

# **The relationship between a selection battery and the academic performance of students on an MBA programme**

**Saffiya Nagdee**

**2011**

# **The relationship between a selection battery and the academic performance of students on an MBA programme**

presented by

**Saffiya Nagdee**

In partial fulfilment of the requirements for the degree

**Magister Educationis**  
(Educational Psychology)

Department of Educational Psychology  
Faculty of Education  
University of Pretoria

**SUPERVISOR:**  
Prof Mokgadi Moletsane

**CO-SUPERVISORS:**  
Dr Ruth Mampane  
Prof William J. Fraser

PRETORIA  
2011

To my family and friends whose unending support  
has enabled me to reach heights never thought possible

## ACKNOWLEDGEMENTS

Words cannot describe how grateful I am for all the support, guidance and encouragement received by those around me. My deepest gratitude goes out to the following:

- My family
- Prof Mokgadi Moletsane
- Dr Ruth Mampane
- Prof William J. Fraser
- Shafeeka Dockrat
- Everyone at the Directorate of Student Development and Support at TUT
- Takesure Zhoua
- Prof Rajah Kanes
- Joyce Jordaan
- Avie Cherington
- Adrie van Dyk
- My colleagues
- My peers

---oOo---

## DECLARATION OF ORIGINALITY

I, Saffiya Nagdee (student number 29295557), declare that this dissertation titled:

*"The relationship between a selection battery and the academic performance of students on an MBA programme"*

is my original work and that all the sources that were consulted and quoted have been acknowledged in the reference list.

Saffiya Nagdee  
2011

---oOo---

## **ABSTRACT**

The study is a quantitative analysis into the selection process of the Masters in Business Administration (MBA) programme at the Tshwane University Technology (TUT).

The selection battery used at TUT to select the MBA applicants is comprised of the Situation Specific Evaluation Expert (SpEEx), the English Literacy Skills Assessment (ELSA), and the 15 Factor Questionnaire (15FQ+). This test battery aims to obtain information on an applicant with regards to his/her cognitive potential (verbal and non-verbal ability), language proficiency, and personality. Therefore, the aim of the study was to investigate the relationship between the selection battery and the academic performance of those students selected into the MBA programme at TUT by examining the differences between the scores of the psychometric selection batteries and the academic performance of those students selected.

Upon analyses and interpretation of the data it was determined that there were no statistically significant differences between the scores of the different components of the selection batteries used and the academic performance of those selected.

### **KEY WORDS:**

- Learning Potential
- Situation Specific Evaluation Expert (SpEEx)
- Personality
- 15 Factor Questionnaire (15FQ+)
- English Literacy Skills Assessments (ELSA)
- English Proficiency
- Masters in Business Administration (MBA)

## ACRONYMS

TUT	Tshwane University of Technology
MBA	Masters in Business Administration
ELSA	English Literacy Skills Assessment
SpEEx	Situation Specific Evaluation Expert
15FQ+	15 Factor Questionnaire
GMAT	Graduate Management Aptitude Test
GPA	Grade Point Average

---oOo---

## TABLE OF CONTENTS

	Page
<b>CHAPTER 1</b>	
<b>Orientation of the Study</b>	
<b>1.1 INTRODUCTION</b>	1
<b>1.2 PROBLEM STATEMENT</b>	1
<b>1.3 RATIONALE FOR THE STUDY</b>	3
<b>1.4 RESEARCH QUESTIONS</b>	4
1.4.1 PRIMARY RESEARCH QUESTION OF THE STUDY	5
1.4.2 SECONDARY RESEARCH QUESTIONS OF THE STUDY	5
<b>1.5 RESEARCH AIM AND OBJECTIVES</b>	6
1.5.1 AIM	6
1.5.2 OBJECTIVES	6
<b>1.6 NULL HYPOTHESES</b>	7
<b>1.7 RESEARCH METHODOLOGY</b>	9
1.7.1 RESEARCH PARADIGM	9
1.7.2 RESEARCH DESIGN	10
<b>1.8 SELECTION OF PARTICIPANTS</b>	10
<b>1.9 DATA COLLECTION</b>	10
<b>1.10 DATA ANALYSIS AND INTERPRETATION</b>	11
<b>1.11 LITERATURE REVIEW</b>	12
<b>1.12 THEORETICAL FRAMEWORK</b>	13



	Page
<b>1.13 ETHICAL CONSIDERATIONS</b>	14
<b>1.14 VALIDATION OF THE STUDY</b>	15
<b>1.15 CLARIFICATION OF KEY TERMS</b>	15
1.15.1 POTENTIAL	15
1.15.2 LEARNING POTENTIAL	16
1.15.3 SITUATION SPECIFIC EVALUATION EXPERT (SPEEX)	16
1.15.4 PERSONALITY	16
1.15.5 15 FACTOR QUESTIONNAIRE (15FQ+)	16
1.15.6 ENGLISH LITERACY SKILLS ASSESSMENTS (ELSA)	17
1.15.7 ENGLISH PROFICIENCY	17
1.15.8 MASTERS IN BUSINESS ADMINISTRATION (MBA)	17
<b>1.16 CONCLUSION</b>	18
<b>1.17 ARRANGEMENT OF CHAPTERS</b>	19

---oOo---

## **CHAPTER 2**

### **Psychometric tests as Predictors of Academic Success**

<b>2.1</b>	<b>INTRODUCTION</b>	20
<b>2.2</b>	<b>USE OF PSYCHOMETRIC ASSESSMENTS</b>	20
<b>2.3</b>	<b>PROBLEMS FACING HIGHER EDUCATION INSTITUTIONS</b>	22
<b>2.4</b>	<b>PSYCHOMETRIC SELECTION FOR HIGHER EDUCATION IN SOUTH AFRICA</b>	22
<b>2.5</b>	<b>PREDICTORS OF ACADEMIC SUCCESS</b>	23
2.5.1	COGNITIVE ABILITY AND ACADEMIC SUCCESS	24
2.5.2	PERSONALITY AND ACADEMIC SUCCESS	25
2.5.3	ENVIRONMENTAL AND BIOGRAPHICAL FACTORS	28
<b>2.6</b>	<b>THEORETICAL FRAMEWORK</b>	29
<b>2.7</b>	<b>CONCLUSION</b>	33

---oOo---

## CHAPTER 3 EMPIRICAL RESEARCH

<b>3.1</b>	<b>INTRODUCTION</b>	34
<b>3.2</b>	<b>RESEARCH METHODOLOGY</b>	34
3.2.1	RESEARCH DESIGN	34
3.2.2	NON-EXPERIMENTAL RESEARCH	35
<b>3.3</b>	<b>SELECTION OF PARTICIPANTS</b>	37
3.3.1	SAMPLING METHOD	37
3.3.2	DESCRIPTION OF SAMPLE	37
<b>3.4</b>	<b>DATA COLLECTION</b>	39
<b>3.5</b>	<b>THE SELECTION BATTERY USED BY TUT</b>	39
3.5.1	INSTRUMENT 1: THE SITUATION SPECIFIC EVALUATION EXPERT (SpEEEx)	40
3.5.1.1	The SpEEEx Indices	40
3.5.1.2	Predictive Validity of the SpEEEx	41
3.5.1.3	Test Bias of the SpEEEx	42
3.5.2	INSTRUMENT 2: THE ENGLISH LITERACY SKILLS ASSESSMENT (ELSA)	42
3.5.3	INSTRUMENT 3: THE 15 FACTOR PERSONALITY QUESTIONNAIRE (15FQ+)	42
3.5.3.1	Items of the 15FQ+	44
3.5.3.2	Scoring of the 15FQ+	44
3.5.3.3	Interpretation of the 15FQ+	44
3.5.3.4	Criterion Score of the 15FQ+	46
<b>3.6</b>	<b>THE GROUPING OF SCORES OBTAINED THROUGH THE PSYCHOMETRIC ASSESSMENT</b>	48
3.6.1	COGNITIVE ABILITY SCORES	48
3.6.1.1	Verbal ability	49
3.6.1.2	Non-Verbal Ability	49
3.6.1.3	Language Proficiency	50
3.6.1.4	Cognitive Ability	50
3.6.1.5	Personality	50

	Page
<b>3.7 DATA ANALYSIS</b>	<b>51</b>
3.7.1 INTRODUCTION	51
3.7.2 STATISTICAL ANALYSIS CONDUCTED FOR THE CATEGORIES OF, VERBAL ABILITY, NON-VERBAL ABILITY, LANGUAGE PROFICIENCY, AND COGNITIVE ABILITY	52
3.7.3 ANALYSIS CONDUCTED FOR THE PERSONALITY CATEGORY	54
<b>3.8 RESEARCH PROCESS</b>	<b>55</b>
<b>3.9 CONCLUSION</b>	<b>56</b>

---oOo---

## CHAPTER 4 RESULTS

<b>4.1</b>	<b>INTRODUCTION</b>	57
<b>4.2</b>	<b>RESULTS OF THE STATISTICAL ANALYSIS ADDRESSING NULL HYPOTHESIS 1</b>	59
4.2.1	DESCRIPTIVE STATISTICS OF THE VERBAL ABILITY SCORES	60
<b>4.3</b>	<b>RESULTS OF THE STATISTICAL ANALYSIS ADDRESSING NULL HYPOTHESIS 2</b>	61
4.3.1	DESCRIPTIVE STATISTICS OF THE NON-VERBAL ABILITY SCORES	61
<b>4.4</b>	<b>RESULTS OF THE STATISTICAL ANALYSIS ADDRESSING NULL HYPOTHESIS 3</b>	63
4.4.1	DESCRIPTIVE STATISTICS OF THE LANGUAGE PROFICIENCY SCORES	63
<b>4.5</b>	<b>RESULTS OF THE STATISTICAL ANALYSIS ADDRESSING NULL HYPOTHESIS 4</b>	65
4.5.1	DESCRIPTIVE STATISTICS OF THE COGNITIVE ABILITY SCORES	65
<b>4.6</b>	<b>RESULTS OF THE STATISTICAL ANALYSIS ADDRESSING NULL HYPOTHESIS 5</b>	66
4.6.1	DESCRIPTION OF THE PERSONALITY CHARACTERISTICS OF THE SAMPLE	67
4.6.2	RELIABILITY STATISTIC	68
4.6.3	RESULTS OF THE CROSS TABULATION OF THE 15FQ+	68
4.6.3.1	FACTOR $f$ A (Distant aloof / Empathic)	69
4.6.3.2	INTELLECTANCE $\beta$ (Low Intellectance / High Intellectance)	70
4.6.3.3	FACTOR $f$ C (Affected by feelings / Emotionally stable)	71
4.6.3.4	FACTOR $f$ E (Accommodating / Dominant)	71
4.6.3.5	FACTOR $f$ F (Sober serious / Enthusiastic)	72
4.6.3.6	FACTOR $f$ G (Expedient / Conscientious)	73
4.6.3.7	FACTOR $f$ H (Retiring / Socially bold)	74
4.6.3.8	FACTOR $f$ I (Hard-headed / Tender-minded)	74
4.6.3.9	FACTOR $f$ L (Trusting / Suspicious)	75
4.6.3.10	FACTOR $f$ M (Concrete / Abstract)	76
4.6.3.11	FACTOR $f$ N (Direct / Restrained)	77

	Page
4.6.3.12 FACTOR <i>f</i> O (Confident / Self-doubting).....	77
4.6.3.13 FACTOR <i>f</i> Q 1 (Conventional / Radical).....	78
4.6.3.14 FACTOR <i>f</i> Q 2 (Group-oriented / Self-sufficient).....	79
4.6.3.15 FACTOR <i>f</i> Q 3 (Informal / Self-disciplined).....	80
4.6.3.16 FACTOR <i>f</i> Q 4 (Composed / Tense-driven).....	80
4.6.3.17 GLOBAL FACTOR 1 (INTROVERT / EXTRAVERT).....	81
4.6.3.18 GLOBAL FACTOR 2 (LOW ANXIETY / HIGH ANXIETY).....	82
4.6.3.19 GLOBAL FACTOR 3 (PRAGMATISM / OPENNESS TO EXPERIENCE).....	83
4.6.3.20 GLOBAL FACTOR 4 (INDEPENDENCE / AGREEABLENESS).....	84
4.6.3.21 GLOBAL FACTOR 5 (LOW SELF-CONTROL / HIGH SELF-CONTROL).....	84
<b>4.5 CONCLUSION</b> .....	<b>85</b>

---oOo---

## **CHAPTER 5**

### **Findings, Recommendations, and Conclusion**

<b>5.1</b>	<b>INTRODUCTION</b>	87
<b>5.2</b>	<b>FINDINGS</b>	87
5.2.1	NULL HYPOTHESIS (Ho) 1	89
5.2.2	NULL HYPOTHESIS (Ho) 2	90
5.2.3	NULL HYPOTHESIS (Ho) 3	91
5.2.4	NULL HYPOTHESIS (Ho) 4	92
5.2.5	NULL HYPOTHESIS (Ho) 5	93
5.2.6	NULL HYPOTHESIS (Ho) 6	95
<b>5.3</b>	<b>RECOMMENDATIONS</b>	95
5.3.1	RECOMMENDATIONS FOR TUT	95
5.3.2	RECOMMENDATIONS FOR FURTHER RESEARCH	102
<b>5.4</b>	<b>LIMITATIONS OF THE STUDY</b>	102
<b>5.5</b>	<b>CONCLUSION</b>	103

---oOo---

<b>REFERENCES</b>	105
-------------------	-----

<b>APPENDICES</b>	112
-------------------	-----

Appendix A

Ethical Clearance Certificate from the University of Pretoria

Appendix B

Ethical Clearance Certificate from the Tshwane University of Technology

---oOo---



## LIST OF TABLES

	Page
Table 1.1 Summary of 15 factors as identified by the 15FQ+ .....	17
Table 3.1 Age range of the sample .....	38
Table 3.2 The SpEEEx indices used by TUT .....	41
Table 3.3 Global factors of the 15 FQ+ .....	46
Table 3.4 Primary source traits of the 15FQ+ .....	47
Table 3.5 Scoring Schedule of the 15FQ+ .....	50
Table 3.6 Definitions of statistical terms .....	53
Table 4.1 Descriptive Statistics summary – Verbal Ability .....	60
Table 4.2 Kruskal-Wallis Statistic – Verbal Ability .....	61
Table 4.3 Descriptive Statistics summary – Non-verbal Ability .....	61
Table 4.4 Kruskal-Wallis Statistic – Non-verbal Ability .....	62
Table 4.5 Descriptive Statistics summary – Language Proficiency .....	63
Table 4.6 Kruskal-Wallis Statistic – Language Proficiency .....	64
Table 4.7 Descriptive Statistics summary – Cognitive Ability .....	65
Table 4.8 Kruskal-Wallis Statistic – Cognitive Ability .....	66
Table 4.9 Summary of the personality profile of the sample (n = 32) .....	67
Table 4.10 Summary of the Chronbach Alpha result .....	68
	Page
Table 4.11 Summary of personality profile – FACTOR $f$ A .....	69
Table 4.12 Summary of cross tabulations – FACTOR $f$ A .....	69
Table 4.13 Summary of personality profile – INTELLECTANCE $\beta$ .....	70
Table 4.14 Summary of cross tabulations – INTELLECTANCE $\beta$ .....	70
Table 4.15 Summary of personality profile – FACTOR $f$ C .....	71
Table 4.16 Summary of cross tabulations – FACTOR $f$ C .....	71
Table 4.17 Summary of personality profile – FACTOR $f$ E .....	71
Table 4.18 Summary of cross tabulations – FACTOR $f$ E .....	72

Table 4.19	Summary of personality profile – FACTOR $f$ F	72
Table 4.20	Summary of cross tabulations – FACTOR $f$ F	73
Table 4.21	Summary of personality profile – FACTOR $f$ G	73
Table 4.22	Summary of cross tabulations – FACTOR $f$ G	73
Table 4.23	Summary of personality profile – FACTOR $f$ H	74
Table 4.24	Summary of cross tabulations – FACTOR $f$ H	74
Table 4.25	Summary of personality profile – FACTOR $f$ I	74
Table 4.26	Summary of cross tabulations – FACTOR $f$ I	75
Table 4.27	Summary of personality profile – FACTOR $f$ L	75
Table 4.28	Summary of cross tabulations – FACTOR $f$ L	76
Table 4.29	Summary of personality profile – FACTOR $f$ M	76
Table 4.30	Summary of cross tabulations – FACTOR $f$ M	76
Table 4.31	Summary of personality profile – FACTOR $f$ N	77
Table 4.32	Summary of cross tabulations – FACTOR $f$ N	77
Table 4.33	Summary of personality profile – FACTOR $f$ O	77
Table 4.34	Summary of cross tabulations – FACTOR $f$ O	78
Table 4.35	Summary of personality profile – FACTOR $f$ Q 1	78
Table 4.36	Summary of cross tabulations – FACTOR $f$ Q 1	79
Table 4.37	Summary of personality profile – FACTOR $f$ Q 2	79
Table 4.38	Summary of cross tabulations – FACTOR $f$ Q 2	79
Table 4.39	Summary of personality profile – FACTOR $f$ Q 3	80
Table 4.40	Summary of cross tabulations – FACTOR $f$ Q 3	80
Table 4.41	Summary of personality profile – FACTOR $f$ Q 4	80
Table 4.42	Summary of cross tabulations – FACTOR $f$ Q 4	81
Table 4.43	Summary of personality profile – Global Factor 1	81
Table 4.44	Summary of cross tabulations – Global Factor 1	82
Table 4.45	Summary of personality profile – Global Factor 2	82
Table 4.46	Summary of cross tabulations – Global Factor 2	82
Table 4.47	Summary of personality profile – Global Factor 3	83
Table 4.48	Summary of cross tabulations – Global Factor 3	83
Table 4.49	Summary of personality profile – Global Factor 4	84
Table 4.50	Summary of cross tabulations – Global Factor 4	84
Table 4.51	Summary of personality profile – Global Factor 5	84
Table 4.52	Summary of cross tabulations – Global Factor 5	85
Table 5.1	Summary of the correlation coefficients of the 15FQ+ personality traits	94

Table 5.2	Range of scores across the categories verbal ability, non-verbal ability and language proficiency	97
Table 5.3	Conditions applicable to special industries - adapted from Parsons	102

---oOo---

## LIST OF FIGURES

	Page
Figure 2.1 Illustration of the three-step process of the Trait and Factor Theory (adapted from Schreuder and Coetzee, 2008)	31
Figure 3.1 Graphical representation of gender distribution of the sample who participated in the study	38
Figure 3.2 Example of box plot	53
Figure 3.3 Summary of the research process undertaken by the researcher	55
Figure 4.1 Graphical representation of the Verbal Ability scores across the three groups	61
Figure 4.2 Graphical representation of the Non-verbal Ability scores across the three groups	62
Figure 4.3 Graphical representation of the Language Proficiency scores across the three groups	64
Figure 4.4 Graphical representation of the Cognitive Ability scores across the three groups	66
Figure 5.1 Graphical representation of the verbal ability scores	89
Figure 5.2 Graphical representation of the non-verbal ability scores	90
Figure 5.3 Graphical representation of the language proficiency scores	92
Figure 5.4 Graphical representation of the cognitive ability scores	93
Figure 5.5 Graphical representation of the personality characteristics of Group 1	98
Figure 5.6 Graphical representation of the personality characteristics of Group 2	98
Figure 5.7 Graphical representation of the personality characteristics of Group 3	99
Figure 5.8 Graphical representation of the global factor personality traits of Group 1	100
Figure 5.9 Graphical representation of the global factor personality traits of Group 2	100
Figure 5.10 Graphical representation of the global factor personality traits of Group 3	101

# **CHAPTER 1**

## **Orientation to the Study**

### **1.1 INTRODUCTION**

This chapter introduces the study by discussing the problem statement and rationale motivating the study. Thereafter, the research question and sub questions are listed. The research aims and objectives are explored and the null hypotheses stated. The following dimensions of the research methodology are subsequently presented: research paradigm and design, selection of participants, data collection and analysis. Ethical considerations pertinent to this study are also considered. The theoretical framework guiding the study is presented and a concise literature review clarifies key terms associated with this study. The chapter concludes with a brief overview of subsequent chapters outlining the organisation of this report.

### **1.2 PROBLEM STATEMENT**

According to Herman (1995), most countries select applicants for Higher Education based on merit. In South Africa, the Grade 12 Senior Certificate serves as a baseline for assessing an applicant for undergraduate courses. However, since a Masters in Business Administration (MBA) course is usually regarded as postgraduate, applicants are not selected based on their Grade 12 results, therefore this form of selection no longer applies.

Psychometric instruments still play a major role in most admission processes at Higher Education Institutions in South Africa, despite criticisms surrounding the cultural bias of these instruments (Kotze & Griessel, 2008). Such selection processes are presumed to provide insight into an applicant's future academic success, and as a result, tests used as part of these processes have been scrutinised in research with regards to bias, reliability and validity (Fish & Wilson, 2007; Kotze & Griessel, 2008; Sulaiman & Mohezar, 2006).

In the United States of America and the United Kingdom (UK), most institutions offering the MBA programme make use of the Graduate Management Admissions Test (GMAT) when selecting applicants into the programme (Dobson, Krapljan-Barr & Vielba, 1999). The GMAT measures general verbal (GMAT-verbal) and mathematical skill (GMAT-Quantitative), both of which are thought to be associated with academic success in the first year of study in an MBA programme (Dobson et al., 1999). According to the results of the study conducted by Dobson and his colleagues (1999), which focused on the use of the GMAT in UK business schools, the GMAT-verbal was found to be a good predictor of MBA examination performance. However the study generated weak prediction power of the GMAT-Quantitative in terms of academic performance. In South Africa, research conducted by Kotze and Griessel (2008) has highlighted the role of a student's numerical and verbal abilities, as well as personality attributes, in the prediction of MBA academic success.

According to Kotze and Griessel (2008) South African institutions offering the MBA qualification do not have very high graduation rates. Therefore, they identified the need to investigate these poor throughput rates and explore the criteria used for student selection into MBA programmes. This in turn has highlighted the importance of analysing and describing the competencies targeted by selection processes (Bain, Fedynich & Knight, 2010; Harris & Owen, 2007; Kotze & Griessel, 2008). Kotze and Griessel (2008) further feel that these competencies should include components of knowledge, skills and abilities, which they consider to be essential for achieving successful academic performance at MBA level. Similarly, O'Conner and Paunonen (2007) highlighted an increase in the search for understanding the reasons for individual differences in academic achievement. They further argued that knowledge of the factors that influence academic success might have important implications for learning and education. This argument concurs with Vermunt (2005) who states that prior knowledge, intellectual abilities, learning style, personality, attitudes to courses, motivation, work habits, and study skills are among the various factors that affect a student's learning patterns.

The above discussion emphasises the need for institutions which offer an MBA programme, to research and evaluate their current selection procedures. Currently, most institutions offering the MBA programme make use of the GMAT

as a means of selecting candidates into the course (Bain et al., 2010; Kotze & Griessel, 2008). As stated, the GMAT measures two aspects linked to academic success, verbal and mathematical abilities. The Tshwane University of Technology (TUT) however differs from these institutions by utilising three tests that assess verbal abilities, non-verbal abilities, language proficiency and personality. These three tests comprise the Situation Specific Evaluation Expert (SpEEEx), the English Literacy Skills Assessment (ELSA), and the 15 Factor Questionnaire (15FQ+). These tests are viewed as essential in the identification of candidates who presumably possess the cognitive skills and personality characteristics needed to complete the MBA programme. The selection battery applied by TUT can be seen as an attempt to strengthen the selection process by including other factors that might have an effect on the academic success of the MBA students. However, no institutional research has been done on the use of these tests in the context of MBA selection, and therefore it is essential to analyse the use of the selection processes used by TUT for the selection of candidates into the MBA programme.

### **1.3 RATIONALE FOR THE STUDY**

Previous studies conducted on MBA selection procedures have focused on the selection practices of specific institutions, therefore limiting the results to that specific environment. Sulaiman and Mohezar (2006) investigated the admission criteria set out for the MBA course at the University of Malaysia. According to their results, work experience, age, ethnicity and gender did not seem to be related to MBA performance. However, their study did highlight that undergraduate performance played an important role in determining success at graduate level (Sulaiman & Mohezar, 2006). Similarly, Fish and Wilson (2007) attempted to analyse the potential factors used to predict success in a highly controlled one-year MBA programme at an accredited American college on the United States-Canadian border. Their study found that undergraduate grade point average (GPA) and the verbal component of the Graduate Management Aptitude Test (GMAT) were significant predictors for success in the MBA programme. The results further indicated that qualitative factors, such as background and nationality, also had an impact on predicting a student's success in the MBA programme (Fish & Wilson, 2007). Although the above studies yielded significant results, these were unfortunately confined to the respective institute in

which the study was conducted, and therefore, should not be generalised to other institutions such as TUT.

Institutional research focusing on the validity of the SpEEx as a tool for selection has mainly focused on its applicability for undergraduate courses (Kriel, 2001). No research on the use of the ELSA or the 15 FQ+, in terms of their applicability as selection instruments, at TUT could be found. In addition, no institutional research is available on this test battery, which TUT employs to assess its MBA applicants. This lack of institutional research, lead to the need of conducting a study into the selection test battery used at TUT. This study attempts to address part of that need by focusing specifically on the selection test battery used for selecting potential students into the MBA programme. This was done by investigating the differences between the applicants' scores on the selection battery and their academic performance after the first and second year of study. This study could be beneficial for improving the quality of the services offered by the Directorate of Student Development and Support at TUT. The results from this study could enable the adaptation of the selection battery used to select the MBA students, as well as open doors for further institutional research in this area.

#### **1.4 RESEARCH QUESTIONS**

The discussion above emphasises the need for institutions to evaluate their current selection procedures in an attempt to evaluate their effectiveness in admitting those students who are deemed most likely to achieve academic success in the MBA programme. According to Kotze and Griessel (2008) the following questions should guide institutions in this process:

- 1) Do the admission criteria and standards used ensure that the best possible students are chosen for the specific course?
- 2) Do the admission criteria and standards used identify those students who are most likely to make the most of their education?

The assessment process used by TUT to select MBA applicants ideally serves to accommodate the notion of learning potential (through the SpEEx), English proficiency (through the ELSA) and personality (through the 15FQ+), therefore creating the expectation that the best students are selected into its MBA programme. Although it is acknowledged that extraneous variables may play a



role in a student being unsuccessful in a course, it is hypothesised by those involved in the selection process that the inclusion of a personality instrument into the test battery, identifies those applicants who might not possess the soft skills to cope under different and difficult circumstances. Furthermore, by introducing a measure of learning potential, the test battery assumes that any past educational disadvantages of an applicant will not influence his/her chance of entry into the programme (The Genesis Group, 2007).

The results of the selection battery are split into different categories; the 15FQ+ informs the assessor of the applicant's personality profiles, while the scores of the SpEEEx and ELSA are grouped together to form a cognitive profile of the applicant. The cognitive profile of each individual is sub-totalled into the following categories:

1. Verbal ability
2. Non-verbal ability, and
3. Language proficiency

These categorisations are clarified further in Chapter 3, section 3.6.1.

Taking into consideration the specific components set out in the selection battery, the research question and sub-questions set out for the study are as follows:

#### **1.4.1 PRIMARY RESEARCH QUESTION OF THE STUDY**

What is the difference between the scores on the selection battery, used to select applicants into the MBA programme, and the academic performance of the students selected?

#### **1.4.2 SECONDARY RESEARCH QUESTIONS OF THE STUDY**

- a. What does literature document about the link between selection instruments at Higher Education Institutions (HEI) and the academic performance of those students selected?
- b. What is the difference between the scores of the verbal component of the selection battery and the academic performance of the students selected into the MBA programme?

- c. What is the difference between the scores of the non-verbal component of the selection battery and the academic performance of the students selected into the MBA programme?
- d. What is the difference between the scores of the language proficiency component of the selection battery and the academic performance of the students selected into the MBA programme?
- e. What is the difference between the scores of the personality component of the selection battery and the academic performance of the students selected into the MBA programme?

## **1.5 RESEARCH AIM AND OBJECTIVES**

### **1.5.1 AIM**

The literature consulted leads to the presumption that a selection battery should be tailored to assess the components (verbal abilities, personality, etc) needed for an applicant to be successful in a given course. If this is in place it is further deduced that the students who are selected into the course would perform well academically. With this in mind, the aim of this study is to investigate the relationship between the selection battery used to select students into the MBA programme at TUT, and the academic performance of the students selected by comparing the scores on the selection instruments (SpEEEx, the ELSA and the 15FQ+) with the academic performance of the selected students.

### **1.5.2 OBJECTIVES**

The selection battery utilised by TUT, creates an opportunity to investigate different criteria (verbal ability, non-verbal ability, language proficiency and personality) in the attempt to address the aim of the study. Therefore, this research seeks to determine, through statistical methods:

- The difference between the scores of the verbal component of the selection battery and the academic performance of the students selected into the MBA programme;
- The difference between the scores of the non-verbal component of the selection battery and the academic performance of the students selected into the MBA programme;

- The difference between the scores of the language proficiency component of the selection battery and the academic performance of the students selected into the MBA programme; and
- The difference between the scores of the personality component of the selection battery and the academic performance of the students selected into the MBA programme.

## **1.6 NULL HYPOTHESES**

The present study is focused on investigating the relationship between the selection battery used by TUT and the academic performance of those students selected into the MBA programme. This was done by examining the differences between the scores on the selection battery and the academic performance of those selected into the MBA programme. As discussed above in section 1.4, the raw scores of the selection battery have been grouped into the categories of verbal ability, non-verbal ability, language proficiency and personality. In addition, the academic performance of the students selected for the study have been divided into different groups, as it could not be categorised as pass or fail due to the certain requirements outlined in the MBA prospectus. These requirements specified the number of modules students are expected to complete per year of study. Therefore, it was necessary to split the 'academic performance' of the students into the following groups:

Group 1: Students who had passed at least ten modules after two years;

Group 2: Students who had passed at least five modules after one year and less than ten after two years; and

Group 3: Students who had passed less than five modules after one year and less than ten modules after two years.

From the above categorisations and requirements the following null hypotheses were formed to be tested and evaluated:

### **Null Hypothesis (Ho) 1:**

There is no significant difference between the scores on the verbal component of the selection battery used to select applicants into the MBA programme, across the three groups of academic performance of the students selected.

- **Null Hypothesis (Ho) 2:**

There is no significant difference between the scores on the non-verbal component of the selection battery used to select applicants into the MBA programme, across the three groups of academic performance of the students selected.

- **Null Hypothesis (Ho) 3:**

There is no significant difference between the scores on the language proficiency component of the selection battery used to select applicants into the MBA programme, across the three groups of academic performance of the students selected.

- **Null Hypothesis (Ho) 4:**

There is no significant difference between the scores on the cognitive ability component of the selection battery used to select applicants into the MBA programme, across the three groups of academic performance of the students selected.

- **Null Hypothesis (Ho) 5:**

There is no significant difference between the scores on the personality component of the selection battery used to select applicants into the MBA programme, across the three groups of academic performance of the students selected.

- **Null Hypothesis (Ho) 6:**

There is no significant difference between the scores on the selection battery used to select applicants into the MBA programme, across the three groups of academic performance of the students selected.

The scores collected for the investigation of the null hypotheses, as stated above, are derived from the raw scores of the selection battery conducted on the MBA applicants in 2008. These raw scores are divided into the different components, namely: verbal, non-verbal, language proficiency, cognitive ability, and personality. To statistically investigate the differences between the different components, the means and median are computed from the raw scores available and subsequently investigated. A detailed explanation pertaining to the

distribution of the raw scores obtained from the selection battery are further elaborated upon in Chapter 3, section 3.7.2, paragraph 2.

## **1.7 RESEARCH METHODOLOGY**

### **1.7.1 RESEARCH PARADIGM**

The paradigmatic perspective applied in this study vests within the positivist paradigm of thinking. The positivist paradigm places emphasis on observation and reason as a means of understanding human behaviour (Dash, 2005). Positivism focuses on experimental and quantitative methods to verify hypotheses in the search for facts. This paradigm also allows the findings of the study to be generalised within the parameters of the sample and sampling context (Gephart, 1999). According to the positivist paradigm, science is seen as a means of acquiring the truth (Krauss, 2005). True knowledge is thought to be based on the experience of the senses and obtainable by observation and experimentation (Dash, 2005). He further posits that, *'positivists work and think within the framework of the principles and assumptions of science, which are determinism, empiricism, parsimony, and generality'* (Dash, 2005, np).

Determinism refers to those events that are caused by other circumstances of which understanding the casual links of these events is necessary for prediction and control (Dash, 2005). Empiricism refers to *'the collection of verifiable empirical evidences in support of theories or hypotheses'* (Dash, 2005, n.p). Parsimony is the explanation of phenomena in the most cost-effective way possible (Dash, 2005). Generality is referred to as the process by which the observations of a particular phenomenon can be generalised to the world at large (Dash, 2005).

The ultimate goal within this paradigm is to integrate and order findings generated from research into a meaningful pattern or theory that can be regarded as being true for the time being (not the ultimate truth) (Dash, 2005). Furthermore he states that no absolute truth can be found as theory is subject to revision or modification when new evidence is found (Dash, 2005).

### **1.7.2 RESEARCH DESIGN**

This study is guided by a quantitative research design, in which specific and narrow questions are asked about a topic, and numerical data from participants is then collected to answer those questions (Creswell, 2005). Once the data is collected, it is analysed using statistics. This method makes it possible for research to be conducted in an unbiased and objective manner (Creswell, 2005). The quantitative research strategy which this study follows is a non-experimental research strategy, since there is no need to manipulate, control or interfere with any of the variables.

The aim of quantitative research is to identify the variables that predict an outcome or criterion. This form of research requires the researcher to identify one or more predictor variables, as well as a criterion variable. According to Creswell (2005), a predictor variable is used to make a forecast about an outcome. For the purpose of this study, the results from the selection battery can be considered to be the predictor variables. In total, 27 predictor variables had been identified for each applicant: 23 variables arising from the applicants' 15FQ+ results, while the remaining four are the results from the indices of the SPEEX and ELSA. These variables are elaborated upon in Chapter 3, section 3.5.

A criterion variable refers to the outcome being predicted (Creswell, 2005). For this study, the criterion variable was the participants' academic performance.

### **1.8 SELECTION OF PARTICIPANTS**

According to Gravetter and Forzano (2003, p.115), *'each research study is a unique event that involves a specific group of participants.'* Given that the sample population for the study has already been identified, and the data is easily accessible, non-probability sampling methods, as well as cluster sampling, were used in selecting participants for this study (Gravetter & Forzano, 2003). The sample requirements had an effect on the overall sample size. As a result, the sample size is quite small which impacts on the power of the results of the statistical analysis. The sample and sampling methods are addressed in more detail in Chapter 3, section 3.3.

## **1.9 DATA COLLECTION**

The data collection phase of a research project involves retrieving sufficient data in order to address the research hypotheses and answer the research questions (Gravetter & Forzano, 2003). For this study, the data collected were the raw scores of each of the variables under examination. This means that two sets of data needed to be collected for each participant - the results from the selection test, and the academic results for the years 2008 and 2009. The selection test results for each participant were retrieved from the server held at the Directorate of Student Development Support (SDS), while the participants' academic results were assessed via TUT's main database. Once the data were obtained, it was coded, and entered into a database for analysis (Leong & Austin, 2006).

## **1.10 DATA ANALYSIS AND INTERPRETATION**

Within quantitative data analysis, the researcher begins by re-orientating him/herself to the original hypotheses so that the appropriate statistical techniques can be employed (Leong & Austin, 2006). Therefore, the data were structured and analysed according to the hypotheses formulated above.

Once collected, the data were taken to the Department of Statistics at the University of Pretoria, where it was discussed with the statistician and the correct statistical techniques were chosen based on both the aim of the study and the formulated hypotheses. The data were analysed by means of SPSS, which is the most commonly used statistical data analysis software (Muijs, 2004). This form of analysis made it possible to investigate the relationship between each of the predictor variables on the criterion variable (Muijs, 2004).

In this study, frequency Tables and cross tabulations were computed on the retrieved data. The former were computed to aid in the descriptive analysis of the data, while the latter aided in the analysis of relationships between variables. The Kruskal-Wallis test was used to investigate the differences in scores between the three groups, while the strength of the supposed relationships were measured using the Pearson's Chi-square test and Fishers Exact Test thus, computing p-values to determine whether or not the relationship was statistically

significant (Muijs, 2004). The procedures of data analysis are addressed in more detail in Chapter 3.

### **1.11 LITERATURE REVIEW**

Psychological tests are usually designed for a specific context and used to address a specific purpose, one of which is their value in selection processes (Foxcroft, Paterson, Le Roux & Herbst, 2004). Nzama, De Beer and Visser (2008) argue the value that psychological assessments are thought to provide. They believe that, initially, it was accepted that these psychological assessment added value, but lately this viewpoint has changed and a question mark is now placed surrounding the validity and fairness of such instruments. Furthermore, practitioners partaking in a survey conducted by Foxcroft et al. (2004) highlighted various characteristics of tests, which they felt enabled psychometric tests to add value to a situation. These practitioners argued that psychological tests:

- are objective;
- are underpinned by a sound research base;
- assess constructs, which are impossible to measure with other methods;
- cover a broad spectrum of constructs, and assessment practitioners can choose between different tests to meet specified needs;
- provide for the assessment of psychopathology and for deductions to be made regarding therapeutic interventions;
- tap the more subtle aspects of human behaviour and are geared towards the identification of the potential to develop (i.e., tests are enabling);
- can be used as a screening mechanism to reduce the number of applicants in job selection;
- provide a wealth of information in a short space of time;
- provide standardised information, which makes it possible to compare and contrast the performance of test-takers with each other in high-stakes selection testing.

(Foxcroft et al., 2004, p.132)

According to this survey conducted by Foxcroft et al. (2004), the most frequently used psychometric tests by South African practitioners are those measuring intellectual ability, personality functioning and interests. According to Nzama et



al., (2008), cognitive tests are useful in predicting difficult criteria such as performance and trainability. However, ability cannot be viewed as the only factor influencing job performance. Personality factors are also seen as important. According to Duff, Boyle, Dunleavy and Ferguson (2004), predictive models of academic performance have highlighted the importance of variables such as intelligence and motivation, with personality being included as an additional predictor. Furthermore, Nzama et al. (2008, p.40) state that *'Personality tests are more predictive of contextual performance than task performance, whereas ability tests tend to be predictive of task performance.'*

Further literature regarding the use of psychometric tests and their value in identifying predictors of academic success are reviewed in Chapter 2.

### **1.12 THEORETICAL FRAMEWORK**

The goal of the TUT psychometric selection test battery is to select those candidates who will most likely 'fit' into the course and be successful in the course. This is done by screening the applicants to find those whose cognition and personality will most likely be able to succeed in the course. This matching of person and environment is characteristic of the Trait and Factor Theory of Frank Parsons (Parsons, 1909; Schreuder & Coetzee, 2008). The theoretical framework of Parsons was chosen for this study as it aligns with the aim and hypotheses of the study, and provides structure in the investigation of the 'person-environment' fit of the applicants selected into the MBA programme. More specifically, whether or not an applicant's verbal ability, non-verbal ability, cognitive ability, language proficiency and personality can 'fit' the demands of an MBA programme.

According to Schreuder and Coetzee (2008), Parsons outlined three steps essential to career counselling. Foremost, Parsons believed that an individual should have insight into his/her personality characteristics when choosing a career. Secondly, he/she should have insight into the characteristics demanded by the occupation of interest. Thirdly, the individual should be able to compare his/her personal characteristics with that of the occupation of interest to see whether or not it is congruent.

This approach is applied within occupational and organisational settings, and is used to aid personnel selection, placement and evaluation techniques (Schreuder & Coetzee, 2008). Since occupations generally differ in terms of the individual traits required from employees, the nature and requirements of the occupation should guide which individual characteristics need to be measured during assessment (Schreuder & Coetzee, 2008). According to Kriel (2001) in order to select an employee for a position within an organisation, information with regards to the organisation and the applicant is needed. However, in terms of selection in higher education, Kriel (2001) suggests that information on the relevant academic course, as well as information on the applicant, need to be accumulated. This process is evident in the selection procedure of the MBA applicants at TUT. Through the psychometric assessments, further information about the applicants is obtained with the hope of selecting those individuals who possess the personality characteristics most likely beneficial to handle the demands of an MBA, and who have the potential to be trained successfully. Through this process it is presumed that the chances of selecting such students are increased. The theoretical framework is elaborated upon in Chapter 2, section 2.6.

### **1.13 ETHICAL CONSIDERATIONS**

Ethics in research is important as it protects the rights of the research respondents, and ensures that the researcher does not cause harm or expose them to unnecessary emotional stress in any way (Leong & Austin, 2006). In addition, ethical research principles ensure that the identity of the participants is concealed, unless otherwise specified by the participants (Leong & Austin, 2006).

The parameters of the study required ethical clearance to be obtained from both the University of Pretoria (UP) as well as TUT. UP requires that all researchers obtain ethical clearance before research can commence so that a high standard of excellence and morality in research projects is maintained.

Since the current study is a post-hoc study, it was problematic to obtain informed consent from the sample of students selected. However, ethical clearance was obtained from TUT to access the required data for research purposes. In addition to accessing the relevant databases on which the data were stored, permission

from the respective departments (SDS and MBA department) was requested. The confidentiality and anonymity of the participants were maintained by tracking the results of the selection tests and academic performance using the students' student numbers. Furthermore, once the data were obtained the student numbers were converted into sequential numbers. Therefore, there was no reference to any specific student number in the final results of the study.

The accessed data remained the property of TUT. However, disks with the data were created for storage at the University of Pretoria (UP), and therefore, UP will claim ownership of the study.

#### **1.14 VALIDATION OF THE STUDY**

Part of the validation of the study was established through the tests chosen as part of the selection battery used to select the students into the MBA programme. These tests, namely the SpEEEx, ELSA, and 15FQ+ have good psychometric properties (discussed in Chapter 3) thereby eliminating any doubt that reliable scores should be obtained through these tests.

#### **1.15 CLARIFICATION OF KEY TERMS**

##### **1.15.1 POTENTIAL**

Potentiality, the term used when describing potential in Reber and Reber (2001, p.552), is defined as: '*A set of circumstances that suggest a latent ability; characteristics that are used to infer that some property or talent not currently manifested will develop or be learned.*' In addition, Schreuder and Coetzee (2008, p.96) define aptitude as the '*potential to acquire skills through training and experience.*' Therefore, for the purpose of this study, potential is described as having the capacity, or capability, to acquire particular skills.

### **1.15.2 LEARNING POTENTIAL**

An individual's capacity to process and apply new information is known as his/her learning potential (Kriel, 2001). Learning potential is an important construct as it measures the ability of an individual to benefit from mediation or learning instead of his/her current cognitive ability, which might be flawed due to previous learning experiences.

### **1.15.3 SITUATION SPECIFIC EVALUATION EXPERT (SpEEEx)**

The Situation Specific Evaluation Expert (SpEEEx) is an assessment instrument that measures learning potential (The Genesis Group, 2007). The nine subtests utilised by TUT to assess the learning potential of its applicants are: Conceptualisation, Observance, Insight, Calculations, Environmental Exposure, Comparisons, Perception, Object Assembly and Reading Comprehension. These subtests are discussed further in Chapter 3, section 3.5.1.

### **1.15.4 PERSONALITY**

According to trait theories, an individual's personality is a '*compendium of traits or characteristic ways of behaving, thinking, feeling, reacting, etc*' (Reber & Reber, 2001, p.525).

### **1.15.5 15 FACTOR QUESTIONNAIRE (15FQ+)**

The 15 Factor Questionnaire (15FQ+) is an instrument used to assess personality factors, based on Cattell's personality model (15FQ+ Manual, 2002), which divides personality into factors as presented in the Table below:

**Table 1.1: Summary of 15 factors as identified by the 15FQ+**

FACTOR $f$ A	Distant Aloof	Empathic
INTELLECTANCE $\beta$	Low Intellectance	High Intellectance
FACTOR $f$ C	Affected by feelings	Emotionally stable
FACTOR $f$ E	Accommodating	Dominant
FACTOR $f$ F	Sober serious	Enthusiastic
FACTOR $f$ G	Expedient	Conscientious
FACTOR $f$ H	Retiring	Socially-bold
FACTOR $f$ I	Hard-headed	Tender-minded
FACTOR $f$ L	Trusting	Suspicious
FACTOR $f$ M	Concrete	Abstract
FACTOR $f$ N	Direct	Restrained
FACTOR $f$ O	Confident	Self-doubting
FACTOR $f$ Q 1	Conventional	Radical
FACTOR $f$ Q 2	Group- oriented	Self sufficient
FACTOR $f$ Q 3	Informal	Self-disciplined
FACTOR $f$ Q	Composed	Tense-drive

#### **1.15.6 ENGLISH LITERACY SKILLS ASSESSMENTS (ELSA)**

The English Literacy Skills Assessment measures a candidate's English language skills performance, *'equating the competency-input performance level to that of a South African English mother-tongue user'* (Horne, 2007, p.1).

#### **1.15.7 ENGLISH PROFICIENCY**

Language proficiency is thought to be an important moderator of test performance since it reflects familiarity *'with concepts and access to the language medium through which knowledge has to be gained'* (Van Eeden, De Beer & Coetzee, 2001, p.171).

#### **1.15.8 MASTERS IN BUSINESS ADMINISTRATION (MBA)**

The MBA programme at TUT was developed to suit the South African environment. The outcomes of the course are to deliver managers who have the qualities and skills needed to generate economic growth, and to create employment opportunities in South Africa. The course also prepares its graduates

to compete in the global business environment, thereby enhancing the credibility of South Africa within international markets.

The MBA programme, developed by TUT's Faculty of Management Sciences is a three-year (minimum) to five-year (maximum) course. The entrance requirements into the programme are:

- 1) any diploma or degree; M+4 qualification or combination of qualifications that have been evaluated by the Institution;
- 2) a minimum of five years relevant working experience in a business-related environment; and at least 25 years of age;
- 3) a compulsory psychometric assessment.

The course consists of 15 modules, which are presented by way of lectures, group discussions, case studies and role-plays over a minimum period of three years. Two modules are conducted concurrently over approximately 12 weeks of part-time study, and are completed and examined before the next two modules begin. Therefore six modules should be completed per year. The final six months are spent on a research dissertation.

## **1.16 CONCLUSION**

The present study is a quantitative analysis into the selection process of the MBA programme at TUT. It aims to investigate the differences in the scores of the selection battery utilised by TUT, and the academic performance of those selected into the MBA course. The data analysis is focused on assessing the differences between the predictor variable (selection test results) and the criterion variable (academic results) of each participant. In other words, the data analysis attempts to investigate whether or not the scores of the verbal ability, non-verbal ability, cognitive ability, language proficiency and personality categories produced any significant differences in the academic performance of the applicants selected into the MBA programme at TUT.

## **1.17 ARRANGEMENT OF CHAPTERS**

The dissertation proceeds in Chapter 2 with a comprehensive review of existing literature. Chapter 3 provides an overview of the individual tests used in the MBA selection process of TUT, as well as the methodology of the study, which includes the sampling, research design and statistical analyses. In Chapter 4, the results of the statistical analysis are presented. A summary of the findings as well as recommendations concludes the research report in Chapter 5.

---oOo---

## **CHAPTER 2**

### **Psychometric Tests as Predictors of Academic Success**

#### **2.1 INTRODUCTION**

In this chapter, the literature surrounding the present study is discussed. Firstly, it is imperative to ground the use of psychometric assessments within a Higher Education Institution (HEI) by focusing on literature surrounding the aim of such psychometric assessments. Secondly, a summary is provided on the use of psychometric instruments as part of the selection processes at Higher Education. Thirdly, factors that have been identified as correlating with academic success are mentioned and expanded upon. Due attention is also given to studies linking cognitive ability and/or personality with intelligence, as these factors are linked to the purpose of the psychometric assessment process of TUT. Lastly, the theoretical framework of Frank Parsons is presented.

#### **2.2 USE OF PSYCHOMETRIC ASSESSMENTS**

*'It is important to recognize the limits of human wisdom when reaching opinions based on assessment information'* (Foxcroft & Roodt, 2005, p.7). According to Foxcroft and Roodt (2005), psychological assessments can provide valuable information used to guide individuals, groups and organisations to understand and make informed and appropriate decisions. However, as a consequence, psychological tests assume such an important role as sources of information about an individual; the results from these assessments tend to affect critical life decisions (Kaplan & Saccuzzo, 2009).

Foxcroft and Roodt (2005) recommend that the assessment process be multidimensional and involve gathering information from several sources. Once this information is gathered it should subsequently be evaluated and integrated for the purpose of drawing conclusions or making decisions. Only once all the information is gathered can it be *'synthesized, clustered together and weighed up to describe and understand the functioning of an individual, group or organization'* (Foxcroft & Roodt, 2005, p.6).



According to Kaplan and Saccuzzo (2009, p.6) psychological tests are '*designed to measure characteristics of human beings that pertain to behavior*', thus measuring past and current behaviour, as well as attempting to predict future behaviour. Through psychological assessment, it is possible to identify the strengths and weaknesses of the person being assessed (Foxcroft & Roodt, 2005). By identifying the strengths and weaknesses of individuals, the assessor can gain a better understanding of those areas in which the individual is comfortable and is able to excel, as well as those areas that are problematic for the individual in which he/she needs further development.

In addition to identifying strengths and weaknesses, assessments can serve as tools to map the development and progress of individuals, groups and organisations (Foxcroft & Roodt, 2005). An example of this would be when comparisons are made between pre-tests (given before any training / intervention) and post-tests (administered after the training / intervention). Such comparisons of results can be used to evaluate the effectiveness of a training / intervention programme.

Furthermore, assessments can be used to aid the organisation or institution in making decisions regarding an applicant's suitability for a job or field of study (Foxcroft & Roodt, 2005). In this way applicants are screened to determine if they meet the requirements set out by the organisation or institution. According to Kaplan and Saccuzzo (2009), psychological tests evaluate individual differences in terms of ability and personality. These tests further assume that differences shown on the test mirror the differences between individuals in a real life setting.

Lastly, assessments can be used to identify an individual's training and educational needs (Foxcroft & Roodt, 2005). For example, due to the increase in technological advances and changes brought about by research, individuals need to stay abreast of the latest developments in their field. One way for an organisation to ensure that its employees are in line with the current research and body of knowledge within their area is to evaluate the current level of knowledge, so that training can be recommended.

The psychometric assessment battery used to screen the MBA applicants at TUT is designed to aid in the decision making process regarding an applicant's suitability and likelihood of achieving success in the MBA programme.

### **2.3 PROBLEMS FACING HIGHER EDUCATION INSTITUTIONS**

According to Herman (1995, p.264), there has been an increase of enrolments into Higher Education Institutions, which could be due, to among many things, '*the increased application of compulsory school education and of the equality of educational opportunity, the increasing need for skilled person power and the overall desire for a good education.*' This increase of applicants, coupled with the fact that most Higher Education Institutions in South Africa receive the bulk of their government subsidies based on the success rate of students, tends to apply pressure on institutions to maintain a high pass rate (Kriel, 2001). It is for this reason that emphasis is increasingly placed on selecting students for Higher Education who have the best chance of achieving academic success. According to Kriel (2001), Higher Education Institutions are faced with two choices. Firstly, they could drop their academic standard, thereby increasing the amount of students that qualify for entry into the institution, as well as for government subsidies. Secondly, they can maintain their standards but employ screening processes, ensuring that those students who have the potential to be successful in their course of study will be admitted (Kriel, 2001). As a result, to enable Higher Education Institutions to adequately select potentially successful students, measures need to put in place to aid such a screening process (Kriel, 2001). This already seems to be the case in some institutions, as Herman (1995) states that at Higher Education Institutions where the costs per student are high, more stringent entrance requirements are being applied to ensure smaller, more manageable classes, as well as good quality students.

### **2.4 PSYCHOMETRIC SELECTION FOR HIGHER EDUCATION IN SOUTH AFRICA**

According to Kriel (2001, p.48), psychometric assessment in South Africa is at a '*historical crossroad as it tries to free itself from European theories.*' Adding that in the South African context, previously disadvantaged groups are '*confronted with tests of which the content is attuned to the dominantly white culture.*' This

can be seen as discriminatory. In a country as diverse in culture as South Africa, the tests being used are not culturally sensitive for all population in the country. As a result, the use of psychometric assessments, especially for selection and promotion purposes, has been receiving enormous amounts of criticism, mostly from political circles (Kriel, 2001). Thus, it has become clear that there is a need for fair, reliable and valid instruments in South Africa to assess the ability of prospective students and their potential to be successful in their studies (Kriel, 2001). Maree (2002, p.1) puts forth a challenge that rings true for all academic institutions using psychometric assessment as part of their selection process, he proposes that, *'all tertiary institutions in South Africa will have to investigate the question of selecting students effectively and fairly.'*

Maree (2002) further directs the audience to the Employment Equity Bill, highlighting the use of fair and unbiased tests during an assessment process. According to Maree (2002), the Employment Equity Bill has been put in place to counter any misuse of psychometric tests. According to this law, any psychological assessment of an employee is prohibited unless the assessment used has *'been scientifically shown to be valid and reliable, can be applied fairly to all employees, and is not biased against any employee or group'* (Maree, 2002, p.2). Therefore, the implication is that this law should be applied to any environment in which the use of psychometric assessments takes place.

## **2.5 PREDICTORS OF ACADEMIC SUCCESS**

An important part of a selection process is its prediction of future behaviour. Since there are a variety of factors influential in the prediction of a candidate's behaviour, it is important to identify the factors deemed significant in influencing the eventual academic performance of a candidate. Kriel (2001) identified a few of these factors, as follows:

- 1) Scholastic performance. Since scholastic academic achievement is usually represented in the form of final school marks, Grade 12 has been used to predict academic success at a Higher Education level. This, however, is debatable as results are highly dependent on the educational opportunity of the candidate and are thought to *'refer more to the opportunity to learn than the ability to learn'* (Kriel, 2001, p.78). Within

a postgraduate context, previous tertiary qualifications are used instead of the Grade 12 Senior Certificate to assess whether or not the applicant will qualify for a certain course.

- 2) Learning potential, which represents the individual's capacity to process and apply new information.
- 3) Biographical factors such as age and gender.

Over time, the search for understanding the reasons for individual differences in academic achievement has been amplified (O'Connor & Paunonen, 2007). Knowing the factors that may influence academic success could have important implications for learning and education. Whether it be gaining insight into who is likely to excel or perform poorly in academic programs, or identifying these success factors to help guide the development of curricula to improve the levels of academic performance (O'Connor & Paunonen, 2007). Some of these factors are discussed below.

### **2.5.1 COGNITIVE ABILITY AND ACADEMIC SUCCESS**

Generally MBA programmes have selection processes that involve an assessment of each candidate's '*demonstrated and potential abilities to be a successful student and business leader*' (Hedlund, Wilt, Nebel, Ashford & Sternberg, 2006, p.102). The most widely used test is the General Management Aptitude Test (GMAT), which is a traditional measure of intelligence, or general cognitive ability. It consists of multiple-choice questions and measures verbal and quantitative skills. The GMAT includes an essay section, which is aimed at measuring analytical skills. According to Hedlund et al. (2006) the flaw with the GMAT is that it has been found to differentiate in test scores across gender (males over females), as well as ethnic and racial groups (whites over blacks). In addition, its applicability in the South African context is contested (Hedlund et al., 2006).

According to Hedlund et al. (2006) traditional admissions processes (those relying primarily on the GMAT and undergraduate grades) neglect to take into account the full range of abilities that are necessary for academic success. They, therefore, suggest that a supplement to the GMAT, which increases prediction, could be of great benefit to business school admissions. To help increase its

prediction of successful students, TUT employs the Situation Specific Evaluation Expert (SpEEx), as such a supplement to assess learning potential. The SpEEx was introduced into TUT's selection process by Kriel (2001) to ensure that students who have the best chance of achieving academic success are admitted into the institution. The SpEEx aims to measure learning potential by assessing what an individual can learn over what he/she has already learnt.

### **2.5.2 PERSONALITY AND ACADEMIC SUCCESS**

*'Cognitive ability reflects what an individual can do, personality traits reflect what an individual will do'* (O'Connor & Paunonen, 2007, p.972). Cognitive ability is an important factor that influences academic success. However, if viewed in isolation, it does not account for individual differences in academic success. Therefore, it is important to identify non-cognitive predictors of academic success, which could include variables that are related to personality (O'Connor & Paunonen, 2007). The results of the study conducted by Furnham, Chamorro-Premuzic and McDougall (2003), suggests that once a candidate proves to have the cognitive potential, personality variables then take over to dictate educational outcomes.

Certain individual habits that influence academic success can be dependent on behavioural tendencies, which are reflected in personality traits (O'Connor & Paunonen, 2007). Therefore, personality inventories may aid in the prediction of academic potential, especially in higher levels of formal education (Furnham et al., 2003).

Although intelligence and personality have previously been treated as separate issues in research studies, some studies have focused on the correlation between these two constructs. Such studies demonstrate consistent predictable correlations between personality and intelligence (Moutafi, Furnham & Paltiel, 2005).

Current literature conceptualises personality through the Five-Factor Model of personality (O'Connor & Paunonen, 2007). According to this model, the factors of Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness are seen as the overarching factors. More narrow personality

traits fall under these broad factors. Among these Big Five personality factors, Openness to Experience has been found to most consistently correlate with intelligence (Moutafi et al., 2005).

Studies conducted on the link between Extraversion and Intelligence has produced ambiguous results. According to a study conducted by Moutafi et al. (2005), extraverts have been found to perform well on timed tasks while introverts performed better in tasks that required insight and reflection. Extraversion has also been linked with self-efficacy. High self-efficacy behaviour patterns include being active, selecting opportunities and managing the situation. Therefore, extraverts seem to be in line with those who display higher levels of self-efficacy (Tabak, Nguyen, Basuray & Darrow, 2009).

A research study done by Dollinger, Matyja and Huber (2008), examined the influences of factors over which students have no choice (verbal intelligence, personality, and previous performance) and those factors which they can control (class attendance, amount of study and part-time work and ultimate educational goals). Their results indicate that conscientiousness is associated with academic performance.

According to a study conducted by Tabak et al. (2009), self-efficacy is partially mediated by a conscientiousness–performance relationship. In this study conscientiousness is referred to as being dependable, hardworking and persistent. More specifically, a study conducted by Dollinger et al. (2008) reported that more conscientious individuals set higher academic goals. In this study, it was also found that extraverts and agreeable participants engaged in more projects. It is speculated that this was due to most of the projects requiring some form of social engagement (Dollinger et al., 2008). Both a student's learning rate, as well as his/her accumulation of knowledge, can be influenced by self-discipline (Gong, Rai, Beck & Heffernan, 2009). Students with higher self-discipline tend to be more careful and detail oriented when completing tasks therefore making their performance better than that of their colleagues (Gong et al., 2009).

According to Moutafi et al. (2005), individuals with a high score on neuroticism seem to achieve lower intelligence scores, while agreeableness is the only factor that seems to have no correlation or link with intelligence.

There is also evidence suggesting that personality can predict job performance (Morgeson, Campion, Dipboye, Hollenbeck, Murphy & Schmitt, 2007). However, criticisms have evolved around the fact that faking on self-report measures of personality cannot be avoided. It is, therefore, suggested that the use of published self-report personality tests should be reconsidered (Morgeson et al., 2007). When personality tests are used in conjunction with cognitive ability tests, validity is likely to be increased than when either assessment is used separately (Morgeson et al., 2007). To aid information generated through standardised tests, it is further suggested that the attributes considered in selection should be broadened to include aspects such as personality, motivation, prior experience, etc (Hedlund et al., 2006). It is believed that these measures will aid the selection procedure by tapping into non-cognitive factors that could be relevant to academic performance. Evidence further suggests that such measures could reduce subgroup differences, thereby increasing predictive validity (Hedlund et al., 2006). Therefore, the use of a cognitive measure will compliment the use of the personality measure when assessing an applicant. In this way the psychometric process will be multidimensional, and the assessor will be able to paint a holistic picture of the applicant.

In addition, Hedlund et al. (2006, p.103), propose that the term intelligence be defined broadly to include *'aspects such as interpersonal intelligence, emotional intelligence, and creative and practical intelligence.'* This broadening of the definition of intelligence recognises that individuals have different strengths that might not be identified through traditional approaches of measuring intelligence (Hedlund et al., 2006). According to Hedlund et al. (2006, p.104) practical intelligence is linked to self-regulation in that it is *'the ability that individuals use to find a more optimal fit between themselves and the demands of the environment through adapting to the environment, shaping (or changing) the environment, or selecting a new environment in the pursuit of personally valued goals.'*

Self-regulation refers to the ability of an individual to alter his/her behaviour (Baumeister & Vohs, 2007), and refers to an individual's ability to be flexible and adaptable, adjusting their actions in response to the societal and situational demands present. In order for regulation to occur a clear and well-defined standard needs to be set. This needs to be in place so that regulation towards that standard can take place (Baumeister & Vohs, 2007). During the process of self-regulation, the person needs to monitor his/her behaviour by comparing him/herself to the standard. If they fall short, they should revisit their plan for change *'in order to bring it up to what it should be'* (Baumeister & Vohs, 2007, p.3). Changing the self can be a difficult process and, therefore, willpower is a powerful tool that the individual should possess. In addition to willpower, the individual should have the motivation to meet the standard, hence achieving the goal (Baumeister & Vohs, 2007). The concept of self-regulation includes many non-cognitive attributes such as interpersonal skills, perseverance and good judgment - attributes that are not captured by standardised selection tests yet are often important predictors of academic and job success (Baumeister & Vohs, 2007). Research conducted by Hedlund et al. (2006), shows that by incorporating a measurement of practical intelligence into the selection process of Higher Institutions, prediction of academic success will be stronger.

### **2.5.3 ENVIRONMENTAL AND BIOGRAPHICAL FACTORS**

Among tertiary students mode, of study, student age, previous tertiary education and past academic performance are factors which have been identified as contributing to academic success (Dickson, Fleet & Watt, 2000).

Vermunt (2005, P.207) conducted a study aimed at clarifying relations between the way students learn and personal, contextual and performance variables, stating that *'personal influences cause consistency in the way students learn, environmental, or contextual influences are responsible for variability.'* The results of this study showed that personal and contextual factors (academic discipline, prior education, age and gender) impacted on students' learning patterns. A further finding was that students' learning patterns explained a part of the variance in their academic performance.



Age is considered to be another influencing variable. It is assumed that younger and older people differ in their learning. Adults are seen to have more life experience, learning motivation and learning ability. A student's previous level of education, as well as the nature of the learning environment which he/she has been exposed to, seems to be an important contextual variable influencing the student's educational experience (Vermunt, 2005).

Distance Learning, or part-time study, has also been related to lower academic success. Results of a study conducted by Dickson et al. (2000), concluded that distance education students were less likely to succeed than students who studied full-time and attended regular classes.

## **2.6 THEORETICAL FRAMEWORK**

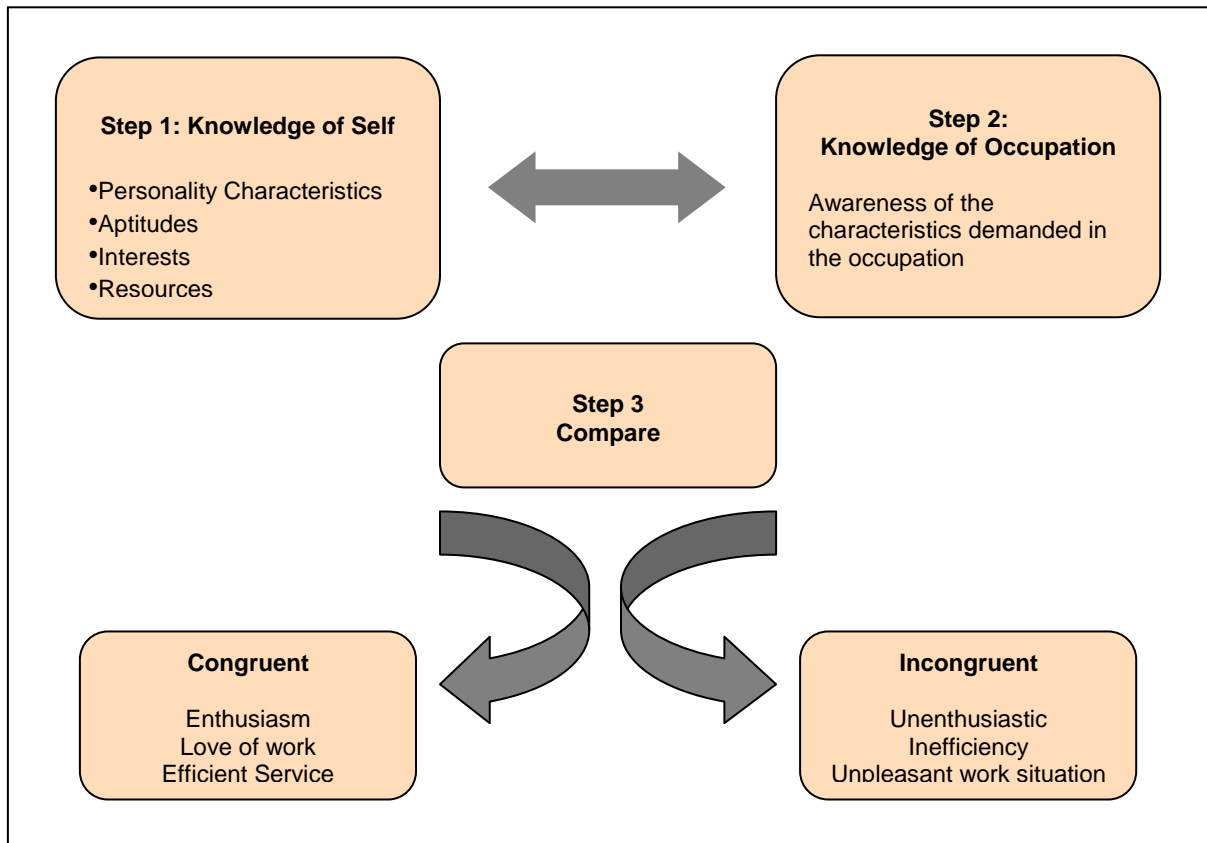
*'If a boy takes up a line of work to which he is adapted, he will achieve far greater success than if he drifts into an industry for which he is not fitted'* (Parsons, 1909, p.3). For the theoretical framework underpinning this study, attention is drawn to career theory, specifically to that of the Trait and Factor Theory developed by Frank Parsons. Parsons is credited for being a pioneer in the career guidance movement (Stead & Watson, 2006), and founded the first vocational guidance centre (Osipow, 1987). Initially, Parsons intended to prevent the exploitation of workers by bringing changes into education and social institutions, providing workers with the opportunity to choose jobs that matched their abilities and interests. Through this he also tried to aid unemployed school leavers to find suitable jobs (Stead & Watson, 2006).

According to Parsons (1909, p 100):

*The wise selection of the business, profession, trade, or occupation to which ones life is to be devoted and the development of full efficiency in the chosen field are matters of the deepest moment to young men and to the public. These vital problems should be solved in a careful, scientific way, with due regard to each person's aptitudes, abilities, ambitions, resources, and limitations, and the relations of these elements to the conditions of success than if he drifts into an industry for which he is not fitted. An occupation out of harmony with the worker's aptitudes and capacities means inefficiency, unenthusiastic, and perhaps distasteful*

*labor, and low pay; while an occupation in harmony with the nature of the man means enthusiasm, love of work, and high economic values, superior product, efficient service, and good pay.*

Parsons (1909) highlighted the importance of **adaptation** in the work environment, advocating the unison of an individual's abilities and passion with his daily work. He outlined three steps essential to career counselling. Firstly, when choosing a career an individual should have sufficient knowledge of his/her personality characteristics, namely; self, aptitudes, interests, resources, limitations and other qualities. In addition, the person should also be aware of the characteristics demanded by the occupation of interest (Schreuder & Coetzee, 2008). Lastly, the individual should be able to compare his/her personal characteristics with those of the occupation of interest to determine whether or not there is congruence (Schreuder & Coetzee, 2008). Parsons' theory was elevated with the arrival of differential psychology, which emphasised the identification of personality traits through scientific measurement. As a result intelligence tests, vocational tests, aptitude tests and personality instruments were developed (Stead & Watson, 2006). In summary, according to Parsons' theory, the goal of providing career advice is to find the job niche best suited to one's characteristics (Osipow, 1987). Figure 2.1 below is a graphical representation of the process underlying the Trait and Factor Theory.



**Figure 2.1: Illustration of the three-step process of the Trait and Factor Theory (adapted from Schreuder & Coetzee, 2008)**

The three steps stated above form a process of describing individual traits or characteristics, as well as factors in the work environment, and then matching traits with factors (Stead & Watson, 2006). Hence, the Trait and Factor Theory was born. According to this approach, traits provide a basis for measuring, describing and predicting behaviour. Schreuder and Coetzee (2008) refer to traits, as those characteristics, which are typical of an individual, are relatively stable over time and consistent in different situations. According to Schreuder and Coetzee (2008, p.95), career choice is viewed as a '*function of agreement between the individual and the job.*' The more agreement there is between the two, the more the individual is likely to be satisfied in the job.

Parsons used the principles of Light, Information, Inspiration and Cooperation when providing counselling. According to Spokane and Glickerman (1994, in O'Brien, 2001, p.67), these principles can be defined as follows: Light refers to the '*insight gained about oneself*'; Information included data collected about oneself and the world of work; Inspiration was equated with hope that

*encouraged confidence in career pursuits; and Cooperation involved the mobilization of resources to actualize one's career choice.'* Parsons approached career intervention by assessing clients with the hope of matching individuals and occupations, as well as addressing the interpersonal and intrapersonal concerns that could affect career development (O'Brien, 2001).

Within an occupational and organisational setting, this approach is used for job descriptions, personnel selection, placement, and evaluation techniques (Schreuder & Coetzee, 2008). Occupations generally differ in terms of the individual traits required from employees, therefore, the nature and requirements of the occupation determine which individual characteristics need to be measured (Schreuder & Coetzee, 2008). According to Kriel (2001) in order to select an employee for a position in an organisation, information with regards to the organization, as well as the applicant, is needed. The abilities and traits of the applicant need to be known.

Osipow (1987, p.334), however, envisioned problems with Parsons approach and asked the following questions: *'how do we assess people? How do we measure the environment? Having measured individuals and assessed their environments, how do we compare the two regarding the degree and quality of fit? More precisely, which personal attributes do we need to assess (height, weight, age, personality, sex, length of hair etc?) and which environmental aspects are of importance?'* He suggested that firstly the elements of environmental demands should be identified, thereby refining one's understanding of the important environmental influences.

According to Parsons (1909), an occupation that is out of sync with an individual's aptitudes and capacities will produce inefficiency, as well as an unenthusiastic and unpleasant work situation. However, if there is harmony between the occupation and the person (in terms of his aptitudes and capacities), there will be an increase in enthusiasm and love of work. In addition, this harmony brings with it higher economic values, superior products and efficient service (Parsons, 1909). If this harmony is needed for the employee to be fruitful in his/her career, surely this recipe could be effective for employers who wish to employ individuals who will bring efficiency to the organisation? In the same token, universities could screen applicants to accept individuals who fit the profile

of a successful student for a specific course, since: *'To win the best success of which one is capable, his best abilities and enthusiasms must be united with his daily work'* (Parsons, 1909, p.5).

Students for the MBA programme at TUT are selected by means of psychometric assessments. Further information about the applicants are obtained with the hope of selecting individuals who possess the personality characteristics befit to handle the demands of an MBA, and who have the potential to be successful in their training. Through this process it is presumed that the chances of selecting students, who are most likely to be successful in the course, are increased.

## **2.7 CONCLUSION**

Prior knowledge, intellectual abilities, learning style, personality, attitudes to courses, motivation, work habits and study skills are among the various factors affecting a student's learning patterns (Vermunt, 2005). In South Africa, research conducted by Kotze and Griessel (2008) found that numerical and verbal abilities, as well as personality attributes, seem to play an important role in the prediction of MBA academic success. They, therefore, concluded that the competencies assessed in selection processes should include the knowledge, skills, and abilities essential for achieving academic success. In addition, any psychological attributes necessary for an individual to complete the MBA successfully should be included. This combination is thought to prove fruitful in predicting the best possible candidates for the MBA programme (Kotze & Griessel, 2008). This highlights the concepts of Trait and Factor Theory in which an individual is on the path of success only if that path is aligned with his/her abilities, personality and interests.

---oOo---

## **CHAPTER 3**

### **Research Method and Description of Psychometric Instruments**

#### **3.1 INTRODUCTION**

This chapter addresses the research methodology applied during the course of the investigation. In addition, the sample and sampling methods used are discussed. Thereafter, the research design and procedure are explained and the methods of data collection are discussed. The psychometric instruments used by TUT to select the MBA applicants are unpacked and the distribution of the psychometric results is explained. The chapter is concluded with an elaboration of the data analysis.

#### **3.2 RESEARCH METHODOLOGY**

##### **3.2.1 RESEARCH DESIGN**

This study lies vested in a positivist paradigmatic approach, which emphasises the use of observations and reason as a means of understanding human behaviour (Dash, 2005). Within this paradigm, experiments and quantitative methods are used to test hypotheses in the search for facts. In addition, the findings of a study guided by a positivist paradigm can be generalised to the parameters of the sample and sampling context (Gephart, 1999).

Within the positivist paradigm, a quantitative research design was used, influencing the direction of the study. According to Creswell (2005), in a quantitative study, once an area is identified, the researcher asks specific and narrow questions and then collects numerical data from the respondents. In addition, the data of a quantitative study are analysed using statistical methods. This paradigm coincides with the study as it relates to the fact that the assessment battery chosen for the selection of candidates into the MBA programme are considered to be carefully selected measuring instruments that

are used for the collection of evidence to support the choice of allowing a certain student to enter into the MBA programme.

This study utilised a non-experimental, *ex-post facto* research strategy. These concepts are elaborated below.

### **3.2.2 NON-EXPERIMENTAL RESEARCH**

This study is non-experimental as there was no need to attempt to manipulate, control or interfere with any of the variables (Gravetter & Forzano, 2003). More specifically, this study falls under *ex post facto* research. According to Cohen, Manion and Morrison (2009, p.264) *ex post facto* is derived '*from what is done afterwards.*' Furthermore, in terms of social and educational research, *ex post facto* research '*refers to those studies which investigate possible cause-and-effect relationships by observing an existing condition or state of affairs and searching back in time for causal factors*' (Cohen et al., 2009, p.264). Researchers seek to identify, in retrospect, the factors that are associated with certain '*occurrences, or conditions, or aspects of behavior*' (Cohen et al., 2009, p.264).

Since, the focus of the study is to investigate the differences between the psychometric selection process of the MBA course, and the academic performance of students selected into the course predictor variables, as well as a criterion variable needed to be identified. According to Creswell (2005), a predictor variable is used to make a forecast about an outcome. Therefore, for the purpose of this study, the results from the selection battery (the selection results) were identified as the predictor variables. In total, 27 predictor variables were identified for each applicant. Twenty-three (23) variables arose from the participants' 15FQ+ results (personality), and four from the participants' ELSA and SpEEEx results. The scores of these subtests were distributed into the categories of verbal ability, non-verbal ability, cognitive ability, language proficiency, and personality. The scores of these categories were then used as the predictor variables in the statistical analysis. These variables are elaborated upon below in, section 3.5.

In quantitative research, the outcome being predicted is referred to as the criterion variable (Creswell, 2005). Therefore, in the current study, the academic performance of the participants was identified as the criterion variable. The academic performance of the participants was further broken down into three categories:

- 1) Students who had passed at least ten modules after two years (group 1);
- 2) Students who had passed at least five modules after one year and less than 10 after two years (group 2); and
- 3) Students who had passed less than five modules after one year and less than ten modules after two years (group 3).

Although creating a further limitation to the already small sample size, the rationale behind this categorisation stems from the course requirements, which state that students should take a minimum of six modules per academic year of study. Therefore, to further investigate the differences between the academic performance of the participants and the selection criterion, it was decided to divide the sample as follows:

- **Group 1 (n = 13)**

Those students who have passed the required number of modules as outlined by the prospectus in their first and second year of study.

- **Group 2 (n = 7)**

Those students who have passed the required number of modules as outlined by the prospectus in their first year of study but who have passed less than the required number of modules in their second year.

- **Group 3 (n = 12)**

Those students who have not passed the required number of modules as outlined in the prospectus in their first and second year of study.



### **3.3 SELECTION OF PARTICIPANTS**

#### **3.3.1 SAMPLING METHOD**

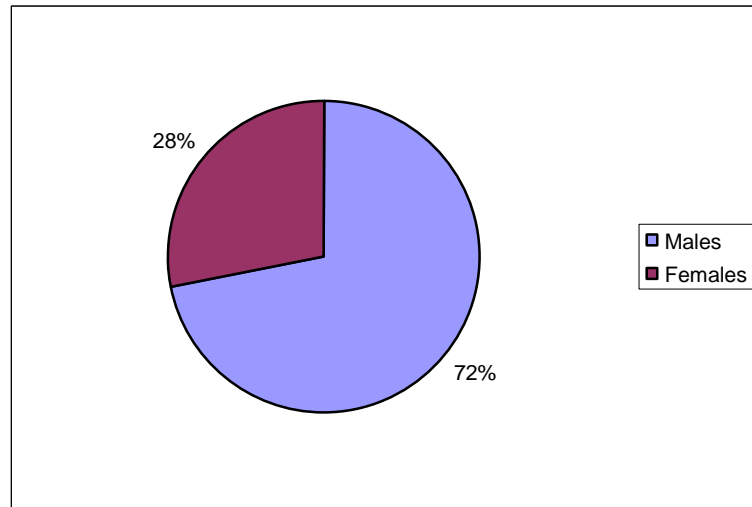
According to Cohen et al. (2009, p.100), the quality of research is dependent on factors such as '*the appropriateness of the methodology and instrumentation*', as well as '*the suitability of the sampling strategy that has been adopted.*' The focus of the study is on the psychometric instruments used for the selection of applicants into the MBA course at TUT, therefore, it was intended to make use of students from this course as part of the sample population. Since the psychometric selection procedure for the MBA course is fairly new, a cohort of students from the MBA course had been considered. To make the necessary distinctions, it was important that the respondents had been through the selection process, and completed at least two years of study.

Therefore, respondents were selected using non-probability, convenience, and purposive sampling methods. The sample was non-probable as it was with the full understanding that a specific sample was selected that did not necessarily represent the wider population. As the study is *ex post facto* in nature, the data already existed and were easily accessible. As a result, convenience sampling was employed. Students from the 2008 MBA course were purposefully selected, as all the necessary data were present in that group. Therefore, the selected participants were students who had completed the psychometric selection procedure to gain entry into the MBA programme and who had registered for their first year of study into the programme in 2008. The inclusion of all students from this group eliminated any selection bias that could have infiltrated the study. However, the restrictions placed during sampling created the first limitation of the study. Since the cohort of students from the 2008 MBA programme was the only group of students of which all the data needed were available, the sample size is therefore quite small ( $n = 32$ ).

#### **3.3.2 DESCRIPTION OF SAMPLE**

According to Cohen et al. (2009), if the statistical analysis of data is conducted, a sample size of thirty is generally considered to be the minimum number of cases that could be used. This is, however, considered to be a small number by some who advise that more respondents be used (Cohen et al., 2009). However based

on the parameters of this study, the sample consisted of only 32 MBA students from TUT, made up of nine females and 23 males (as presented below in Figure 3.1).



**Figure 3.1: Graphical representation of gender distribution of the sample who participated in the study**

The age range of the respondents were between 29 and 56 years, as follows: Two participants (6.3% of the sample) were under the age of 30 years, 16 participants (50% of the sample) were between the ages of 30 – 39 years, 10 participants (31.3% of the sample) were between the ages of 40 – 49 years while the remaining four participants (12.5% of the sample) were older than 50 years. This sample is generally indicative of the MBA cohort at TUT, as the minimum age required for application into the course is 25 years. Due to the small sample size, the age range of the sample is reported on as stated in the statistical report.

**Table 3.1: Age range of the sample**

Age groups	Frequency	Percent	Valid Percent	Cumulative Percent
Younger than 30 years	2	6.3	6.3	6.3
30-39 years	16	50.0	50.0	56.3
40-49 years	10	31.3	31.3	87.5
50+ years	4	12.5	12.5	100.0
Total	32	100.0	100.0	

The average age was 39.4 years (standard deviation = 7.6), while the median age was 38 years.

### **3.4 DATA COLLECTION**

The data collected for the study were twofold. The first set of data retrieved were the psychometric selection results of the respondents. This information was accessed via the Department of Student Development and Support at TUT. The data were retrieved from the server by the researcher, thus ensuring participants' anonymity. Once the psychometric data were retrieved, the participants were tracked using their student numbers and the relevant academic results for the year 2008 and 2009 were retrieved via TUT's database.

As the data were already in a database, ethical clearance was obtained from TUT to conduct the study and retrieve the necessary data for research purposes. In addition, permission was obtained from the relevant departments in order to retrieve the required data. The subsequent two sections (3.5 and 3.6) provide a description of the psychometric selection battery used at TUT, as well as information on how the results (raw scores) of the selection battery were distributed.

### **3.5 THE SELECTION BATTERY USED BY TUT**

To address the criticism levelled at the use of internationally developed psychometric instruments, which are not normed in South Africa, and compare respondents to European / American societies, locally developed psychometric instruments are used. According to Foxcroft and Roodt (2005), in any context where assessments are used, an assessment battery should be tailored to reflect the purpose, as well as to meet the needs of the organisation or individual. The instruments are viewed as being essential in identifying candidates who possess the cognitive skills and personality characteristics needed to complete the MBA programme. In terms of this, TUT makes use of a specific selection battery to screen its MBA applicants. The three instruments used for this purpose are the Situation Specific Evaluation Expert (SpEEEx) which aims to assess learning potential, the English Literacy Skills Assessment (ELSA) which assesses Language Proficiency, and the 15 Factor Questionnaire (15FQ+) which measures

personality traits. This battery is presumed to take into account the areas that could affect an applicant's success in the MBA course.

### **3.5.1 INSTRUMENT 1: THE SITUATION SPECIFIC EVALUATION EXPERT (SPEEX)**

The Situation Specific Evaluation Expert (SpEEEx), which aims to measure potential rather than achievement, was added to the selection process of TUT by Kriel (2001) to ensure that those students who have the best chance of achieving academic success are admitted into the institution. This selection procedure allows for fair discrimination among applicants (Kriel, 2001).

Erasmus developed the SpEEEx in 1964 from observing that the psychometric assessment system employed at the time was not culturally fair and conducive to the South African context (The Genesis Group, 2007). The SpEEEx was, therefore, developed as an alternative. It is registered with the Health Professions Council of South Africa as a psychological test for measuring Cognition, Intelligence, and Aptitude. In terms of Cognitions, the SpEEEx taps into the '*emotional, social and cognitive dimensions of intelligence and aptitude*' (The Genesis Group, 2007, p.6). In addition, the SpEEEx measures the candidates' 'overall capacity for learning and problem solving' (intelligence), and '*ability to do the work required in a specific situation*' (aptitude) (The Genesis Group, 2007, p.6). Rather than measuring achievement, the SpEEEx assesses '*what the individual can learn, not what he/she has already learnt*', i.e. their potential (The Genesis Group, 2007, p.5). According to Van der Merwe and De Beer (2006), assessing potential creates the hope of providing a fair assessment for all despite unequal educational opportunities. It is thought that disadvantaged learners are ill prepared for the demands of higher education.

#### **3.5.1.1 The SpEEEx Indices**

The indices of the SpEEEx that TUT utilises are tabulated below:

**Table 3.2: The SpEEEx indices used by TUT** (Adapted from Erasmus, 2003)

PibSpEEEx 100 <b>Conceptualisation</b>	A visual cognitive subtest with various forms and figures that assesses an individual's potential or capacity to reason in spatial terms. This entails seeing the relationship between parts, envisaging the whole or end-result and anticipating the outcome
PibSpEEEx 304 <b>Calculations (advanced)</b>	An English cognitive subtest developed for those who have completed at least a Grade 12 qualification. It assesses the individual's potential or capacity to work with numbers
PibSpEEEx 401 <b>Observance</b>	A visual cognitive subtest measuring the individual's potential, or capacity to pay attention, understand, and be alert
PibSpEEEx 402 <b>Mental Alertness (advanced observance)</b>	This English cognitive subtest measures the individual's potential or capacity to pay attention, understand, and to be alert
PibSpEEEx 502 <b>Assembling (advanced)</b>	A visual cognitive subtest that measures the potential or capacity to conceptualise the bigger picture by arranging parts into a whole
PibSpEEEx 1000 <b>Insight</b>	An English cognitive subtest that assesses the potential or capacity to understand, grasp and reflect foresight
PibSpEEEx 1600 <b>Reading Comprehension</b>	An English cognitive subtest that assesses the potential or capacity to read, as well as to understand what has been read clearly and objectively
PibSpEEEx 900 <b>Environmental Exposure</b>	Assesses an individual's capacity to expose oneself to an environment that is stimulating, to gather information from various sources, to accumulate knowledge of one's environment, to participate in environmental activity, to know and understand what people do and to relate to an eventful environment

### 3.5.1.2 Predictive Validity of the SpEEEx

According to Reber and Reber (2001, p.783), predictive validity refers to the '*extent to which the scores on a test are predictive of actual performance.*' Kriel, (n.d), conducted a study at the Technikon Pretoria (the previous name of TUT) surrounding the situation-specific validity of the SpEEEx and its accuracy in predicting academic success of students at the institution. According to the results of her study, the SpEEEx was found to have course specific predictive validity for students in different courses at the Institution (Kriel, n.d).

### **3.5.1.3 Test Bias of the SpEEx**

According to a another study conducted by Kriel (1999), the usage of the SpEEx adheres to the guidelines set by the Employment Equity Act (mentioned in Chapter 2), hence promoting fair test use.

### **3.5.2 INSTRUMENT 2: THE ENGLISH LITERACY SKILLS ASSESSMENT (ELSA)**

The English Literacy Skills Assessment (ELSA) is a South African developed measure that assesses an individual's use of the English Language (Horne, 2007). In addition, it identifies strengths and weaknesses in an English language-training environment. Studies have found the ELSA to be culturally fair with adequate reliability and validity (Horne, 2007).

### **3.5.3 INSTRUMENT 3: THE 15 FACTOR PERSONALITY QUESTIONNAIRE (15FQ+)**

When assessing personality, it is assumed that personality traits are stable (Foxcroft & Roodt, 2005). It is also presumed that these traits or tendencies predispose individuals to behave in a particular way. According to Foxcroft and Roodt (2005), an assumption is made that an individual's behaviour is influenced by these internal factors. According to this school of thought, traits are thought to be important predictors of many factors, including leadership, career choice and academic and work success.

Standardised questionnaires, inventories, or interviews that contain a fixed set of statements, or questions, fall under the structured form of personality assessments (Foxcroft & Roodt, 2005). In these assessments test-takers are required to indicate their responses to statements, or questions, by choosing an answer from a set of given possible answers. In certain assessment respondents are required to answer by indicating the relevancy of the statements or questions. Scoring in structured assessments is normally guided by fixed scoring rules (Foxcroft & Roodt, 2005). The 15FQ+ is considered to be a formal form of personality assessment.

The 15 Factor Questionnaire (15FQ+) was added to the selection battery at TUT to introduce the element of personality into the selection process. As stated in Furnham et al. (2003, p.63), *'once suitable levels of intelligence are met*

*personality variables play an increasing role in educational outcomes.*' The 15FQ+ was developed to serve as an alternative to the 16PF and has been written in a way that avoids any culture, sex and age bias (15FQ+ Manual, 2002). According to research conducted, personality factors strongly influence an individual's career choice, his/her potential for burnout, and trainability (potential) (15FQ+ Manual, 2002).

The 15FQ+ is based on the Factor-Analytic Theory developed by Raymond Cattell (Cattell & Mead, 2008). The primary traits of Cattell's theory are considered as being imperative in attempting to understand and predict *'the complexity of actual behaviour'* (Cattell & Mead, 2008, p.137). Through factor analysis of these primary traits, second-order or global factors emerged (The Big Five personality traits). These global factors provide *'the larger conceptual, organizing framework for understanding the meaning and function of the primary traits'* (Cattell & Mead, 2008, p.139). Research has shown that personality influences among other things:

- a person's career choice,
- success in the chosen career,
- a person's potential for burnout,
- an individual's trainability, and
- job satisfaction.

(15FQ+ Manual, 2002).

The 15FQ+ was developed from its predecessor, the 15FQ. During development items were changed to make the assessment culture friendly and appropriate for a diverse population (Meiring, Van de Vijver & Rothmann, 2005). However, according to Meiring et al. (2005) the 15FQ+ is still not suitable for use in the multicultural setting of South Africa as it displayed low levels of internal consistency of some of the scales. In addition, the constructs are not measured uniformly for each ethnic group; therefore, the 15FQ+ lacks construct equivalence. It was recommended that the problematic factors of Accommodating – Dominant, Practical – Abstract, Self-assured – Apprehensive, Conventional – Radical, Relaxed – Tense driven, need to be revisited and redeveloped to take into account the cross-cultural sensitivities of the different groups within South Africa (Meiring et al., 2005).

### 3.5.3.1 Items of the 15FQ+

The items of the 15FQ+ scales have been written to avoid culture, sex and age bias. In addition, the items of the 15FQ+ are designed to assess broad source traits (15FQ+ manual, 2002).

### 3.5.3.2 Scoring of the 15FQ+

The 15FQ+ uses a Sten scoring system:

- 1 - Extremely low
- 2 - Very low
- 3 - Low
- 4 – Slightly below average
- 5 & 6 – Average
- 7 – Slightly above average
- 8 – High
- 9 – Very high
- 10 – Extremely high

There are two scales, which are not reported using Sten scores: the Infrequency, and Central Tendency scales. These scores are scaled according to the probability that a given score indicates an invalid profile. A risk scaled score of 8 or 9 indicates the *possibility* that a profile may not be interpretable due to central tendency responding, or due to infrequency responding. It is likely that a profile is invalid if the respondent scores 10 (15FQ+ Manual, 2002).

### 3.5.3.3 Interpretation of the 15FQ+

When interpreting a 15FQ+ personality profile, the first step is to review the impression management scales (15FQ+ Manual, 2002). These scales provide information on the validity of the profile. The impression management scales consist of:

#### 1) The Social Desirability Scale

This scale ‘assesses a person’s desire to present an unrealistically positive image of themselves to others’ (15FQ+ Manual, 2002, p.8). If a candidate scores high on this scale, it implies that he/she has either deliberately attempted to distort



his/her self-image or has a highly over-idealised self-image (15FQ+ Manual, 2002).

## **2) Infrequency Scale**

This scale identifies if the candidate gave only little consideration and thought to items when completing the assessment (15FQ+ Manual, 2002).

## **3) Central Tendency Scale**

This scale assesses the possibility that the candidate may have been indecisive or reluctant to respond openly and directly (15FQ+ Manual, 2002). A high score on this scale could indicate that the candidate has a '*poorly defined self-concept*', has been indecisive, or is '*genuinely moderate in respect to many personality traits and dispositions*' (15FQ+ Manual, 2002, p.9). A score of 10 on this scale suggests that the personality profile is likely to be invalid.

## **4) Faking Good**

This scale assesses the tendency of the individual to be presented in a favourable light. A candidate with a high score tends to deny a variety of problem behaviours and difficulties that generally apply to many people (15FQ+ Manual, 2002).

## **5) Faking Bad**

This scale assesses the tendency of the individual to be presented in an unfavourable light. These candidates admit to a variety of problem behaviours and difficulties that do not routinely apply to them (15FQ+ Manual, 2002).

It is important that when interpreting the meaning of the impression management scales, due consideration is given to the context in which the test was administered (15FQ+ Manual, 2002). For example, if a candidate is being assessed for selection purposes, it is common for him/her to portray themselves in a socially desirable manner. These scales should also be interpreted with caution, as it is possible that the candidate answered in a particular manner due to a language barrier where the candidate might not have understood the item in totality (15FQ+ Manual, 2002).

The next step in interpretation is to review the global factor scale scores (see Table 3.1). These scales assess the Big Five personality dimensions and provide a broad description of the candidate's personality indicating his/her '*general personality orientation*' (15FQ+ Manual, 2002, p.10). After interpreting the global factors, the interpretation of the primary source traits can begin (15FQ+ Manual, 2002). Table 3.2 indicates the primary source traits of the 15FQ+.

### 3.5.3.4 Criterion Scores of the 15FQ+

Criterion scores are added to the 15FQ+ report to '*add further useful **insight** into the candidate's character and most likely work place behaviour*' (15FQ+ Manual, 2002, p.12). The 15FQ+ includes criterion scores for:

- Team Roles
- Career Themes
- Leadership Styles
- Subordinate Styles

Table 3.3 and 3.4 below indicate the global factors and the primary source traits of the 15FQ+, which are the scales used in this investigation.

**Table 3.3: Global factors of the 15 FQ+**

<b>Extraversion</b> <ul style="list-style-type: none"> <li>▪ Orientated to the outer world of people, events and external activities</li> <li>▪ Needs social contact and external stimulation</li> </ul>	<b>Introversion</b> <ul style="list-style-type: none"> <li>▪ Orientated towards their own inner world of thoughts, perceptions and experiences</li> <li>▪ Not much social contact and external stimulation required</li> </ul>
<b>Low anxiety</b> Well adjusted, calm, resilient, and able to cope with emotionally demanding situations.	<b>High anxiety</b> Vulnerable, touchy, sensitive, prone to mood swings, challenged by emotionally demanding situations
<b>Pragmatism</b> <ul style="list-style-type: none"> <li>▪ Influenced by hard facts and tangible evidence</li> <li>▪ May not be open to new ideas</li> </ul>	<b>Openness to experience</b> <ul style="list-style-type: none"> <li>▪ Influenced more by ideas, feelings and sensations</li> <li>▪ Open to possibilities and subjective experiences</li> </ul>
<b>Independence</b> <ul style="list-style-type: none"> <li>▪ Self-determined</li> <li>▪ Independent minded</li> <li>▪ Strong willed</li> </ul>	<b>Agreeableness</b> <ul style="list-style-type: none"> <li>▪ Agreeable</li> <li>▪ Tolerant</li> <li>▪ Obliging</li> </ul>

<ul style="list-style-type: none"> <li>Confrontational</li> </ul>	<ul style="list-style-type: none"> <li>Happy to compromise</li> </ul>
<b>Low self-control</b> <ul style="list-style-type: none"> <li>Low levels of self-control and restraint</li> <li>Not influenced by social norms and internalised parental expectations</li> </ul>	<b>High self-control</b> <ul style="list-style-type: none"> <li>Exhibiting high levels of self-control</li> <li>Influenced by social norms and internalised parental expectations</li> </ul>

**Table 3.4: Primary source traits of the 15FQ+**

<b>FACTOR fA</b>	<b>Distant aloof</b> Lacking empathy, distant, detached and impersonal	<b>Empathic</b> Friendly, personable, participating, warm-hearted and caring
<b>INTELLECTANCE β</b>	<b>Low Intellectance</b> Lacking confidence in one's own intellectual abilities	<b>High Intellectance</b> Confident in one's own intellectual abilities
<b>FACTOR fC</b>	<b>Affected by feelings</b> Emotional, changeable, labile and moody	<b>Emotionally stable</b> Mature, calm and phlegmatic
<b>FACTOR fE</b>	<b>Accommodating</b> Passive, mild, humble and deferential	<b>Dominant</b> Assertive, competitive, aggressive and forceful
<b>FACTOR fF</b>	<b>Sober serious</b> Restrained, taciturn and cautious	<b>Enthusiastic</b> Lively, cheerful, happy-go-lucky and carefree
<b>FACTOR fG</b>	<b>Expedient</b> Spontaneous, disregarding of rules and obligations	<b>Conscientious</b> Preserving, dutiful and detail-conscious
<b>FACTOR fH</b>	<b>Retiring</b> Timid, socially anxious, hesitant in social settings and shy	<b>Socially-bold</b> Venturesome, talkative and socially confident
<b>FACTOR fI</b>	<b>Hard-headed</b> Utilitarian, unsentimental and tough minded	<b>Tender-minded</b> Sensitive, aesthetically aware and sentimental
<b>FACTOR fL</b>	<b>Trusting</b> Accepting, unsuspecting and credulous	<b>Suspicious</b> Sceptical, cynical, doubting and critical
<b>FACTOR fM</b>	<b>Concrete</b> Solution-focused, realistic, practical and down-to-earth.	<b>Abstract</b> Imaginative, absent-minded, impractical and absorbed in thought
<b>FACTOR fN</b>	<b>Direct</b> Genuine, artless, open, direct, straightforward and shrewd	<b>Restrained</b> Diplomatic, socially astute, socially aware and restrained

<b>FACTOR f O</b>	<b>Confident</b> Secure, self-assured, unworried and guilt-free	<b>Self-doubting</b> Worrying, insecure and apprehensive
<b>FACTOR f Q 1</b>	<b>Conventional</b> Traditional, conservative and conforming	<b>Radical</b> Experimenting, open to change and unconventional
<b>FACTOR f Q 2</b>	<b>Group-oriented</b> Sociable, group dependent and a 'joiner'	<b>Self sufficient</b> Solitary, self reliant, individualistic
<b>FACTOR f Q 3</b>	<b>Informal</b> Informal, uncontrolled, lax and follows own urges	<b>Self-disciplined</b> Compulsive, fastidious and exacting willpower
<b>FACTOR f Q 4</b>	<b>Composed</b> Relaxed, placid and patient	<b>Tense-driven</b> Impatient and low frustration tolerance
<b>eIQ</b>	<b>Lacking empathy</b> Moody, temperamental, insensitive, socially artless and low frustration tolerance	<b>Empathic</b> Caring, emotionally mature, socially astute, composed and perceptive
<b>WORK ATTITUDE</b>	Absent-minded, lax, disregards rules and unconventional	Persevering, dutiful, solution-focused, conscientious and conforming

### 3.6 THE GROUPING OF SCORES OBTAINED THROUGH THE PSYCHOMETRIC ASSESSMENT

Once the MBA applicant has completed the psychometric selection process, the scores of the SpEEEx and ELSA are grouped together to form the cognitive profile of the applicant. The results of the 15FQ+ are displayed separately (See Chapter 4, section 4.6).

#### 3.6.1 COGNITIVE ABILITY SCORES

The cognitive profile of each applicant is sub-totalled into the following categories:

- Verbal ability
- Non-verbal ability, and
- Language proficiency

These three categories are then added up to provide the total cognitive ability score for each applicant.

### **3.6.1.1 Verbal Ability**

The verbal ability score for each applicant is calculated by combining the following subtests of the SpEEx:

- 1) Conceptualisation,
- 2) Mental alertness,
- 3) Observance,
- 4) Environmental exposure, and
- 5) Insight.

The total for the verbal ability is 100. Although each subtest is calculated to have a maximum of 10, they each have different weightings. These weightings are calculated with careful consideration of the skills assessed in each subtest, as well as how important these skills are to the expected success in the respective course. The weightings of these subtests for entrance into the MBA course are as follows:

- 1) Conceptualisation: 2x the applicant's score = 20 (maximum score)
- 2) Mental alertness: 3x the applicant's score = 30 (maximum score)
- 3) Observance: 1x the applicant's score = 10 (maximum score)
- 4) Environmental exposure: 2x the applicant's score = 20 (maximum score), and
- 5) Insight: 2x the applicant's score = 20 (maximum score).

### **3.6.1.2 Non-verbal Ability**

The non-verbal ability score of the cognitive profile of each applicant includes the subtests of Calculations and Object Assembly, both of which are taken from the SpEEx. The total for the non-verbal ability is 20, with 10 as the highest an applicant can score on any subtest. Each subtest has a weighting of one. Therefore, the weightings of these subtests for entrance into the MBA course are as follows:

- 1) Calculations: 1x the applicant's score = 10 (maximum score), and
- 2) Object Assembly: 1x the applicant's score = 10 (maximum score)

### 3.6.1.3 Language Proficiency

The ELSA (language proficiency) and the Reading Comprehension subtest of the SpEEEx are used to assess language. The total for the Language Proficiency is 40; with 10 being the highest an applicant can score on any subtest. Each subtest has a weighting of two. Therefore, the weightings of these subtests for entrance into the MBA course are as follows:

- 1) Language proficiency: 2x the applicant's score = 20 (maximum score), and
- 2) Reading comprehension: 2x the applicant's score = 20 (maximum score)

### 3.6.1.4 Cognitive Ability

The total score for the cognitive profile of each applicant is calculated by adding the verbal ability, non-verbal ability and language scores. Therefore, the cognitive ability score is out of 160.

### 3.6.1.5 Personality

The 15FQ+ has an output of scores for each factor, these scores are then placed on a scale from one to ten, with the two personality preferences on the extremes of this scale; for example, with FACTOR *fA* an individual is rated on whether they prefer being 'Distant Aloof' or 'Empathic'. To judge this their scores will fall between 1 and 10 with 'Distant Aloof' on the one side and Empathic on the other. Table 3.5, provides an example of the scoring schedule produced for the 15FQ+.

**Table 3.5: Scoring Schedule of the 15FQ+**

	1	2	3	4	5	6	7	8	9	10	
Distant aloof											Empathic
Low Intellectance											High Intellectance
Affected by feelings											Emotionally stable
Accommodating											Dominant
Sober serious											Enthusiastic
Expedient											Conscientious
Retiring											Socially-bold
Hard-headed											Tender-minded
Trusting											Suspicious

	1	2	3	4	5	6	7	8	9	10	
Concrete											Abstract
Direct											Restrained
Confident											Self-doubting
Conventional											Radical
Group- oriented											Self sufficient
Informal											Self-disciplined
Composed											Tense-driven
Lacking empathy											Empathic
Work Attitude (Low)											Work attitude (High)
Extraversion											Introversion
Low anxiety											High anxiety
Pragmatism											Openness to experience
Independence											Agreeableness
Low self-control											High self-control

### 3.7 DATA ANALYSIS

#### 3.7.1 INTRODUCTION

After collection the data were analysed statistically at the Department of Statistics at the University of Pretoria using the SPSS programme. The SPSS is the most commonly used statistical data analysis software (Muijs, 2004). Through this form of analysis it was possible to investigate the differences between each of the predictor variables on the criterion variable.

As stated in section 3.6.1, the collected data were grouped into categories (verbal ability, non-verbal ability, language proficiency, cognitive ability and personality) and as per the hypotheses formulated in Chapter 1 (section 1.6), were aligned as such. It was, therefore, fitting that the data analyses accommodate these categories, and thus different statistical procedures were applied. One limitation of the statistical analysis was that the academic performance of the participants were categorised into groups (as described previously in section 3.2.2). Thus an already small sample was further broken up into smaller groups, which impacted on the input numbers when conducting the statistical analysis. To address the issues surrounding the small sample size,

precaution was taken to ensure all possible statistical methods were explored with the statistician. The dividing of the sample was necessary so as to compare the different categories of scores across the three groups, varying in academic performance, to investigate whether there is a difference between the three groups with regards to their scores (range, mean, and median) on the different categories.

### **3.7.2 STATISTICAL ANALYSIS CONDUCTED FOR THE CATEGORIES OF VERBAL ABILITY, NON-VERBAL ABILITY, LANGUAGE PROFICIENCY, AND COGNITIVE ABILITY**

Firstly, frequency Tables were calculated to allow the researcher to get to know the sample. According to Cody and Smith (1997), a frequency refers to the number of participants in a specific cell. These Tables were computed for age, gender, the verbal sub-total scores and non-verbal subtotal scores (both as obtained by participants on the SpEEx), the language proficiency subtotal (calculated by combining the Reading Comprehension subtest of the SpEEx and the ELSA score), and the total cognitive score obtained.

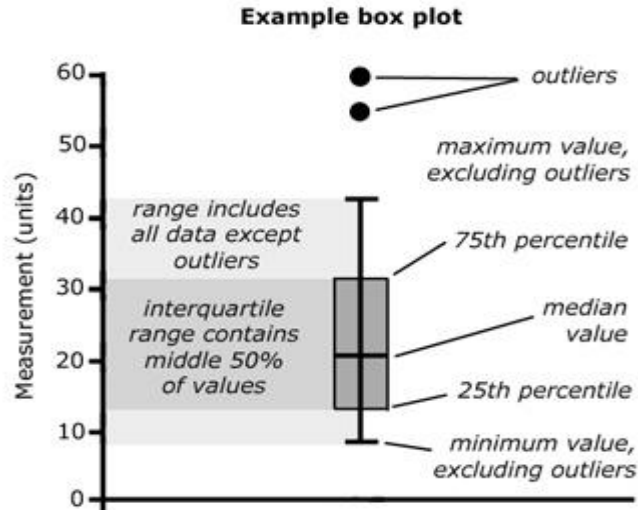
Secondly, descriptive statistics of the sample were used to address the categories of verbal ability, non-verbal ability, language proficiency and cognitive ability. According to Cohen et al. (2009), descriptive statistics are generally used when the data collected is descriptive in nature, which is characteristic of the data in this study. The applications focus on computing the mean, median, the minimum and maximum values, as well as standard deviation (SD) from the raw scores of the variables (Cohen et al., 2009). Therefore, the raw scores of the selection battery, which were distributed into the categories of verbal ability, non-verbal ability, language proficiency, and cognitive ability, were used in the statistical analysis. For this statistical investigation the medians and means of the different categories were computed for the purpose of addressing the hypotheses set out in Chapter 1 (section 1.6). Howell (1992) regards the median as an effective measure of central tendency under certain conditions. Downie and Heath (1974, p.47) state that the median remains the best average to use, when a distribution is 'positively or negatively skewed.' Table 3.6, provides definitions of the above terms as adapted from Howell (2011).



**Table 3.6: Definitions of statistical terms**

Term	Definition
Mean	The mean is calculated by adding the value of all the scores and dividing that by the number of scores in the data set
Median	The median is considered to be the middle value in a set of data
Standard Deviation	The standard deviation is the positive square root of the variance

Thirdly, box-and-whisker plots were computed to illustrate the distribution of the different scores across the three groups. This plot was used to show, the distribution of the median and the variability of the raw scores around the median for the categories of verbal ability, non-verbal ability, language proficiency and cognitive ability across the three groups. The box-and-whisker plot does not provide any statistical value to the data presented and further statistical analysis was subsequently conducted. Based on this illustration, Figure 3.2 illustrates the information provided in the box-and-whisker plot.



**Figure 3.2: Example of box plot** (taken from <http://web.anglia.ac.uk>)

Lastly, the Kruskal-Wallis test was used to investigate if there was a significant difference between the three groups in relation to the different categories of scores, by exploring the variability between the **medians** of the three groups. The Kruskal-Wallis test is a non-parametric test that is used to compare two or more samples that are independent and not related to each other (Corder &

Foreman, 2009). The Kruskal- Wallis test is sensitive to differences in central tendency and, according to Howell (1992) can be used to test hypotheses of samples drawn from identical populations. The medians were used for this analysis as it is not as affected by outliers (extreme values) as the mean is (Cohen & Lea, 2004). SPSS computes an H-statistic for the Kruskal-Wallis. In order for the H-statistic to be considered as a significant on the 5% level, the value is required to be equal to, or above, 6.00 (Corder & Foreman, 2009).

### 3.7.3 STATISTICAL ANALYSIS CONDUCTED FOR THE PERSONALITY CATEGORY

The scoring schedule of the 15FQ+ places each factor on a scale from one to ten, with the preferences associated with that factor at the extreme ends of that scale. For example:

	1	2	3	4	5	6	7	8	9	10	
Distant aloof											Empathic

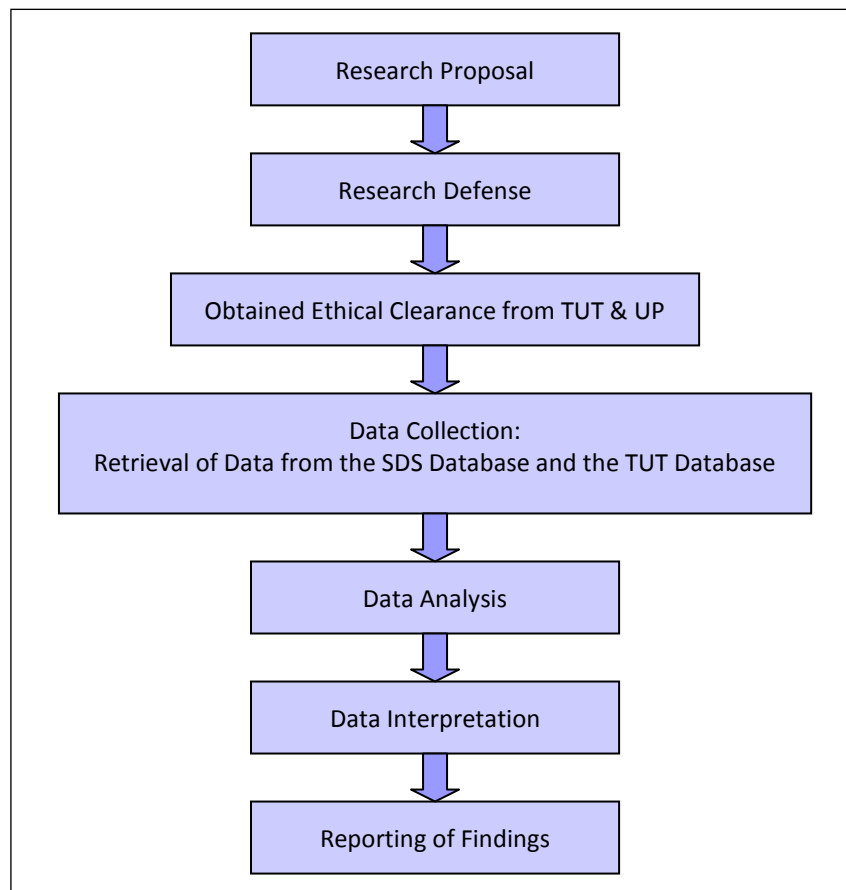
For the purpose of the statistical analysis it was necessary to quantify these preferences. As such, it was decided that all the scores between, and including one and five, should be ascribed to the preference on the lower end of the scale (in the above instance the preference of 'Distant aloof'). Therefore, all those scores falling between, and including six and ten would be ascribed to the preference at the upper end of the scale (in the above example, the 'Empathic' preference).

To investigate the significant difference among the personality category across the three groups, cross tabulations, as well as the Chi-Square test and Fisher's Exact test were conducted. Through the cross tabulations, the data were analysed to identify any patterns of associations existing between the variables. The significant difference between the scores was measured using P-values to determine whether or not such an association is statistically significant (Muijs, 2004). The Chi-Square test and Fisher's Exact test were used in the study to check for associations. Since the study's sample size was quite small, both the Chi-Square test and Fishers Exact test were computed. The Fisher's Exact test is a preferred statistical approach when conducting research with a small sample size (Corder & Foreman, 2009) and is used in many studies including those conducted by Wilson, Baker, Nordstrom and Legwand, (2008), and Ghetian,

Parrott, Volkman and Lengerich (2008). According to Leong and Austin (2006), certain assumptions need to be met for the Chi-Square test to yield accurate results. One such important assumption is that the expected frequencies for each category should not be lower than five. However, given the sample size of the study some frequencies on some categories fell below five.

Both the Chi-Square test and Fisher's Exact test are used to measure if there is a statistically significant difference between a statistically generated expected result and an actual result. Usually, the accepted minimum level of significance is  $p = 0.05$ . Therefore, a result was considered statistically significant if the significance level of the statistic was smaller than 0.05 (Cohen et al., 2009).

### 3.8 RESEARCH PROCESS



**Figure 3.3: Summary of the research process undertaken by the researcher**

Figure 3.3 above provides a graphical representation of the research process undertaken in this study. Since this study followed an *ex post facto* research design, the data were easily available and could be retrieved once the necessary

ethical clearance certificates were obtained. Upon retrieval, the data were sent to the statistician for analysis. Thereafter, it was possible for the results of the statistical analysis to be interpreted and then reported on.

### **3.9 CONCLUSION**

In the study, the utmost care was taken in an attempt to ensure that all possible avenues were addressed during the data collection and data analysis phase of the research. Ethical clearance was obtained from all the respective institutions before any data were collected. In addition, the data were collected using student numbers to ensure the respondents could not be identified. Lastly, the data were analysed by means of frequencies and descriptive statistics. In the analysis, where necessary, both the Pearson's Chi-Square test and Fisher's Exact test were used to determine whether there were any statistically significant results. The next chapter reports on the results of the statistical analysis.

---oOo---

## CHAPTER 4

### Results

#### 4.1 INTRODUCTION

In this chapter the results of the statistical analysis are reported and briefly discussed. The interpretations of the results are addressed in Chapter 5. The values that were computed for the analysis were acquired through the results of the selection battery used to assess the participants. The scores of the selection battery used were distributed into categories (verbal ability, non-verbal ability, language proficiency, cognitive ability and personality), which were taken into account when formulating the null hypotheses. These values were, therefore, used to direct the statistical analysis. As a result, different statistical procedures had to be applied to address the different null hypotheses formulated, and the reporting of the statistical analysis is structured according to Null Hypotheses 1 to 5. Null Hypothesis (Ho) 6 is not included as part of a separate section of statistical analysis as it addresses the significant difference between the scores on the entire selection battery, used to select applicants into the MBA programme, and the academic performance of the students selected, thereby encompassing all the statistics conducted. This hypothesis will be addressed in Chapter 5 with the interpretation of the results. Null Hypotheses 1 to 5 are as follows:

- **Null Hypothesis (Ho) 1**

There is no significant difference between the scores on the verbal component of the selection battery used to select applicants into the MBA programme, across the three groups of academic performance of the students selected.

- **Null Hypothesis (Ho) 2**

There is no significant difference between the scores on the non-verbal component of the selection battery used to select applicants into the MBA programme, across the three groups of academic performance of the students selected.

▪ **Null Hypothesis (Ho) 3**

There is no significant difference between the scores on the language proficiency component of the selection battery used to select applicants into the MBA programme, across the three groups of academic performance of the students selected.

▪ **Null Hypothesis (Ho) 4**

There is no significant difference between the scores on the cognitive ability component of the selection battery used to select applicants into the MBA programme, across the three groups of academic performance of the students selected.

▪ **Null Hypothesis (Ho) 5**

There is no significant difference between the scores on the personality component of the selection battery used to select applicants into the MBA programme, across the three groups of academic performance of the students selected.

Before the results of the statistical analysis can be reported it is important to recapitulate how the academic performances of the participants were categorised into groups. These groups, described in the previous chapter, were as follows:

- Group 1: Students who had passed at least ten modules after two years (n = 13)
- Group 2: Students who had passed at least five modules after one year and less than ten after two years (n = 7)
- Group 3: Students who had passed less than five modules after one year and less than ten modules after two years (n = 12)

Since the sample of the study is quite small (n = 32), further splitting of the sample into groups impacted on the statistical procedures used. However, precaution was taken to ensure all possible avenues were explored during the statistical analyses. Although restricting, this categorisation of the participants in terms of their academic performance was essential as it served as a baseline from which academic achievement could be measured and, therefore, compared.

In addressing Null Hypothesis 1 through to 4 the statistical analysis that will be reported are the descriptive statistics of the sample, with a focus on the mean, median, minimum and maximum values, as well as standard deviation (SD) of the variables. In addition, box-and-whisker plots illustrate the distribution of the different scores across the three groups, thereby providing a visual representation of the spread of the scores. Thereafter, the Kruskal-Wallis test statistic is presented. This allowed for the investigation of the significant differences between the three groups in relation to the different categories of scores, by exploring variability between the means of the groups. Different statistical methods were employed to address Null Hypothesis 5. A summary of the cross tabulations, reliability statistic as well as the results of the Chi-Square test and Fisher's Exact test are reported. (An in-depth statistical breakdown is presented in Chapter 3, section 3.7).

## 4.2 RESULTS OF THE STATISTICAL ANALYSIS ADDRESSING NULL HYPOTHESIS 1

Null Hypothesis 1 states that there is no significant difference between the scores of the verbal ability component of the selection battery across the three groups of academic performance of the participants in terms of the number of modules passed (as categorised above, namely; Group 1, Group 2 and Group 3). The statistical analysis addressing this hypothesis focuses on the verbal ability score of the selection battery, and tries to identify its relationship with the academic success of the three groups through descriptive statistics (See Table 4.1).

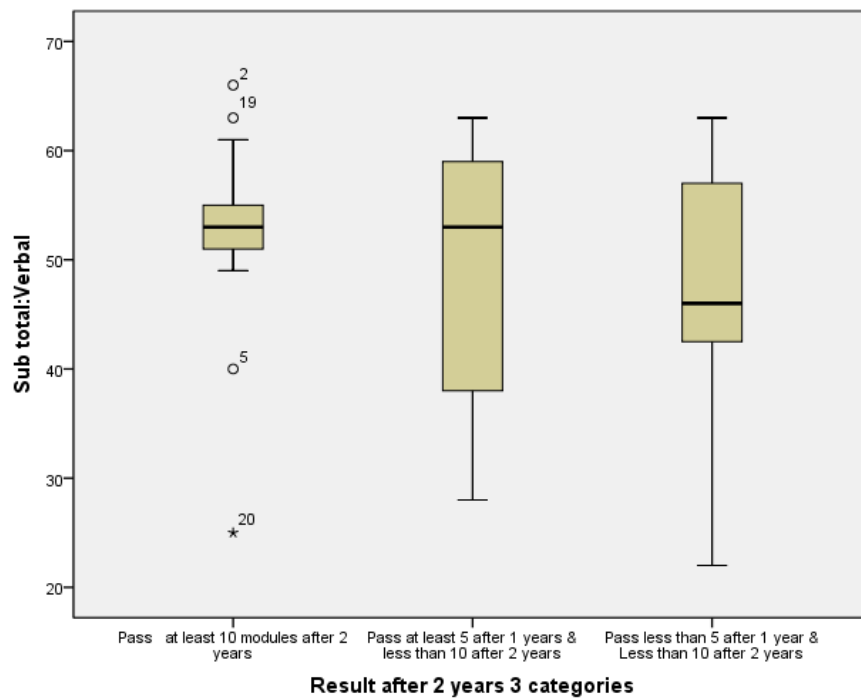
### 4.2.1 DESCRIPTIVE STATISTICS OF THE VERBAL ABILITY SCORES

**Table 4.1: Descriptive Statistics Summary – Verbal Ability**

Group 1 (n = 13)		Group 2 (n = 7)		Group 3 (n = 12)	
Mean	52.08	Mean	48.29	Mean	47.50
Median	53.00	Median	53.00	Median	46.00
Minimum	25	Minimum	28	Minimum	22
Maximum	66	Maximum	63	Maximum	63
Std. Deviation	10.412	Std. Deviation	13.549	Std. Deviation	11.580

Keeping in mind that the maximum score that can be obtained for the verbal ability category is 100, the applicants who were accepted into the MBA

programme in 2008 obtained scores that ranged from 25 (lowest score) to 66 (highest score) for the verbal ability category of their cognitive profile.



**Figure 4.1: Graphical representation of the Verbal Ability scores across the three groups**

Figure 4.1 is a box-and-whisker plot providing additional information on the distribution of the verbal ability scores across the three groups. From this figure, it is evident that although the minimum score for the verbal ability category in Group 1 is 25, and the maximum score is 66, the students who obtained these marks are the outliers of the group. Upon analysis of the different box-and-whisker plots for the three groups, it can be seen through the first and third quartile scores (which are different for each group) that there is a small variability of the scores around the median of Group 1 in comparison to the other two groups. This was investigated further using the Kruskal-Wallis test (Table 4.2), which was used to statistically assess whether or not a significant difference exists between the medians of the three groups. As stated in Chapter 3, SPSS computes an H-statistic for the Kruskal-Wallis, and this value should be equal to, or above, 6.00 to be considered significant on the 5% level. However, in this study the statistic used to judge statistical significance in the Table below is the "Asymp.Sig." value, which is considered to be significant if the value smaller than 0.05.



**Table 4.2: Kruskal-Wallis Statistic – Verbal Ability**

	Sub total: <b>Verbal Ability</b>
H	.663
Df	2
Asymp. Sig.	.718

According to these results presented there is no significant difference in the medians of the verbal ability scores across the three groups since the significant value is greater than  $> 0.05$ . This implies that, although the medians of the verbal ability score across the three groups seem to differ visually, as illustrated in the box-and-whisker plot, there is no statistical evidence to support this.

### 4.3 RESULTS OF THE STATISTICAL ANALYSIS ADDRESSING NULL HYPOTHESIS 2

Null Hypothesis 2 states that there is no difference between the scores of the non-verbal component of the selection battery across the three groups of academic performance of the participants in terms of the number of modules passed (as categorised above, namely; Group 1, Group 2 and Group 3). The statistical analysis addressing this hypothesis focused on the non-verbal ability score of the selection battery, and investigated its relationship with the academic success of the three groups through descriptive statistics (See Table 4.3).

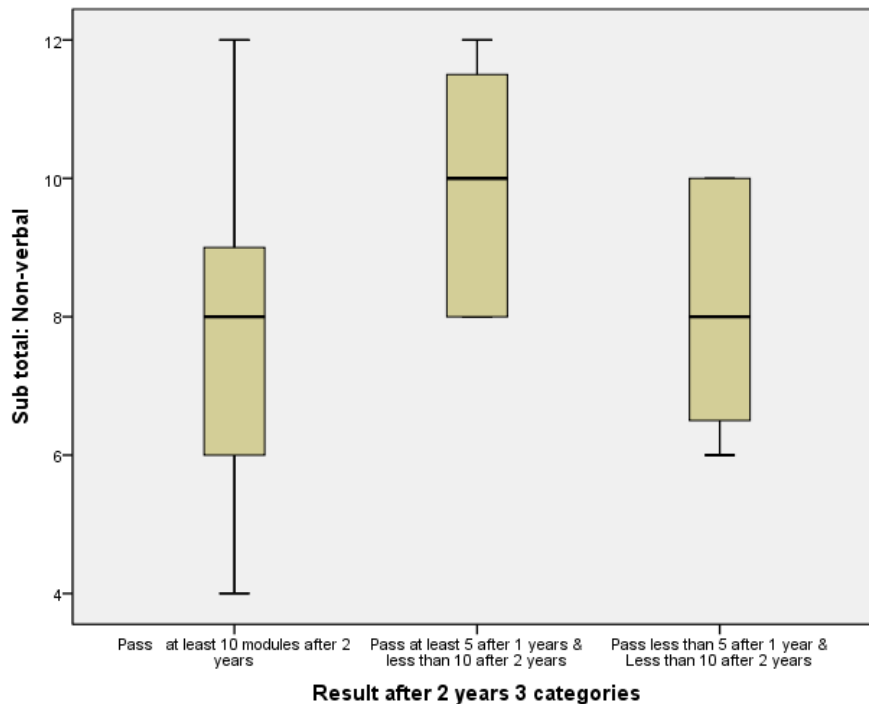
#### 4.3.1 DESCRIPTIVE STATISTICS OF THE NON-VERBAL ABILITY SCORES

**Table 4.3: Descriptive Statistics Summary – Non-verbal Ability**

<b>Group 1 (n = 13)</b>		<b>Group 2 (n = 7)</b>		<b>Group 3 (n = 12)</b>	
Mean	7.69	Mean	9.86	Mean	8.00
Median	8.00	Median	10.00	Median	8.00
Minimum	4	Minimum	8	Minimum	6
Maximum	12	Maximum	12	Maximum	10
Std. Deviation	2.323	Std. Deviation	1.864	Std. Deviation	1.651

The maximum score that could be obtained for this category was 20. The lowest score obtained for the non-verbal category was four, while the highest score was 12.

Figure 4.2 provides additional information about the three groups in relation to the medians of the groups. From this figure, it can be seen that the first and third quartile scores differ for each group. In addition the medians for Group 1 and 3 seem to be equal. This was investigated further using the Kruskal-Wallis test (Table 4.4).



**Figure 4.2: Graphical representation of the Non-Verbal Ability scores across the three groups**

**Table 4.4: Kruskal-Wallis Statistic – Non-Verbal Ability**

	Sub total: <b>Non-Verbal ability</b>
H	4.842
Df	2
Asymp. Sig.	.089

According to the results, there is no significant difference in the medians of the non-verbal ability scores across the three groups since the significant value is  $>0.05$ . This implies that although the medians of the non-verbal ability score across the three groups seem to differ, there is no statistical evidence to support this.

Although the test statistics do not suggest any significant difference, a value of 0.089 can be considered to be close to representing a significant value. It is at this juncture that an argument can be formed around the sample size of the study, suggesting that had the sample size been bigger there could have been a statistically significant difference between the medians of the non-verbal ability scores across the three groups. Taking this possibility further, the box-and-whisker plot suggests that the difference would most probably be found with Group 2 as visually, it seems the median in Group 2 differs from that of Group 1 and 3.

#### 4.4 RESULTS OF THE STATISTICAL ANALYSIS ADDRESSING NULL HYPOTHESIS 3

Null Hypothesis 3 states that there is no significant difference between the scores of the language proficiency component of the selection battery across the three groups of academic performance of the participants in terms of the number of modules passed (as categorised above, namely; Group 1, Group 2 and Group 3). Therefore, the language proficiency scores were used in the descriptive statistical analysis to investigate their relationship with the academic success of the three groups (See Table 4.5).

##### 4.4.1 DESCRIPTIVE STATISTICS OF THE LANGUAGE PROFICIENCY SCORES

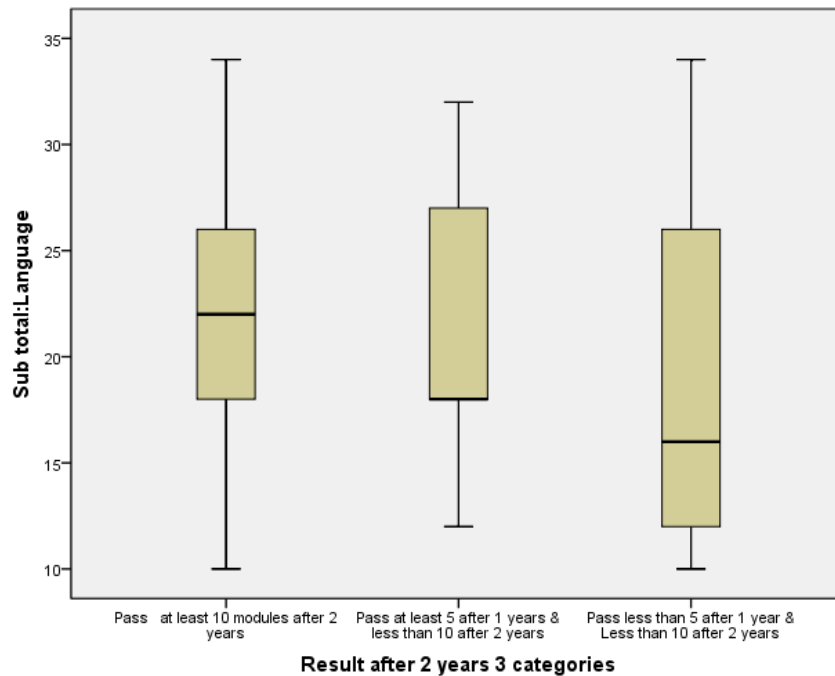
**Table 4.5: Descriptive Statistics Summary – Language Proficiency**

Group 1 (n = 13)		Group 2 (n = 7)		Group 3 (n = 12)	
Mean	22.00	Mean	21.71	Mean	19.33
Median	22.00	Median	18.00	Median	16.00
Minimum	10	Minimum	12	Minimum	10
Maximum	34	Maximum	32	Maximum	34
Std. Deviation	6.976	Std. Deviation	7.064	Std. Deviation	8.627

The maximum score an applicant could obtain for language proficiency was 40. The scores of the applicants who were accepted into the MBA programme in 2008 ranged from 10 (lowest score) to 34 (highest score).

The box-and-whisker plot in Figure 4.3 suggests that the language proficiency scores are distributed differently across the three groups. Further analysis

indicates that the language proficiency scores of Group 1 seem to be distributed evenly around the median while Group 2 and 3 have unequal distribution. In addition the medians of the three groups differed and this difference was further investigated using the Kruskal-Wallis test (Table 4.6).



**Figure 4.3 Graphical representation of the Language Proficiency scores across the three groups**

**Table 4.6: Kruskal-Wallis Statistic – Language Proficiency**

	Sub total: <b>Language Proficiency</b>
H	1.438
df	2
Asymp. Sig.	.487

According to the results, there is no significant difference in the medians of the language proficiency scores across the three groups since the significant value is  $> 0.05$ . This implies that although there seemed to be a difference with regards to the median across the three groups, there is no statistical evidence to support this.

## 4.5 RESULTS OF THE STATISTICAL ANALYSIS ADDRESSING NULL HYPOTHESIS 4

Null Hypothesis 4 states that there is no significant difference between the scores of the cognitive ability component of the selection battery across the three groups of academic performance of the participants in terms of the number of modules passed (as categorised above, namely; Group 1, Group 2 and Group 3). The statistical analysis addressing this hypothesis focused on the cognitive ability scores of the applicants across the three groups (See Table 4.7).

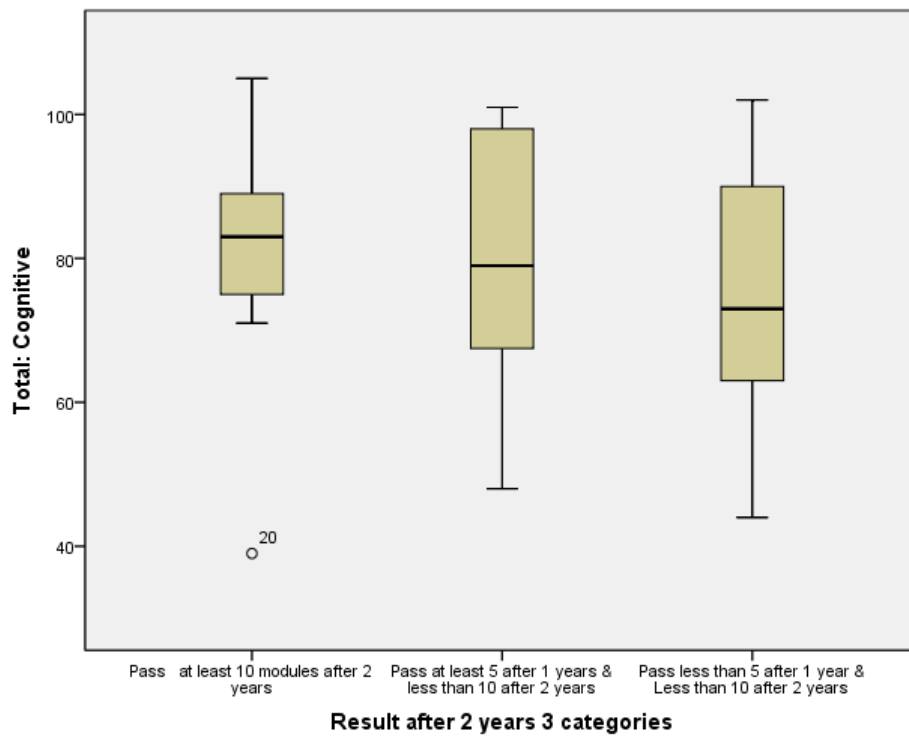
### 4.5.1 DESCRIPTIVE STATISTICS OF THE COGNITIVE ABILITY SCORES

**TABLE 4.7: Descriptive Statistics Summary – Cognitive Ability**

Group 1 (n = 13)		Group 2 (n = 7)		Group 3 (n = 12)	
Mean	81.77	Mean	79.86	Mean	74.83
Median	83.00	Median	79.00	Median	73.00
Minimum	39	Minimum	48	Minimum	44
Maximum	105	Maximum	101	Maximum	102
Std. Deviation	16.523	Std. Deviation	20.120	Std. Deviation	18.693

The total cognitive ability score was calculated by adding the scores of the above three categories (verbal ability, non-verbal ability and language proficiency). Therefore, the total score for cognitive ability was 160, with the lowest score a participant obtained being 39, and the highest score 105.

Figure 4.4 provides additional information on the distribution of the cognitive ability scores across the three groups. From this figure, it can be seen that although the minimum score for the cognitive ability category in Group 1 is 39, the student who obtained this score is an outlier of the group, suggesting that the rest of the scores were evenly distributed around the median. Upon analysis of the different box-and-whisker plots for the three groups, it can be seen through the first and third quartile scores that the variability of scores around the median differs for each group. There is a small variability of the scores around the median of Group 1 in comparison to the other two groups. In addition, the medians of the three groups differ. This was investigated further using the Kruskal-Wallis test (Table 4.8).



**Figure 4.4: Graphical representation of the Cognitive Ability scores across the three groups**

**Table 4.8: Kruskal-Wallis Statistic – Cognitive Ability**

	Sub total: <b>Cognitive Ability</b>
H	1.280
df	2
Asymp. Sig.	.527

According to the results, there is no significant difference in the medians of the cognitive ability scores across the three groups since the significant value is  $>0.05$ . This implies that, although the medians of the cognitive ability score across the three groups seem to differ, there is no statistical evidence to support this.

#### 4.6 RESULTS OF THE STATISTICAL ANALYSIS ADDRESSING NULL HYPOTHESIS 5

Null Hypothesis 5 states that there is no significant difference between the scores of the personality component of the selection battery across the three groups of academic performance of the participants in terms of the number of modules passed (as categorised above, namely; Group 1, Group 2 and Group 3). The

statistical analysis addressing this hypothesis focused on the personality profile of the applicants across the three groups.

#### 4.6.1 DESCRIPTION OF THE PERSONALITY CHARACTERISTICS OF THE SAMPLE

Table 4.9 is a summary of the personality scores as indicated by the 15FQ+ results, thereby providing a profile of the entire sample:

**TABLE 4.9: Summary of personality profile of the sample (n = 32)**

<b>FACTOR f A</b>	<b>Distant aloof</b> 34.4%	<b>Empathic</b> 65.6%
<b>INTELLECTANCE β</b>	<b>Low Intellectance</b> 25%	<b>High Intellectance</b> 75%
<b>FACTOR f C</b>	<b>Affected by feelings</b> 46.9%	<b>Emotionally stable</b> 53.1%
<b>FACTOR f E</b>	<b>Accommodating</b> 40.6%	<b>Dominant</b> 59.4%
<b>FACTOR f F</b>	<b>Sober serious</b> 43.8%	<b>Enthusiastic</b> 56.2%
<b>FACTOR f G</b>	<b>Expedient</b> 28.1%	<b>Conscientious</b> 71.9%
<b>FACTOR f H</b>	<b>Retiring</b> 37.5%	<b>Socially-bold</b> 62.5%
<b>FACTOR f I</b>	<b>Hard-headed</b> 59.4%	<b>Tender-minded</b> 40.6%
<b>FACTOR f L</b>	<b>Trusting</b> 34.4%	<b>Suspicious</b> 65.6%
<b>FACTOR f M</b>	<b>Concrete</b> 50%	<b>Abstract</b> 50%
<b>FACTOR f N</b>	<b>Direct</b> 28.1%	<b>Restrained</b> 71.9%
<b>FACTOR f O</b>	<b>Confident</b> 56.2%	<b>Self-doubting</b> 43.8%
<b>FACTOR f Q 1</b>	<b>Conventional</b> 34.4%	<b>Radical</b> 65.6%
<b>FACTOR f Q 2</b>	<b>Group-oriented</b> 59.4%	<b>Self sufficient</b> 40.6%
<b>FACTOR f Q 3</b>	<b>Informal</b> 37.5%	<b>Self-disciplined</b> 62.5%
<b>FACTOR f Q 4</b>	<b>Composed</b>	<b>Tense-driven</b>

	78.1%	21.9%
<b>Global factors of the 15 FQ+</b>	<b>Introvert</b> 40.6%	<b>Extravert</b> 59.4%
	<b>Low anxiety</b> 59.4%	<b>High anxiety</b> 40.6%
	<b>Pragmatism</b> 43.8%	<b>Openness to experience</b> 56.2%
	<b>Independence</b> 68.8%	<b>Agreeableness</b> 31.2%
	<b>Low self-control</b> 25%	<b>High self-control</b> 75%

#### 4.6.2 RELIABILITY STATISTIC

**Table 4.10: Summary of Chronbach Alpha result**

<b>Cronbach's Alpha</b>	<b>Cronbach's Alpha Based on Standardized Items</b>	<b>N of Items</b>
.394	.389	21

Chronbach's Alpha was calculated to investigate the internal consistency of the results across all 21 personality factors. The results indicated in Table 4.10 is .394, indicating that there is a low degree of internal consistency or reliability. These results are expected to be lower due to the small sample size leading to few participant responses to compare. Another explanation could be that since the 15FQ+ is a self-report instrument, in which test takers indicate their preference of an observed behaviour, it can be expected that the difference in opinion would therefore influence the consistency of the results. Reliability could also be affected by each participant's interpretations of the items or questions.

#### 4.6.3 RESULTS OF THE CROSS TABULATION OF THE 15 FQ+

In Table 4.9 above, the personality profile of the sample was displayed as a percentage. However, due to the dividing of the sample into three groups, the scores of each personality profile below will not be presented as a percentage since a single digit raise or drop in scores, will result in a seemingly significant percentage difference.



As discussed in Chapter 3, section 3.7.3, the scoring schedule of the 15FQ+ places each factor on a scale from one to ten with the preferences associated with that factor at the extreme ends of that scale. For the purpose of the statistical analysis, it was decided that all the scores between, and including one and five, should be ascribed to the preference on the lower end of the scale while those scores falling between, and including six and ten would be ascribed to the preference at the upper end of the scale. Cross tabulations were conducted with the primary personality traits as well as the five global factors of the 15FQ+ with the three categories: passed at least ten modules after two years (Group 1), passed at least five modules after one year and less than ten after two years (Group 2), and passed less than five modules after one year and less than ten after two years (Group 3).

#### 4.6.3.1 FACTOR *f* A (Distant aloof / Empathic)

**Table 4.11: Summary of personality profile – FACTOR *f* A**

	<b>Distant aloof</b>	<b>Empathic</b>
Group 1 (n = 13)	3	10
Group 2 (n = 7)	3	4
Group 3 (n = 12)	5	7
Total	11	21

In Group 1, three participants fell into the *Distant aloof* category, while ten participants were more *Empathic*. In Group 2, three participants had personality characteristics of being *Distant aloof*, while four participants were *Empathic*. In Group 3, five participants fell into the *Distant aloof* category, while seven are *Empathic*. In the total sample 11 participants displayed the personality traits of being *Distant aloof*, while 21 displayed the characteristics associated with being *Empathic*.

**Table 4.12: Summary of cross tabulations – FACTOR *f* A**

	<b>Value</b>	<b>df</b>	<b>Exact Sig. (2-Sided)</b>
Pearson Chi-Square	1.242 <sup>a</sup>	2	.631
Fisher's Exact Test	1.352		.631

According to the statistical analysis conducted, the p-value (the value in the **Exact Sig.** column) is greater than 0.05 (p-value>0.05). Therefore, no significant difference was found between the personality characteristics of *Distant aloof* and *Empathic* with regards to the academic performance of the sample.

#### 4.6.3.2 INTELLECTANCE $\beta$ (Low Intellectance / High Intellectance)

**Table 4.13: Summary of personality profile – INTELLECTANCE  $\beta$**

	Low Intellectance	High Intellectance
Group 1 (n = 13)	3	10
Group 2 (n = 7)	0	7
Group 3 (n = 12)	5	7
Total	8	24

In Group 1, three participants fell into the *Low Intellectance* category, while ten participants were characterised as having the personality trait of *High Intellectance*. In Group 2, all seven participants fell into the category of *High Intellectance*. In Group 3, five participants preferred the personality traits associated with *Low Intellectance*, while seven preferred the personality traits associated with *High Intellectance*. Therefore, in the total sample eight participants showed a preference for the personality traits associated with *Low Intellectance*, while 24 showed a preference for the personality traits associated with *High Intellectance*.

**Table 4.14: Summary of cross tabulations – INTELLECTANCE  $\beta$**

	Value	df	Exact Sig. (2-Sided)
Pearson Chi-Square	4.137 <sup>a</sup>	2	.125
Fisher's Exact Test	3.818		.167

According to the statistical analysis conducted, the p-value>0.05. Therefore, no significant difference was found between the personality characteristics of *Low Intellectance* and *High Intellectance* with regards to the academic performance of the sample.

#### 4.6.3.3 FACTOR *f* C (Affected by feelings / Emotionally stable)

**Table 4.15: Summary of personality profile – FACTOR *f* C**

	<b>Affected by feelings</b>	<b>Emotionally stable</b>
Group 1 (n = 13)	6	7
Group 2 (n = 7)	4	3
Group 3 (n = 12)	5	7
Total	15	17

In Group 1, six participants seemed to show signs of being *Affected by feelings*, while seven participants could be considered to be more *Emotionally stable*. In Group 2, four participants had personality characteristics of the *Affected by feelings* category, while three participants had personality characteristics of being *Emotionally stable*. In Group 3, five participants were *Affected by feelings* while seven were *Emotionally stable*. Therefore, in the total sample, 15 participants preferred the personality traits associated with being *Affected by feelings*, while 17 preferred those associated with being *Emotionally stable*.

**Table 4.16: Summary of cross tabulations – FACTOR *f* C**

	<b>Value</b>	<b>df</b>	<b>Exact Sig. (2-Sided)</b>
Pearson Chi-Square	.430 <sup>a</sup>	2	.902
Fisher's Exact Test	.527		.902

The statistical analysis revealed no significant difference between the personality characteristics of *Affected by feelings* and *Emotionally stable* with regards to the academic performance of the sample, as the  $p\text{-value} > 0.05$ .

#### 4.6.3.4 FACTOR *f* E (Accommodating / Dominant)

**Table 4.17: Summary of personality profile – FACTOR *f* E**

	<b>Accommodating</b>	<b>Dominant</b>
Group 1 (n = 13)	5	8
Group 2 (n = 7)	5	2
Group 3 (n = 12)	3	9
Total	13	19

In Group 1, five participants fell into the *Accommodating* category, while eight participants were more *Dominant*. In Group 2, five participants had personality characteristics of being *Accommodating*, while two participants preferred the behaviours associated with the *Dominant* category. In Group 3, three participants preferred being *Accommodating*, while nine participants preferred being *Dominant*. Therefore, in the total sample, 13 participants displayed preferences for being *Accommodating*, while 19 participants preferred being *Dominant*.

**Table 4.18: Summary of cross tabulations – FACTOR *f* E**

	Value	df	Exact Sig. (2-Sided)
Pearson Chi-Square	3.993 <sup>a</sup>	2	.157
Fisher's Exact Test	3.774		.157

According to the statistical analysis conducted, the  $p\text{-value} > 0.05$ . Therefore, no significant difference was found between the personality characteristics of *Accommodating* and *Dominant* with regards to the academic performance of the sample.

#### 4.6.3.5 FACTOR *f* F (Sober serious / Enthusiastic)

**Table 4.19: Summary of personality profile – FACTOR *f* F**

	Sober serious	Enthusiastic
Group 1 (n = 13)	4	9
Group 2 (n = 7)	4	3
Group 3 (n = 12)	6	6
Total	14	18

In Group 1, four participants fell into the *Sober serious* category, while nine participants were *Enthusiastic*. In Group 2, four participants had personality characteristics of being *Sober serious*, while three participants preferred the characteristics associated with being *Enthusiastic*. In Group 3, six participants prefer being *Sober serious*, while six preferred being *Enthusiastic*. Therefore, in the total sample, 14 participants display preferences for behaviours associated with being *Sober serious*, while six preferred those associated with being *Enthusiastic*.

**Table 4.20: Summary of cross tabulations – FACTOR *f* F**

	Value	df	Exact Sig. (2-Sided)
Pearson Chi-Square	1.591 <sup>a</sup>	2	.478
Fisher's Exact Test	1.628		.478

The statistical analysis revealed no significant difference between the personality characteristics of *Sober serious* and *Enthusiastic* with regards to the academic performance of the sample as the  $p\text{-value} > 0.05$ .

#### 4.6.3.6 FACTOR *f* G (Expedient / Conscientious)

**Table 4.21: Summary of personality profile – FACTOR *f* G**

	Expedient	Conscientious
Group 1 (n = 13)	5	8
Group 2 (n = 7)	3	4
Group 3 (n = 12)	1	11
Total	9	23

In Group 1, five participants preferred behaviours associated with the *Expedient* category, while eight participants preferred being *Conscientious*. In Group 2, three participants had personality characteristics of being *Expedient*, while four participants preferred being *Conscientious*. In Group 3, one participant fell into the *Expedient* category, while 11 participants were *Conscientious*. Therefore, in the total sample, nine participants had personality characteristics of being *Expedient*, while 23 preferred being *Conscientious*.

**TABLE 4.22: Summary of cross tabulations – FACTOR *f* G**

	Value	df	Exact Sig. (2-Sided)
Pearson Chi-Square	3.764 <sup>a</sup>	2	.214
Fisher's Exact Test	3.890		.149

According to the statistical analysis conducted, the  $p\text{-value} > 0.05$ . Therefore, no significant difference was found between the personality characteristics of *Expedient* and *Conscientious* with regards to the academic performance of the sample.

#### 4.6.3.7 FACTOR *f* H (Retiring / Socially bold)

**Table 4.23: Summary of personality profile – FACTOR *f* H**

	Retiring	Socially bold
Group 1 (n = 13)	6	7
Group 2 (n = 7)	2	5
Group 3 (n = 12)	4	8
Total	12	20

In Group 1, six participants fell into the *Retiring* category, while seven participants were more *Socially bold*. In Group 2, two participants had personality characteristics of *Retiring*, while five participants preferred being *Socially bold*. In Group 3, four participants fell into the *Retiring* category, while eight were *Socially bold*. Therefore, in the total sample, 12 participants displayed personality traits of being *Retiring*, while 20 participants were *Socially bold*.

**Table 4.24: Summary of cross tabulations – FACTOR *f* H**

	Value	df	Exact Sig. (2-Sided)
Pearson Chi-Square	.742 <sup>a</sup>	2	.719
Fisher's Exact Test	.772		.719

According to the statistical analysis conducted, the  $p\text{-value} > 0.05$ . Therefore, no significant difference between the personality characteristics of *Retiring* and *Socially bold*, with regards to the academic performance of the sample, was found.

#### 4.6.3.8 FACTOR *f* I (Hard-headed / Tender-minded)

**Table 4.25: Summary of personality profile – FACTOR *f* I**

	Hard-headed	Tender-minded
Group 1 (n = 13)	8	5
Group 2 (n = 7)	3	4
Group 3 (n = 12)	8	4
Total	19	13

In Group 1, eight participants showed signs of being *Hard-headed*, while five participants could be considered to be more *Tender-minded*. In Group 2, three participants had personality characteristics of the *Hard-headed* category, while four participants had personality characteristics of being *Tender-minded*. In Group 3, eight participants were *Hard-headed*, while four were *Tender-minded*. Therefore, in the total sample, 19 participants preferred the personality traits associated with being *Hard-headed*, while 13 preferred those associated with being *Tender-minded*.

**Table 4.26: Summary of cross tabulations – FACTOR *f* I**

	Value	df	Exact Sig. (2-Sided)
Pearson Chi-Square	1.082 <sup>a</sup>	2	.591
Fisher's Exact Test	1.130		.591

The statistical analysis revealed no significant difference between the personality characteristics of *Hard-headed* and *Tender-minded* with regards to the academic performance of the sample, as the  $p\text{-value} > 0.05$ .

#### 4.6.3.9 FACTOR *f* L (Trusting / Suspicious)

**Table 4.27: Summary of personality profile – FACTOR *f* L**

	Trusting	Suspicious
Group 1 (n = 13)	6	7
Group 2 (n = 7)	2	5
Group 3 (n = 12)	3	9
Total	11	21

In Group 1, six participants were *Trusting*, while seven participants were *Suspicious*. In Group 2, two participants had personality characteristics of being *Trusting*, while five participants associated themselves with the *Suspicious* category. In Group 3, three participants preferred being *Trusting*, while nine participants were more *Suspicious*. Therefore, in the total sample, 11 participants displayed preferences for being *Trusting*, while 21 participants were *Suspicious*.

**Table 4.28: Summary of cross tabulations – FACTOR *f* L**

	Value	df	Exact Sig. (2-Sided)
Pearson Chi-Square	1.372 <sup>a</sup>	2	.570
Fisher's Exact Test	1.352		.631

According to the statistical analysis conducted, the  $p\text{-value} > 0.05$ . Therefore, no significant difference was found between the personality characteristics of *Trusting* and *Suspicious* with regards to the academic performance of the sample.

#### 4.6.3.10 FACTOR *f* M (Concrete / Abstract)

**Table 4.29: Summary of personality profile – FACTOR *f* M**

	Concrete	Abstract
Group 1 (n = 13)	7	6
Group 2 (n = 7)	2	5
Group 3 (n = 12)	7	5
Total	16	16

In Group 1, seven participants preferred the behaviours associated with the *Concrete* category, while six participants preferred being more *Abstract*. In Group 2, two participants had personality characteristics of being *Concrete*, while five participants preferred being *Abstract*. In Group 3, seven participants fell into the *Concrete* category, while five participants were more *Abstract*. Therefore, in the total sample, 16 participants had personality characteristics of being *Concrete*, while 16 preferred being *Abstract*.

**Table 4.30: Summary of cross tabulations – FACTOR *f* M**

	Value	df	Exact Sig. (2-Sided)
Pearson Chi-Square	1.696 <sup>a</sup>	2	.538
Fisher's Exact Test	1.662		.538

According to the statistical analysis conducted, the  $p\text{-value} > 0.05$ . Therefore, no significant difference was found between the personality characteristics of *Concrete* and *Abstract* with regards to the academic performance of the sample.



#### 4.6.3.11 FACTOR *f* N (Direct / Restrained)

**Table 4.31: Summary of personality profile – FACTOR *f* N**

	Direct	Restrained
Group 1 (n = 13)	4	9
Group 2 (n = 7)	1	6
Group 3 (n = 12)	4	8
Total	9	23

In Group 1, four participants showed signs of being *Direct*, while nine participants could be considered to be more *Restrained*. In Group 2, one participant had personality characteristics associated with the *Direct* category, while six participants had personality characteristics of being *Restrained*. In Group 3, four participants were *Direct*, while eight were *Restrained*. Therefore, in the total sample, nine participants preferred personality traits associated with being *Direct*, while 23 preferred those associated with being *Restrained*.

**Table 4.32: Summary of cross tabulations – FACTOR *f* N**

	Value	df	Exact Sig. (2-Sided)
Pearson Chi-Square	.869 <sup>a</sup>	2	.776
Fisher's Exact Test	.845		.776

The statistical analysis revealed no significant difference between the personality characteristics of *Direct* and *Restrained* with regards to the academic performance of the sample, as the  $p\text{-value} > 0.05$ .

#### 4.6.3.12 FACTOR *f* O (Confident / Self-doubting)

**Table 4.33: Summary of personality profile – FACTOR *f* O**

	Confident	Self-doubting
Group 1 (n = 13)	9	4
Group 2 (n = 7)	3	4
Group 3 (n = 12)	6	6
Total	18	14

In Group 1, nine participants fell into the *Confident* category, while four participants were *Self-doubting*. In Group 2, three participants had personality characteristics of being *Confident*, while four participants were more *Self-doubting*. In Group 3, six participants preferred being *Confident*, while six participants tended to be *Self-doubting*. Therefore, in the total sample, 18 participants displayed preferences for being *Confident*, while 14 participants were *Self-doubting*.

**Table 4.34: Summary of cross tabulations – FACTOR *f* O**

	Value	df	Exact Sig. (2-Sided)
Pearson Chi-Square	1.591 <sup>a</sup>	2	.478
Fisher's Exact Test	1.628		.478

According to the statistical analysis conducted, the  $p\text{-value} > 0.05$ . Therefore, no significant difference was found between the personality characteristics of *Confident* and *Self-doubting*, with regards to the academic performance of the sample.

#### 4.6.3.13 FACTOR *f* Q I (Conventional / Radical)

**Table 4.35: Summary of personality profile – FACTOR *f* Q I**

	Conventional	Radical
Group 1 (n = 13)	4	9
Group 2 (n = 7)	2	5
Group 3 (n = 12)	5	7
Total	11	21

In Group 1, four participants were *Conventional*, while nine participants were *Radical*. In Group 2, two participants had personality characteristics of being *Conventional*, while five participants preferred characteristics associated with being *Radical*. In Group 3, five participants were *Conventional*, while seven preferred being *Radical*. Therefore, in the total sample, 11 participants displayed preferences for behaviours associated with being *Conventional*, while 21 preferred those associated with being *Radical*.

**Table 4.36: Summary of cross tabulations – FACTOR *f* Q 1**

	Value	df	Exact Sig. (2-Sided)
Pearson Chi-Square	.462 <sup>a</sup>	2	.800
Fisher's Exact Test	.541		.800

The statistical analysis revealed no significant difference between the personality characteristics of *Conventional* and *Radical* with regards to the academic performance of the sample, as the  $p\text{-value} > 0.05$ .

#### 4.6.3.14 FACTOR *f* Q 2 (Group-oriented / Self-sufficient)

**Table 4.37: Summary of personality profile – FACTOR *f* Q 2**

	Group-oriented	Self-sufficient
Group 1 (n = 13)	8	5
Group 2 (n = 7)	4	3
Group 3 (n = 12)	7	5
Total	19	13

In Group 1, eight participants preferred behaviours associated with the *Group-oriented* category, while five participants preferred being *Self-sufficient*. In Group 2, four participants had personality characteristics of being *Group-oriented*, while three participants preferred being *Self-Sufficient*. In Group 3, seven participants fell into the *Group-oriented* category, while five participants were *Self-sufficient*. Therefore, in the total sample 19 participants had personality characteristics of being *Group-oriented*, while 13 preferred being *Self-sufficient*.

**Table 4.38: Summary of cross tabulations – FACTOR *f* Q 2**

	Value	df	Exact Sig. (2-Sided)
Pearson Chi-Square	.045 <sup>a</sup>	2	1.000
Fisher's Exact Test	.190		1.000

According to the statistical analysis conducted, the  $p\text{-value} > 0.05$ . Therefore, no significant difference was found between the personality characteristics of *Group-oriented* and *Self-sufficient* with regards to the academic performance of the sample.

#### 4.6.3.15 FACTOR *f* Q 3 (Informal / Self-disciplined)

**Table 4.39: Summary of personality profile – FACTOR *f* Q 3**

	Informal	Self-disciplined
Group 1 (n = 13)	6	7
Group 2 (n = 7)	3	4
Group 3 (n = 12)	3	9
Total	12	20

In Group 1, six participants seemed to show signs of being *Informal*, while seven participants could be considered to be more *Self-disciplined*. In Group 2, three participants had personality characteristics of the *Informal* category, while four participants had personality characteristics of being *Self-disciplined*. In Group 3, three participants were *Informal*, while nine were *Self-disciplined*. Therefore, in the total sample, 12 participants preferred personality traits associated with being *Informal*, while 20 preferred those associated with being *Self-disciplined*.

**Table 4.40: Summary of cross tabulations – FACTOR *f* Q 3**

	Value	df	Exact Sig. (2-Sided)
Pearson Chi-Square	1.301 <sup>a</sup>	2	.578
Fisher's Exact Test	1.373		.578

The statistical analysis revealed no significant difference between the personality characteristics of *Informal* and *Self-disciplined* with regards to the academic performance of the sample, as the  $p\text{-value} > 0.05$ .

#### 4.6.3.16 FACTOR *f* Q 4 (Composed / Tense-Driven)

**Table 4.41: Summary of personality profile – FACTOR *f* Q 4**

	Composed	Tense-driven
Group 1 (n = 13)	12	1
Group 2 (n = 7)	5	2
Group 3 (n = 12)	8	4
Total	25	7

In Group 1, 12 participants fell into the *Composed* category, while one participant was *Tense-Driven*. In Group 2, five participants had personality characteristics of being *Composed*, while two participants preferred the behaviours associated with the *Tense-Driven* category. In Group 3, eight participants preferred being *Composed*, while four participants reported being *Tense-driven*. Therefore, in the total sample, 25 participants displayed preferences for being *Composed*, while seven participants reported being *Tense-driven*.

**Table 4.42: Summary of cross tabulations – FACTOR f Q 4**

	Value	df	Exact Sig. (2-Sided)
Pearson Chi-Square	2.636 <sup>a</sup>	2	.312
Fisher's Exact Test	2.758		.270

According to the statistical analysis conducted, the  $p\text{-value} > 0.05$ . Therefore, no significant difference was found between the personality characteristics of *Composed* and *Tense-driven* with regards to the academic performance of the sample.

#### 4.6.3.17 GLOBAL FACTOR 1 (INTROVERT / EXTRAVERT)

**Table 4.43: Summary of personality profile – Global factor 1**

	Introvert	Extravert
Group 1 (n = 13)	5	8
Group 2 (n = 7)	3	4
Group 3 (n = 12)	5	7
Total	13	19

In Group 1, five participants fell into the *Introvert* category, while eight participants were *Extraverted*. In Group 2, three participants had personality characteristics associated with being an *Introvert*, while four participants preferred the characteristics associated with being an *Extravert*. In Group 3, five participants preferred being *Introverted*, while seven preferred being *Extraverted*. Therefore, in the total sample, 13 participants displayed preferences for behaviours associated with being an *Introvert*, while 19 preferred those associated with being an *Extravert*.

**Table 4.44: Summary of cross tabulations – Global factor 1**

	Value	df	Exact Sig. (2-Sided)
Pearson Chi-Square	.045 <sup>a</sup>	2	1.000
Fisher's Exact Test	.190		1.000

The statistical analysis revealed no significant difference between the personality characteristics of *Introvert* and *Extravert*, with regards to the academic performance of the sample, as the  $p\text{-value} > 0.05$ .

#### 4.6.3.18 GLOBAL FACTOR 2 (LOW ANXIETY / HIGH ANXIETY)

**Table 4.45: Summary of personality profile – Global factor 2**

	Low anxiety	High anxiety
Group 1 (n = 13)	10	3
Group 2 (n = 7)	2	5
Group 3 (n = 12)	7	5
Total	19	13

In Group 1, ten participants preferred the behaviours associated with the *Low anxiety* category, while three participants preferred those associated with the *High anxiety* category. In Group 2, two participants had personality characteristics of having *Low anxiety*, while five participants seemed to be highly anxious. In Group 3, seven participants fell into the *Low anxiety* category, while five participants had *High Anxiety*. Therefore, in the total sample, 19 participants had personality characteristics associated with *Low anxiety*, while 13 seemed to be highly anxious.

**Table 4.46: Summary of cross tabulations – Global factor 2**

	Value	df	Exact Sig. (2-Sided)
Pearson Chi-Square	4.419 <sup>a</sup>	2	.123
Fisher's Exact Test	4.220		.123

According to the statistical analysis conducted, the  $p\text{-value} > 0.05$ . Therefore, no significant difference was found between the personality characteristics of *Low*

*anxiety* and *High anxiety* with regards to the academic performance of the sample.

#### 4.6.3.19 Global factor 3 (Pragmatism / Openness to experience)

**Table 4.47: Summary of personality profile – Global factor 3**

	Pragmatism	Openness to experience
Group 1 (n = 13)	4	9
Group 2 (n = 7)	3	4
Group 3 (n = 12)	7	5
Total	14	18

In Group 1, four participants fell into the *Pragmatism* category, while nine participants were open to experiences. In Group 2, three participants had personality characteristics of being pragmatic, while four participants were open to experiences. In Group 3, seven participants were pragmatic, while five were open to experiences. Therefore, in the total sample, 14 participants were *Pragmatic*, while 18 were open to experiences.

**Table 4.48: Summary of cross tabulations – Global factor 3**

	Value	df	Exact Sig. (2-Sided)
Pearson Chi-Square	1.929 <sup>a</sup>	2	.383
Fisher's Exact Test	1.937		.383

According to the statistical analysis conducted, the  $p\text{-value} > 0.05$ . Therefore, no significant difference was found between the personality characteristics of *Pragmatism* and *Openness to experience* with regards to the academic performance of the sample.

#### 4.6.3.20 Global factor 4 (Independence / Agreeableness)

**Table 4.49: Summary of personality profile – Global factor 4**

	<b>Independence</b>	<b>Agreeableness</b>
Group 1 (n = 13)	8	5
Group 2 (n = 7)	5	2
Group 3 (n = 12)	9	3
Total	22	10

In Group 1, eight participants fell into the *Independence* category, while five participants preferred the *Agreeableness* category. In Group 2, five participants had personality characteristics associated with *Independence*, while two participants were more *Agreeable*. In Group 3, nine participants were *Independent*, while three were *Agreeable*. Therefore, in the total sample, 22 participants had personality characteristics of *Independence*, while ten had personality characteristics associated with *Agreeableness*.

**Table 4.50: Summary of cross tabulations - Global Factor 4**

	<b>Value</b>	<b>df</b>	<b>Exact Sig. (2-Sided)</b>
Pearson Chi-Square	.556 <sup>a</sup>	2	.885
Fisher's Exact Test	.638		.885

The statistical analysis revealed no significant difference between the personality characteristics of *Independence* and *Agreeableness*, with regards to the academic performance of the sample, as the  $p\text{-value} > 0.05$ .

#### 4.6.3.21 Global Factor 5 (Low self-control / High self-control)

**Table 4.51: Summary of personality profile – Global factor 5**

	<b>Low self-control</b>	<b>High self-control</b>
Group 1 (n = 13)	4	9
Group 2 (n = 7)	3	4
Group 3 (n = 12)	1	11
Total	8	24



In Group 1, four participants fell into the *Low self-control* category, while nine participants had *High self-control*. In Group 2, three participants had personality characteristics of *Low self-control*, while four participants had personality characteristics of having *High self-control*. In Group 3, one participant had *Low self-control*, while 11 participants had *High self-control*. Therefore, in the total sample eight participants had *Low self-control*, while 24 had higher *Self-control*.

**Table 4.52: Summary of cross tabulations – Global factor 5**

	Value	df	Exact Sig. (2-Sided)
Pearson Chi-Square	3.199 <sup>a</sup>	2	.222
Fisher's Exact Test	3.254		.222

According to the statistical analysis conducted, the  $p\text{-value} > 0.05$ . Therefore, no significant difference was found between the personality characteristics of *Low self-control* and *High self-control* with regards to the academic performance of the sample.

## 4.7 CONCLUSION

As discussed in Chapter 1, Section 1.2, the use of a selection battery creates certain expectations on the performance of those students selected into the course. From this it is expected that those with higher scores in the categories assessed by the selection instruments will subsequently perform better academically. The results of the statistical analysis indicated no significant differences between any of the observed categories across the three groups of academic performance. Upon first glance of the data, the box-and whisker plots suggested that there might be differences in the median for the verbal, non-verbal, language proficiency and cognitive ability categories. However, further investigation into these supposed variances between the three groups, highlighted the importance of the use of statistical measures in determining the significance of an observed relationship between factors as the Kruskal-Wallis test statistic produced no statistically significant values. Admittedly the small sample size could have impacted on the results of the statistical procedures performed and also the way the sample was selected.

However, every possible measure was taken to ensure that the statistical analyses used were the most appropriate methods available to address the hypotheses formulated. In the following chapter, the interpretation of the statistical analyses is focused on in an attempt to explain the statistical results achieved.

---oOo---

## **CHAPTER 5**

### **Findings, Recommendations and Conclusions**

#### **5.1 INTRODUCTION**

According to Kotze and Griessel (2008) the graduation rates of an MBA qualification, across Higher Education Institutions in South Africa, are not very high. Therefore, there is a need to address these poor throughput rates by exploring the criteria used to select applicants into the programme. This study attempted to address this need by exploring the selection criteria TUT employs to select applicants for its MBA programme. In this study, two sets of data were analysed per participant. The first being the participants' results from the selection tests written to gain entry into the course. The second set was the participants' academic records tracking their progress within the course for the first two years of study. In the previous chapter, the statistical analysis of the collected data was reported. In this chapter the findings of the data analysis is discussed, with recommendations provided for TUT as well as for further research. Lastly, the limitations of the study are discussed.

#### **5.2 FINDINGS**

The aim of the study was to investigate the differences between the scores on the selection battery and the academic performance of the students selected into the MBA programme at TUT. With this in mind the null hypotheses of the study were formed. In the following section the findings of the study are presented in accordance with the null hypotheses formulated for the study, which are:

- **Null Hypothesis (Ho) 1**

There is no significant difference between the scores on the verbal component of the selection battery used to select applicants into the MBA programme, across the three groups of academic performance of the students selected.

- **Null Hypothesis (Ho) 2**

There is no significant difference between the scores on the non-verbal component of the selection battery used to select applicants into the MBA programme, across the three groups of academic performance of the students selected.

- **Null Hypothesis (Ho) 3**

There is no significant difference between the scores on the language proficiency component of the selection battery used to select applicants into the MBA programme, across the three groups of academic performance of the students selected.

- **Null Hypothesis (Ho) 4**

There is no significant difference between the scores on the cognitive ability component of the selection battery used to select applicants into the MBA programme, across the three groups of academic performance of the students selected.

- **Null Hypothesis (Ho) 5**

There is no significant difference between the scores on the personality component of the selection battery used to select applicants into the MBA programme, across the three groups of academic performance of the students selected.

- **Null Hypothesis (Ho) 6**

There is no significant difference between the scores on the selection battery used to select applicants into the MBA programme, across the three groups of academic performance of the students selected.

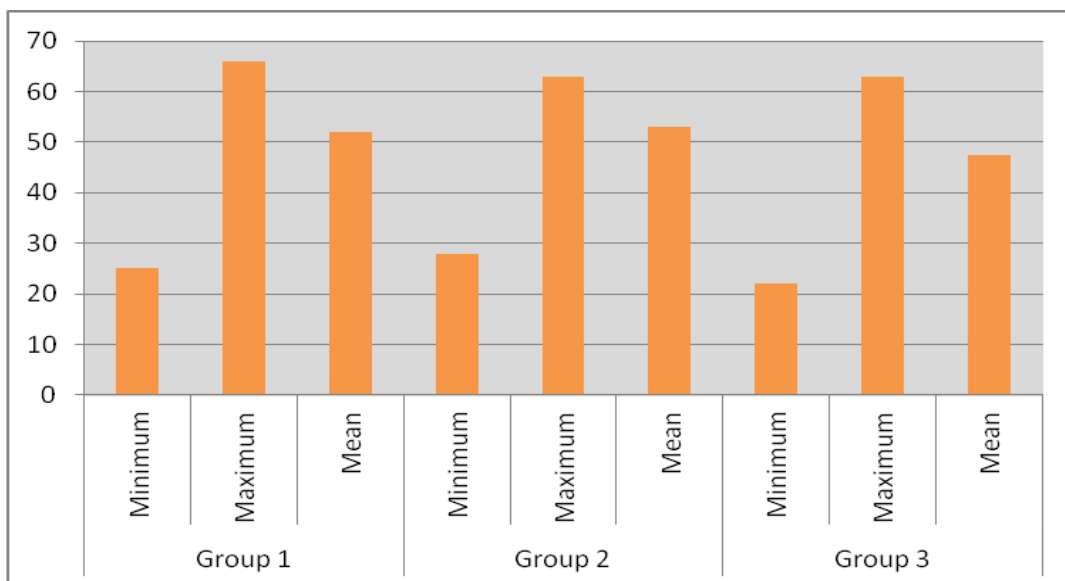
The academic performance of the students could not simply be categorised as pass or fail due to the certain requirements outlined in the MBA prospectus, which specifies, the number of modules students are to complete per year of study. Therefore, it was necessary to split the term 'academic performance' into the following groups:

- Group 1: Students who had passed at least ten modules after two years;
- Group 2: Students who had passed at least five modules after one year and less than ten after two years; and
- Group 3: Students who had passed less than five modules after one year and less than ten modules after two years.

### 5.2.1 NULL HYPOTHESIS (Ho) 1

*There is no significant difference between the scores on the verbal component of the selection battery used to select applicants into the MBA programme, across the three groups of academic performance of the students selected.*

The results of the statistical analysis revealed that participants across all three groups varied in terms of their verbal scores. The minimum verbal ability score by participants in Group 1 was 25, with a maximum score of 66. The mean of Group 1's verbal ability score was 52.08. In Group 2, the minimum verbal ability score attained was 28, while the maximum was 63. The mean verbal ability score obtained by the participants in Group 2 was 48.29. In Group 3, the minimum verbal ability score obtained was 22, while the maximum score was 63. Group 3 obtained a mean of 47.50 for their verbal ability. Figure 5.1 illustrates the distribution of the verbal ability scores across the three groups of the sample.



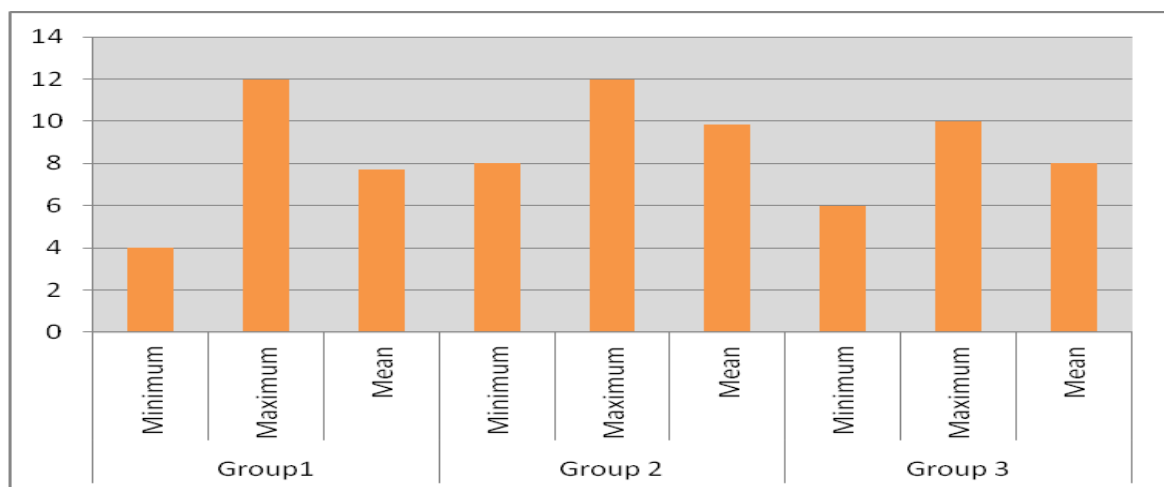
**Figure 5.1 Graphical representation of the verbal ability scores**

From the above distribution it is evident that there is no significant difference in the verbal ability scores across the three groups. Furthermore, upon analysis of the box-and-whisker plot (displayed in Chapter 4, section 4.2.1), there seemed to be a graphical indication that there are differences between the three groups, in terms of their medians. However, the Kruskal-Wallis test disproved any statistically significant difference between the medians of the verbal ability scores of the participants and their academic performance.

## 5.2.2 NULL HYPOTHESIS (Ho) 2

*There is no significant difference between the scores on the non-verbal component of the selection battery used to select applicants into the MBA programme, across the three groups of academic performance of the students selected.*

According to the results of the statistical analysis, the minimum non-verbal ability score of participants in Group 1 was four, and the maximum score was 12. The mean of Group 1's non-verbal ability score was 7.69. In Group 2, the minimum non-verbal ability score attained was eight, while the maximum was 12. The mean non-verbal ability score obtained by the participants in Group 2 was 9.86. In Group 3, the minimum non-verbal ability score obtained was six, while the maximum score was ten. Group 3 obtained a mean of eight for their non-verbal ability. Figure 5.2 illustrates the distribution of the non-verbal ability scores across the three groups of the sample.



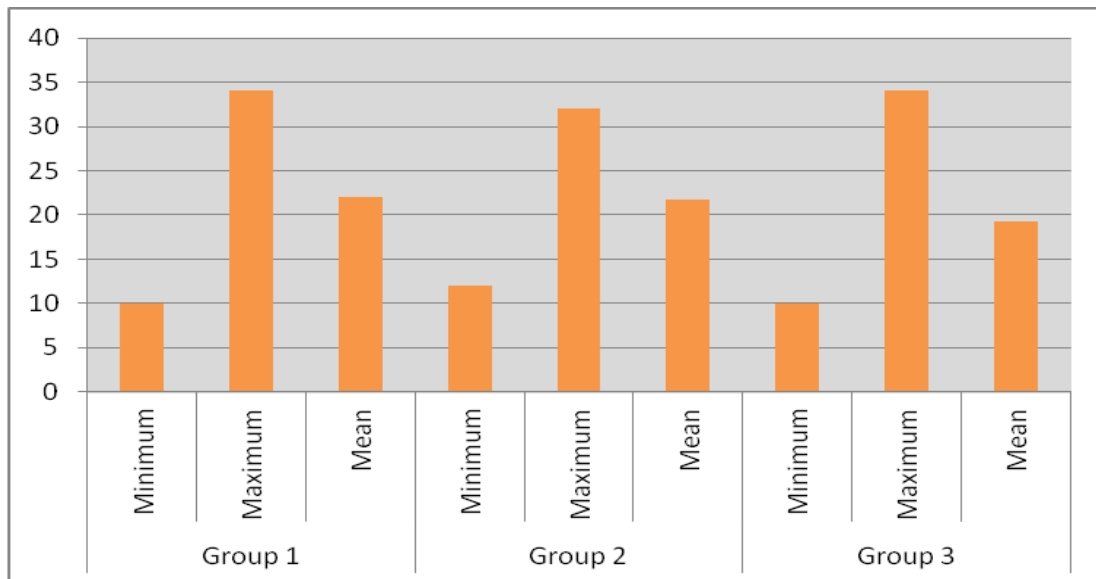
**Figure 5.2 Graphical representation of the non-verbal ability scores**

From the above representation, it can be observed that the non-verbal ability scores for Group 1 and 3 did not differ significantly: being 7.69 and 8.00 respectively. Upon analysis of the box-and-whisker plot (displayed in Chapter 4, section 4.3.1), once again, there seemed to be a graphical indication that there might be differences between the three groups, in terms of their medians. The Kruskal-Wallis test disproved any statistically significant difference between the medians of the non-verbal ability scores of the participants and their academic performance.

### **5.2.3 NULL HYPOTHESIS (Ho) 3**

*There is no significant difference between the scores on the language proficiency component of the selection battery used to select applicants into the MBA programme, across the three groups of academic performance of the students selected.*

Figure 5.3 (below) illustrates the distribution of the language proficiency scores across the three groups of the sample. According to the results of the statistical analysis, the minimum language proficiency score obtained by participants in Group 1 was ten, while the maximum score was 34. The mean of the language proficiency score of Group 1 was 22. In Group 2, the minimum language proficiency score attained was 12, while the maximum was 32. The mean language proficiency score obtained by the participants in Group 2 was 21.71. In Group 3 the minimum language proficiency score obtained was ten, while the maximum score was 34. Group 3 obtained a mean of 19.33 for language proficiency.



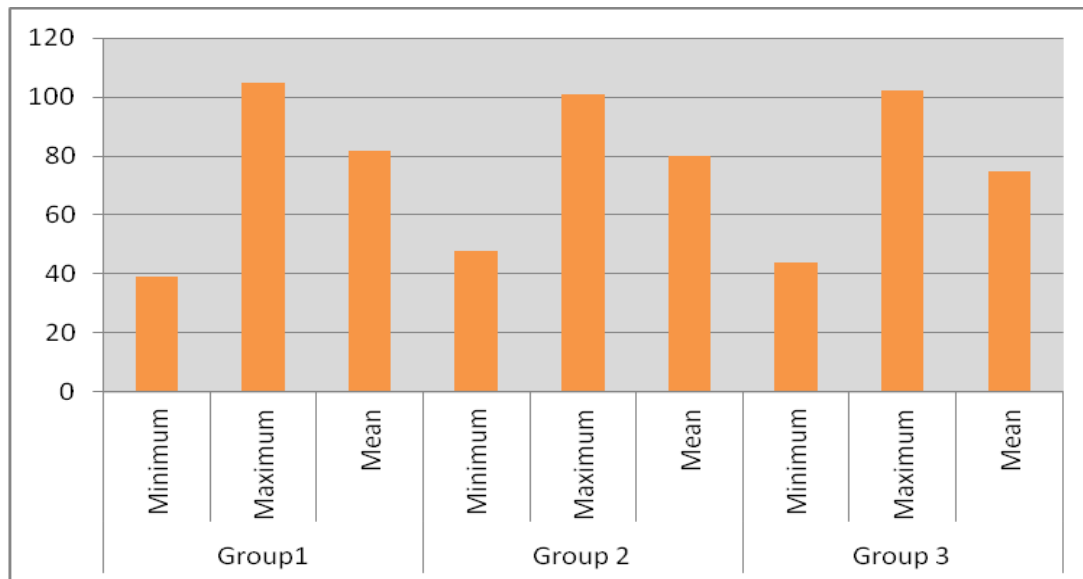
**FIGURE 5.3 Graphical representation of the language proficiency scores**

The mean of the language proficiency scores across the three groups did not differ significantly, thereby inferring no significant difference between the academic performance of the three groups and their language proficiency. Upon investigation of the medians of the three groups, graphically there seemed to be a difference, evident in the box-and-whisker plot (refer to Chapter 4, section 4.4.1), but the Kruskal-Wallis test statistics indicated no significant difference between the three groups in terms of their medians.

#### **5.2.4 NULL HYPOTHESIS (Ho) 4**

*There is no significant difference between the scores on the cognitive ability component of the selection battery used to select applicants into the MBA programme, across the three groups of academic performance of the students selected.*





**FIGURE 5.4 Graphical representation of the cognitive ability scores**

Figure 5.4 (above), illustrates the distribution of the cognitive ability scores across the three groups of the sample. According to the results of the statistical analysis, the minimum cognitive ability score obtained by participants in Group 1 was 39, while the maximum score was 105. The mean of the cognitive ability score for Group 1 was 81.77. In Group 2, the minimum cognitive ability score attained was 48, while the maximum was 101. The mean cognitive ability score obtained by the participants in Group 2 was 79.86. In Group 3 the minimum cognitive ability score obtained was 44, while the maximum score was 102. Group 3 obtained a mean of 74.83 for cognitive ability. From the above representation, it can be observed that the cognitive ability scores across the three groups did not differ significantly being 81.77 and 79.86 respectively. When investigating the difference across the medians of the three groups using the box-and-whisker plot (displayed in Chapter 4, section 4.5.1), there seemed to be a graphical indication that there was a difference between the medians of the three groups, but the Kruskal-Wallis test again disproved any statistically significant difference between the medians of the cognitive ability scores across the three groups.

### 5.2.5 NULL HYPOTHESIS (Ho) 5

*There is no significant difference between the scores on the personality component of the selection battery used to select applicants into the MBA*

*programme, across the three groups of academic performance of the students selected.*

The statistical analysis conducted to explore the difference between the academic success of the applicants, and their personality characteristics assessed through the 15FQ+ yielded results that were not statistically significant. Table 5.1 provides a summary of the correlation coefficient values of the 15FQ+ personality characteristics.

**Table 5.1: Summary of the correlation coefficients of the 15FQ+ personality traits**

	<b>Pearson Chi-Square</b>	<b>Fisher's Exact Test</b>
FACTOR $f_A$	.631	.631
INTELLECTANCE $\beta$	.125	.167
FACTOR $f_C$	.902	.902
FACTOR $f_E$	.157	.157
FACTOR $f_F$	.478	.478
FACTOR $f_G$	.214	.149
FACTOR $f_H$	.719	.719
FACTOR $f_I$	.591	.591
FACTOR $f_L$	.570	.631
FACTOR $f_M$	.538	.538
FACTOR $f_N$	.776	.776
FACTOR $f_O$	.478	.478
FACTOR $f_{Q_1}$	.800	.800
FACTOR $f_{Q_2}$	1.000	1.000
FACTOR $f_{Q_3}$	.578	.578
FACTOR $f_{Q_4}$	.312	.270
GLOBAL FACTOR 1	1.000	1.000
GLOBAL FACTOR 2	.123	.123
GLOBAL FACTOR 3	.383	.383
GLOBAL FACTOR 4	.885	.885
GLOBAL FACTOR 5	.222	.222

These results are not significant as all the correlation coefficient values calculated from the Pearson Chi-Square and Fishers Exact Test are above 0.05. These

results are in line with a study conducted by Nzama, et al., (2008), who ascertained that selection interviews, together with psychological assessments of personality traits and cognitive functioning, did not predict work performance. However, other studies (Furnham et al., 2003; Moutafi et al., 2005; O'Connor & Paunonen, 2007) did support the predictive validity of personality factors and intelligence.

### **5.2.6 NULL HYPOTHESIS (Ho) 6**

*There is no significant difference between the scores on the selection battery used to select applicants into the MBA programme, across the three groups of academic performance of the students selected.*

The hypothesis discussed above was identified to aid in the investigation of the entire selection battery used at TUT so that an informed decision could be taken regarding the selection process as a whole. The statistical analysis conducted to address this hypothesis produced no significant differences between the different components of the selection battery, across the three groups of academic performance of the students selected into the MBA programme. Although one cannot accept a Null Hypothesis, there seems to be enough statistical evidence suggesting that this Null Hypothesis should not be rejected.

## **5.3 RECOMMENDATIONS**

### **5.3.1 RECOMMENDATIONS FOR TUT**

According to Bisschoff (2005), the problem that South African business schools face is admitting the right applicants into their MBA programmes. She defines the 'right learner' as one who performs academically, thereby passing the programme. In addition, these applicants are expected to make a difference within the business sector on completing the programme.

The question, therefore, follows: What selection mechanisms should Higher Education Institutions put in place in order to select suitable candidates into their institution? When analysing the existing MBA prospectus, TUT has based its selection process on certain theoretical assumptions drawn from academic literature. This entails designing a selection battery that helps quantify an

applicant's abilities (verbal, nonverbal and language proficiency), as well as personality, to guide the decision making process for candidate selection into the MBA programme. This method is in line with Van der Merwe and De Beer (2006), who state that a selection battery, which satisfies the aims of Higher Education Institutions, should measure cognitive factors (such as language proficiency), as well as other factors including locus of control and study habits. The current selection battery used by TUT comprises the SpEEEx and ELSA to assess an applicant's cognitive ability and language proficiency, while the 15FQ+ assesses an applicant's personality, which is a reflection of his/her locus of control. Himmeleit (1950) further argued that selection techniques should be channelled to obtain some information on the intellectual ability of a candidate. He acknowledged that tests of intelligence and aptitude are by far not the only psychological techniques, which could make a contribution to learner selection. He further highlighted the importance of other significant academic success factors, such as a degree of general adjustment, motivation and interests. According to Lumsden, Bore, Millar, Jack and Powis (2005), the use of psychometric tests should aim at measuring personality characteristics and abilities rather than learned material. Conrad (2006) states that measures of personality have practical implications for selecting applicants for Higher Education Institutions, as well as for learner development.

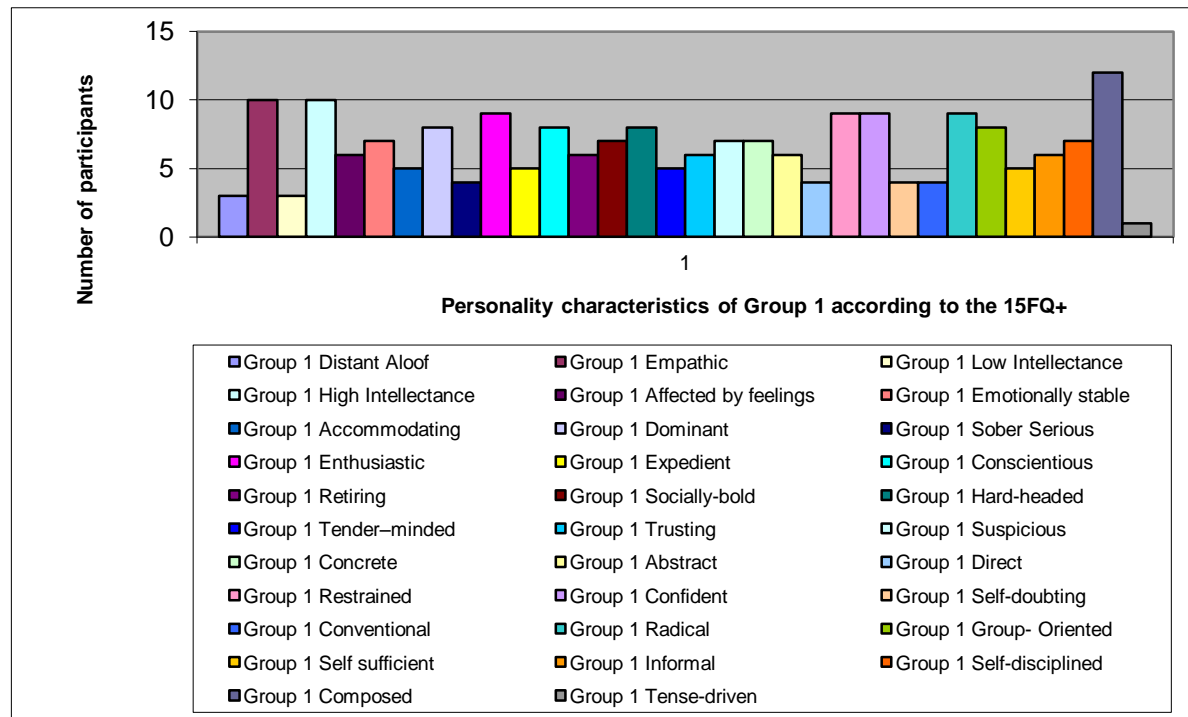
With research advocating a selection battery that measures a candidate's abilities and personality, why then did the current study produce such negative results? When perusing the descriptive statistics of the study, it became clear that no set criteria were used to select the applicants. Below is a Table representing the minimum and maximum scores obtained across the three groups for the verbal ability, non-verbal ability, cognitive ability and language proficiency categories.

**Table 5.2 Range of scores across the categories verbal ability, non-verbal ability and language proficiency**

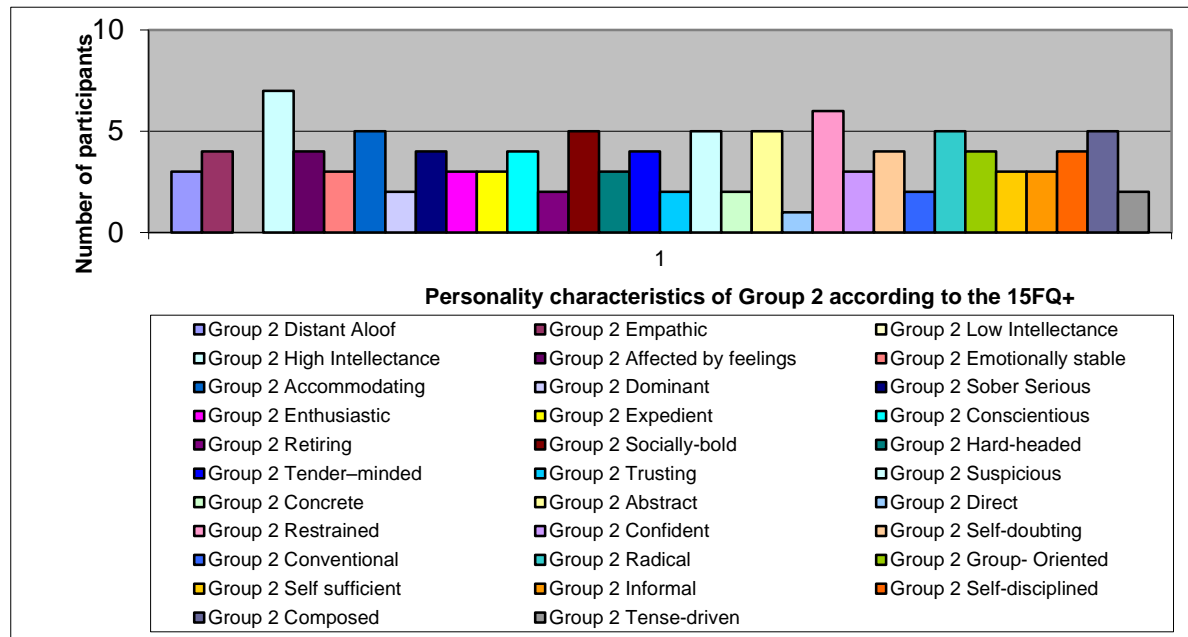
	<b>Group 1 (n = 13)</b>		<b>Group 2 (n = 7)</b>		<b>Group 3 (n = 12)</b>	
	Minimum value	Maximum value	Minimum value	Maximum value	Minimum value	Maximum value
Verbal ability	25	66	28	63	22	63
Non-verbal ability	4	12	8	12	6	10
Language proficiency	10	34	12	32	10	34
Cognitive ability	39	105	48	101	44	102

Through an assessment of the range of scores above, it appears that unclear cut-off scores were applied during the selection of the applicants. According to Kotze and Griessel (2008), selection processes should clearly describe and examine the selection criteria to ascertain their relevance to the educational and employment goals identified. The research conducted by Kotze and Griessel (2008) further highlights how important it is to identify and prioritise the competencies used as selection criteria. They further emphasise the importance of validating such criteria through continued research.

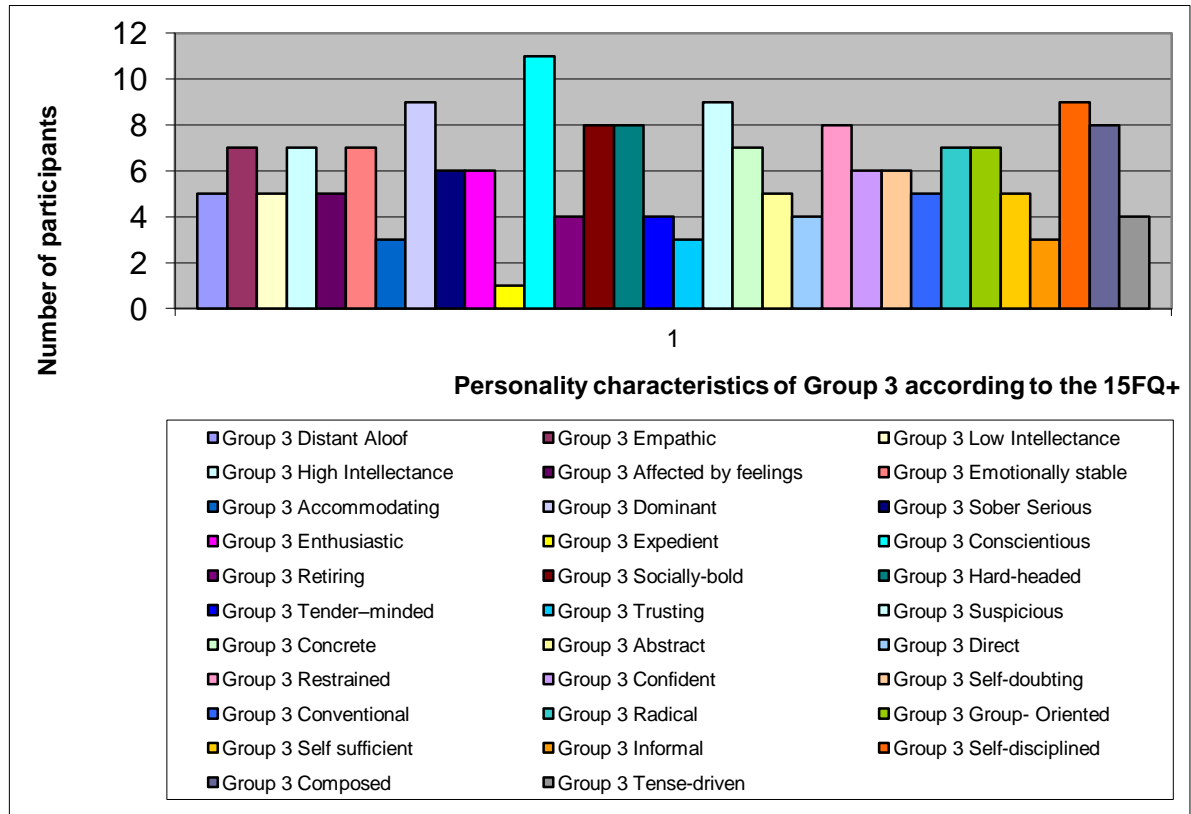
During the evaluation of the sample's personality characteristics, a similar deduction was made. It seems that no definite personality criteria have been integrated into the use of the personality assessment for selecting a specific cohort of applicants based on their personality traits. Even when the global factors of the 15FQ+ are taken into consideration, it can be observed that no clear-cut criteria were used during participant selection. Figures 5.5 – 5.10 illustrate the distribution of the global personality characteristics across the sample, as well as the three groups.



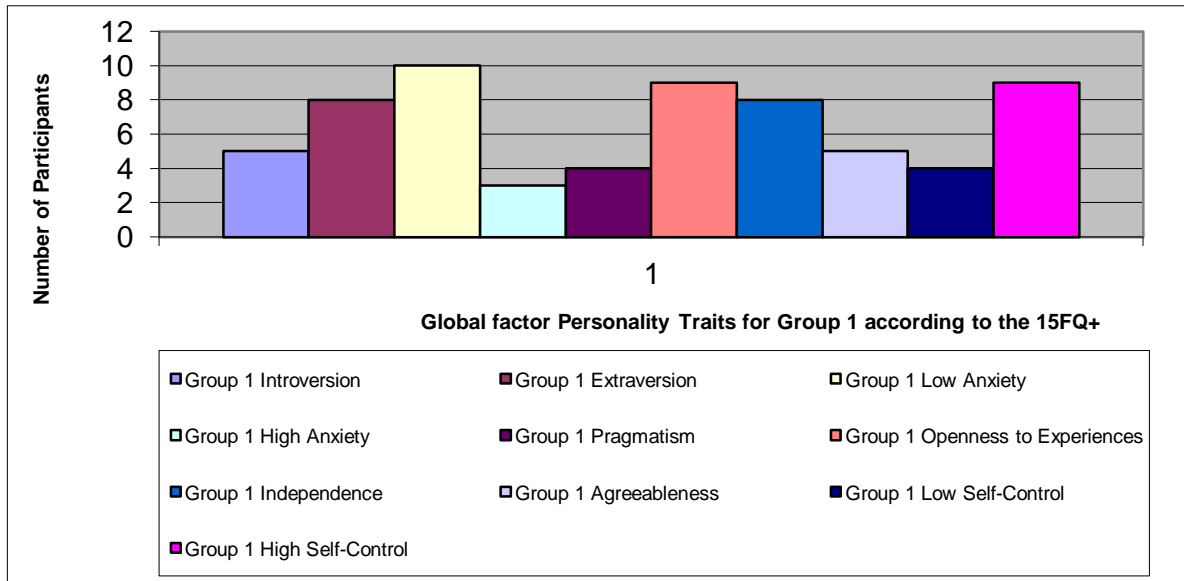
**Figure 5.5: Graphical representation of the personality characteristics of Group 1**



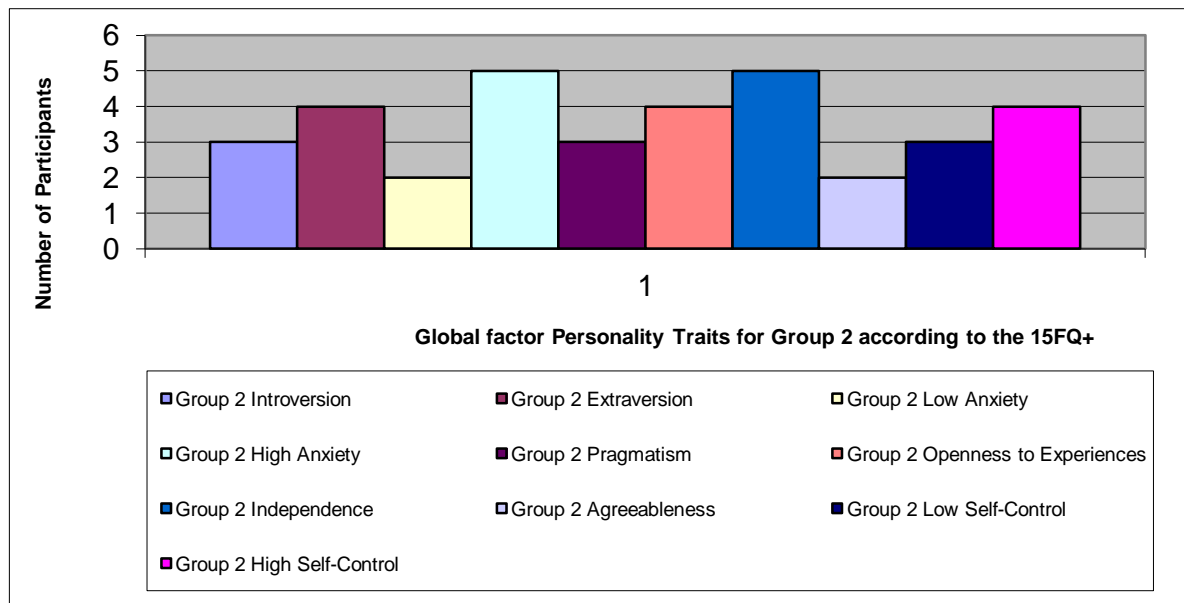
**Figure 5.6: Graphical representation of the personality characteristics of Group 2**



**Figure 5.7: Graphical representation of the personality characteristics of Group 3**

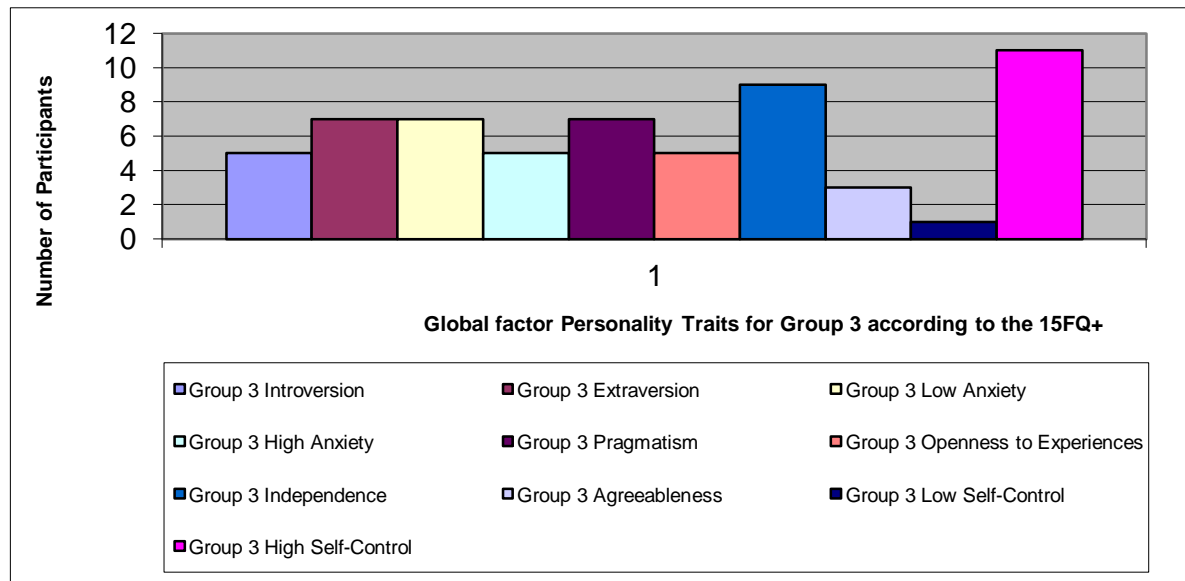


**Figure 5.8: Graphical representation of the Global factor personality traits of Group 1**



**Figure 5.9: Graphical representation of the Global factor personality traits of Group 2**





**Figure 5.10: Graphical representation of the Global factor personality traits of Group 3**

From the above, it is recommended that TUT sets criteria for selecting MBA applicants. These criteria should span both cognitive and personality dimensions, and should be researched in terms of their applicability and validity. Although subject to scrutiny, Parsons (1909) identified the following particular conditions applicable to special industries or groups of industries (refer to Table 5.3 below). (This publication is quite old but emphasis is placed on its content as it is the most recent original work done by Parsons that could be accessed). Although, Parsons (1909) admits that these traits might not be comprehensive or accurate - and certainly in the current business environment these traits might not apply - they are worth mentioning, especially as they may act as a starting point for identifying job specific criteria. Since Parsons (1909) did not have set criteria for an MBA professional, the qualities of owners and managers are mentioned as they relate closely to the characteristics of an MBA professional. The test battery that TUT currently uses for selection into the MBA course could be effective in determining such attributes or characteristics in future applicants if applied effectively.

**Table 5.3: Conditions applicable to special industries** (adapted from Parsons, 1909, p.52-54)

<b>Owners, managers, heads of departments</b>	<b>Owners, managers, etc</b>	<b>Managers</b>
<ul style="list-style-type: none"> <li>▪ Skill of hand and eye</li> <li>▪ Knowledge of the trade</li> <li>▪ Care, accuracy, quickness, loyalty, hearty obedience to orders</li> <li>▪ Working as if the business was your own, etc</li> <li>▪ Ability to get along with others and to get the best out of them</li> <li>▪ Knowledge of human nature</li> <li>▪ Sympathy and appreciation</li> <li>▪ Organising ability</li> </ul>	<ul style="list-style-type: none"> <li>▪ Broad knowledge of business affairs</li> <li>▪ Good judgement, caution</li> <li>▪ Foresight</li> <li>▪ Good business connections</li> <li>▪ Reputation for sound judgement, square dealing, honesty, reliability</li> <li>▪ Organizing and executive power.</li> <li>▪ Ability to get along with others and to get the best out of them</li> </ul>	<ul style="list-style-type: none"> <li>▪ Executive ability</li> <li>▪ Organising power</li> <li>▪ Energy</li> <li>▪ Push</li> <li>▪ Enterprise</li> <li>▪ Tact</li> <li>▪ Knowledge of the business</li> <li>▪ Knowledge of human nature</li> </ul>

### 5.3.2 RECOMMENDATIONS FOR FURTHER RESEARCH

It is recommended that this research be replicated with a larger sample size so as to increase the statistical power of the results obtained, and then compare the results of the two studies. In addition, ongoing institutional research should be in place to constantly evaluate the effectiveness of the selection mechanisms used at TUT. According to Herman (1995), universities have to constantly update their institutional research on the selection procedures that they use to ensure that the criteria used for selection of the applicants are valid and reliable.

### 5.4 STRENGTHS AND LIMITATIONS OF THE STUDY

The strength of the study lies vested in the findings and recommendations of the study. The findings contribute to existing literature on using psychometric tests as part of selection processes. In addition, the results lead to the recommendations which could enable deeper investigation into the selection processes of the MBA programme.

This study was limited in terms of the small sample size of the study. The reason for this was due to the small number of applicants that gain entry every year into the MBA programme.

In addition, by using the Kruskal-Wallis test, to statistically investigate differences of the median, the statistical analysis of the study was limited. When investigating the median, outliers in the statistical calculation are ignored, thereby discounting the possible influences these outliers might have in the study.

Furthermore, the study, being *ex post facto* in nature, was in itself a limitation. The study might have generated more solid and reliable results had the researcher played a more active role in the research process by, for example, applying clear cut-off scores of the assessments used at the point of selection. Alternatively, a quasi-experimental approach could have been set up in which the researcher applied certain interventions post-selection testing measuring the influence of the intervention through the academic performance of the participants. Another limitation of the study was its inability to generalise the findings to other groups as it was localised to the MBA cohort of TUT.

## **5.5 CONCLUSION**

In South Africa selection for tertiary education of undergraduate courses is based on achievement in the Senior Certificate examination (Herman, 1995). However, for postgraduate qualifications, completion of previous tertiary education is a prerequisite for selection. In addition, TUT has put in place a selection process for its postgraduate MBA course to aid in the process of selecting candidates who will most likely be successful in the course. According to Himmeleit (1950), applicants get selected into Higher Education Institutions in four common ways. Firstly, selection can be based on the applicant's final school certificate. The second way is through a written examination, which either attempts to assess the applicant's knowledge and understanding of a specific field of study, or it can be used to determine their scope of interest, and ability to organise his/her thoughts. Generally a combination of the first two types of selection mechanisms is used. The third approach is through testimonials and references, generally

obtained from the candidate's previous place of employment or school. The fourth means of selecting potential candidates is through an interview.

Most of these techniques mentioned by Himmeleit (1950) are still used today. Despite observing in 1950 that teachers involved in the selection processes were dissatisfied with the way in which it was done, he also noted that the methods appeared to let through a considerable number of candidates of relatively poor quality. This therefore begs the question: Why do so many Higher Education Institutions still use the same methods of selection more than 60 years later?

TUT attempts to assess the candidates that apply for the MBA programme as holistically as possible, combining the selection techniques mentioned by Himmeleit (1950). Yet, the Institution still seems to select candidates who produce mediocre academic results. A greater concern; however, was that it seems as though the selection test results had been misused / underused / not used at all, as the criteria used to inform the decision of who gets accepted into the course, is unclear. It is, therefore, suggested that the MBA department identify the cohort of applicants they would like to admit into the programme, so that the assessment battery can be tailored to include measures that assess the identified criteria.

---ooOoo---

## REFERENCES

15FQ+ Manual, 2002, Retrieved August 12, 2009, from [www.genesysonline.net](http://www.genesysonline.net)

Bain, S., Fedynich, L. & Knight, M. (2010). The successful graduate student: a review of the factors for success. *Journal of Academic and Business Ethics*, 3(7):1-9.

Baumeister, R.F. & Vohs, K.D. (2007). Self-Regulation, ego depletion, and motivation. *Social and Personality Psychology Compass*, 1:1-14.

Bisschoff, C.A. (2005). A preliminary model to identify low-risk MBA applicants. *South African Journal of Economic and Management Sciences*, 8(3):300-309.

Cattell, H.E.P. & Mead, A.D. (2008). *The Sixteen Personality Factor Questionnaire (16PF)*. Retrieved from <http://library.iit.edu/reserves/docs/psy504f.pdf>

Cody, R.P. & Smith, J.K. (1997). *Applied statistics and the SAS Programming Language*. (4<sup>th</sup> ed.). New Jersey: Prentice-Hall, Inc.

Cohen, B.H. & Lea, R.B. (2004). *Essentials of statistics for the social and behavioural science*. New Jersey: Wiley & Sons, Inc.

Cohen, L., Manion, L. & Morrison, K. (2009). *Research methods in Education*. (6<sup>th</sup> ed.). London and New York: Routledge.

Conrad, M. (2006). Aptitude is Not Enough: How personality and behavior predict academic performance. *Journal of Research in Personality*, 40:339-346.

Corder, G.W. & Foreman, D.I. (2009). *Nonparametric statistics for non-statisticians*. (2<sup>nd</sup> ed.). New Jersey: John Wiley & Sons, Inc

Creswell, J.W. (2005). *Educational research: planning, conducting and evaluating quantitative and qualitative research*. (2<sup>nd</sup> ed.). USA: Pearson Education, Inc.

Dash, N.K. (2005). *Module: Selection of the research paradigm and methodology*. Online research methods resource for teachers and trainers. Manchester: Manchester Metropolitan University. Retrieved from [http://www.celt.mmu.ac.uk/researchmethods/Modules/Selection\\_of\\_methodology/index.php](http://www.celt.mmu.ac.uk/researchmethods/Modules/Selection_of_methodology/index.php)

Dickson, J., Fleet, A. & Watt, H.M.G. (2000). Success of Failure in a core University unit: what makes the difference? *Higher Education and Development*, 19(1):59-73.

Dollinger, S.J., Matyja, A.M. & Huber, J.L. (2008). Which factors best account for academic success: those which college students can control or those they cannot? *Journal of Research in Personality*, 42:872-885.

Dobson, P. Krapljan-Barr, P. & Vielba, C. (1999). An Evaluation of the Validity and Fairness of the Graduate Management Admissions Test (GMAT) Used for MBA Selection in a UK Business School. *International Journal of Selection and Assessment*, 7(4):196-202.

Downie, N.M. & Heath, R.W. (1974). *Basic statistical methods*. (4<sup>th</sup> ed.). New York: Harper & Row Publishers.

Duff, A., Boyle, E., Dunleavy, K. & Ferguson, J. (2004). The relationship between personality, approach to learning and academic performance. *Personality and Individual Differences*, 36:1907-1920.

Erasmus, E. (2003). *JP Expert / PIBSpEEEx: The new generation Situation-specific Job-profiling and assessment system*. Faculty of Economic Management Sciences. Pretoria: University of Pretoria.

Example Box Plot. Retrieved 14 September 2011, from <http://web.anglia.ac.uk>

Fish, L.A. & Wilson, F.S. (2007). Predicting performance of one-year MBA students. *College Students Journal*, 41(3):507-514.

Foxcroft, C., Paterson, H., Le Roux, N. & Herbst, D. (2004). *Psychological assessment in South Africa: A needs analysis. Final report*. Retrieved from [http://www.hsrc.ac.za/Research\\_Publication-18438.phtml](http://www.hsrc.ac.za/Research_Publication-18438.phtml)

Foxcroft, C. & Roodt, G. (2005). *An introduction to psychological assessment in the South African Context*. (2<sup>nd</sup> ed.). South Africa: Oxford University Press.

Furnham, A., Chamorro-Premuzik, T. & McDougall, F. (2003). Personality, cognitive ability and beliefs about intelligence as predictors of academic performance. *Learning and Individual Differences*, 14:49-66.

Gephart, R. (1999). Paradigms and research methods. *Research Methods Forum*. 4. Retrieved from [http://division.aomonline.org/rm/1999\\_RMD\\_Forum\\_Paradigms\\_and\\_Research\\_Methods.htm](http://division.aomonline.org/rm/1999_RMD_Forum_Paradigms_and_Research_Methods.htm)

Ghetian, C.B., Parrott, R., Volkman, J.E. & Lengerich, E.J. (2008). Cancer registry policies in the United States and geographic information systems applications in comprehensive cancer control. *Health Policy*, 87(2):185-193.

Gong, Y., Rai, D., Beck, J.E. & Heffernan, N.T. (2009). *Does self-discipline impact students knowledge and learning?* Computer Science Department. Worcester: Worcester Polytechnic Institute. Retrieved from <http://www.educationaldatamining.org/EDM2009/uploads/proceedings/gong.pdf>

Gravetter, F.J. & Forzano, L.B. (2003). *Research methods for the behavioral sciences*. Thompson Learning Inc.

Harris, S. & Owen, C. (2007). Discerning quality: using the multiple mini-interview in student selection for the Australian National University Medical School. *Medical Education*, 41:234-241.

Hedlund, J., Wilt, J.M., Nebel, K.L., Ashford, S.J. & Sternberg, R.J. (2006). Assessing practical intelligence in business school admissions: A supplement to the graduate management admissions test. *Learning and Individual Differences*, 16:101-127.

Herman, H.D. (1995). School-leaving examinations, selection and equity in Higher Education in South Africa. *Comparative Education*, 31(2):261-274.

Himmeleit, H.T. (1950). Student selection – an experimental Investigation: I. *The British Journal of Sociology*, 1(4):328-346.

Horne, T.J. (2007). *The trainability of the African-language transferee (ALT)*. Hough & Horne.

Howell, D.C. (1992). Statistical methods for psychology. (3<sup>rd</sup> ed.). California: Duxbury Press.

Howell, C. (2011). *Fundamental statistics for the behavioral sciences*. Canada: Wadsworth, Cengage Learning.

Kaplan, R.M. & Saccuzzo, D.P. (2009). *Psychological testing: Principles, applications, and insight*. (7<sup>th</sup> ed.). USA: Wadsworth Cengage Learning.

Kotze, M. & Griessel, L. (2008). Predicting the academic performance of MBA students: a South African study. *International Journal of the Humanities*, 6(1):147-156.

Krauss, S.E. (2005). Research Paradigms and Meaning Making: A Primer. *The Qualitative Report*, 10(4):758-770.

Kriel, H. (n.d). *Situation-specific validity*. Retrieved June 30, 2010, from [www.pibspeex.com](http://www.pibspeex.com)

Kriel, H. (1999). *Test bias in an academic environment*. Retrieved June 30, 2010, from [www.pibspeex.com](http://www.pibspeex.com)



Kriel, H. (2001). *The validation of a potential assessment battery for engineering technology students*. Masters Dissertation. Pretoria: University of Pretoria.

Leong, T.L. & Austin, J.T. (2006). *The Psychology research handbook. A guide for graduate students and research assistants*. (2<sup>nd</sup> ed.). USA: Sage Publications, Inc.

Lumsden, M.A., Bore, M., Millar, K., Jack, R. & Powis, D. (2005). Assessment of personal qualities in relation to admission to medical school. *Medical Education*, 39:258-265.

Maree, J.G. (2002). The use of selection mechanisms at tertiary institutions: are we begging the question? *South African Journal of Criminology*, 25(3), 141-151.

Meiring, D., Van de Vijver, F.J.R. & Rothmann, S. (2005). Bias in an adapted version of the 15FQ+ Questionnaire in South Africa. *South African Journal of Psychology*, 36(2):340-356.

Morgeson, F.P., Campion, M.A, Dipboye, R.L., Hollenbeck, J.R., Murphy, K. & Schmitt, N. (2007). Reconsidering the use of personality tests in personnel selection contexts. *Personnel Psychology*, 60:683–729.

Moutafi, J., Furnham, A. & Paltiel, L. (2005). Can personality factors predict intelligence? *Personality and individual Differences*, 38:1021–1033.

Muijs, D. (2004). *Doing quantitative research in education with SPSS*. London: Sage Publications Ltd.

Nzama, L., De Beer, M. & Visser, D. (2008). Predicting work performance through selection interview ratings and psychological assessment. *South African Journal of Industrial Psychology*, 34(3):39-47.

O'Brien, K.M. (2001). The legacy of Parsons: career counselors and vocational psychologists as agents of social change. *The Career Development Quarterly*, 50:66-76.

O’Conner, M.C. & Paunonen, S.V. (2007). Big Five personality predictors of post-secondary academic performance. *Personality and Individual Differences*, 43:971-990.

Osipow, S.H. (1987). Applying person-environment theory to vocational behavior. *Journal of Vocational Behavior*, 31:333-336.

Parsons, F. (1909). *Choosing a vocation*. Boston and New York: The Riverside Press Cambridge.

Reber, A.S. & Reber, E.S. (2001). *The Penguin Dictionary of Psychology*. (3<sup>rd</sup> ed.). England: Penguin Books.

Schreuder, A.M.G. & Coetzee, M. (2008). *Careers: an organizational perspective*. South Africa: Juta & Co.

Stead, G.M. & Watson, M.B. (2006). *Career psychology in the South African context*. (2<sup>nd</sup> ed.). South Africa: Van Schaik Publishers.

Sulaiman, A. & Mohezar, S. (2006). Student success factors: Identifying key predictors. *Journal of Education for Business*, 81(6):328-333.

Tabak, F., Nguyen, N., Basuray, T. & Darrow, W. (2009). Exploring the impact of personality on performance: how time-on-task moderates the mediation by self-efficacy. *Personality and Individual Differences*, 47:823-828.

The Genesis Group: Management and Development Consultants. (2007). *Job analysis, competency assessments and evaluation: Towards creating a performance management system*. Retrieved from <http://www.thegenesisgroup.co.za/downloads/speex.pdf>

Wilson, F.L., Baker L.M., Nordstrom, C.K. & Legwand, C. (2008). Using the Teach-back and Orem's self-care deficit nursing Theory to increase childhood immunization communication among low-income mothers. *Issues in comprehensive pediatric nursing*, 31(1):7-22.

Van der Merwe, D. & De Beer, M. (2006). Challenges of student selection: Predicting academic performance. *South African Journal of Higher Education*, 20(4):547-562.

Van Eeden, R., De Beer, M. & Coetzee, C.H. (2001). Cognitive ability, learning potential, and personality traits as predictors of academic achievement by engineering and other science and technology students. *South African Journal of Higher Education*, 15(1):171-179.

Vermunt, J.D. (2005). Relations between student learning patterns and personal and contextual factors and academic performance. *Higher Education*, 49:205-234.

---ooOoo---

## APPENDICES

### APPENDIX A

Ethical Clearance Certificate from the University of Pretoria



UNIVERSITY OF PRETORIA  
FACULTY OF EDUCATION  
RESEARCH ETHICS COMMITTEE

**CLEARANCE CERTIFICATE**

**DEGREE AND PROJECT**

**INVESTIGATOR(S)**

**DEPARTMENT**

**DATE CONSIDERED**

**DECISION OF THE COMMITTEE**

**CLEARANCE NUMBER :**

EP09/11/04

MEd

The relationship between a selection battery and the academic performance of students on an MBA programme

Saffiya Nagdee

Department of Educational Psychology

1 December 2011

APPROVED

Please note:

*For Masters applications, ethical clearance is valid for 2 years*

*For PhD applications, ethical clearance is valid for 3 years.*

**CHAIRPERSON OF ETHICS  
COMMITTEE**

Prof L Ebersohn

DATE

1 December 2011

CC

Jeannie Beukes  
Prof. Fraser  
Dr. Mampane  
Dr. Moletsane

This ethical clearance certificate is issued subject to the following conditions:

1. A signed personal declaration of responsibility
2. If the research question changes significantly so as to alter the nature of the study, a new application for ethical clearance must be submitted
3. It remains the students' responsibility to ensure that all the necessary forms for informed consent are kept for future queries.

Please quote the clearance number in all enquiries.

## **APPENDIX B**

### Ethical Clearance Certificate from the Tshwane University of Technology

---ooOoo---



## Research Ethics Committee

---

March 8, 2010

Ref#: 2010/02/011 Name: Nagdee S Student #: University of Pretoria
--

Ms S Nagdee  
Directorate Student Development and Support  
Higher Education Development and Support  
Tshwane University of Technology

Dear Ms Nagdee,

---

TITLE	:	"The correlation of the Masters in Business Administration selection instruments and academic success at Tshwane University of Technology"
INVESTIGATOR	:	NAGDEE S
PROGRAMME	:	Masters in Educational Psychology, University of Pretoria

---

In reviewing the proposal, the expedited review panel wishes to table the following comments/notes for your consideration/attention/notification:

- The various sets of archive data should be fully anonymised during data analysis to ensure that the identity of the particular students is completely protected. This means that the students' names and student numbers should be replaced by sequential codes at the onset of data collection. Also, no file (electronic or paper) should be kept anywhere that links the students' names and student numbers to the assigned sequential codes.
- A copy of the final dissertation should be provided to the TUT Directorate: Student Development and Support for notification and implementation of the research findings.

The research proposal, permission letters and UP Ethics letter were reviewed by an expedited review panel of the Research Ethics Committee of Tshwane University of Technology. The study is hereby <b>approved</b> .
---

*We empower people*

---

The decision of the expedited review panel will be tabled for ratification by the full Research Ethics Committee at its meeting on March 29, 2010.

Note:

*The reference number [top right corner of this communiqué] should be clearly indicated on all forms of communication [e.g. Webmail, E-mail messages, letters] with the relevant stakeholders.*

Yours sincerely,



WA HOFFMANN (Dr)

Chairperson: Research Ethics Committee

[Ref#2010=02=011=NagdeeS]

cc Ethics Committee Representative (HEDS) – Dr E van Heerden

*We empower people*

---