descriptive statistics to gain an overall picture of the results attained by the students in the samples for each of the years of the study.
- Correlation analyses to measure the closeness of the relationships of the independent variables to performance in the dependent variable.
- Stepwise regression analysis to weight the independent variables in predicting subsequent performance in Financial Accounting 1.

These analyses will be further discussed in Chapter 3.

### 1.10 The importance of the study

According to Asmal (2002) 85% of students who start tertiary education never finish. In order to ensure the effective and efficient utilization of the scarce resources at the disposal of the technikon (and other Higher Education institutions), and to ensure that students who are enrolled into the institution have a reasonable chance of being successful, it is imperative that the selection criteria used by the institution are reliable.

This research is a step in that direction. If it reveals that the matric results in Accounting, mathematics and the aggregate are not linked to success in Financial Accounting 1, it means that they cannot continue to be used as the predominant or often sole selection criteria. It might then become important for the technikon to examine and consider the value of additional measures for assessing student potential for success in Higher Education and use supplementary criteria in the selection process - for example the Placement Test in English for Educational Purposes (PTEEP) developed by the Alternative Admissions Research Project at the University of Cape Town, which is discussed in chapter 2.

### 1.11 Chapter summary

In this introductory chapter, the background to the problem, the purpose of the study, and the rationale for the research has been discussed, and the research questions clarified. The aims and importance of the research, the hypotheses, the limitations of the study, and the assumptions underlying the study have been presented. In addition, the study has been located within the body of previously published work on admissions testing and the prediction of Accounting scores, the concepts have been clarified and the research approach has been introduced.

In the next chapter, the relevant literature will be reviewed.

### 1.12 Organisation of the remainder of the thesis

The following five chapters are arranged as follows:

Chapter 2 presents the relevant literature review; Chapter 3 gives a detailed explanation of the research design and methods; Chapter 4 covers the hypothesis testing and presentation of the results of the study; Chapter 5 deals with the discussion of the results, and Chapter 6 presents the conclusions, limitations of the research and implications of the findings, and makes recommendations based on these findings.

# CHAPTER 2

## LITERATURE REVIEW

The first section of this chapter examines current issues in the selection of promising students for Higher Education study. In particular, the issue of "potential" for study is explored, along with a discussion of research into the study of this concept. The chapter then explains the notion of "success" in Higher Education study and different ways of assessing it. The concluding sections of this chapter examine the parts played by different academic achievement and demographic variables as predictors of potential for, and success in, academic study. Because the research in this thesis explores relationships between potential and success in the study of Financial Accounting at tertiary level, a review of the importance of prior academic experience in Accounting and Mathematics is a specific focus of this section. In addition, the role played by demographic factors such as gender and age also forms part of this section of the chapter.

The layout of the review is as follows:

Section 2.1 explores the issues that are raised by the process of selecting students for admission to Higher Education.

Section 2.2 reflects on the problems that are encountered in trying to assess student potential for success in Higher Education.

Section 2.3 reviews and discusses the various factors that researchers have found to contribute to students being successful or not in Higher Education

Section 2.4 examines the arguments put forward for using learning potential tests to predict academic performance, and for other educational purposes, rather than traditional psychometric tests.

Section 2.5 reviews whether prior Accounting knowledge is a good predictor of success in Accounting studies.

Section 2.6 examines whether prior studies have found that past academic performance is a reliable predictor of academic success for most students.

Section 2.7 reviews research findings on Mathematics background as a predictor of academic success at a tertiary level.

Section 2.8 summarises recent research studies with regard to English proficiency as a predictor of academic success in Accounting and other courses of study.

Section 2.9 reviews the relationship between gender and academic performance in Accounting at a tertiary level.

Section 2.10 examines the relationship between age and performance in Accounting at a tertiary level.

## 2.1 The issue of selection for Higher Education

In South Africa, as in most other countries, the number of applicants requiring places at institutions of Higher Education usually exceeds by far the number of places available at these institutions (Mitchell, Fridjhon & Haupt, 1997:382). Consequently, Higher Education institutions have to make choices and *select* from this huge number of applicants those they believe have the potential and ability to meet the requirements of Higher Education.

Even in institutions that admit all applicants who meet a minimum requirement (for example, have obtained a matric exemption), selection is necessary for individual courses that are highly sought after. In South Africa, the Higher Education Act 101 of 1997 compels Higher Education institutions to disclose their admissions policies,

including the selection criteria on which these policies are based (Yeld, 2001:31). In order to demonstrate the necessity for institutions to have some form of selection, the alternatives to selection suggested by Klitgaard (1985, cited in Yeld, 2001:31-37) could be considered:

- Raising tuition prices.
  The institution could set its fees at a level that only the target number of students could meet. Since this option would tend, among other things, to perpetuate privilege, reduce student diversity and undermine the need to redress the imbalances of the past, it could not be considered a feasible alternative to selection.

- Changing (increasing) the size of the Higher Education system.
  The institution could enlarge in order to accommodate an increase in applications, rather than having to choose which students to admit from a large pool of applications. Since the institution will reach a point at which it not possible to accommodate all the applicants, selection will become necessary.

- Random selection.
  The institution could admit applicants by chance (e.g. on the basis of a lottery) where their possibility of being admitted does not relate to their performance or opportunities prior to application. This option could result in the institution investing resources in students who have little chance of success, and rejecting those who have the potential to succeed.

- Fail-first or tryout approach.
  Students could be admitted randomly, or by other means, and their performance assessed at a later point (perhaps at the end of the first year), on the basis of which they are finally either accepted or rejected. This approach simply postpones the selection process and could be a costly and demoralising experience for those who are subsequently rejected.

- Selection by administrative default (Segall, 1994, cited in Yeld, 2001:31). Institutions sometimes fail to respond to applicants who then simply arrive for registration and are enrolled, either upon payment of registration fees or on a first-come-first-served basis. This could result in the institution admitting students who have little chance of success, as well as in 'de-selecting' promising students who abandon their application procedure when they do not hear from the institution.

Most administrators and applicants might agree that the above-mentioned alternatives are unsuitable. Some kind of selection by the institution is therefore unavoidable in Higher Education when the number of applicants exceeds the number of places available and/or where a certain pre-requisite level of knowledge/skills is needed. However, finding appropriate criteria for selection is, however, difficult and complex and should be the product of economic, ethical, policy and administrative decisions.

Historically, the most important - and often the only - criteria used in the selection process in South Africa are the results of the matriculation (or equivalent school-leaving) examination. Many South African researchers like Behr (1995), Jackson & Young (1987), and Ronda (1999) support the matric exam as the most important single predictor of success at tertiary level. Others like Mehl and Gerwel (1992), Mitchell, Fridjhon and Haupt (1997) and Yeld (2001) agree that in South Africa the matric result is a useful predictor of academic success at university for some students. However, it should not be used as the only selection criterion. As Yeld (2001:1), Cliff (2003) and others point out, in South Africa the school leaving results are not necessarily reliable predictors of academic success in Higher Education for the majority of educationally disadvantaged applicants.

These latter students come from a school environment that has been characterised by under-resourcing, mismanagement, inappropriate or inadequate approaches to teaching and learning, or socio-economic deficiencies that have not adequately prepared them for

participation in Higher Education (Cliff *et al.*, 2003:2). Actually, poor schooling may be masking the educational potential of at least some of these students. It is therefore apparent that, if Higher Education institutions rely solely on the school-leaving results, one consequence may be that only small numbers of educationally disadvantaged applicants being selected for admission to Higher Education. Since one of the aims of the Higher Education Act 101 of 1997 is to "redress past discrimination and ensure representivity and equal access" (Yeld 2001:40), it has become imperative to develop and use additional criteria on which more accurate selection can be based.

Mitchell *et al.* (1997) and Yeld (2001) suggest that either the Higher Education system or individual institutions should establish a well-designed admissions testing system to supplement the information obtained from the matric results. Such a testing system is already in place in a number of institutions in South Africa (Yeld, 2001:5). The Placement Tests in English for Educational Purposes (PTEEP) developed by the Alternative Admissions Research Project (AARP) at the University of Cape Town, is an example of a selection device that can be used together with the information supplied by the matric exam, to obtain "complementary insights into the abilities of applicants" (Yeld, 2001:11).

These PTEEP tests are based on the idea of "cognitive academic language proficiency" (Cummins, 2000, cited in Yeld, 2001:8). The focus on English has resulted from the fact that it is the language of instruction in most schools and Higher Education institutions, even though less than 10% of the South African population speaks English as a first language (Yeld, 2001:7). The University of Cape Town and other institutions use these tests to provide access opportunities for students whose matric results would not necessarily have shown their ability to succeed in Higher Education (Yeld, 2001:2). The PTEEP has also been translated into Afrikaans for use by an institution whose language of instruction is Afrikaans. In addition to this Language Test, there are also AARP tests for Mathematical and Scientific thinking (Cliff *et al.*, 2003).

It is evident that for some students selection into Higher Education cannot be dependent solely on past achievement. Section 2.2 will therefore explore the literature in connection with the issues surrounding attempts to assess student potential for Higher Education.

## 2.2 Matriculation results as a means of assessing student potential for success in Higher Education

Nearly a decade ago Mitchell *et al.* (1997:382) established that the majority of students who were eligible for, and who were given access to, universities in South Africa were those who had obtained 'matriculation exemption' by writing one of the South African matric exams. Today - despite the fact that students come from a wide, often disadvantaged, and non-uniform school background - the most important, and often the only, criterion used in the selection process are the matric marks attained by each student. Consequently, the question that arises is whether the marks attained by students in the matric exam enable tertiary institutions to assess the potential of those students likely to be successful in Higher Education.

In a pilot study Fresen and Fresen (1987:494) investigated the extent to which matric symbols correlated with first-year results in Business Statistics at the University of the Western Cape in South Africa. At some universities students are rated according to the symbols achieved in the various subjects in the matric exam. A – E symbols are, for example, awarded scores of 8, 7, 6, 5, 4, and 3 respectively for HG subjects, or 6, 5, 4, 3, 2 and 1 respectively for SG subjects. These scores are then used slightly differently by different faculties and by the various universities. The researchers doubled the scores of the two best subjects, before the ratings of the six matric subjects were added together. In examining whether they could predict the pass rate in Business Statistics 1 B from the matric symbols obtained by students, they found that matric symbols and the first-year tertiary pass rates were strongly correlated.

Upon initial examination, it would appear that Mitchell *et al.* (1997:384) corroborated this finding in a study conducted at the University of the Witwatersrand (Wits). They analysed the first-year university performance of students in the Faculties of Arts, Commerce, Science, Engineering and Medicine in relation to the matric marks of students from eight different education authorities/departments. Their study revealed a strong relationship between the average matric mark of students and the first year pass rate. They found that - irrespective of which education department's matric exam had been written - if the average mark of a student is high, then the student's chance of passing first year at university is also high. For example, for the group of students admitted with a matric mark of 65% or more, 88.6% subsequently passed the first year. This is compared to a pass rate of 40.6% for students who had been admitted with average matric marks of 45 – 49%.

The above study, however, suggested that - while the matriculation mark achieved by a student is a reasonably good predictor of pass/fail at university - the accuracy of the prediction fluctuated according to the type of matric exam written, the high school attended, and the faculty in which the student registers. Mitchell *et al.* (1997:386) therefore concluded that matric mark was a poor predictor of university mark at any level and that, judging by final-year marks, the top matriculants were rarely the best graduates. They further concluded that the matric exam was more a school-leaving exam than it was a university entrance exam.

Since there are so many factors that influence success at university, over-emphasis on matric performance seems unjustifiable and there appears to be a need for the establishment of another kind of university entrance examination.

If the aim is to admit *only* those students who - on the basis of their school-leaving examination results - are expected to pass, it seems that institutions of Higher Education should accept students with as high a matric average mark as possible. However, if this approach were to be followed, institutions would not have sufficient students to fill their first-year classes. They would also exclude many students from previously

disadvantaged schools, and even talented students who may not have had school opportunities to demonstrate that talent. One suggestion is that institutions should be admitting more D and E aggregate students, and should also be trying to establish what factors determine which of these students will pass or fail. As Mitchell *et al.* (1997:385) point out, the mark a student achieves in the matric exam is far more than a measure of the individual student's intellect, also reflecting ameliorating influences such as the following:

- The positive or negative socio-economic and family circumstances of the student.
- The strong or weak academic environment in which the student is taught.
- The amount and quality of encouragement the student received.
- The value the student's family places on academic achievement.
- The student's own commitment to, and interest in, achieving good marks.

Whilst selection procedures for Higher Education are currently heavily dependent on matric results as the most cogent means of assessing the potential ability of a group of applicants for success at tertiary level, evidence is being offered to show that other factors can impact significantly on the ultimate success of individual Higher Education students (See, for example, MacKinnon, 1962, cited in Behr, 1985; Nisbet & Welsh, 1976, cited in Behr, 1985; Jackson & Young, 1987; Tinto, 2002; Cliff, 2002; and Biggs, 1985).

As has been discussed in this section, good matric results do not necessarily guarantee good results in Higher Education. The following section will therefore examine the literature regarding other factors that could play a role in whether students are successful at a tertiary level or not.

## 2.3 Factors that contribute to students being successful in Higher Education

Much research has been done, and will continue to be conducted, around the issue of which factors impact on the ultimate success of students in Higher Education (See, for example, section 2.2). As Cliff (2002:1) has pointed out, in the USA entire journals, such as *The Journal of College Student Attrition*, are assigned to the task of trying to establish what influences cause some students to be successful, whilst others are not. Other journals, like *The Freshman Year Experience*, have been publishing articles for years in connection with the personal, education background, and Higher Education context factors associated with success in first year studies.

Jackson & Young (1987:135) asserted that some students might have the academic aptitude or potential ability to succeed in Higher Education, but they might have lacked the facilities they needed to be effective students, like:

- The ability to adapt.
- Motivation.
- The capacity for independent learning.
- The acquisition and practice of learning skills such as communication, analysis and synthesis.

Many researchers over the years have supported this view of Jackson and Young. For example, MacKinnon (1962, cited in Behr, 1985:111) suggested that "if a person has the minimum of intelligence required for mastery of a field of knowledge, whether he performs creatively of banally in that field will be crucially determined by non-intellective factors". From interviews conducted with students in their investigation to predict failure at university in Britain, Nisbet and Welsh (1976, cited in Behr, 1985:111), found that the most likely causes of failure at tertiary level were not so much lack of academic aptitude, as the following:

- Subject difficulty.

- Lack of application.
- Disorganised study habits.
- Domestic and/or personal difficulties.
- Lack of motivation.
- Transition problems arising from school or work to university.

Similarly, Tinto (2002:1) stated that the cause of not being successful and dropping out of Higher Education lay not only with the students, but also with the actual nature of the environment in which Higher Education institutions required their students to learn. He asserted that students who were supported in their learning, who were given regular feedback on their learning, and who were actively involved in learning, especially with their peers, would be more likely to learn, and therefore more likely to be successful and to persist in Higher Education (Tinto, 2002:2 & 6). Institutions utilise various practices to accomplish this, like co-operative learning, collaborative learning, problem-based learning, classroom assessment and the one Tinto (2002) advocates, namely, learning communities.

As pointed out in chapter 1, students in learning communities are gathered into clusters (groups of peers) that move through a series of courses together. Through this they are able to develop a network of supportive peers, which helps them in their transition to Higher Education. A study was conducted by Tinto (2002), under the auspices of the National Center for Teaching, Learning and Assessment, to investigate the effect of learning community programmes on the academic and social performance and persistence of new students at three different institutions in the USA. It was found that learning community students became more actively involved in classroom learning, and spent more time learning together, also out of class. This helped students to bridge the gap between academic classes and student social life. Participating in the learning community also seemed to enhance the quality of student learning. By learning in collaborative groups, students learned from each other and assumed responsibility for the learning of others. Since students learned more, and became more academically

and socially engaged in the learning communities, they also persisted at a much higher rate.

According to Cliff (2002:1), research ranging from student entry-levels, persistence through or attrition from Higher Education, to eventual graduation, revealed that success in Higher Education was the result of a complex interaction between personological factors (Biggs, 1985), education context factors and socio-cultural factors. According to the 3-P Model of Biggs, Presage (prediction), Personological and Perception variables interacted with the Higher Education context to impact qualitatively on student learning outcomes. Bigg's Model concentrated on the interplay between students' motives for study, their study strategies as a result of these study motives and the qualitative learning outcomes they attained. According to Biggs, therefore, whether students' were successful was related to the extent to which their study motives and their study strategies were congruent - firstly with each other and, secondly, with the learning outcomes they were expected to achieve based on the assessment demands of the institution. Similarly, Vermunt and Verloop (1999) associated student persistence through Higher Education and their eventual success with the extent to which the students were able to perceive the high demands made on them in the Higher Education context, and adjust their study approaches accordingly to meet these demands. Cliff (2002:2) also added that research into student learning during the past thirty years had clearly demonstrated that student motivations for learning, approaches to learning, conceptions of learning and perceptions of the learning environment all impact qualitatively on learning outcome.

## 2.4 Assessing learning potential

At the Cape Technikon, psychometric tests are sometimes used to assess the potential of students in the process of selection. This section therefore examines the literature in connection with the matter of assessing learning potential.

In recent years, the relevance of using intelligence tests in education has been questioned, and learning potential tests have been considered as an alternative (Ruijssenaars, Castelijns & Hamers, 1993:69). As Boeyens (1989a: 1) pointed out, the moral issues surrounding the selection of the most suitable and deserving candidates for limited education and career opportunities required that the appropriateness of traditional psychometric testing be re-evaluated, to ensure that previous inequality in education is not simply perpetuated. Psychometric tests are problematic in the sense that they do not identify students in disadvantaged groups who have the potential to succeed, since they often measure previously acquired knowledge and skills (Boeyens, 1989a; Guthke, 1993; Hamers & Resing, 1993). In the 1980s there was much research to indicate that the psychometric test results of disadvantaged students cannot really be compared with those of advantaged students (Gardner, 1928; Feuerstein, 1980; Taylor, 1987b; and Shochet, 1986, cited in Boeyens, 1989a: 5). Nor can any forms of assessing "potential", for that matter.

Most students in developed western societies have been exposed to an educational process intended to optimise their academic performance. This is not the case in South Africa, where there has been grossly uneven provision of educational opportunities for different groupings of students. Under these conditions, previous academic performance of a student will not necessarily be a useful predictor of future academic performance. To overcome this problem, learning potential tests have been used in vocational and educational aptitude assessment (Winkler, 1978; Robertson & Mindel, 1980; Downs, 1985; and Guthke, 1991, cited in Guthke, 1993). Consequently tertiary institutions are also increasingly offering additional enrichment programmes for disadvantaged students, since they believe that these students can benefit from such supplementary inputs.

Thorndike – who was one of the best-known intelligence researchers – defined intelligence as 'the ability to learn' as far back as 1924. However, despite this, practical intelligence assessment has been entirely result-oriented, thereby discriminating against disadvantaged students because they may not adequately reveal latent learning

potential (Guthke, 1993:14). Psychologists Vygotsky and Kern paved the way for operationalising the idea of 'learning ability' in the 1930s. It was revived again during the 1960s and 1970s because of the way in which disadvantaged students performed poorly on conventional intelligence tests.

Boeyens (1989a: 12) refers to learning potential as the ability to learn problem-solving strategies, as opposed to IQ, which reflects the acquired level of problem-solving proficiency. Thus, an individual's IQ score, which is an ability score, provides a general view of problem-solving strategies acquired in the past. Therefore; although it does provide some indication of an individual's ability to learn, it is a very general and incomplete indication. As a result, Boeyens asserts that ability measured with psychometric tests will be relatively "independent of learning potential" (1989a: 12). It appears, therefore, that there is a definite need for a learning potential assessment method that will overcome these problems.

A learning potential test has the psychometric properties of a regular test, but differs from it with regard to how it is administered. The test procedure includes a training phase, which is usually preceded by a pre-test and followed by a post-test (Hamers & Resing, 1993:27), therefore integrating assessment and instruction. Based on Vygotsky's concept of the Zone of Proximal Development (ZPD), the idea is that "cognitive performance with optimal aid should provide the most valid assessment of learning potential" (Hamers & Sijtsma, 1993:365). Since conventional intelligence tests can underestimate the true intellectual potential of disadvantaged students, the training phase in the test offers these students a better chance of getting a fair test result. Consequently Hamers and Resing (1993:27) asserted that learning potential tests are deemed to be better predictors of academic performance and therefore better suited for educational purposes, despite the many theoretical and methodological problems still associated with them (Hamers & Sijtsma, 1993:375). Guthke (1993:63) supported this view, and claimed that learning potential tests will dominate practice during the next decades, and allow the test takers to show not only their current level of competence,

but also their ability to respond to new information and to learn from feedback and prompts during the course of a test.

Since this current research aims to examine whether there is a relationship between the Financial Accounting 1 performance of students and their prior performance in Matric Accounting, Matric Aggregate, and Matric Mathematics, the next three sections will examine the literature in this regard.

## 2.5 Prior Accounting knowledge as a predictor of success in Accounting studies

Intuitively one might expect that students who had studied Accounting at high school would have an advantage and therefore perform better than those who have no high school background in Accounting. However, previous studies in various institutions and countries have produced mixed results that do not conclusively support this assumption.

In a study conducted at the Nanyang Business School at Nanyang Technological University in Singapore, Koh and Koh (1999) investigated the impact of six variables, of which prior Accounting knowledge was one, on the performance of students in a Bachelor of Accountancy degree programme. They found no evidence in their study that prior high-school Accounting knowledge gives students any advantage. Instead, they found that students with prior (high school) Accounting knowledge did not perform as well as those without prior knowledge. Consequently, they do not support the view of some (e.g. Loveday, 1993, cited in Koh & Koh, 1999:25) that students with high school Accounting should receive priority for admission or be exempted from first semester Accounting. One possible explanation could be that prior Accounting knowledge had a significant impact only if what was studied at high school was directly relevant to what was studied at the university (Loveday, 1993, cited in Koh and Koh, 1999:15).

Similarly, Moses (1987) conducted an empirical study at the Naval Postgraduate School in the USA in order to investigate whether prior exposure to Accounting – acquired from prior coursework in Accounting; work experience in an Accounting or financial position;

and independent reading of business publications - and general academic ability are related to performance in Accounting courses. After controlling for general academic ability, he found that performance in the first graduate-level Accounting course was related to work experience and reading frequency, but *not* to prior Accounting coursework. However, he does indicate that the study did not take into account the recency of exposure. Given that the gap between undergraduate Accounting coursework and entry into the graduate programme could have been at least two years, the benefits of prior Accounting coursework could have worn off, while the benefits from working or reading could have been acquired more recently.

At Purdue University in the USA, Eskew and Faley (1988) developed a model to explain student performance in the first college-level Financial Accounting examination. They reported that the pre-college study of Accounting was significantly related to the examination performance in the introductory Accounting course. Furthermore, they reported that pre-college exposure to Accounting was helpful throughout the course. In their study, which examined the factors affecting first year Accounting student performance, Gul and Fong (1993) also found that at the Chinese University of Hong Kong previous knowledge of Accounting was a significant predictor of student performance in Accounting. However, when performance was monitored over time, prior Accounting knowledge appeared to lose its advantage and even affect student performance adversely. For example, on comparing the performance in Elementary Financial Accounting of students who had studied Accounting in high school to that of those who had not, Baldwin and Howe (1982), reported that at Arizona State University in the USA students who had studied Accounting previously perform better early in the course, but worse subsequently on later examinations. These findings were supported by Bergin (1983), in a similar study on two groups of introductory Financial Accounting students at Winona State University in the USA. The results of the study also indicated that the students who had studied Accounting in high school performed better than the other group early in the course, but worse than the other group as the material began to get more difficult. These studies therefore appeared to suggest that, if there was an advantage due to prior Accounting knowledge, it was a small one that rapidly decreased.

A possible explanation Bergin (1983:26-27) and Baldwin and Howe (1988:625) offered for the above-mentioned phenomenon of students who had studied Accounting previously performing better early in the course, but worse on later examinations, was that students who had never studied Accounting before devoted considerable time and effort from the beginning of the course, since every topic covered was new to them. By contrast, those who had studied Accounting before did not have to study Accounting intensively at the beginning of the semester, since much of the work covered was of a review nature. They became overconfident and believed that they could cruise through the course. However, as the material covered became more advanced, it required an increase in the amount of time devoted to studying Accounting, for which they were psychologically unprepared. There might also be other explanations, such as the mismatch between the studying and the assessment of Accounting at school level and its assessment at tertiary level.

Thus, it is suggested that students who have studied Accounting before be alerted to the fact that they will have to devote considerably more time and effort to Accounting study as the topics covered become more difficult and unfamiliar. The study by Bergin produced evidence that a considerable shock, like a low test score, was required before this latter group of students would change their study habits. Baldwin and Howe recommended forceful counselling with the high school Accounting students at the beginning of the first Accounting course to try to avoid this.

## 2.6 Past academic performance as a predictor of academic success

Boeyens (1989:3) asserted that "in modern western educational settings, past academic performance is a good predictor of future academic performance". This viewpoint is corroborated by many researchers, and it is well documented that past academic performance reflects general academic ability and is significantly related to future academic performance in Accounting (Dockweiler & Willis, 1984; Moses, 1987; Eskew &

Faley, 1988; Doran, Bouillon & Marvin, 1991; Koh & Koh, 1999), as well as in non-Accounting related courses (Behr, 1985; Jackson & Young, 1987).

Doran *et al.* (1991:5) reported that past academic performance and aptitude were the most important determinants of future academic performance in Accounting principles courses. Their study used multiple regression analysis to determine the importance of various factors in explaining variations in student performance on Accounting Principles 1 and 11 at Iowa State University in the USA. Based on a study at the University of Durban-Westville in South Africa to assess the predictive value of the matric exam and of IQ for assessing success in first-year university studies, Behr (1995:111) concluded that performance in the matriculation examination is still the best predictor of academic success at university. He asserted that the individuals who have performed well at school have acquired routine patterns of work and attitudes to study that will be to their advantage in pursuing their tertiary studies. Koh and Koh (1999:24) confirmed that prior academic performance or academic aptitude (however it is measured) is a universal determinant of academic success. For them, this finding highlights the importance of attracting top students to the Accounting courses and of using measures of academic aptitude as a primary criterion for admission.

In a study investigating the validity of using past academic performance as a criterion for admission into university in Pakistan, as opposed to establishing standardised university entrance exams, it was concluded that past performance was a highly successful predictor of graduate level performance, whether the students were admitted on the basis of an admissions test or not (Khan, 1997). An opposing view is that, because of the extremely heterogeneous provision of education in South Africa, the current matric results are not a useful predictor of future academic performance for the majority of applicants to Higher Education. Boeyens (1989:2) asserted that education institutions, which use previous academic performance as a selection criterion, are assuming that all candidates have been exposed to comparable educational opportunities in the past. Since this is not the case in South Africa, matric results need to be supplemented with a

non-curriculum-aligned core skills test to achieve the most effective and fair approach to assessment for selection purposes (Yeld, 2001).

In South Africa, Ronda (1999) reported that distinctly better academic performance in matric was associated with significantly better performance in the university courses she investigated at the University of Cape Town. Although Mehl and Gerwel (1992) agreed that in South Africa the matric result was a useful predictor of academic success at university for high-achieving students, irrespective of educational background, they experienced a problem with it being used as an "absolute measure" between very different schools and across all nine provinces.

## 2.7 Mathematics background as a predictor of academic success in Accounting

Since Accounting requires sound numerical skills, a strong Mathematics background should enable students to perform better. In support of this viewpoint, numerous studies have reported that Mathematics background was a significant variable with regard to the variation in student performance in Accounting courses. For example, Eskew and Faley (1988) conducted a study at Purdue University in the USA to explain student examination performance in Introductory Accounting. They found that high school Mathematics contributed positively and significantly to the variation in student performance in the first college-level Financial Accounting course.

Based on research at the Chinese University of Hong Kong regarding the factors that affect the performance of first year Accounting students, Gul and Fong (1993) established that high school certificate level grades in Mathematics had a positive and significant effect on student performance in Introductory Accounting . Koh and Koh (1999) supported this finding in their study at Nanyang Business School at Nanyang Technological University in Singapore. They also found that students with a stronger Mathematics background produced better results in a three-year Accounting degree programme. They consequently asserted that this finding establishes Mathematics as a universally important determinant of performance in an Accounting degree programme

(Koh & Koh, 1999:24). Wong and Chia (1996) also provided empirical evidence to show that a higher level of competence in Mathematics was associated with better performance in Financial Accounting, for students who were more competent in English. Their investigation was conducted in the Department of Accounting at the Hong Kong University of Technology and aimed to investigate the interaction between proficiency in both Mathematics and English on the performance of students in the first-year Accounting course.

In contrast to the above findings, other studies revealed no significant association between Mathematics background and performance in Accounting (Bartlett *et al.*, 1993; and Gist *et al.*, 1996, cited in Koh & Koh, 1999:16). Lozancic (2003) conducted a study at the University of Cape Town in order to determine whether the existing quantitative admission criteria to the Commerce Academic Development Programme are effective in selecting those students who have the potential to succeed in Financial Accounting 1a. The current researcher shares her surprise at the finding that Matric Mathematics was not a significant predictor of success in the introductory Accounting course, "despite the fact that both Mathematics and Accounting require logical thought and the ability to conceptualise: (Lozancic, 2003:23). However, on the whole, a relationship between Mathematics background and performance in an Accounting course seems evident from prior research. This could be due to the fact that Accounting is a Mathematics-based course, which therefore requires sound numerical skills (Koh & Koh, 1999:16).

Some of the aims of the current research are to examine whether there is a relationship between the Financial Accounting 1 performance of students and their home language (indicating proficiency in English, the main language of instruction for Financial Accounting 1), their gender and their age. For this reason, the last three sections review the literature regarding these issues.

## 2.8 English proficiency as a predictor of academic success

The problem of whether English proficiency is a likely determinant of performance in a first year Financial Accounting course is perhaps more important in those countries in which English is not necessarily the first language. In a study of 50 full-time first-year Accounting major students at the Hong Kong University of Science and Technology, Wong and Chia (1996:188) confirmed the findings of Gul and Fong (1993:38) with regard to the positive association between proficiency in English and performance in Accounting. The latter researchers reported that 18.1% of the 443 respondents in their study at the Chinese University of Hong Kong University were from Chinese, rather than English secondary schools. Furthermore, they reported that the students who came from English secondary schools performed better in the Accounting course than those who came from Chinese secondary schools. Hence they asserted that English proficiency appeared to be a significant variable in predicting success for introductory Accounting students.

Contrary to the above results, a study by Drennana and Rohde (2002) at the University of Queensland in Australia concluded that English as a student's first or subsequent language was not associated with differential performance at *introductory levels* of Accounting studies. However, students whose first language is English performed significantly better in *advanced* Management Accounting than those whose first language was not English.

A South African study by Booysen (1996) revealed that the highest pass rate in first semester studies in electrical and mechanical engineering at the Peninsula Technikon in South Africa was achieved by the group of students using a Black language as mother tongue, followed by the English-speaking group, while the lowest result was achieved by the Afrikaans-speaking group. The language of tuition at this particular institution is predominantly English.

## 2.8 The relationship between gender and academic performance

Since 1960 the increase in the number of women entering the Accounting profession has exceeded the increases in the fields of law, engineering, or medicine (Buckless, Lipe & Ravenscroft, 1991:2). With these increases in the numbers of female Accounting students, many studies have been conducted in the UK and USA on the relationship between gender and academic performance, with conflicting results being reported. In a study conducted in the USA using 1110 upper-division Accounting students, Mutchler, Turner, and Williams (1987, cited in Lipe, 1989:144-145) found that:

- Firstly, female students significantly outperformed male students in upper-division Accounting courses.

- Secondly, female-instructed students received higher scores than students with male instructors.

They proposed the following four explanations for the outstanding performance of the female students in their study:

- The female students may have felt driven to outperform male students in order to break into a field that was stereotypically male.

- The female students may have been more career-motivated and success-oriented than the male students.

- The female students may have had a higher quantitative aptitude than the male students.

- Biased instructors may have perceived that the female students were more outstanding performers than the male students, and rewarded them with higher grades.

As Lipe (1989:145) aptly pointed out, all of these possible explanations have important implications for Accounting educators. The first might cause them to be concerned about the stress levels of females in Accounting courses. The second and third may cause them to be concerned about the motivation and ability of male Accounting students. The fourth might cause them to question whether male Accounting students are treated fairly.

The fact that students received higher grades in the five female-instructed classes than in the five male instructed classes might possibly be attributed to gender differences in grading policies and teaching effectiveness.

Lipe (1989) conducted a follow-up study to test for gender effects on student performance and instructor effectiveness in a lower-division Accounting course with a strictly coordinated grading policy on 401 students at the University of Michigan in the USA. Unlike the study by Mutchler *et al.* (1987, cited in Lipe, 1989), the study by Lipe (1989:147) indicated that students' scores were neither statistically associated with their gender, nor with the gender of their instructor. However, there was a significant interaction between these two variables. Male students performed better than females in male-instructed classes, while female students with female instructors outperformed female students taught by male instructors. The study by Lipe (1989:148-149) also reported that the hypothesised causes of superior performance by female students over male students posited by Mutchler *et al.* (1987, cited in Lipe, 1989) cannot be generalised to all other groups of Accounting students.

In another USA study Tyson (1989, cited in Buckless, Lipe and Ravenscroft, 1991:3), found that female students outperformed male students in all sections of an introductory Accounting class. However, student gender no longer had an impact on Accounting grades in this study when college GPAs, high school rankings, or scores on math SATs were used as covariates. Buckless *et al.* (1991) conducted an investigation at North Carolina State University, the University of Michigan and Eastern Michigan University in

the USA using 1662 Introductory and 145 Intermediate Financial Accounting students, to integrate and extend the above studies. Their findings similarly suggested that the gender related results reported by Lipe (1989) and Mutchler *et al.* (1987, cited in Lipe, 1989) may have been eliminated had students' academic aptitude been considered. They concluded that academic aptitude accounted for much more of the variance in student performance in Accounting than did the gender of the students or the gender of the instructors.

In another study at Iowa State University on approximately 1600 Accounting students, Doran *et al.* (1991) reported that males, on average, performed better than females in Accounting Principles 1, but not in Accounting Principles 11. However, this could be due to the fact that there were a large number of male engineering students enrolled in Accounting Principles 1, rather than any inherent gender effect.

Similarly at the Nanyang Business School at Nanyang Technological University in Singapore, Koh and Koh (1999) found that males performed significantly better than their female counterparts in the Accounting examinations during the first two years of the accountancy degree programme. A possible speculative explanation offered by the researchers was that this superior performance by males could be due to the fact that there were twice as many females as males in their study sample; therefore the unfavourable sex ratio might possibly have motivated the males to do better.

When one considers all of the above-mentioned studies, there therefore does not appear to be any conclusive evidence to support any inherent gender effect on Accounting performance once factors like academic aptitude are taken into account.



### 2.10 The relationship between age and academic performance

In their investigation into the possible impact of various variables, such as age, on the performance of students in a three-year accountancy degree programme in Singapore, Koh and Koh (1999) found that age appeared to be significantly related to performance

in Accounting; with younger students performing significantly better in the Accounting programme than their older counterparts. This finding was consistent with that of Bartlett *et al.* (1993, cited in Koh & Koh, 1999:17 & 26). One possible explanation is that, although the maturity of the older students enabled them to cope with basic understanding, it counted against them when it came to settling down to routine patterns of study and examinations. Contrary to the findings of the previous two researchers, Dockweiler and Willis (1984, cited in Koh & Koh, 1999:17), on the other hand, found that the age on entering the Accounting programme contributed statistically to the older students performing better.

The results reported by Hoskins and Newstead (1997) also supported this latter finding pertaining to older students performing better. They conducted a study that analysed the records of a British university to try to identify the variables that served as predictors of degree performance. Their results reflected that age was a powerful predictor of success, with mature students gaining better marks in degrees, on average, than the younger students.

Despite the findings reported above, there does not seem to be a definitive theory to explain the effect of age on performance, so explanations tend to be speculative. For example, older students may be expected to perform better because they have the advantage of experience and maturity, whilst younger students may also be expected to perform better because they have the advantage of being fresh out of school (Koh & Koh, 1999:26).



## 2.11 Chapter Summary

This chapter has explored the issues that are raised by the selection process of students to Higher Education and the problems encountered in attempting to assess student potential for success in Higher Education, as well as the various factors that have been found to contribute to tertiary students being successful or not. This chapter has also reviewed whether other researchers have found prior Accounting knowledge, past

academic performance and Mathematics background to be good predictors of success in Accounting studies. In addition, it has explored prior studies with regard to English proficiency as a predictor of academic success in Accounting and other courses. Finally, it has examined the relationship between gender and academic performance in Accounting as well as the relationship between age and performance in Accounting at a tertiary level.

In the next chapter, the research design and methods will be discussed.

# CHAPTER 3

# RESEARCH DESIGN AND METHODS

## 3.1 Introduction

In this chapter, the ex post facto research methodology is described, together with the sample included in the study, the context of the study, the variables used in the study, and the method of collecting data for the study. The eight null hypotheses that will be tested in the next chapter are presented, as well as the statistical methods that will be used in the analyses. Lastly, the limitations and delimitations of the research design and the ethical considerations of the study are explained.

## 3.2 Research methodology

The ex post facto research method has been utilized in this study. Within the context of educational or social research, the phrase *ex post facto* means 'after the fact' or 'in retrospect'. It refers to those studies in which researchers observe an existing situation (e.g. past records of marks in a Financial Accounting 1 course) and look back to find what pertinent factors (e.g. Matric aggregate) appear to be associated with this situation. Kerlinger (1970, cited in Cohen *et al.*, 2000:205) defines ex post facto research as that in which the independent variable or variables have already occurred, and in which the researcher starts with observing a dependent variable or variables. The researcher then examines the independent variable or variables in retrospect for their possible effects on, or relationship to, the dependent variable or variables.



## 3.3 Data sampling and setting of the study

The research was conducted within the Faculty of Business Informatics at the Cape Technikon. Input data, over a period of five years, consists of the following information for each student included in the study:

- Final mark attained in Financial Accounting 1
- Matric Accounting result for higher grade (HG) or standard grade (SG)
- Matric aggregate
- Matric Mathematics result for higher grade (HG) or standard grade (SG)
- Home language
- Gender
- Age.

All the above-mentioned data have been collected from the technikon records for the students admitted into the subject Financial Accounting 1 during the five-year period 1998 to 2002. In 2002, the subject Financial Accounting 1 was split into two modules, namely module A and Module B (whose samples are indicated in the next paragraph as $n_5$ and $n_6$), and these are dealt with separately. These modules are referred to as 2002A and 2002B. The investigation includes the data of full-time and part-time students, including students admitted into the academic development programme on the satellite campus in Bellville, as well as students admitted to the satellite campus in Wellington.

The sample sizes for each of the above-mentioned five years are $n_1$=338; $n_2$=353; $n_3$=316; $n_4$=413; $n_5$=247; $n_6$=225. Students for whom the Financial Accounting 1 marks, Matric aggregate scores, home language, gender or age data are missing, have been excluded from the study. For 1998, for example, 338 students out of 460 enrolled for Financial Accounting 1 have been included in the sample, that is, 74% of the initial enrolment. The sample therefore consists of students for whom all of the relevant details are available. Since students are not compelled to have studied both Matric Accounting and Mathematics in order to gain admission into the Accounting programmes mentioned in chapter 1, a student was included in the study when at least one of these two marks was supplied, for either the higher or standard grade.

### 3.4 Selection of dependent and independent variables

The data used in this investigation has been arranged into the following dependent and independent variables for the samples $n_1$ to $n_6$:

Dependent variable: the final mark attained in Financial Accounting 1

Independent variables:
- Matric Accounting result for HG or SG
- Matric aggregate
- Matric Mathematics result for HG or SG
- Home language
- Gender
- Age.

The data in this study can be further classified as (Krzanowski, 1997:5):

Ordinal:
- Matric aggregate score
- Accounting HG and SG scores
- Mathematics HG and SG scores

Nominal:
- Home language
- Gender

Interval/ratio:
- Age
- Financial Accounting 1 scores.



### 3.5 Data collection

Negotiations with an administrative officer in the department of institutional planning and transformation, led to the relevant data being extracted from the existing operational

database of the technikon. She approached the database administrator at the institution to write a computer programme for this purpose.

Additional explanatory data with regard to student assessment and selection were collected through interviews with the Business Informatics faculty officer, as well as with officers in the examination department, psychometric testing, academic support, and transformation at Cape Technikon. Explanatory data with regard to matriculation results were obtained through interviews with Western Cape Education Department officials.

Furthermore, once the hypotheses have been tested, explanatory interviews will be conducted with one or more Accounting specialists in Higher Education (lecturers, subject co-ordinators, course heads or heads of departments) regarding their interpretation of the patterns and findings of the current investigation. After providing them with a summary of the results of the study, they will be asked in an open-ended question to provide feedback regarding whether the results of the various hypotheses make professional sense to them – that is, whether the results and findings agree with what they perceive about the relationships between the various independent variables and the dependent variable, from their experience of having taught Financial Accounting 1 for a number of years.

If the answers provided by the interviewees are not sufficiently detailed, they will be asked more specifically whether the finding of each individual hypothesis makes professional sense to them. They will then also be asked to provide input regarding what other qualitative variables they believe could possibly influence the performance of the first-year Accounting students. They could be provided with a list of factors which various other researchers have found to be significantly associated with performance in Higher Education and then asked to select five or ten factors which they have observed as being important.

## 3.6 Hypotheses

This study involved testing year by year the following null hypotheses for the approximately 300 Financial Accounting 1 students in each of the five years from 1998 to 2002:

***Null hypothesis 1:*** *Matric Accounting HG score level (grouped as A&B, C, D or E-H) as a predictive independent variable*

Ho1: There will be no significant difference between the mean performance scores of students in Financial Accounting 1, when they are grouped in terms of their previous year's Matriculation performance in Accounting HG.

***Null hypothesis 2:*** *Matric Accounting SG score level (A&B, C, D or E-H) as a predictive independent variable*

Ho2: There will be no significant difference between the mean performance scores of students in Financial Accounting 1, when they are grouped in terms of their previous year's Matriculation performance in Accounting SG.

***Null hypothesis 3:*** *Matric aggregate score (A&B, C, D or E-H) as a predictive independent variable*

Ho3: There will be no significant difference between the mean performance scores of students in Financial Accounting 1, when they are grouped in terms of their previous year's Matriculation aggregate performance level.

***Null hypothesis 4:*** *Matric Mathematics (HG) performance level as a predictive independent variable for Financial Accounting 1*

Ho4: There will be no significant difference between the mean performance scores of students in Financial Accounting 1, when they are grouped in terms of their previous year's Matriculation performance in Mathematics HG.

***Null hypothesis 5:*** *Matric Mathematics (SG) score level (A&B, C, D or E-H) as a predictive independent variable*

Ho5: There will be no significant difference between the mean performance scores of students in Financial Accounting 1, when they are grouped in terms of their previous year's Matriculation performance level in Mathematics SG.

***Null hypothesis 6:*** *Home language as a predictive independent variable*

Ho6: There will be no significant difference between the mean performance scores of students in Financial Accounting 1, when they are grouped in terms of their home language.

***Null hypothesis 7:*** *Gender as a predictive independent variable*

Ho7: There will be no significant difference between the mean performance scores of students in Financial Accounting 1, when they are grouped in terms of their gender.

***Null hypothesis 8:*** *Age as a predictive independent variable*

Ho6: There will be no significant difference between the mean performance scores of students in Financial Accounting 1, when they are grouped in terms of their ages.

***Face Validity***

When an expert in tertiary-level Accounting (lecturer, subject co-ordinator, course head or head of department) is interviewed independently for his or her interpretations and explanations of the results obtained for null hypotheses 1 to 8, will these suggestions be in substantial agreement with the findings?



## 3.7 Data analysis and selection of statistical methods

Predominantly quantitative analyses will be used in this study. In order to achieve the objectives of the study, the following statistical analyses of the data will be conducted using the Windows software programme Statistica.

- Descriptive statistics will be used; firstly, to ascertain whether the Financial Accounting 1 marks for each of the years of the study followed a normal distribution (refer to histograms to be presented in Chapter 4), and secondly to gain an overall impression of the results achieved by students in Financial Accounting 1 when they are grouped in terms of the various independent variables (except gender and age).

- The Shapiro-Wilk W test for normality will be used to establish whether the various Matric symbol groups are normally distributed. If not, non-parametric statistical tests will be used for comparative analysis of the data.

- Analysis of variance (ANOVA) analyses will be conducted to compare the mean performance scores in Financial Accounting 1 of more than two groups, namely the various Matric symbol groups and the three different home language groups. ANOVA tests compare the variability of scores within groups with the variability between groups. It uses the F-distribution to derive a value with which the null hypothesis is tested (Carlson & Thorne, 1997).

- For normally distributed data, t-tests will be performed to compare the mean performance scores in Financial Accounting 1 of only two groups, namely that of males and females.

- Mann-Whitney tests will be performed to compare the mean performance scores of the Matric Mathematics SG students regrouped into only two symbol bands, namely A-D and E-H (since the sample sizes for the various symbol-levels are too small to perform an ANOVA)

- Correlation analyses (e.g. non-parametric correlations for discrete or skewed data, or Pearson product-moment correlations for normal data) will be conducted to measure the relationship between an individual independent or predictor variable (viz. age) to performance in Financial Accounting 1 (the dependent or

response variable). Correlation analysis enables the strength of the relationship between two variables to be described numerically as a correlation coefficient, i.e. a number between –1.00 and +1.00 (Carlson & Thorne, 1997).

- Forward stepwise regression analysis will be conducted, so as to weight the individual independent variables as possibly predicting subsequent performance in Financial Accounting 1. It is further explained in section 4.4 and 5.10.

### 3.8 Limitations and delimitations of the research design

The data used in this investigation relates to student performance at only one South African tertiary institution, namely the Cape Technikon. The data further relates to the performance of students from only one subject, namely Financial Accounting 1, offered by one faculty, namely the Faculty of Business Informatics. In addition, the data includes only those quantitative variables mentioned in 3.3. Therefore, initially it does not take into account any qualitative variables, such as the study habits of students, their commitment to their studies, their support structures, home environments, financial situations, etc, which could have influenced their performance in Financial Accounting 1; although at the discussion or explanatory stage, these considerations may be suggested as being contextually important.

### 3.9 Ethical considerations

This is an ex post facto investigation, which does not involve face-to-face interactions with the students, nor does it require the use of any of their personal information apart from their home language, gender and age, so the individual anonymity of students is assured. Furthermore, permission for the study was obtained from the acting dean of the Faculty of Business Informatics at the time that the study was being planned. As far as the interviews with expert colleagues are concerned, permission will be obtained from the interviewees and their names will be kept confidential. Consequently, there does not appear to be any threat of ethical transgression with this investigation.

### 3.10 Chapter summary

This chapter has presented details regarding the setting of the study, the manner in which the generated data has been collected, the samples engaged in the study, and the methodology according to which the research is being conducted. It has also introduced the statistical methods to be employed in the study, the dependent and independent variables selected, and the hypotheses that will be tested in the study. Finally, it has explained the limitations and delimitations of the research design as well as the ethical considerations that were made regarding the study.

In the next chapter, the hypotheses will be tested and the results of the study will be presented.

# CHAPTER 4

# PRESENTATION OF RESULTS AND FINDINGS

## 4.1 Introduction

This chapter presents the results of the analyses performed to investigate the relationships between final performance in Financial Accounting 1 (the dependent variable) and the following independent academic and biographical variables, year by year, for the period 1998 to 2002:

- Matric Accounting HG scores
- Matric Accounting SG scores
- Matric aggregate scores
- Matric Mathematics HG scores
- Matric Mathematics SG scores
- Home Language
- Gender
- Age

After testing for the existence of normally distributed scores for the dependent variable and for the first five independent variables (with approximately equal variances), the following statistical procedures were performed – using the statistical software package *Statistica Version 6*:

- For non-normal data, the Mann-Whitney test to determine whether the mean performance scores of two or more groups are significantly different from each other.

- ANOVA (Analysis of Variance): To test whether the normally distributed performance scores of more than two independent groups are significantly different from one another (Carlson & Thorne, 1997).

- t-test: To determine whether the normally distributed performance scores of two independent groups (e.g. females and males) are significantly different from each other.

- Correlation analysis: To calculate the strength of the linear relationship between two continuous variables (Carlson & Thorne, 1997), namely age in years and performance in Financial Accounting 1.

- General regression models: To determine the possible effect of all the variables of interest (independent variables – both categorical and continuous) on the dependent variable (Krzanowski, 1990).

All the differences in performance were evaluated at the 5% significance level, i.e. they were deemed to be significant if the p-values were equal to or less than 0.05 ($p < 0.05$ or $p=0.05$).

In addition to the above, descriptive statistics were recorded or calculated for some of the variables. These included the sample size, mean, standard deviation, minimum, maximum, and 95% confidence interval (an interval in which we are 95% sure that the true mean lies).

It is important to note that, due to small sample sizes,

- A aggregates/symbols are grouped with B, and are indicated as A&B, and
- F, FF, G, GG[5] and H symbols are grouped with E, and are indicated as E-H.

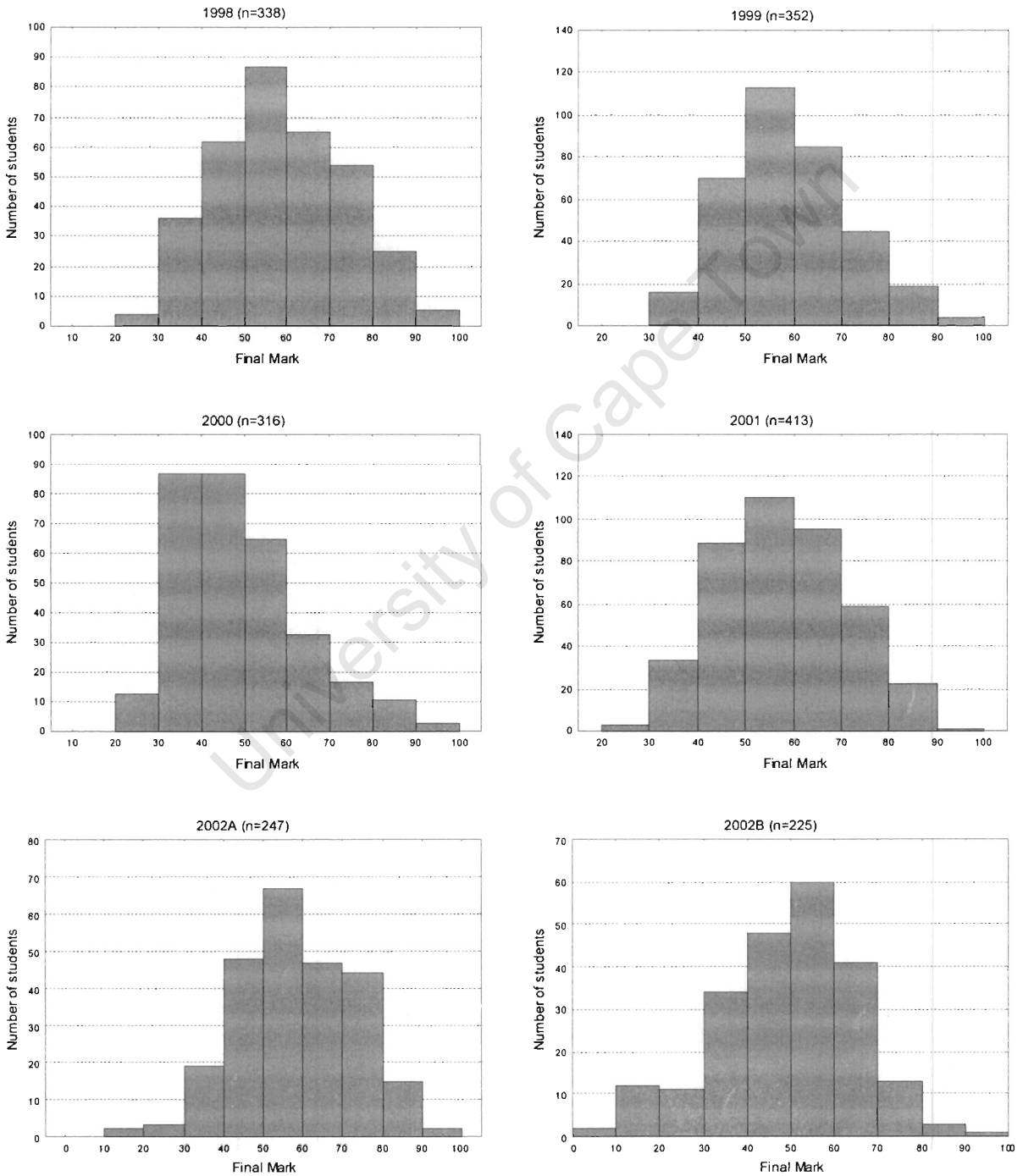


[5] A GG-symbol, which reflected that a mark of 20-24% had been attained, has been discontinued by the Education Department and is now included in a G-symbol.

## *4.2 Results: performance score distributions*

Figure 4.1 presents the distributions of final marks achieved in Financial Accounting 1 for the years 1998-2002.

**Figure 4.1 Histograms of final marks in Financial Accounting 1**



Tables 4.1 and 4.2 summarise the basic descriptive statistics (i.e. sample size, mean, standard deviation, minimum, maximum) for the students' ages and their final marks obtained in Financial Accounting 1, for the years 1998 – 2002. There is a clear trend for progressively increasing average age of students taking Financial Accounting 1 over the five-year period. Although no significant association was found between the variables Age and Financial Accounting 1 mark when the correlation analysis was done (Table 4.19), Age became a significant factor in influencing the final mark in Financial Accounting when other factors were taken into account in the regression analysis for four out of the six groups of students examined (Tables 4.20-4.25).

**Table 4.1 Descriptive statistics for students' ages for the years 1998-2002**

| | | Age in years | | | |
|---|---|---|---|---|---|
| Year | Valid n | Mean Age | sd | Minimum | Maximum |
| 1998 | 338 | 19.02 | 2.73 | 16 | 37 |
| 1999 | 352 | 19.08 | 2.53 | 16 | 38 |
| 2000 | 316 | 19.02 | 3.00 | 16 | 40 |
| 2001 | 413 | 19.23 | 3.11 | 16 | 42 |
| 2002A | 247 | 20.67 | 4.20 | 17 | 38 |
| 2002B | 225 | 20.58 | 4.21 | 17 | 38 |

**Table 4.2 Descriptive statistics for the students' final marks in Financial Accounting 1 for the years 1998-2002**

| | | Final mark (%) | | | |
|---|---|---|---|---|---|
| Year | Valid n | Mean | sd | Minimum | Maximum |
| 1998 | 338 | 59.08 | 15.12 | 23 | 96 |
| 1999 | 352 | 59.39 | 12.40 | 32 | 96 |
| 2000 | 316 | 50.02 | 14.41 | 21 | 96 |
| 2001 | 413 | 58.17 | 13.18 | 28 | 95 |
| 2002A | 247 | 59.07 | 14.69 | 15 | 96 |
| 2002B | 225 | 50.20 | 15.79 | 3 | 93 |

Tables 4.3 to 4.5 summarise the distributions of gender, matric aggregate symbols obtained, and home language groups comprising the intact sample of students registered for Financial Accounting 1 for the years 1998-2002.

**Table 4.3 Frequency tables of distributions for gender for the years 1998-2002**

| | Gender | | | |
|---|---|---|---|---|
| Year | Female | | Male | |
| | No. | % | No. | % |
| 1998 | 186 | 55.03 | 152 | 44.97 |
| 1999 | 205 | 58.24 | 147 | 41.76 |
| 2000 | 188 | 59.49 | 128 | 40.51 |
| 2001 | 279 | 67.55 | 134 | 32.45 |
| 2002A | 165 | 66.80 | 82 | 33.20 |
| 2002B | 152 | 67.56 | 73 | 32.44 |

There is a trend for the proportion of female students enrolled for Financial Accounting 1 to increase significantly over the five-year period (Chi square = 8.55; $p < 0.01$). However, the t-tests performed reflected no significant difference between the average Financial Accounting 1 marks of female and male students (Table 4.18).

**Table 4.4 Frequency tables of distributions for Matric aggregate for the years 1998-2002**

| | Matric Aggregate Symbols | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | A | | B | | C | | D | | E | | F | |
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| 1998 | 4 | 1.18 | 18 | 5.33 | 84 | 24.85 | 153 | 45.27 | 77 | 22.78 | 2 | 0.59 |
| 1999 | 5 | 1.42 | 28 | 7.95 | 97 | 27.56 | 147 | 41.76 | 71 | 20.17 | 4 | 1.14 |
| 2000 | 3 | 0.95 | 29 | 9.18 | 97 | 30.70 | 128 | 40.51 | 57 | 18.04 | 2 | 0.63 |
| 2001 | 2 | 0.48 | 31 | 7.51 | 109 | 26.39 | 173 | 41.89 | 96 | 23.24 | 2 | 0.48 |
| 2002A | 0 | 0.00 | 4 | 1.62 | 41 | 16.60 | 119 | 48.18 | 77 | 31.17 | 6 | 2.43 |
| 2002B | 0 | 0.00 | 4 | 1.78 | 38 | 16.89 | 111 | 49.33 | 68 | 30.22 | 4 | 1.78 |



According to Table 4.4 the percentage of students taking Financial Accounting 1 who had attained A, B and C aggregates in matric has decreased markedly, especially since 2000 (for example those who had attained C-symbols dropped from approximately 31% to 17%), whilst those who had attained D and E aggregates had increased (for example from approximately 18% to 30% for those who had attained E-symbols). However, as

Tables 4.2 and 4.11 show, there has not been a corresponding decline in their average Financial Accounting 1 marks over this period.

**Table 4.5 Frequency tables of distributions for home language for the years 1998-2002**

| | Language | | | | | |
|---|---|---|---|---|---|---|
| Year | English | | Afrikaans | | Other | |
| | No. | % | No. | % | No. | % |
| 1998 | 180 | 53.25 | 111 | 32.84 | 47 | 13.91 |
| 1999 | 177 | 50.28 | 131 | 37.22 | 44 | 12.50 |
| 2000 | 183 | 57.91 | 92 | 29.11 | 41 | 12.97 |
| 2001 | 249 | 60.29 | 108 | 26.15 | 56 | 13.56 |
| 2002A | 152 | 61.54 | 44 | 17.81 | 51 | 20.65 |
| 2002B | 140 | 62.22 | 37 | 16.44 | 48 | 21.33 |

The number of English home language students enrolled for Financial Accounting 1 has increased by approximately 9% from 1998 to 2002B and the number of Other (predominantly Xhosa) home language students by approximately 7%, while the number of Afrikaans students has decreased by approximately 16% over this period. This may be one indication of the changing demographic profile of the students taking Financial Accounting 1.

Table 4.6 presents the similar distributions of symbols obtained in the matric examinations in Accounting and Mathematics by the intact sample of students registered for Financial Accounting 1 for the years 1998 – 2002.

**Table 4.6 Frequency tables for the distribution of performance in Matric Accounting HG, Accounting SG, Mathematics HG and Mathematics SG, by year and by symbol**

| ACCOUNTING | 1998 | | 1999 | | 2000 | | 2001 | | 2002A | | 2002B | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HG SYMBOL | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| A | 8 | 2.37 | 8 | 2.27 | 9 | 2.85 | 7 | 1.69 | 3 | 1.21 | 2 | 0.89 |
| B | 17 | 5.03 | 20 | 5.68 | 13 | 4.11 | 9 | 2.18 | 1 | 0.40 | 1 | 0.44 |
| C | 37 | 10.95 | 34 | 9.66 | 29 | 9.18 | 28 | 6.78 | 10 | 4.05 | 10 | 4.44 |
| D | 51 | 15.09 | 58 | 16.48 | 41 | 12.97 | 55 | 13.32 | 12 | 4.86 | 13 | 5.78 |
| E | 65 | 19.23 | 70 | 19.89 | 51 | 16.14 | 68 | 16.46 | 36 | 14.57 | 34 | 15.11 |
| F | 1 | 0.30 | 1 | 0.28 | 1 | 0.32 | 2 | 0.48 | | | | |
| GG | | | 1 | 0.28 | | | 2 | 0.48 | 1 | 0.40 | 1 | 0.44 |
| Did not take | 159 | 47.04 | 160 | 45.45 | 172 | 54.43 | 242 | 58.60 | 184 | 74.49 | 164 | 72.89 |

| ACCOUNTING | 1998 | | 1999 | | 2000 | | 2001 | | 2002A | | 2002B | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SG SYMBOL | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| A | 11 | 3.25 | 14 | 3.98 | 23 | 7.28 | 35 | 8.47 | 11 | 4.45 | 11 | 4.89 |
| B | 24 | 7.10 | 21 | 5.97 | 46 | 14.56 | 64 | 15.50 | 24 | 9.72 | 22 | 9.78 |
| C | 38 | 11.24 | 26 | 7.39 | 26 | 8.23 | 44 | 10.65 | 40 | 16.19 | 38 | 16.89 |
| D | 30 | 8.88 | 30 | 8.52 | 22 | 6.96 | 32 | 7.75 | 38 | 15.38 | 33 | 14.67 |
| E | 20 | 5.92 | 19 | 5.40 | 14 | 4.43 | 34 | 8.23 | 35 | 14.17 | 33 | 14.67 |
| F | 7 | 2.07 | 15 | 4.26 | 13 | 4.11 | 11 | 2.66 | 13 | 5.26 | 7 | 3.11 |
| FF | | | | | | | 1 | 0.24 | | | | |
| Did not take | 208 | 61.54 | 227 | 64.49 | 172 | 54.43 | 192 | 46.49 | 86 | 34.82 | 81 | 36.00 |

| MATHEMATICS | 1998 | | 1999 | | 2000 | | 2001 | | 2002A | | 2002B | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HG SYMBOL | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| A | | | | | | | | | | | | |
| B | | | | | | | 1 | 0.24 | | | | |
| C | | | | | 1 | 0.32 | 1 | 0.24 | | | | |
| D | 1 | 0.30 | 1 | 0.28 | 1 | 0.32 | 2 | 0.48 | 1 | 0.40 | 1 | 0.44 |
| E | 2 | 0.59 | 1 | 0.28 | 2 | 0.63 | 3 | 0.73 | 4 | 1.62 | 3 | 1.33 |
| F | | | | | | | 1 | 0.24 | | | | |
| H | 1 | 0.30 | 1 | 0.28 | | | | | | | | |
| Did not take | 334 | 98.82 | 349 | 99.15 | 312 | 98.73 | 405 | 98.06 | 242 | 97.98 | 221 | 98.22 |

| MATHEMATICS | 1998 | | 1999 | | 2000 | | 2001 | | 2002A | | 2002B | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SG SYMBOL | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| A | | | 2 | 0.57 | 3 | 0.95 | 2 | 0.48 | 1 | 0.40 | 1 | 0.44 |
| B | 4 | 1.18 | 3 | 0.85 | 2 | 0.63 | 3 | 0.73 | 2 | 0.81 | 1 | 0.44 |
| C | 4 | 1.18 | 5 | 1.42 | 2 | 0.63 | 1 | 0.24 | 3 | 1.21 | 4 | 1.78 |
| D | 3 | 0.89 | 7 | 1.99 | 2 | 0.63 | | | 3 | 1.21 | 2 | 0.89 |
| E | 7 | 2.07 | 11 | 3.13 | 7 | 2.22 | 4 | 0.97 | 8 | 3.24 | 8 | 3.56 |
| F | 6 | 1.78 | 2 | 0.57 | 6 | 1.90 | 3 | 0.73 | 1 | 0.40 | 1 | 0.44 |
| GG | | | | | 1 | 0.32 | | | | | | |
| H | 1 | 0.30 | 1 | 0.28 | | | | | | | | |
| Did not take | 313 | 92.60 | 321 | 91.19 | 293 | 92.72 | 400 | 96.85 | 229 | 92.71 | 208 | 92.44 |

## 4.3 Hypothesis testing

In this section the hypotheses are tested statistically and the results are presented in various tables.

***Ho1: Matric Accounting HG score level (banded as A&B, C, D or E-H) as a predictive independent variable***

Null hypothesis 1 states: "That there will be no significant difference between the mean performance scores of students in Financial Accounting 1, when they are grouped in terms of their previous year's Matriculation performance in Accounting Higher Grade."

Table 4.7 presents the mean performance scores for Financial Accounting 1, standard deviations, 95% confidence intervals and sample sizes for the various Matric Accounting HG groups (namely A&B, C, D, and E-H), for the years 1998 - 2002. In addition, it indicates whether the Financial Accounting 1 marks for each of these groups are normally distributed for each of the years, based on the Shapiro-Wilk W test for normality.

**Table 4.7 Descriptive statistics in Financial Accounting 1 for the several Matric Accounting Higher Grade (HG) student groups**

| Year | Symbol for Matric Accounting HG | Mean for Financial Accounting 1 | sd | Lower 95% Confidence Interval | Upper 95% Confidence Interval | n | Shapiro-Wilk W test p-values | Normally distributed Financial Accounting 1 marks? |
|---|---|---|---|---|---|---|---|---|
| 1998 | A&B | 78.92 | 11.90 | 74.23 | 83.61 | 25 | 0.602 | Yes |
| | C | 71.14 | 11.86 | 67.28 | 74.99 | 37 | 0.101 | Yes |
| | D | 65.94 | 11.85 | 62.66 | 69.22 | 51 | 0.458 | Yes |
| | E-H | 54.76 | 11.86 | 51.87 | 57.64 | 66 | 0.075 | Yes |
| | | | | | | | | Yes |
| 1999 | A&B | 60.34 | 12.01 | 56.33 | 64.36 | 35 | 0.339 | Yes |
| | C | 52.76 | 12.02 | 48.91 | 56.61 | 38 | 0.150 | Yes |
| | D | 48.60 | 12.00 | 44.27 | 52.93 | 30 | 0.107 | Yes |
| | E-H | 51.96 | 12.00 | 47.40 | 56.53 | 27 | 0.074 | Yes |
| | | | | | | | | Yes |
| 2000 | A&B | 73.55 | 12.57 | 68.25 | 78.84 | 22 | 0.367 | Yes |
| | C | 62.48 | 12.55 | 57.87 | 67.09 | 29 | 0.365 | Yes |
| | D | 51.63 | 12.55 | 47.76 | 55.51 | 41 | 0.111 | Yes |
| | E-H | 45.40 | 12.55 | 41.96 | 48.85 | 52 | 0.245 | Yes |
| | | | | | | | | Yes |
| 2001 | A&B | 76.13 | 12.08 | 70.16 | 82.09 | 16 | 0.122 | Yes |
| | C | 71.54 | 12.06 | 67.03 | 76.04 | 28 | 0.021 | No |
| | D | 60.67 | 12.09 | 57.46 | 63.89 | 55 | 0.398 | Yes |
| | E-H | 58.13 | 12.05 | 55.31 | 60.94 | 72 | 0.704 | Yes |
| | | | | | | | | Yes |
| 2002A | A&B | 81.75 | 11.64 | 70.11 | 93.39 | 4 | 0.398 | Yes |
| | C | 79.10 | 11.64 | 71.74 | 86.46 | 10 | 0.429 | Yes |
| | D | 70.50 | 11.64 | 63.78 | 77.22 | 12 | 0.158 | Yes |
| | E-H | 60.73 | 11.62 | 56.90 | 64.56 | 37 | 0.872 | Yes |
| | | | | | | | | Yes |
| 2002B | A&B | 83.00 | 13.30 | 67.62 | 98.38 | 3 | 1.000 | Yes |
| | C | 66.90 | 13.31 | 58.48 | 75.32 | 10 | 0.601 | Yes |
| | D | 62.15 | 13.30 | 54.77 | 69.54 | 13 | 0.019 | No |
| | E-H | 53.89 | 13.31 | 49.38 | 58.39 | 35 | 0.431 | Yes |

See Appendix 1 for more information regarding the tests of normality.[6]

ANOVA tests were performed, as shown in Table 4.8, to determine whether the levels of the symbols achieved by students for Accounting HG in the Matriculation examination are statistically related to their subsequent marks in Financial Accounting 1.

[6]With the exception of the two results that are highlighted, there is a consistent pattern of normality therefore we will assume normality from hereon.

**Table 4.8 ANOVA results for the possible relationship between Matric Accounting Higher Grade (HG) symbols and Financial Accounting 1 marks, for the years 1998-2002**

| Year | Sum of Squares | Degrees of Freedom | Mean Sum of Squares | F | p |
|---|---|---|---|---|---|
| 1998 | 13190.2 | 3 | 4396.7 | 31.19 | <0.001 |
| 1999 | 10287.3 | 3 | 3429.1 | 35.39 | <0.001 |
| 2000 | 14442.3 | 3 | 4814.1 | 30.52 | <0.001 |
| 2001 | 6800.0 | 3 | 2266.7 | 15.53 | <0.001 |
| 2002A | 3934.5 | 3 | 1311.5 | 9.69 | <0.001 |
| 2002B | 3394.1 | 3 | 1131.4 | 6.40 | 0.001 |

The findings presented in Table 4.7 show that every year there is a difference between the mean performance scores of students in Financial Accounting 1, when they are grouped in terms of their previous year's Matriculation performance in Accounting HG. In 1998, for example, Matric Accounting HG A&B students achieved an average mark of 78.92%, C students achieved an average mark of 71.14%, D students averaged 65.94% and the E-H students achieved the lowest mean mark, namely 54.76%.

This pattern of the Matric Accounting HG A&B students achieving the best results in Financial Accounting 1 and the E-H students achieving the worst results is repeated in the years 2000, 2001, 2002 (Module A) and 2002 (Module B). The only deviation is observed in 1999, when the Matric Accounting HG E-H students marginally out-performed the D students. These two groups achieved average marks of 52.0% and 48.6% respectively for Financial Accounting 1.

An ANOVA test was performed to determine whether the means of the various groups are significantly different (significance being indicated by $p<0.05$). Based on these results, null Hypothesis 1 is rejected. The results in Table 4.8 reveal that there is a statistically significant difference between performances in Financial Accounting 1, for the several Matric Accounting HG groups arranged by levels, for each of the years. For each of the years the p-values are less than or equal to 0.001.

***Ho2: Matric Accounting Standard Grade (SG) score level (A&B, C, D or E-H) as a predictive independent variable***

Null hypothesis 2 states: "That there will be no significant difference between the mean performance scores of students in Financial Accounting 1, when they are grouped in terms of their previous year's Matriculation performance level in Accounting Standard Grade (SG)."

Table 4.9 presents the mean performance scores for Financial Accounting 1, standard deviations, 95% confidence intervals and sample sizes for the various Matric Accounting SG levels (namely A&B, C, D, and E-H), for the years 1998 - 2002.

**Table 4.9 Descriptive statistics in Financial Accounting 1 for the several Matric Accounting Standard Grade (SG) student groups**

| Year | Symbol for Matric Accounting SG | Mean for Financial Accounting 1 | sd | Lower 95% Confidence Interval | Upper 95% Confidence Interval | n |
|---|---|---|---|---|---|---|
| 1998 | A&B | 60.34 | 12.01 | 56.33 | 64.36 | 35 |
| | C | 52.76 | 12.02 | 48.91 | 56.61 | 38 |
| | D | 48.60 | 12.00 | 44.27 | 52.93 | 30 |
| | E-H | 51.96 | 12.00 | 47.40 | 56.53 | 27 |
| | | | | | | |
| 1999 | A&B | 59.69 | 9.29 | 56.58 | 62.79 | 35 |
| | C | 51.85 | 9.28 | 48.25 | 55.45 | 26 |
| | D | 52.27 | 9.26 | 48.92 | 55.62 | 30 |
| | E-H | 50.29 | 9.29 | 47.18 | 53.39 | 35 |
| | | | | | | |
| 2000 | A&B | 48.81 | 11.63 | 46.05 | 51.57 | 69 |
| | C | 44.96 | 11.57 | 40.47 | 49.46 | 26 |
| | D | 42.41 | 11.59 | 37.52 | 47.30 | 22 |
| | E-H | 42.67 | 11.59 | 38.25 | 47.08 | 27 |
| | | | | | | |
| 2001 | A&B | 58.97 | 11.34 | 56.72 | 61.22 | 99 |
| | C | 53.27 | 11.34 | 49.90 | 56.65 | 44 |
| | D | 51.75 | 11.37 | 47.80 | 55.71 | 32 |
| | E-H | 50.63 | 11.33 | 47.33 | 53.93 | 46 |
| | | | | | | |
| 2002A | A&B | 66.51 | 12.13 | 62.47 | 70.56 | 35 |
| | C | 57.23 | 12.14 | 53.44 | 61.01 | 40 |
| | D | 50.24 | 12.14 | 46.35 | 54.12 | 38 |
| | E-H | 51.77 | 12.12 | 48.32 | 55.23 | 48 |
| | | | | | | |
| 2002B | A&B | 54.70 | 13.56 | 50.03 | 59.36 | 33 |
| | C | 45.13 | 13.56 | 40.78 | 49.48 | 38 |
| | D | 45.55 | 13.56 | 40.88 | 50.21 | 33 |
| | E-H | 41.75 | 13.53 | 37.51 | 45.99 | 40 |



An ANOVA test was performed, as shown in Table 4.10, to determine whether the symbol levels achieved by students for Accounting SG in the Matriculation examination are statistically related to their subsequent marks in Financial Accounting 1.

**Table 4.10 ANOVA results for the possible relationship between Matric Accounting SG symbols and Financial Accounting 1 marks, for the years 1998-2002**

| Year | Sum of Squares | Degrees of Freedom | Mean Sum of Squares | F | p |
|---|---|---|---|---|---|
| 1998 | 2439.5 | 3 | 813.2 | 5.65 | 0.001 |
| 1999 | 1813.0 | 3 | 604.3 | 7.03 | <0.001 |
| 2000 | 1157.1 | 3 | 385.7 | 2.87 | 0.039 |
| 2001 | 2907.0 | 3 | 969.0 | 7.52 | <0.001 |
| 2002A | 6049.8 | 3 | 2016.6 | 13.73 | <0.001 |
| 2002B | 3220.9 | 3 | 1073.6 | 5.84 | 0.001 |

Table 4.9 reveals that in 1998 the A&B symbol Matric Accounting SG students performed much better than the C, D and E-H students in Financial Accounting 1. During each of the subsequent years, they outperformed the other groups by about 8% (except in 2000 where they only performed about 4% better than the students who had attained a C-symbol for Matric Accounting SG). Note that in 1998 the students who had achieved E-H symbols achieved 51.96% in Financial Accounting 1, which is approximately the same average mark as those who had attained a C-symbol. This will be further commented on in chapter 5.

The ANOVA results in Table 4.10 show that there is a significant difference in the Financial Accounting 1 performance between the different Matric Accounting SG groups. For each of the years, the p-value is less than or equal to 0.01, except for 2000, where $p<0.05$. Null hypothesis 2 is therefore rejected, and it is concluded that there is a difference between the mean performance scores of students in Financial Accounting 1, when they are grouped in terms of their previous year's Matriculation performance level in Accounting SG.

***Ho3: Matric aggregate score level (A&B, C, D or E-H) as a predictive independent variable***

Null hypothesis 3 states: "That there will be no significant difference between the mean performance scores of students in Financial Accounting 1, when they are grouped in terms of their previous year's Matriculation aggregate performance level."

Table 4.11 presents the mean performance scores for Financial Accounting 1, standard deviations, 95% confidence intervals and sample sizes for the various Matric aggregate levels (namely A&B, C, D, and E&F), for the years 1998 - 2002.

**Table 4.11 Descriptive statistics in Financial Accounting 1 for the several Matric aggregate student groups**

| Year | Symbol for Matric Aggregate | Mean for Financial Accounting 1 | sd | Lower 95% Confidence Interval | Upper 95% Confidence Interval | n |
|---|---|---|---|---|---|---|
| 1998 | A&B | 76.50 | 13.60 | 70.79 | 82.21 | 22 |
| | C | 65.16 | 13.66 | 62.23 | 68.08 | 84 |
| | D | 57.27 | 13.61 | 55.10 | 59.43 | 153 |
| | E-H | 51.27 | 13.60 | 48.25 | 54.28 | 79 |
| | | | | | | |
| 1999 | A&B | 74.58 | 10.68 | 70.92 | 78.23 | 33 |
| | C | 64.04 | 10.74 | 61.91 | 66.18 | 97 |
| | D | 56.08 | 10.67 | 54.34 | 57.81 | 147 |
| | E-H | 53.19 | 10.65 | 50.76 | 55.61 | 75 |
| | | | | | | |
| 2000 | A&B | 67.47 | 12.61 | 63.08 | 71.85 | 32 |
| | C | 53.88 | 12.61 | 51.36 | 56.39 | 97 |
| | D | 45.13 | 12.56 | 42.94 | 47.33 | 128 |
| | E-H | 44.80 | 12.60 | 41.57 | 48.03 | 59 |
| | | | | | | |
| 2001 | A&B | 71.46 | 12.12 | 67.30 | 75.61 | 33 |
| | C | 62.31 | 12.11 | 60.03 | 64.60 | 109 |
| | D | 56.05 | 12.10 | 54.24 | 57.87 | 173 |
| | E-H | 52.83 | 12.18 | 50.42 | 55.24 | 98 |
| | | | | | | |
| 2002A | A&B | 69.50 | 13.76 | 55.95 | 83.05 | 4 |
| | C | 68.46 | 13.77 | 64.23 | 72.70 | 41 |
| | D | 59.66 | 13.74 | 57.18 | 62.15 | 119 |
| | E-H | 53.08 | 13.76 | 50.11 | 56.06 | 83 |
| | | | | | | |
| 2002B | A&B | 64.00 | 15.28 | 48.94 | 79.06 | 4 |
| | C | 56.90 | 15.29 | 52.01 | 61.78 | 38 |
| | D | 50.57 | 15.28 | 47.71 | 53.43 | 111 |
| | E-H | 45.33 | 15.27 | 41.78 | 48.88 | 72 |

An ANOVA test was performed, as shown in Table 4.12, to determine whether the Matric aggregate symbols achieved by students are statistically related to their subsequent marks in Financial Accounting 1.

**Table 4.12 ANOVA results for the possible relationship between Matric aggregate symbols and Financial Accounting 1 marks, for the years 1998-2002**

| Year | Sum of Squares | Degrees of Freedom | Mean Sum of Squares | F | p |
|---|---|---|---|---|---|
| 1998 | 15102.1 | 3 | 5034.0 | 27.16 | <0.001 |
| 1999 | 14210 | 3 | 4737 | 41.48 | <0.001 |
| 2000 | 15852.1 | 3 | 5284.0 | 33.26 | <0.001 |
| 2001 | 11268 | 3 | 3756 | 25.47 | <0.001 |
| 2002A | 7068.5 | 3 | 2356.2 | 12.45 | <0.001 |
| 2002B | 4185.2 | 3 | 1395.1 | 5.97 | 0.001 |

The results presented in Table 4.11 show that there is a difference between the mean performance scores of students in Financial Accounting 1, when they are grouped in terms of their previous year's Matriculation average performance level. The results in Table 4.11 display a trend in the Financial Accounting 1 marks, where the Matric A&B-aggregate students are the top achievers in Financial Accounting 1, followed by the C- and then D-aggregate students, with the E&F-aggregate students consistently being the lowest performers in Financial Accounting 1. In 1998, for example, the Matric A&B-aggregate students scored an average of 76.5%, whilst the E&F-aggregate students scored an average of only 51.27%, with C and D-aggregate students performing in between. This trend is followed in each of the subsequent years.

The findings of the ANOVA test in Table 4.12 confirm that null hypothesis 3 should be rejected. It shows that, overall, the means of the various matric aggregate groups are significantly different from each other for each of the five years. (For 1998-2002A, $p<0.001$ and for 2002B, $p=0.001$.)

***Ho4: Matric Mathematics Higher Grade (HG) performance level as a predictive independent variable for Financial Accounting 1***

Null hypothesis 4 states: "That there will be no significant difference between the mean performance scores of students in Financial Accounting 1, when they are grouped in terms of their previous year's Matriculation performance in Mathematics Higher Grade (HG)."

The sample sizes for Matric Mathematics HG were too small to perform an ANOVA or any other analysis. However, Table 4.13 presents the Financial Accounting 1 mean scores, for the years 1998-2002, for each of the Matric Mathematics HG score levels achieved in previous years.

**Table 4.13 Mean scores in Financial Accounting 1 for the various Matric Mathematics HG groups, for the years 1998-2002**

| Year | Symbol for Matric Mathematics HG | Mean for Financial Accounting 1 | sd | n |
|---|---|---|---|---|
| 1998 | D | 77.00 | - | 1 |
| | E-H | 53.67 | 19.22 | 3 |
| | | | | |
| 1999 | D | 65.00 | - | 1 |
| | E-H | 61.50 | 37.48 | 2 |
| | | | | |
| 2000 | C | 35.00 | - | 1 |
| | D | 55.00 | - | 1 |
| | E-H | 52.50 | 2.12 | 2 |
| | | | | |
| 2001 | A&B | 56.00 | - | 1 |
| | C | 63.00 | - | 1 |
| | D | 50.50 | 14.85 | 2 |
| | E-H | 45.50 | 14.62 | 4 |
| | | | | |
| 2002A | D | 83.00 | - | 1 |
| | E-H | 57.25 | 16.56 | 4 |
| | | | | |
| 2002B | D | 61.00 | - | 1 |
| | E-H | 57.33 | 6.66 | 3 |

***Ho5: Matric Mathematics Standard Grade (SG) score level (A&B, C, D or E-H) as a predictive independent variable***

Null hypothesis 5 states: "That there will be no significant difference between the mean performance scores of students in Financial Accounting 1, when they are grouped in terms of their previous year's Matriculation performance level in Mathematics Standard Grade (SG)."

Table 4.14 presents the mean performance scores for Financial Accounting 1, standard deviations, 95% confidence intervals and sample sizes for the various Matric Mathematics SG levels (namely A&B, C, D, and E-H), for the years 1998 - 2002. The sample sizes are too small to test for normalities.

**Table 4.14 Descriptive statistics in Financial Accounting 1 for the several Matric Mathematics SG student groups**

| Year | Symbol for Matric Mathematics SG | Mean for Financial Accounting 1 | sd | Lower 95% Confidence Interval | Upper 95% Confidence Interval | n |
|---|---|---|---|---|---|---|
| 1998 | A&B | 52.75 | 13.66 | 38.55 | 66.95 | 4 |
| | C | 47.25 | 13.66 | 33.05 | 61.45 | 4 |
| | D | 50.67 | 13.65 | 34.28 | 67.06 | 3 |
| | E-H | 44.14 | 13.66 | 36.56 | 51.73 | 14 |
| | | | | | | |
| 1999 | A&B | 53.20 | 10.06 | 43.96 | 62.44 | 5 |
| | C | 57.20 | 10.06 | 47.96 | 66.44 | 5 |
| | D | 53.86 | 10.08 | 46.05 | 61.67 | 7 |
| | E-H | 53.50 | 10.07 | 47.98 | 59.02 | 14 |
| | | | | | | |
| 2000 | A&B | 50.00 | 9.48 | 41.15 | 58.85 | 5 |
| | C | 35.00 | 9.49 | 23.57 | 46.43 | 2 |
| | D | 43.00 | 9.49 | 29.00 | 57.00 | 2 |
| | E-H | 45.64 | 9.50 | 40.35 | 50.93 | 14 |
| | | | | | | |
| 2001 | A&B | 56.00 | 12.63 | 15.25 | 96.75 | 5 |
| | C | 63.00 | - | 22.25 | 103.75 | 1 |
| | D | 50.50 | - | 21.69 | 79.31 | 2 |
| | E-H | 45.50 | 14.00 | 25.13 | 65.87 | 4 |
| | | | | | | |
| 2002A | A&B | 66.67 | 18.78 | 43.41 | 89.92 | 3 |
| | C | 52.00 | 18.78 | 28.74 | 75.26 | 3 |
| | D | 56.33 | 18.78 | 33.08 | 79.59 | 3 |
| | E-H | 53.89 | 18.78 | 40.46 | 67.32 | 9 |
| | | | | | | |
| 2002B | A&B | 56.00 | 19.12 | 26.55 | 85.45 | 2 |
| | C | 33.00 | 19.12 | 8.95 | 57.05 | 4 |
| | D | 67.00 | 19.12 | 37.55 | 96.45 | 2 |
| | E-H | 45.78 | 19.11 | 31.89 | 59.66 | 9 |



The sample sizes per performance level for Matric Mathematics SG were again too small to perform an ANOVA; but Table 4.15 presents the results of the Mann-Whitney test that was performed to determine whether there is a statistically significant difference between the Financial Accounting 1 mean scores of the re-grouped Matric Mathematics SG A-D students and those of the E-H students, condensed overall into just two bands of performance.

**Table 4.15 Results of Mann-Whitney tests to compare the average mark in Financial Accounting 1 of the Matric Mathematics SG A-D band of students with that of the E-H band of students**

| Year | Symbol bands for Matric Mathematics SG | Mean performance scores for Financial Accounting 1 | sd | n | Mann-Whitney U statistic | p-value |
|---|---|---|---|---|---|---|
| 1998 | A-D | 50.18 | 9.24 | 11 | 47.0 | 0.10 |
| | E-H | 44.14 | 15.50 | 14 | | |
| 1999 | A-D | 54.65 | 10.09 | 17 | 112.5 | 0.80 |
| | E-H | 53.50 | 9.44 | 14 | | |
| 2000 | A-D | 44.10 | 12.05 | 9 | 69.5 | 0.98 |
| | E-H | 45.64 | 8.41 | 14 | | |
| 2001 | A-D | 52.17 | 11.30 | 6 | 18.0 | 0.67 |
| | E-H | 57.00 | 13.99 | 7 | | |
| 2002A | A-D | 58.33 | 21.81 | 9 | 40.5 | 1.00 |
| | E-H | 53.89 | 13.57 | 9 | | |
| 2002B | A-D | 49.29 | 22.22 | 8 | 28.0 | 0.71 |
| | E-H | 45.78 | 19.16 | 9 | | |



As Table 4.14 illustrates, there is a noticeable difference between certain mean performance scores of students in Financial Accounting 1, when they are grouped in terms of their previous year's Matriculation performance level in Mathematics SG. In 1998, for example, the four students who had attained A&B-symbols for Mathematics SG scored an average of 52.75 marks in Financial Accounting 1, whilst the other 14 students who had attained only E-H-symbols scored an average of only 44.14 marks. However, due to small samples, this difference is not statistically significant, so null hypothesis 5 cannot be rejected.

When the Financial Accounting 1 mean scores of the matric Mathematics SG A-D students are compared with those of the E-H students, Table 4.15 shows that there is no statistically significant difference between the bands (for each of the years, $p>0.05$). On

the basis of this, null hypothesis 5 is tenable (i.e. not rejected), although this finding is likely due to the small sample sizes for Mathematics SG for each year. Small sample sizes meant that a more incisive test, like an ANOVA, could not be performed.

***Ho6: Home language (namely English, Afrikaans and Other) as a predictive independent variable***

Null hypothesis 6 states: "That there will be no significant difference between the mean performance scores of students in Financial Accounting 1, when they are grouped in terms of their home language."

Table 4.16 presents the mean performance scores for Financial Accounting 1, standard deviations, 95% confidence intervals and sample sizes for the various home language groups (namely English, Afrikaans and Other), for the years 1998 - 2002.

**Table 4.16 Descriptive statistics in Financial Accounting 1 for the various home language student groups**

| Year | Home language | Mean for Financial Accounting 1 | sd | Lower 95% Confidence Interval | Upper 95% Confidence Interval | n |
|---|---|---|---|---|---|---|
| 1998 | ENGLISH | 59.24 | 15.03 | 57.04 | 61.45 | 180 |
| | AFRIKAANS | 60.71 | 15.07 | 57.90 | 63.52 | 111 |
| | OTHER | 54.57 | 15.01 | 50.26 | 58.89 | 47 |
| | | | | | | |
| 1999 | ENGLISH | 58.20 | 11.71 | 56.46 | 59.94 | 177 |
| | AFRIKAANS | 63.76 | 11.79 | 61.74 | 65.78 | 131 |
| | OTHER | 51.16 | 11.74 | 47.67 | 54.64 | 44 |
| | | | | | | |
| 2000 | ENGLISH | 49.25 | 14.20 | 47.19 | 51.31 | 183 |
| | AFRIKAANS | 53.86 | 14.20 | 50.95 | 56.77 | 92 |
| | OTHER | 44.83 | 14.15 | 40.48 | 49.18 | 41 |
| | | | | | | |
| 2001 | ENGLISH | 58.27 | 13.10 | 56.64 | 59.90 | 249 |
| | AFRIKAANS | 60.30 | 13.09 | 57.83 | 62.77 | 108 |
| | OTHER | 53.63 | 13.10 | 50.19 | 57.06 | 56 |
| | | | | | | |
| 2002a | ENGLISH | 58.35 | 14.42 | 56.04 | 60.66 | 152 |
| | AFRIKAANS | 65.02 | 14.46 | 60.73 | 69.31 | 44 |
| | OTHER | 56.10 | 14.43 | 52.11 | 60.08 | 51 |
| | | | | | | |
| 2002B | ENGLISH | 49.31 | 15.74 | 46.70 | 51.93 | 140 |
| | AFRIKAANS | 55.51 | 15.69 | 50.43 | 60.59 | 37 |
| | OTHER | 48.69 | 15.66 | 44.23 | 53.15 | 48 |

An ANOVA test was performed, as shown in Table 4.17, to determine whether the home languages of students are statistically related to their subsequent marks in Financial Accounting 1.

**Table 4.17 ANOVA results for the possible relationship between home language and Financial Accounting 1 marks, for the years 1998-2002**

| Year | Sum of Squares | Degrees of Freedom | Mean Sum of Squares | F | p |
|---|---|---|---|---|---|
| 1998 | 1254.5 | 2 | 627.2 | 2.77 | 0.064 |
| 1999 | 5738.0 | 2 | 2869.0 | 20.77 | <0.001 |
| 2000 | 2570.0 | 2 | 1285.0 | 6.40 | 0.002 |
| 2001 | 1647.5 | 2 | 823.8 | 4.83 | 0.008 |
| 2002A | 2088.7 | 2 | 1044.3 | 5.00 | 0.007 |
| 2002B | 1264.3 | 2 | 632.1 | 2.57 | 0.079 |

Null hypothesis 6 is refuted, except for the years 1998 and 2002B, since there is a difference between the mean performance scores of students in Financial Accounting 1, when they are grouped in terms of their home language for the years 1999-2002A. According to the results in Table 4.17, the Afrikaans home language students marginally outperform the English students in Financial Accounting 1, who in turn marginally outperform the Other language students. This trend persists over all the years.

A p-value of $p<0.05$ from the 1999, 2000, 2001 and 2002A ANOVA results in Table 4.14, indicates that, statistically, there is a significant association between home language and Financial Accounting 1 performance. However, the p-values for 1998 and 2002B (0.06 and 0.08 respectively) may indicate that this result is borderline significant and invites further inspection.

***Ho7: Gender as a predictive independent variable***

Null hypothesis 7 states: "That there will be no significant difference between the mean performance scores of students in Financial Accounting 1, when they are grouped in terms of their gender."

t-tests were performed, as shown in Table 4.18, to test whether the gender of students is related to their Financial Accounting 1 mark, i.e. whether there is a statistically

significant difference between the mean performance scores in Financial Accounting 1 of females and males, for each of the years 1998-2002.

**Table 4.18 Results of t-tests for the relationship between gender and Financial Accounting 1 marks, for the years 1998-2002**

| Year | Mean for Financial Accounting 1 of females | Mean for Financial Accounting 1 of males | t-value | df | p | Valid n females | Valid n males | sd females | sd males | F-ratio var | p value |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1998 | 59.17 | 58.96 | -0.13 | 336 | 0.90 | 186 | 152 | 14.84 | 15.50 | 1.09 | 0.57 |
| 1999 | 58.72 | 60.33 | -1.20 | 350 | 0.23 | 205 | 147 | 12.78 | 11.82 | 1.17 | 0.31 |
| 2000 | 49.05 | 51.43 | -1.44 | 314 | 0.15 | 188 | 128 | 14.55 | 14.15 | 1.06 | 0.74 |
| 2001 | 57.42 | 59.74 | 1.68 | 411 | 0.09 | 279 | 134 | 13.06 | 13.34 | 1.04 | 0.76 |
| 2002A | 57.77 | 61.70 | -1.99 | 245 | 0.05 | 165 | 82 | 14.48 | 14.84 | 1.05 | 0.78 |
| 2002B | 49.28 | 52.12 | -1.27 | 223 | 0.21 | 152 | 73 | 15.06 | 17.15 | 1.30 | 0.19 |

According to the results displayed in Table 4.18, the mean performance scores in Financial Accounting 1 of females and males differ marginally for each of the years. However, the results of the t-tests in Table 4.18 reflect a p-value exceeding 0.05 for each year (except for 2002B, where p=0.05), indicating non-significance. Since there is not a significant difference between the mean performance scores of students in Financial Accounting 1, when they are grouped in terms of their gender, null hypothesis 7 is therefore tenable (i.e. is not rejected).

***Ho8: Age as a predictive independent variable***

Null hypothesis 8 states: "That there will be no significant correlation between the mean performance scores of students in Financial Accounting 1 and their ages."

A Pearson product-moment correlation analysis, as shown in Table 4.19, was performed between the variables, age and Financial Accounting 1, to determine whether there is a statistically significant association between the ages of students and their Financial Accounting 1 performance, for the years 1998-2002.

**Table 4.19 Correlations (r) between individual students' ages and their final marks in Financial Accounting 1**

| Year | All Students r | Excluding outlying[7] students r |
|---|---|---|
| 1998 | 0.03 | -0.11 |
| | p=0.59 | p=0.06 |
| | (n=338) | (n=312) |
| 1999 | -0.07 | -0.07 |
| | p=0.21 | p=0.23 |
| | (n=352) | (n=325) |
| 2000 | 0.04 | -0.01 |
| | p=0.48 | p=0.83 |
| | (n=316) | (n=294) |
| 2001 | -0.05 | -0.06 |
| | p=0.30 | p=0.23 |
| | (n=413) | (n=397) |
| 2002A | -0.02 | -0.08 |
| | p=0.74 | p=0.21 |
| | (n=247) | (n=235) |
| 2002B | 0.12 | 0.05 |
| | p=0.06 | p=0.45 |
| | (n=225) | (n=214) |

Particularly low r-values, as indicated in Table 4.19, as well as p-values of more than 0.05 for each of the years indicates that there is not a significant association between the variables age and Financial Accounting 1. Null hypothesis 8 is therefore tenable.

**Face Validity**

When an expert in tertiary-level Accounting (lecturer, subject co-ordinator, course head or head of department) is interviewed independently for his or her interpretations and explanations of the results obtained for null hypotheses 1 to 8, will these suggestions be in substantial agreement with the findings?

[7] Approximately 90% of students fall into the age range 17-21 years. Outlying students fall outside this range.

An interview was conducted with a specialist in tertiary-level Accounting education (head of department who has been teaching Financial Accounting 1 to 4 for several years) to get feedback from him on his interpretations of the results and findings of this current study. Based on his agreement with the results obtained for the various null hypotheses, the answer to the verification question was found to be positive. His comments and reflections are discussed in more detail in Chapter 5.

## 4.4 Regression analysis

A forward stepwise regression (sigma-restricted parameterisation) was performed on the students' scores for each of the years 1998-2002 to determine which variables, adjusting for a number of others, were related to final marks in Financial Accounting 1.

Stepwise selection is an exploratory process of finding a model that, in this case, would make it possible to predict the Financial Accounting 1 mark of a student for each of these years. In forward selection (as opposed to backward elimination) the variables are added to the model as they meet specified significance levels (Lourens & Smit, 2003:171)

Table 4.20 presents the results of the regression analysis to indicate which variables, in combination with others, might play a role in influencing the final mark in Financial Accounting 1, for the year 1998.

**Table 4.20 Results of the regression analysis for the 1998 cohort (n = 338)**

| | Level of effect | Comment | Parameter | Std Error | t | p | -95% Cnf Limit | +95% Cnf Limit |
|---|---|---|---|---|---|---|---|---|
| Intercept | | | 45.812 | 4.796 | 9.553 | 0.000 | 36.38 | 55.25 |
| GENDER | MALE | Pooled | | | | | | |
| HOME LANGUAGE | AFRIKAANS | Pooled | | | | | | |
| HOME LANGUAGE | OTHER | Pooled | | | | | | |
| MATRIC AGGREGATE | C | | 1.270 | 1.307 | 0.972 | 0.332 | -1.30 | 3.84 |
| MATRIC AGGREGATE | D | | -3.782 | 1.152 | -3.283 | 0.001 | -6.05 | -1.52 |
| MATRIC AGGREGATE | E | | -4.835 | 1.620 | -2.985 | 0.003 | -8.02 | -1.65 |
| SUBJECT ONLY | ACCOUNTS | Pooled | | | | | | |
| GRADE | HG | | 6.662 | 0.723 | 9.209 | 0.000 | 5.24 | 8.09 |
| SYMBOL | C | | 1.560 | 1.199 | 1.301 | 0.194 | -0.80 | 3.92 |
| SYMBOL | D | | -0.826 | 1.189 | -0.695 | 0.488 | -3.17 | 1.51 |
| SYMBOL | E | | -6.753 | 1.286 | -5.252 | 0.000 | -9.28 | -4.22 |
| AGE | | | 0.823 | 0.248 | 3.322 | 0.001 | 0.34 | 1.31 |

R-square=0.381

In the regression analysis performed for the 1998 cohort, the variables included in the final regression model were the Matric aggregate (only C, D or E), Accounts/ Maths grade (only HG), Accounts/Maths symbol (only C, D or E-H) and Age. As Table 4.20 shows, variations in these four variables accounted for 38.1% of the subsequent variation in the Financial Accounting 1 mark (this is the R-square value indicated at the bottom of the table), with D and E Matric aggregates, having studied Matric Mathematics or Accounting on HG, having attained an E symbol for Matric Mathematics or Accounting, and Age being significantly influential. Age was not significantly associated with performance when the correlation analysis was done, yet it became significantly related to performance in Financial Accounting 1 when it was examined in combination with the other variables.

The regression equation for the 1998 cohort can be expressed as follows:
Financial Accounting 1 mark = 45.812 + 1.270xC Matric aggregate – 3.782xD Matric aggregate – 4.835xE Matric aggregate + 6.662xHG + 1.560xC symbol – 0.826xD symbol – 6.753xE symbol + 0.823xAge in years

If, for example, we wanted to calculate the predicted score of a 20 year old student with a C Matric aggregate, having done Mathematics (or Accounting) on HG, and having scored a D symbol for it, we would assign values of 1 to Matric C aggregate, to HG, and to D symbol; 20 to age; and values of 0 to all the other variables in the equation. The student's predicted score would therefore be calculated as follows:

Mark for Financial Accounting 1 = 45.812 + 1.270x1 + 6.662x1 – 0.826x1 + 0.823x20 = 69.378 or 69%

Table 4.21 presents the results of the regression analysis to indicate which variables, in combination with others, might play a role in influencing the final mark in Financial Accounting 1, for the year 1999.

**Table 4.21 Results of the regression analysis for the 1999 cohort (n = 352)**

| | Level of effect | Comment | Parameter | Std Error | t | p | -95% Cnf Limit | +95% Cnf Limit |
|---|---|---|---|---|---|---|---|---|
| Intercept | | | 49.070 | 4.105 | 11.952 | 0.000 | 40.995 | 57.144 |
| GENDER | FEMALE | Pooled | | | | | | |
| HOME LANGUAGE | AFRIKAANS | Pooled | | | | | | |
| HOME LANGUAGE | OTHER | Pooled | | | | | | |
| MATRIC AGGREGATE | C | | 0.777 | 0.922 | 0.842 | 0.400 | -1.038 | 2.591 |
| MATRIC AGGREGATE | D | | -4.583 | 0.840 | -5.458 | 0.000 | -6.235 | -2.932 |
| MATRIC AGGREGATE | E | | -4.223 | 1.169 | -3.612 | 0.000 | -6.523 | -1.924 |
| SUBJECT ONLY | ACCOUNTS | Pooled | | | | | | |
| GRADE | HG | | 5.157 | 0.572 | 9.012 | 0.000 | 4.031 | 6.282 |
| SYMBOL | C | | 0.956 | 1.010 | 0.947 | 0.345 | -1.031 | 2.943 |
| SYMBOL | D | | -0.960 | 0.908 | -1.058 | 0.291 | -2.747 | 0.826 |
| SYMBOL | E | | -5.036 | 0.913 | -5.516 | 0.000 | -6.832 | -3.240 |
| AGE | | | 0.654 | 0.213 | 3.071 | 0.002 | 0.235 | 1.073 |

R-square=0.423



In the regression analysis performed for the 1999 cohort, Matric aggregate (C, D or E), Accounts/ Maths grade (HG), Accounts/Maths symbol (C, D or E-H) and Age were the variables included in the final regression model. According to Table 4.21, these variables accounted for 42.3% of the variation in the Financial Accounting 1 mark (as

reflected by the R-square value indicated at the bottom of the table), with the achievement of D and E Matric Aggregates, having done Matric Mathematics or Accounting on HG, an E symbol and Age being significantly influential.

For the 1999 cohort the regression equation can be expressed as follows:
Mark for Financial Accounting 1 = 49.070 + 0.777xC Matric aggregate – 4.583xD Matric aggregate – 4.223xE Matric aggregate + 5.157xHG score + 0.956xC symbol – 0.960xD symbol – 5.036xE symbol + 0.654xAge in years

Table 4.22 presents the results of the regression analysis to indicate which variables, in combination with others, might play a role in influencing the final mark in Financial Accounting 1, for the year 2000 cohort of students.

**Table 4.22 Results of the regression analysis for the 2000 cohort (n = 316)**

| | Level of effect | Comment | Parameter | Std Error | t | p | -95% Cnf Limit | +95% Cnf Limit |
|---|---|---|---|---|---|---|---|---|
| Intercept | | | 35.841 | 4.499 | 7.966 | 0.000 | 26.987 | 44.695 |
| GENDER | FEMALE | Pooled | | | | | | |
| HOME LANGUAGE | AFRIKAANS | Pooled | | | | | | |
| HOME LANGUAGE | OTHER | Pooled | | | | | | |
| MATRIC AGGREGATE | C | | -0.463 | 1.172 | -0.395 | 0.693 | -2.770 | 1.844 |
| MATRIC AGGREGATE | D | | -6.597 | 1.073 | -6.147 | 0.000 | -8.709 | -4.485 |
| MATRIC AGGREGATE | E | | -3.040 | 1.662 | -1.828 | 0.068 | -6.308 | 0.232 |
| SUBJECT ONLY | ACCOUNTS | Pooled | | | | | | |
| GRADE | HG | | 5.926 | 0.773 | 7.667 | 0.000 | 4.405 | 7.447 |
| SYMBOL | C | | 1.592 | 1.284 | 1.240 | 0.216 | -0.934 | 4.119 |
| SYMBOL | D | | -1.702 | 1.262 | -1.349 | 0.178 | -4.186 | 0.781 |
| SYMBOL | E | | -5.140 | 1.303 | -3.945 | 0.000 | -7.704 | -2.576 |
| AGE | | | 0.889 | 0.231 | 3.852 | 0.000 | 0.435 | 1.344 |

R-square=0.376



In the regression analysis performed for the 2000 cohort, Matric aggregate, (C, D or E) Accounts/ Maths grade (HG), Accounts/Maths symbol (C, D or E-H) and Age were the variables included in the final regression model. These variables accounted for 37.6% of the variation in the Financial Accounting 1 mark (this is the R-square value indicated

at the bottom of Table 4.19), with a D Matric Aggregate, having done Matric Mathematics or Accounting on HG, achieving an E symbol and Age appearing to be significantly influential.

The regression equation for the 2000 cohort can be expressed as follows:
Mark for Financial Accounting 1 = 35.841 – 0.463xC Matric aggregate – 6.597xD Matric aggregate – 3.038xE Matric aggregate + 5.926xHG + 1.592xC symbol - 1.702xD symbol – 5.140xE symbol + 0.889xAge in years

Table 4.23 presents the results of the regression analysis to indicate which variables, in combination with others, might play a role in influencing the final mark in Financial Accounting 1, for the year 2001 cohort of students.

**Table 4.23 Results of the regression analysis for the 2001 cohort (n = 413)**

| | Level of effect | Comment | Parameter | Std Error | t | p | -95% Cnf Limit | +95% Cnf Limit |
|---|---|---|---|---|---|---|---|---|
| Intercept | | | 61.244 | 0.717 | 85.382 | 0.000 | 59.833 | 62.654 |
| GENDER | MALE | Pooled | | | | | | |
| HOME LANGUAGE | AFRIKAANS | Pooled | | | | | | |
| HOME LANGUAGE | OTHER | Pooled | | | | | | |
| MATRIC AGGREGATE | C | | 0.914 | 1.077 | 0.849 | 0.397 | -1.203 | 3.032 |
| MATRIC AGGREGATE | D | | -4.502 | 0.973 | -4.627 | 0.000 | -6.415 | -2.59 |
| MATRIC AGGREGATE | E | | -6.072 | 1.313 | -4.626 | 0.000 | -8.652 | -3.492 |
| SUBJECT ONLY | ACCOUNTS | Pooled | | | | | | |
| GRADE | HG | | 4.417 | 0.658 | 6.716 | 0.000 | 3.124 | 5.709 |
| SYMBOL | C | | 2.427 | 1.122 | 2.163 | 0.031 | 0.222 | 4.633 |
| SYMBOL | D | | -1.885 | 1.096 | -1.721 | 0.086 | -4.039 | 0.268 |
| SYMBOL | E | | -2.170 | 1.103 | -1.966 | 0.050 | -4.339 | -0.001 |
| Age | | Pooled | | | | | | |

R-square=0.250



In the regression analysis performed for 2001, Matric aggregate, (C, D or E) Accounts/ Maths grade (HG), Accounts/Maths and symbol (C, D or E-H) were the variables included in the final regression model. These variables, according to Table 4.23, accounted for 25% of the variation in the Financial Accounting 1 mark (this is the R-

square value that appears at the bottom of the table), with the attainment of D and E Matric aggregates and having done Matric Mathematics or Accounting on HG appearing to be significantly influential.

For the 2001 cohort the regression equation can be expressed as follows:
Mark for Financial Accounting 1 = 61.244 + 0.914xC Matric aggregate – 4.502xD Matric aggregate – 6.072xE Matric aggregate + 4.417xHG + 2.427xC symbol – 1.885xD symbol – 2.170xE symbol

Table 4.24 presents the results of the regression analysis to indicate which variables, in combination with others, might play a role in influencing the final mark in Financial Accounting 1, for the year 2002, Module A, cohort of students.

**Table 4.24 Results of the regression analysis for the 2002, Module A, cohort (n = 247)**

| | Level of effect | Comment | Parameter | Std Error | t | p | -95% Cnf Limit | +95% Cnf Limit |
|---|---|---|---|---|---|---|---|---|
| Intercept | | | 64.062 | 0.974 | 65.786 | 0.000 | 62.143 | 65.980 |
| GENDER | FEMALE | Pooled | | | | | | |
| HOME LANGUAGE | AFRIKAANS | Pooled | | | | | | |
| HOME LANGUAGE | OTHER | Pooled | | | | | | |
| MATRIC AGGREGATE | C | Pooled | | | | | | |
| MATRIC AGGREGATE | D | Pooled | | | | | | |
| MATRIC AGGREGATE | E | Pooled | | | | | | |
| SUBJECT ONLY | ACCOUNTS | Pooled | | | | | | |
| GRADE | HG | | 7.322 | 0.932 | 7.852 | 0.000 | 5.485 | 9.158 |
| SYMBOL | C | | 1.554 | 1.485 | 1.046 | 0.296 | -1.371 | 4.478 |
| SYMBOL | D | | -4.580 | 1.473 | -3.110 | 0.002 | -7.481 | -1.679 |
| SYMBOL | E | | -6.815 | 1.276 | -5.342 | 0.000 | -9.329 | -4.302 |
| AGE | | Pooled | | | | | | |

R-square=0.279



In the regression analysis performed for the 2002, Module A, cohort Accounts/ Maths grade (HG) and Accounts/Maths symbol (C, D or E-H) were the variables included in the final regression model. These variables accounted for 27.9% of the variation in the

Financial Accounting 1 mark (this is the R-square value indicated at the bottom of Table 4.24), with HG, and D and E symbols being significantly influential.

The regression equation for the 2002, Module A, cohort can be written as follows:
Mark for Financial Accounting 1 = 64.062 + 7.322xHG + 1.554xC symbol – 4.580xD symbol – 6.815xE symbol

Table 4.25 presents the results of the regression analysis to indicate which variables, in combination with others, might play a role in influencing the final mark in Financial Accounting 1, for the year 2002, Module B, cohort of students.

**Table 4.25 Results of the regression analysis for the 2002, Module B, cohort (n = 225)**

| | Level of effect | Comment | Parameter | Std Error | t | p | -95% Cnf Limit | +95% Cnf Limit |
|---|---|---|---|---|---|---|---|---|
| Intercept | | | 43.550 | 4.635 | 9.396 | 0.000 | 34.415 | 52.685 |
| GENDER | FEMALE | Pooled | | | | | | |
| HOME LANGUAGE | AFRIKAANS | Pooled | | | | | | |
| HOME LANGUAGE | OTHER | Pooled | | | | | | |
| MATRIC AGGREGATE | C | Pooled | | | | | | |
| MATRIC AGGREGATE | D | Pooled | | | | | | |
| MATRIC AGGREGATE | E | Pooled | | | | | | |
| SUBJECT ONLY | ACCOUNTS | Pooled | | | | | | |
| GRADE | HG | | 7.862 | 1.062 | 7.406 | 0.000 | 5.770 | 9.955 |
| SYMBOL | C | | -1.580 | 1.674 | -0.944 | 0.346 | -4.881 | 1.720 |
| SYMBOL | D | | -0.681 | 1.696 | -0.402 | 0.688 | -4.024 | 2.661 |
| SYMBOL | E | | -6.774 | 1.481 | -4.575 | 0.000 | -9.692 | -3.856 |
| Age | | | 0.562 | 0.220 | 2.552 | 0.011 | 0.128 | 0.996 |

R-square=0.254

In the regression analysis performed for the 2002, Module B cohort of students, Accounts/ Maths grade (HG), Accounts/Maths symbol (C, D or E-H) and Age were the variables included in the final regression model. According to Table 4.25, these variables accounted for 25.4% of the variation in the Financial Accounting 1 mark (this is the R-square value indicated at the bottom of the table), with HG, E symbol and Age being significantly influential.

For the 2002, Module B cohort of students, the regression equation can be expressed as follows:

Mark for Financial Accounting 1 = 43.550 + 7.862xHG – 1.580xC symbol – 0.681xD symbol – 6.774xE symbol + 0.562xAge in years

## 4.5 Chapter summary

This chapter has presented the findings of the analyses that were performed to investigate the relationships between performance in Financial Accounting 1 and the following independent variables: Matric Accounting HG scores, Matric Accounting SG scores, Matric aggregate scores, Matric Mathematics HG scores, Matric Mathematics SG scores, Home Language, Gender and Age. It has also presented the results of the regression analysis performed to determine which variables, in combination with others, might play a role in influencing the final mark in Financial Accounting 1 for each of the 1998 to 2002 cohort of students.

In the next chapter, these results and findings will be discussed.

# CHAPTER 5

# DISCUSSION OF RESULTS

## 5.1 Introduction

In the previous chapter the results of this research were presented. In this chapter these results will be discussed and they will be related to the findings of other researchers in the field. Furthermore, an attempt will be made to offer possible explanations for these findings.

In chapter 4 the findings of the research were presented in the order of the eight hypotheses that were tested. The same sequence will be followed in this chapter.

## 5.2 The relationship between Matric Accounting HG scores and subsequent scores in Financial Accounting 1

Previous studies in various institutions and countries have produced inconsistent findings that do not always support the presumption that students who had studied Accounting at high school would have an advantage, and would therefore perform better in Accounting at a tertiary level than those who have no high school background.

The findings of the current study - as reflected by the results of the ANOVA test in Table 4.8 on page 55 of Chapter 4 - is that the Matric Accounting HG results of students are statistically related to their subsequent results in Financial Accounting 1. For example, the findings presented in Table 4.7 on page 54 of Chapter 4 show that in 1998, the Matric Accounting HG A&B students achieved an average mark of 78.92% for Financial Accounting 1, followed by 71.14% for the C students, 65.94% for the D students and only 54.76% for the E-H students. During each of the subsequent years of the study, the Matric Accounting HG A&B students achieved the best results in Financial Accounting 1 and the E-H students achieved the worst results, with only one exception (in 1999).

Furthermore, as the results of the regression analysis for 1998 on p71 shows, having passed Matric Accounting on the HG would have *increased* the Financial Accounting 1 mark of that cohort of students by approximately 7%, and having attained a C+ symbol would have *increased* the final mark by approximately 2%, while having attained a D or E symbol would have *decreased* the final mark by approximately 1% and 7% respectively.

One reason for the superior performance of the students who had performed well in Matric Accounting HG could possibly be the fact that they had not only already learnt the basic concepts and principles of Accounting, but had also learnt how to approach Accounting problems with insight. It is likely that these top students attended well-resourced, previously advantaged schools (like the old Model C schools previously reserved for White students) where the quality of teaching and learning was good. Since they may already have acquired the ability to think conceptually about the subject matter, it could have made the transition to dealing with Accounting at a tertiary level easier for them, hence their better performance in Financial Accounting 1.

The relevance of Matric Accounting HG as a significant predictor of success in Financial Accounting 1 does not come as a surprise when one considers what other previous researchers have reported in this regard. Presently, prior Accounting results are strongly considered when admitting students into the Accounting courses at the Cape Technikon. As pointed out, Matric Accounting is one of the prerequisites for admission with students having to attain at least an E-symbol (40%) on the HG and a C-symbol (60%), although students will still be considered for selection provided they had passed Matric Mathematics.

Lozancic (2003) agrees that a student having previously taken Matric Accounting on the higher grade and the student's symbol achieved in Matric Accounting HG are significant predictors of success in Accounting 1a for students in the Commerce Academic Development Programme (CADP) at the University of Cape Town. She also agrees that a possible explanation for prior Accounting knowledge on the higher grade subsequently

assisting students at university level is that the fundamental Accounting principles and concepts such as debits and credits, assets, liabilities, income, expenses and equity have already become firmly established.

The findings of this study are further supported in another South African study by Rohde and Kavanagh (1996), who monitored the performance of students who entered tertiary courses with similar academic ability, i.e. having obtained the same entrance score. These researchers found that the first year tertiary Accounting result obtained by a student who had studied Accounting previously, was between one and two grades higher than that of a student who had not previously studied Accounting at high school (Rohde & Kavanagh, 1996:275). Similarly, another South African study by Van Rensberg, Penn and Haiden (1998) reported that having taken Matric Accounting subsequently improved a student's final Accounting 1 mark by more than could be attributed to chance.

However, further research would have to be conducted to subsequent Accounting courses to confirm this advantage of Matric Accounting. Several prior researchers have revealed that when subsequent performance was monitored over time, the advantage of prior Accounting studies tends to decrease later in the first year, and as students progress to the second and third years (Eskew & Faley, 1988; Gul & Fong, 1993; Van Rensberg, Penn & Haiden, 1998; Koh & Koh, 1999; Baldwin & Howe, 1982, and Bergin, 1983). These studies therefore seem to suggest what has often been experienced at the technikon - even though this study does not specifically point to it, since it only examines the final mark in Financial Accounting 1 - namely that the advantage due to prior Accounting knowledge could rapidly decrease if precautions are not taken to avoid this happening. Possibly the most important reason for this is that those who had studied Accounting before are often over-confident at the beginning of the course, because much of the introductory subject matter is familiar to them, so they do not devote much time to the subject. When the subject matter subsequently becomes more difficult and requires that more time and effort be devoted to it, they are not mentally prepared to work harder and consequently there is a decline in their results. This view is shared by

various other researchers (for example, Bergin, 1983:26-27 and Baldwin & Howe, 1988:625). It is also possible that matric Accounting only prepares students for tertiary demands at first-year level.

Even if it is found that at the Cape Technikon the benefit of prior Accounting studies decreases by the second or third year, the possible positive effect of previous Accounting study on especially students from previously disadvantaged educational backgrounds could still make it an important factor. The fact that they had studied Accounting at high school, could give them even a small head-start, which could possibly increase their confidence levels and positively influence their learning.

One way of averting the problem of a decline in the results of students who had studied Accounting before could be for lecturers and tutors to intensively counsel these students at the beginning of the year/semester and to warn of the dangers of not applying sufficient time and effort to the study of Accounting as the subject material becomes more unfamiliar and difficult. In line with the report by Bergin (1983), the experienced Accounting students at Cape Technikon have also often demonstrated that a significant shock, like failing a test, was required before they would change their study habits.

In order to stimulate the interest of *all* Financial Accounting students in the subject but especially those who had achieved poorer results in Matric Accounting, including those from disadvantaged educational backgrounds, the suggestion offered by Moses (1987:291) to include certain business publications as part of the compulsory Accounting reading material is worth applying. While prior Accounting tuition is likely to indicate that students have been exposed to textbook Accounting procedures and methods, reading business-type publications (or working/having worked as a student in an Accounting/financial job) provide an opportunity to expose students to the larger business environment in which Accounting operates. This could possibly benefit by having some perspective from which to appreciate the particulars of Accounting that are taught in class.

## 5.3 The relationship between Matric Accounting SG scores and subsequent scores in Financial Accounting 1

The current research has shown that there is a statistically significant difference in the Financial Accounting 1 performance between the different Matric Accounting SG symbol groups (Table 4.10). Table 4.9 on page 57 in Chapter 4 shows that in 1998 the A&B symbol Matric Accounting SG students performed much better than the C, D and E-H students in Financial Accounting 1. During each of the subsequent years, they outperform the other groups by an average of about 4-9%. What is interesting to note is that in 1998 the students who had achieved E-H symbols for Matric Accounting SG achieved approximately the same average mark in Financial Accounting 1 as those who had attained a C-symbol. It is possible that the E-H symbol group includes students from previously disadvantaged backgrounds, where they may not have been adequately prepared for the matric examination and whose matric results were therefore not a good reflection of their ability in Accounting to start with. When they entered an educational environment that was more supportive of their learning, they were consequently able to greatly improve their performance in Financial Accounting 1. This could possibly be regarded as one reason why it might not be fair for the Cape Technikon to base selection decisions only on the matric results of applicants, and why a supplementary mechanism like an admissions test might be necessary. For example, the alternative admissions tests developed by the Alternative Admissions Research Project (AARP) at the University of Cape Town aim to provide access opportunities to tertiary institutions for students from educationally disadvantaged backgrounds, whose matric results do not necessarily reveal their potential to succeed in Higher Education.

Another interesting aspect of the findings in Table 4.9 is that in the year 2000, 69 students (48% of the sample) had attained A&B symbols for Matric Accounting SG, yet they only achieved an average mark of 48.81% in Financial Accounting 1, which is below the pass requirement of 50%. Since students attending the educationally advantaged schools are predominantly advised to enrol for subjects on the HG, it is again possible that a substantial number of these Matric Accounting SG students come

from educationally disadvantaged backgrounds, where the quality of teaching and learning is often of a poor standard. Furthermore, because of the rote-learning approach that is often adopted in the teaching and testing of standard grade subjects, it could be that these students had not acquired the level of conceptual understanding that is crucial for success in Financial Accounting 1, even though they had achieved good results in Matric Accounting SG. This mismatch between the matric results and performance in Financial Accounting 1 could again indicate the need for a supplementary non-achievement based admissions test in order to more accurately measure the potential of applicants to the Cape Technikon to be successful. There are also many other factors which could possibly have contributed to these students who had attained A&B symbols for Matric Accounting SG, failing to achieve the pass requirement of 50% in Financial Accounting 1, like lack of motivation, disorganised study habits, an inability to adapt to the institution, lack of family and institutional support or poor teaching at the institution.

When the average Financial Accounting 1 marks of the various Matric Accounting HG symbol groups are compared with those of the Matric Accounting SG groups for each of the years of the study (Tables 4.7 and 4.9 of Chapter 4), one finds that the Matric Accounting HG symbol groups outperform the SG groups by an average of about 17% for the A&B symbol groups, 16% for the C group, 12% for the D group and 6% for the E-H group. It therefore appears that Matric Accounting HG is a much better predictor of success in Financial Accounting 1 than Matric Accounting SG. This view is supported by Lozancic who asserts that - whilst having passed accountancy on the higher grade can predispose a Commerce Academic Development Programme (CADP) student to succeed in Accounting 1a - if "a student has passed accountancy on the standard grade, it is almost comparable to not having taken accountancy at all" (Lozancic, 2003: 21).

One possible explanation for the Matric Accounting HG students performing better than the Matric Accounting SG students at the Cape Technikon could be that Matric Accounting SG examinations test mainly whether students can replicate what they have been taught in class, whilst the HG examinations are based more on testing the insight

of the students. The Matric Accounting HG students are therefore better prepared for what is required of them in their first-year Accounting tests and examinations.

## 5.4 The relationship between Matric aggregate scores and subsequent scores in Financial Accounting 1

According to the results presented in Table 4.12 on page 60 in Chapter 4, this research study has established that there is a statistically significant association between the average marks of students in Financial Accounting 1 and their previous year's Matric aggregate scores.

According to Table 4.4 on page 50 of Chapter 4 the percentage of students taking Financial Accounting 1 who had attained A, B and C aggregates in matric has decreased markedly, especially since the year 2000 (for example those who had attained C-symbols dropped from approximately 31% to 17%), whilst those who had attained D and E aggregates had increased (for example from approximately 18% to 30% for those who had attained E-symbols). Equity considerations require that increasing numbers of Black students be enrolled, and when one considers that the top achievers in the country are predominantly those who come from educationally advantaged backgrounds, this finding could possibly be due to the fact that and as Yeld (2001:39) points out, historically white universities and technikons - like the Cape Technikon - are enrolling a greater percentage of the country's Black students than historically black universities and technikons. Since most of these students still come from previously disadvantaged educational backgrounds where the quality of teaching and learning is often not good, it could explain why the number of A, B and C Matric aggregate students in Financial Accounting 1 has decreased while the D and E aggregate students had increased.

However, in each of the years included in the study, the Matric A&B-aggregate students are still the top achievers in Financial Accounting 1, followed firstly by the C- and then D-aggregate students, whilst the E&F-aggregate students are consistently the lowest

performers in Financial Accounting 1. In 1998, for example, the Matric A&B-aggregate students scored an average of 76.5%, compared with an average of only 51.27% attained by the E&F-aggregate students. This trend persists in each of the subsequent years. The results of the ANOVA tests in Table 4.12 on page 60 in Chapter 4 reflect a p-value of less than or equal to 0.001 for each of the years, indicating that the means of the various matric aggregate groups are significantly different from each other for the five years.

These findings support what other researchers in the field have found and were to be expected, especially regarding those students from privileged educational backgrounds (like the old Model C schools), where there is adequate coverage of the syllabus and proper means of assessment before the matric exam, so that the matric results of these students are likely to be a good indication of their academic potential and therefore of their future performance in Higher Education. Many researchers confirm the viewpoint that past academic performance is a good predictor of future academic performance in modern western (advantaged) educational situations, and it is well documented by these researchers that past academic performance reflects general academic ability and is significantly related to future academic performance in Accounting (Boeyens, 1989; Dockweiler & Willis, 1984; Moses, 1987; Eskew & Faley, 1988; Doran, Bouillon & Marvin, 1991; Koh & Koh, 1999), as well as in non-Accounting related courses (Behr, 1985; Jackson & Young, 1987).

Behr (1995:111) reported - regarding his study at the University of Durban-Westville in South Africa - that performance in the matriculation examination was still the best predictor of academic success at university. He shares the view of the current researcher that those students who have performed well at school, have already acquired a good work ethic and attitudes to study that would be to their advantage when they pursue their tertiary studies. If they are able to manage the transition from high school to tertiary education, and are not subjected to any serious life changes, there is no reason to assume they will not continue to perform well. Consequently, some researchers emphasise using measures of academic aptitude as primary criteria for

admission to the Accounting courses rather than establishing standardised university entrance examinations (for example Khan, 1997 and Koh & Koh, 1999).

In contrast to the finding of this study that there is a statistically significant association between the average marks of students in Financial Accounting 1 and their previous year's Matric aggregate scores, Lozancic has found that, for the students admitted to the CADP at the University of Cape Town, performance in the matriculation examination did not appear to be a predictor of success in Accounting 1. She accurately asserts that, for these students who are mainly from disadvantaged communities, their matriculation results are not always a true reflection of their abilities. Instead, "their results may be a product of their capabilities, their home environment, their support-base, their financial situation, and the quality of their schooling, which may have been adversely affected by the scarce resources that are available in disadvantaged communities" (Lozancic, 2003:22). It is necessary for institutions, like the Cape Technikon and the University of Cape Town, to enrol students from these backgrounds because of equity and redress, and also to increase the number of Black graduates.

In a country like South Africa - where there is an enormously diverse provision of education - an opposing view to that offered by researchers like Khan (1997) and Koh & Koh (1999) is consequently that the current matric results are not a useful predictor of future academic performance for a huge percentage of applicants to Higher Education. Therefore, although Ronda (1999) reports that conspicuously better academic performance in matric is associated with significantly better performance in the university courses she investigated at the University of Cape Town, one has to acknowledge the contribution of other South African researchers in this regard. Based on approximately ten years of teaching experience at the Cape Technikon, the current researcher agrees with other researchers that in South Africa the matric results, particularly the matric aggregate, is a useful predictor of academic success in Higher Education for *top* students irrespective of their educational background but that it should not be used as the only admission mechanism. Since all applicants to tertiary institutions had not been exposed to equivalent educational opportunities in the past, matric results need to be

supplemented with a non-achievement based admissions test to achieve the most effective and fair approach to selection (see also Mehl and Gerwel, 1992; Yeld, 2001).

## 5.5 The relationship between Matric Mathematics HG scores and subsequent scores in Financial Accounting 1

The sample sizes for Matric Mathematics HG were too small to perform an ANOVA or any other analysis. The numbers of students taking Financial Accounting 1 during each of the years included in the study were 338, 352, 316, 413, 247, and 225 in 1998, 1999, 2000, 2001, 2002A and 2002B respectively. Out of these, the numbers of students taking Financial Accounting 1, who had previously taken Matric Mathematics HG, were only 4, 3, 4, 8, 5 and 4 respectively. (See Table 4.6 on page 52 of Chapter 4 for the symbol distributions of these Matric Mathematics HG students.) The discussion regarding the relationship between Mathematics background and performance in Financial Accounting 1 will therefore be done in the next section.

## 5.6 The relationship between Matric Mathematics SG scores and subsequent scores in Financial Accounting 1

The finding of the current research is that there is no statistically significant association between the Matric Mathematics SG scores of students and their subsequent scores in Financial Accounting 1. According to Table 4.14 on page 63 of Chapter 4, there is a clear difference between certain of the average marks attained by students in Financial Accounting 1, when they are grouped in terms of their symbols achieved in Matric Mathematics SG. In 1998, for example, the four students who had attained A&B-symbols for Mathematics SG scored an average of 52.75 marks in Financial Accounting 1, in comparison with an average of only 44.14 marks attained by the 14 students who had attained E-H-symbols. This difference is, however, not statistically significant due to small sample sizes.

The results of the Mann-Whitney tests in Table 4.15 on page 64 of Chapter 4 show a p-value of more than 0.05 for each of the years from 1998 to 2002B. On the basis of this it is concluded that there is no statistically significant difference between the mean scores in Financial Accounting 1 of the matric Mathematics SG A-D students and those of the E-H students. Since both Accounting and Mathematics require insight, logical thought and the ability to conceptualise, it is surprising that the current study did not find a statistically significant relationship between these two variables. However, it is likely that this finding is due to the small sample sizes for Mathematics SG for each year, which meant that a more incisive test, like an ANOVA, could not be performed. Out of 338, 352, 316, 413, 247, and 225 students taking Financial Accounting 1 during each of the years included in the study, only 25, 31, 23, 13, 18 and 17 respectively had previously taken Matric Mathematics SG (Table 4.6 on page 53 of Chapter 4).

The revelation that only approximately 1% of Financial Accounting 1 students in the study had taken Matric Mathematics on the HG and 10% on the SG was surprising to the current researcher who had assumed that a greater percentage of the Financial Accounting 1 students at the technikon had studied Mathematics at school. This possibly explains why so many of them have difficulty doing the basic calculations for Value Added Tax (VAT), profit mark-ups, ratios, or even simple percentages that they are required to do in first-year Accounting. However, in the light of the shortage of qualified Mathematics teachers in the country, especially in previously disadvantaged schools, it is possibly understandable why so few of the students who are enrolled at the technikon had not studied Mathematics at high school. Furthermore, the Report of the Ministerial Committee on the Senior Certificate Examination (Department of Education 1998, in Yeld 2001:46) reports that in many of these schools the syllabus was not adequately covered. For example, it was found in many schools that twenty teaching days before the matric exam many schools had not even started the Geometry syllabus. This means that even if the students had studied Mathematics at these schools, they would probably not have been adequately prepared for the matric exam. Many of those who had passed Matric Mathematics are also possible attracted to studying Chartered Accounting at a university, rather than enrolling at the technikon.

Since Matric Mathematics is regarded as a prerequisite for admission to the Accounting-related courses at the Cape Technikon in the absence of Matric Accounting, further research would have to be conducted into the lack of a significant relationship between Matric Mathematics SG and Financial Accounting 1 mark to try and establish the possible causes. One possibility could be that in Financial Accounting 1 students are not yet required to make the kind of complex mathematical calculations that are required of them in the second and third years. Further research may therefore reveal that Matric Mathematics becomes more significant as the students progress to Financial Accounting 2 and 3. Consequently, it may be necessary for it to remain a prerequisite or at least a recommendation for admission to the Accounting courses at the Cape Technikon, again bearing in mind that in the interest of equity the matric results should not be used as an unconditional admission mechanism for students from diverse educational backgrounds.

On comparing the results of the current study with those of other researchers in the field, it is observed that several had reported that Mathematics background was a significant variable with regards to the variation in student performance in Accounting courses in the USA, Hong Kong and Singapore respectively (Eskew & Faley, 1988; Gul & Fong, 1993; and Koh & Koh, 1999). Students with a stronger Mathematics background were found to produce better results, which possibly established Mathematics as a universally important determinant of performance in an Accounting degree programme.

Consistent with the results of this current research, and contrary to the findings reported in the previous paragraph, various other studies have reported no significant association between Mathematics background and performance in Accounting. (Bartlett *et al.*, 1993; Gist *et al.*, 1996, cited in Koh & Koh, 1999:16; and Lozancic, 2003:23). The latter researcher reported that for students admitted to the CADP at the University of Cape Town, Mathematics was not a significant predictor of success, notwithstanding the fact that both Mathematics and Accounting require logical thought and the ability to think abstractly. She agrees with the current researcher that one possible reason for this lack of a relationship between Matric Mathematics and Accounting 1 could be that in

Accounting 1 the focus is more on understanding new concepts and being able to apply them, rather than on having to make complex mathematical calculations.

In general, however, possibly because Accounting requires sound numerical skills, it is reasonable to expect that there should be a relationship between Mathematics background and performance in an Accounting course and that - especially for students who come from an educational background where the quality of teaching an learning was good - it is an advantage to have passed Matric Mathematics.

## 5.7 The relationship between the variable home language and performance scores in Financial Accounting 1

The present study has found that, in four out of the six Financial Accounting 1 final marks examined, there is a difference between the mean performance scores of students in Financial Accounting 1, when they are grouped in terms of their different home languages. Although less that 10% of the South African Population speaks English as a first language (Young 2001:7), it is the language of instruction used by the majority of tertiary institutions in the country. Since most of the study material and textbooks in Financial Accounting 1 are in English and the language of instruction at the institution is predominantly English, the expectation was that the English home language group would attain the best results in Financial Accounting 1, followed firstly by the Afrikaans home language group (because a small percentage of classes are also conducted in Afrikaans) and then by the Other (predominantly Xhosa) language group. The reason for this expectation is that the ability of students to understand concepts is often dependent on their command of the English (and to a small extent the Afrikaans) language and on their understanding of English terminology. A large percentage of the Other-language students (especially those from educationally disadvantaged backgrounds) may not possess the language skills that are needed to learn meaningfully in a language that is not their first language. This implies that their ability to understand lectures and interpret questions in class as well as in tutorials and tests/examinations is hampered, putting them at a definite disadvantage.

Contrary to the expectation of the researcher that the English home language students would be the top students, the results in Table 4.16 on page 66 of Chapter 4 reflect that the Afrikaans students marginally outperformed the English students in Financial Accounting 1, who in turn marginally outperformed the Other-language students. This trend persists over all the years. One possible explanation could be that, especially during the first few years of the study, the majority of the comparatively small number of Afrikaans-speaking Financial Accounting 1 students had passed Matric Accounting on the higher grade and were mostly from the old Model C schools, where their Matric results are a better reflection of their ability. In contrast, the majority of the comparatively large numbers of Other-language students came from previously disadvantaged township schools, where Accounting was often not even offered on the higher grade. As Table 4.5 on page 51 of Chapter 4 illustrates, the number of English home language students enrolled for Financial Accounting 1 has increased by approximately 9% from 1998 to 2002B and the number of Other home language students by approximately 7%, while the number of Afrikaans students has decreased by approximately 16% over this period.

The ANOVA results in Table 4.17 on page 67 of Chapter 4 yield p-values of less than 0.05 for the years 1999, 2000, 2001 and 2002A. This indicates that, statistically, there is a significant relationship between home language and Financial Accounting 1 performance. However, the p-values for 1998 and 2002B are slightly more than 0.05 (0.06 and 0.08 respectively). This may be an indication that the aforementioned finding is borderline significant, and invites further research into the association between the home languages of students and their performance in financial Accounting 1.

A similar study by Booysen (1996) - at the Peninsula Technikon in South Africa, where there were the same three broad language bands as at the Cape Technikon, and the language of tuition is also predominantly English - reported that the highest pass rate in first semester studies in electrical and mechanical engineering was achieved by the

group of students using a Black language as mother tongue, followed by the English speaking group, while the lowest result was achieved by the Afrikaans speaking group.

When the findings of the current study are compared with those in other countries where English is not necessarily the first language of the students, it is found that in Hong Kong a positive association was reported between proficiency in English and performance in Accounting; with students who came from English secondary schools performing better in the Accounting course than those who came from Chinese secondary schools (Wong & Chia, 1996; and Gul & Fong, 1993:38). However, a study at the University of Queensland in Australia concluded that English as a student's first or subsequent language was *not* associated with a difference in performance in introductory Accounting (Drennana & Rohde, 2002).

## 5.8 The relationship between the variable Gender and performance scores in Financial Accounting 1

Internationally as well as locally, here has been an increase in the number of female students studying Accounting. At the Cape Technikon the number of female students studying Financial Accounting 1 has increased steadily over the five years during which the current research was conducted, from 55% of the sample in 1998 to 68% in 2002B (Table 4.3 on page 50 of Chapter 4). However, despite this increase, the results of this research reflect that there is not a statistically significant association between the gender of students and their final marks achieved in Financial Accounting 1. According to the results displayed in Table 4.18 on page 68 of Chapter 4, the mean performance scores in Financial Accounting 1 of females and males differ marginally for each of the years. However, the results of the t-tests in Table 4.18 reflect a p-value exceeding 0.05 for each year (except one, where p=0.05), indicating that there is not a significant difference between the mean performance scores of students in Financial Accounting 1, when they are grouped in terms of their gender.

Other researchers have also reported no significant gender differences in the actual Accounting performance of students in their research at three different universities in the USA (Carpenter *et al.,* 1993). Furthermore, research conducted at Technikon Pretoria in South Africa - to predict the probability of a student being a successful first-year student using various predictor variables such as gender – also indicated that gender was not a significant predictor for the success of students in the first year (Lourens & Smit, 2003).

Various other researchers have, however, either found that female Accounting students outperformed their male peers or vice versa. For example, Doran *et al.* (1991) in the USA as well as Koh and Koh (1999) in Singapore reported that males generally performed better than females in a first year Accounting However, they acknowledged that instead of this being due to any real gender effect, it could have been as a result of there being a large number of male students enrolled in the Accounting course and the fact that there were twice as many females as males in their study sample, which could possibly have motivated the males to do better, respectively.

Despite the increase in the number of female students studying Financial Accounting 1 by approximately 13% over the five years during which the current research was conducted, the fact that no significant relationship was found between the gender of the students and their Financial Accounting 1 marks was not surprising. While it may be possible, for example, that some female students may feel driven to perform better than males in Financial Accounting 1 in order to justify that they are capable of gaining access into a field that has been traditionally male, or for some male students to work harder because they are being outnumbered by female students, it seems likely that the gender related results reported by the various researchers may have been eliminated if the academic achievement of the students in the samples had been taken into account (refer also to Buckless *et al*., 1991:6). The inconclusive findings appear to support the current researcher's view that how well students perform in Accounting is more likely to be influenced by factors like their academic ability, analytical skills, levels of motivation, and study habits, than by whether they are male or female.

## 5.9 The relationship between the age of students and their performance scores in Financial Accounting 1

Although the older, more mature part-time students appear to be more motivated, are much more willing to contribute to class discussions and appear to be more knowledgeable about Accounting-related matters, the current researcher was uncertain regarding whether this meant that they would possibly perform better than the younger full-time students, many of whom had had the benefit of having recently been involved in studying Accounting at school. The current investigation, however, found that there is no significant difference between the mean performance scores of students in Financial Accounting 1, when they are grouped in terms of their ages. This could possibly be because the average age of the students in the study is approximately 19 years for 1998-2001 and 21 for 2002A and B (Table 4.1 on page 49 of Chapter 4), therefore the older, more mature, students referred to above are in the minority. Another possible explanation could be that the older students generally also have full-time jobs and therefore have many more demands made on their time and it is consequently more difficult for them to settle down to the routines of study and examinations, even though their experience might have given them the advantage of better understanding the subject matter.

This young student profile could also explain why, on the basis of the correlation analysis to determine the strength of the linear relationship between the students' age and their Financial Accounting 1 mark, a particularly low r-value, as well as a p-value of more than 0.05 for each of the years indicated that there is not a significant association between the variables Age and Financial Accounting 1 mark (Table 4.19 on page 69 of Chapter 4). However, when Age was examined in combination with other variables in the regression analysis, it became significantly influential in influencing the final mark in Financial Accounting 1 (Tables 4.20; 4.21; 4.22 and 4.25).

The results of the correlation analysis of the current study correspond with those of a study at Technikon Pretoria in South Africa where it was similarly found that the age of a

student was not a significant predictor for the success of the students in the first year (Lourens & Smit, 2003).

However, various researchers have reported that the age of the students in their studies seemed to have a significant influence on the Accounting performance of the students. Some reported that the younger students performed significantly better in the Accounting programme than the older students. (Bartlett *et al.,* 1993; and Koh & Koh, 1999). However, others reported that the older students performed better in the Accounting programme than the younger ones (Dockweiler & Willis, 1984, cited in Koh & Koh, 1999; and Hoskins & Newstead, 1997).

Given all of these contradictory findings, it is not surprising that explanations regarding the effect of age on performance tend to be speculative. Whilst on the one hand, for example, the older students are expected perform better because they have the advantage of experience and maturity, on the other hand younger students may be likely to perform better because they have the advantage of having recently attended school and consequently of having been exposed to the routines of studies and examinations.



### 5.10 Regression analysis

A forward stepwise regression analysis was conducted on the Financial Accounting 1 marks of students for each of the years from 1998 to 2002 to establish which of the independent variables, in combination with a number of others, were related to performance in Financial Accounting 1 (the dependent variable). Stepwise selection is an exploratory process of finding a model that, in this case, would make it possible to predict the Financial Accounting 1 mark of a student for each of these years.

The results of the regression analysis Tables 4.20 to 4.25 in Chapter 4 reflect that - for this current research - the variables that were consistently significant in predicting the final mark of a student in Financial Accounting 1 for each of the years of the study were the *Matric Accounting/Maths grade*, and the *Matric Accounting/Maths symbol*. The

*Matric aggregate* was also a significant predictor of the final mark in Financial Accounting 1 for each of the first four years of the study, but not for 2002. When the linear relationship between Age and final mark in Financial Accounting 1 was examined in testing null hypothesis eight, it was concluded that there is not a significant association between the variables Age and Financial Accounting 1. However, when the relationship between Age and final mark in Financial Accounting 1 was examined while taking the effect of other variables into account in the regression analysis, Age became a significant factor in influencing student performance in Financial Accounting 1 for four out of the six cohorts of students. In each of these cases, increasing Age had a positive effect on the Financial Accounting 1 mark of the students (indicated by positive parameters in Tables 4.20, 4.21, 4.22 and 4.25 in Chapter 4).

Furthermore, having passed Matric Accounting or Mathematics on the *higher grade*, and having attained a *C+* symbol in these subjects and in the Matric aggregate, had a positive influence on student performance in Financial Accounting 1 (Positive as opposed to negative parameters for D and E-H symbols in Tables 4.20 - 4.25 in Chapter 4). This information affirms what has been said previously about the matric results of top students being much more reliably related to their subsequent performance in tertiary education. It therefore appears to be more straightforward for Higher Education institutions - including the Cape Technikon - to select these students who achieved good matric results for admission, but more difficult to select among those students whose matric results were not as good, including those who come from disadvantaged educational backgrounds. Particularly for these students, methods of selection that can supplement their matric results are needed. If the technikon relied on achievement test results like the matric exam results only, it could result in low numbers of these students being selected for admission.

Furthermore - based on the R-square values indicated at the bottom of Tables 4.20 to 4.25 on pages 71 to 76 in Chapter 4 - it can be concluded that variations in the scores of the independent academic variables - Matric aggregate, Matric Accounting or Maths grade, and the Matric Accounting or Maths symbol, only account for *less than 50%* of

the subsequent variation in the Financial Accounting 1 mark (38.1%, 42,3%, 37.6%, 25%, 27.9% and 25.4% for the years 1998, 1999, 2000, 2001, 2002A and 2002B respectively). The higher the regression coefficient (R-square) the more the variation in the dependent variable (e.g. Financial Accounting 1 mark) is explained by the independent variables (Lourens & Smit, 2003:175). Consequently, it appears evident that there have to be *other* variables and factors that could possibly have contributed to the variation in the Financial Accounting 1 marks besides these academic variables. The possible impacts of these other variables and factors have been emphasized by many researchers and educators involved in Higher Education. Some of the crucial factors that could impact on the success rate of first-year students are each individual student's personal background and history, as well as their life skills, their personal adaptation to Higher Education, and their financial stability in the first year.

This study therefore confirms that using only predictive measures that are based entirely on pre-enrolment measures like matric results have limited potential in allowing tertiary institutions to predict confidently which students will be capable of successfully completing the course into which they have been admitted. During the past few years many researchers have suggested a variety of post-enrolment factors that could impact significantly on the success of students at a tertiary level, many of which must have been influential in this study when one considers some of the comments made in testing the various hypotheses. Examples of such factors (cited in Killen *et al.,* 2003:148), include the following:

- The motivation of students (Talbot, 1990)
- The approach of students to studying (Meyer, 1990)
- The cultural expectations of students (Ginsberg, 1992)
- The academic literacy of students (Amos & Fischer, 1998)
- The time management skills of students (Lahmers & Zulauf, 2000)
- The peer culture to which students are exposed (Gainen, 1995)
- The quality of teaching (Bartz & Miller, 1991)

- The belief of students in their own ability (Kleeman, 1994; Mc Kenzie & Schweitzer, 2001)
- The student support structures offered by the university (Kleeman, 1994).

### 5.11 Interviews with expert colleagues

An interview was conducted with a specialist in Higher Education Accounting to try to ascertain whether the results and findings of this current study make professional sense to him. The outcome of the interview was that he was in substantial agreement with the results obtained for the various hypotheses.

Regarding the five academic variables, the interviewee reported that he had suspected the existence of a strong correlation between high school Accounting background and performance in Financial Accounting 1. He ascribed this to the fact that - since Accounting has a strong conceptual content as well as a skills component - the students who had already achieved an understanding of the basic principles of Accounting and acquired the necessary practical/processing skills through practice at school level would have a definite advantage in first-year Accounting. He also observed that the students who had achieved good Matric aggregates had already acquired good study habits and a good work ethic, which then also made it easier for them to perform well in Financial Accounting 1. Furthermore, based on his many years of experience, he agreed that Matric Accounting HG is a better predictor of success in Financial Accounting 1 than Matric Accounting SG. His explanation offered for this is once again based on the conceptual nature of Matric Accounting HG, which prepares the students much better for thinking on the kind of level that is required of them in Higher Education.

With regard to the relationship between a sound Mathematics background (or Matric Maths) and performance in Financial Accounting 1, the interviewee held the view that there would be a positive correlation between especially Maths HG and Financial Accounting 1 performance, again because of the conceptual nature of Maths HG. Having taught Financial Accounting 1 throughout all the years covered by the current

study, the current researcher was surprised by the revelation that about 1% of the students had studied Maths on the HG in Matric and fewer than 10% on the SG. The interviewee, however, found the small sample sizes for Matric Maths HG "understandable", possibly because not many Matric Maths HG learners are produced in the Western Cape and those who have studied Maths HG in matric, are possibly drawn to Chartered Accountant studies. An interesting interpretation offered by the interviewee was that if a learner had chosen to do Matric Maths SG, it might already be an indication that such a learner struggles with logical thinking and conceptual skills and would therefore not fare as well in Accounting as a Maths HG learner.

When questioned about the biographical variables, the interviewee related that the findings regarding the relationship between the performance of students in Financial Accounting 1 and their home languages, ages and gender are in keeping with his personal experience and therefore his expectations. With reference to the home language relationship with Financial Accounting 1 performance possibly being borderline significant, the interviewee considered it likely for this kind of result to be "muddled", since one rarely gets to work with pure samples. Most of the literature and study materials are in English; therefore there is an increasing tendency among lecturers to conduct lectures in English, irrespective of the home language group being taught. The interviewee, for example, presently has the only Afrikaans-medium Financial Accounting 1 class, yet 90% of his classes are conducted in English, despite the fact that his home language is Afrikaans.

What the interviewee found most interesting and helpful about the current study, was that it provided confirmation for him of what he had always intuitively suspected as someone involved in teaching first-year Accounting, especially with reference to the debate on whether Matric Accounting should be regarded as a prerequisite for admission to Financial Accounting 1. He also suggested that the Accounting department should in future use the information obtained from this study to put in place intervention strategies to assist students who fall into "at risk" groups, for example by making it

compulsory for then to attend a certain number of tutorials or work through a specific text if they had not studied Accounting at school.

The interviewee was in complete agreement with the current researcher and prior researchers that there are many other factors that could possibly influence the performance of first-year students, besides their prior academic achievements like the matric results. Those he highlighted as being particularly important were: students being able to assume *personal responsibility* for their studies and success; the level of *wellness* of the student, emphasizing that some students have to study under extremely stressful conditions; how *motivated* the students are; and how much *support* the students receive from their family, peers and the institution.

### 5.11 Chapter summary

This chapter discussed the results and findings of the current research that were presented in Chapter 4, and compared these results and findings with those of other South African and international researchers who have also attempted to predict Accounting performance at Higher Education institutions. The discussion also invoked possible explanations by various researchers regarding why certain variables appear to be related to academic achievement (particularly in Accounting courses) and others not.

In the next and final chapter, the conclusions and limitations of the research and implications of the findings will be presented, and recommendations will be made based on these findings.

# CHAPTER 6

# CONCLUSIONS, IMPLICATIONS, RECOMMENDATIONS AND FINAL REMARKS

## 6.1 Introduction

This chapter presents the conclusions, possible implications, recommendations and limitations of the research.

As outlined in Chapter 1, the main research question that this investigation attempted to answer was whether prior accounting knowledge (as indicated by a pass in matric Accounting HG or SG) is a good predicator of success in Financial Accounting 1.

In addition, the following sub questions were also asked:

Is performance level in Financial Accounting 1 linked to other academic variables, like academic aptitude (as indicated by matric aggregate) and mathematics background (as indicated by a pass in matric mathematics), and other measurable influences like home language (indicating proficiency in English/Afrikaans, the language of instruction for Financial Accounting 1), gender (due to the increase in the number of female students being admitted), and age?

The matric aggregate and the matric results in Accounting/Mathematics are usually the main/sole criteria used as a means of selecting students for the National Diploma courses in Cost and Management Accounting, Internal Auditing and Financial Information Systems in the Faculty of Business Informatics at the Cape Technikon. Hence, the reasons for asking the above-mentioned questions were to ascertain whether these matric results are reliable and sufficient criteria for selection purposes, or whether there is a need to introduce additional means of assessing student potential for success in the aforementioned accounting courses.

## 6.2 Conclusions

On the basis of the ANOVA analyses, Mann-Whitney tests (Maths SG), t-tests (gender) and Pearson product-moment correlation (age) conducted in Chapter 4 it can be concluded that there is a statistically significant relationship between the average performance scores of students in Financial Accounting 1 and the variables Matric Accounting HG scores, Matric Accounting SG scores and Matric aggregate scores. The higher the students' aforementioned matric scores, the higher the subsequent Financial Accounting 1 marks are likely to be. However, it is likely that this is only relevant for students from educationally advantaged educational backgrounds where the quality of education was good and the students were consequently well prepared to meet the demands of Higher Education. A significant relationship was also found between the average performance scores of students in Financial Accounting 1 and the variable home language, although the result was possibly borderline significant which might suggest the need for further investigation.

However, the analyses showed that there is no statistically significant relationship between the average Financial Accounting 1 marks of students and the variables Matric Mathematics SG scores, Gender and Age. Since the sample sizes for Matric Mathematics HG were too small to perform any analysis, the nature of the relationship between this particular variable and the subsequent performance of students in Financial Accounting 1 could not be established. Furthermore, the fact that no statistically significant relationship was found between the average Financial Accounting 1 marks of students and their Matric Mathematics SG scores, This finding was unexpected since Accounting requires numerical skills, and since Mathematics and Accounting both require logical and analytical thinking. However, it could also possibly be due to the small sample sizes that prevented a more incisive test from being conducted. Considering the increase in the number of Xhosa-speaking students taking Financial Accounting 1 who come mainly from disadvantaged educational backgrounds, and in the light of the shortage of qualified Mathematics teachers in the country,

especially in disadvantaged schools, it is possibly understandable why so few of the students in the study have not studied Mathematics at high school.

### 6.3 Implications of the findings

It appears evident from the conclusions that the students who attained high Matric aggregates and achieved good symbols for Matric Accounting, also attained the best results in Financial Accounting 1 and vice versa. This study therefore implies that Matric Accounting and Matric aggregate are good predictors of success in Financial Accounting 1, especially for students who had achieved good results in the matric exam, and should continue to be taken into account in selection planning for the accounting courses. However, for students who had performed poorly in the matric exam, including those from educationally disadvantaged backgrounds, their matric results were not always reliably related to their performance in Financial Accounting 1.

Although Matric Accounting and Matric aggregate were found to be good predictors of success in Financial Accounting 1, the regression analyses have shown that these significant independent variables account for less than 50% of the variation in the Financial Accounting 1 results. This emphasizes the fact that other unknown variables have an important influence on the performance of the Financial Accounting 1 students. Therefore other factors may have to be taken into account when the decision has to be made regarding whether to accept a particular student into the course or not. Possibly this might be even more so in the case of students form disadvantaged educational backgrounds whose (adjusted) matric results may not be a reflection of their potential to start with, and whose subsequent success in Higher Education could be influenced by many more considerations than simply their matric results. The significance of these auxiliary factors would need to be confirmed by further investigation into the relationships between Financial Accounting 1 mark and various qualitative factors.

There has been sufficient research proposing that most selection methods give merely an approximate indication of the probability of students being success in Higher

Education. Two of the measures that are most commonly used to predict student success at a tertiary level are the matriculation results achieved by students and standardised tests. However, it is suggested that these two measures have limited empirical support when used on their own and that using a combination of measures can be more predictive than individual measures. The matric examination, being an achievement test, provides important information to the tertiary institution about what the applicants bring with them into Higher Education, because they are related to what the students have been taught. However, for applicants whose learning opportunities have been compromised, the matric results should not be the only measure of the their academic worth. Since Higher Education is a stepping-stone to upper social mobility, it is important for tertiary institutions to ensure that their selection criteria are sensitive to the educational backgrounds of their applicants.

## 6.4 Recommendations for future research

Since resources for tertiary education are scarce, and since there is a big demand for accounting places at tertiary institutions, it is important that a better understanding is gained of the factors that are clearly associated with student performance in accounting, in an attempt to select and admit students who have the ability to succeed in this field. Furthermore, being able to predict more accurately which students might potentially drop out or take longer to graduate, could enable institutions to focus on suitable intervention strategies like bridging courses (also recommended by Lourens & Smit, 2003). Three recommendations are offered for future research:

Firstly – given that many other researchers have found that the advantage of prior accounting knowledge appears to diminish as students progress from their first year into their second or third years - the current research can be extended to the upper-level accounting courses to investigate the success of the relevant admission criteria in predicting success in Financial Accounting (or the accounting courses) at second- and third-year levels.

Secondly, since this current research has suggested that other factors may have an appreciable influence on the success of students in Financial Accounting 1, further research could be conducted in order to determine various qualitative characteristics that could be helpful as predictors of success in Financial Accounting 1.

Lastly, further research can be conducted into exploring the effectiveness of using a supplementary well-designed admissions test that is already being used at another institution (e.g. the AARP tests used at the University of Cape Town), so that the matric results are not used as the sole criteria for selection. This could provide access to Higher Education for students who might not gain access on the basis of their matric results, including those from previously disadvantaged backgrounds, while at the same time ensuring a greater likelihood of them being successful if appropriate placement into curricula is followed. When using an admissions test the aim should not be to duplicate the information that can be acquired from the matric results, but to obtain different, complementary insights into the abilities of the applicants (Yeld, 2001:11). The results of the admissions test can be included as an independent variable and its relationship with the Financial Accounting 1 scores of students can be determined.

## 6.5 Limitations of the research – some final remarks

There are a number of factors that restrict the firmness of the conclusions that can be drawn from this study; consequently prudence must be employed when endeavouring to generalise the results of this study to other institutions, or even to other faculties and students at the institution where the research was conducted.

As was pointed out in Chapters 1 and 3, this investigation was based on data pertaining to student performance in only one subject, (namely Financial Accounting 1), offered in only one faculty (namely the Faculty of Business Informatics) at only one South African tertiary institution (namely the Cape Technikon). Furthermore, the current investigation gathered data pertaining only to specific quantitative variables, the most important being matriculation scores in Accounting, Mathematics and the aggregate.

As various researchers have found, some of the most significant factors on the academic success of students at university appear to be interest in the course, motivation, self-discipline and effort – none of which can be predicted directly from matriculation results (Schmelzer *et al.,* 1987, and Killen, 1994, cited in Killen *et al.,* 2003:148). Nevertheless, it is expected that the results of this research can be incorporated into the enrolment planning, and its recommendations considered regarding the selection criteria for the National Diploma courses in Cost and Management Accounting, Internal Auditing and Financial Information Systems. Furthermore, it is anticipated that the findings can be integrated into intervention strategies in the Faculty of Business Informatics, to improve the chances of first-year students being successful.

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## APPENDIX 1

**p-values for each of the three normality tests performed to determine whether the Financial Accounting 1 marks are normally distributed for each of the Matric Accounting HG groups, for each of the years 1998-2002**

| SYMBOL | Kolmogorov-Smirnov Test p-values | Lilliefors Test p-values | Shapiro-Wilk W test p-values |
|---|---|---|---|
| A&B | > 0.2 | > 0.2 | 0.602 |
| C | > 0.2 | > 0.2 | 0.101 |
| D | > 0.2 | > 0.2 | 0.458 |
| E-H | > 0.2 | < 0.15 | 0.075 |
| | | | |
| A&B | > 0.2 | > 0.2 | 0.339 |
| C | > 0.2 | < 0.2 | 0.150 |
| D | > 0.2 | > 0.2 | 0.107 |
| E-H | > 0.2 | < 0.01 | 0.074 |
| | | | |
| A&B | > 0.2 | > 0.2 | 0.367 |
| C | > 0.2 | < 0.2 | 0.365 |
| D | > 0.2 | < 0.1 | 0.111 |
| E-H | > 0.2 | < 0.05 | 0.245 |
| | | | |
| A&B | > 0.2 | < 0.2 | 0.122 |
| C | > 0.2 | > 0.2 | 0.021 |
| D | > 0.2 | > 0.2 | 0.398 |
| E-H | > 0.2 | > 0.2 | 0.704 |
| | | | |
| A&B | > 0.2 | > 0.2 | 0.398 |
| C | > 0.2 | > 0.2 | 0.429 |
| D | > 0.2 | < 0.2 | 0.158 |
| E-H | > 0.2 | > 0.2 | 0.872 |
| | | | |
| A&B | > 0.2 | > 0.2 | 1.000 |
| C | > 0.2 | > 0.2 | 0.601 |
| D | > 0.2 | < 0.05 | 0.019 |
| E-H | > 0.2 | > 0.2 | 0.431 |



Since the Shapiro-Wilk W test is the preferred test for normality, the p-values for this test have been included in Table 4.7 of Chapter 4.