DYNAMIC COGNITIVE ASSESSMENT: INVESTIGATING LEARNING POTENTIAL WITHIN THE CONTEXT OF AN ACADEMIC INSTITUTION

BY

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“Be still, and know that I am God.”

- Psalms 46:10

Holy Bible (New King James Version)

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ABSTRACT

The educational and psychometric contexts in South Africa are currently characterised by concerns pertaining to the potentially spurious influence of the challenges of cultural heterogeneity and of the redress of past and present disadvantagement. The present investigation forms a research response to these challenges as they relate to the practical utility of a dynamic assessment measure for the purpose of selecting students for curricula at a South African university. In response to a growing dissatisfaction with longstanding selection procedures and instruments, the utility of a dynamically derived learning potential score is explored and contrasted with the traditionally employed static intellective measure of the matriculation score. The present investigation serves to augment a growing body of research that asserts the capacity of dynamic assessment to surmount many of the criticisms typically associated with static assessment and to contribute novel and useful information regarding the intellective faculties of prospective university students.

Within the context of the investigation 71 first year students enrolled for the BA Extended Degree at the University of Johannesburg were assessed using the static intellective measure of a matriculation score and the dynamically informed global learning potential score of the Ability, Processing of Information and Learning Battery Short Version (APIL-B SV). The utility of the dynamically derived learning potential score to predict academic performance during the first year of university study was examined and contrasted with the predictive efficacy of the static matriculation score. The empirically examined data served to support conjecture that a dynamic intellective measure demonstrated significant utility in predicting the future academic performance of first year university students. In addition, the ability of this measure to predict academic performance in a manner that had significant benefit over the traditionally employed static matriculation score was affirmed.

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CHAPTER 1
INTRODUCTION TO THE STUDY

1.1 INTRODUCTION

An area of central psychosocial and psychometric concern in South Africa pertains to the employ of psychometric instrumentation and procedures within an educational context. The intention of the present study is to investigate the practical utility of a dynamic assessment measure of intellectual aptitude for the purposes of selecting students for courses at a university. More specifically, the present investigation will contrast the predictive efficacy of a dynamic assessment measure with a traditional static predictor of academic performance. The contextual motivators for the pursuit of this investigation are explored in the following sections.

1.2 EDUCATIONAL CONTEXT

Since the change in political dispensation in 1994, education in South Africa has been characterised by critical reflection and reform (De Villiers, 1999). Effective as of 2008 a new outcomes-based assessment protocol for schools comes into full effect (Department of Education: Republic of South Africa (RSA), 2005a). Motivated by an intention towards outcomes based assessment, where learners are assessed throughout the year as they learn, this revision purports a philosophy that is deemed to be less biased and more centred on student potential (Department of Education: RSA, 2005b).

The need for emphasis on non-biased assessment and a focus on student potential is born of important circumstantial considerations particular to the South African context. Under the apartheid regime, the South African education system was characterised by discrimination and engendered disadvantagement (Nzimande, 1999). At present in South Africa, there remain gross discrepancies and deficiencies in schools with regard to facilities, textbooks and the quality and quantity of teaching (De Villiers, 1995). It is asserted in this investigation that an emphasis on students'

potential to perform in the future (in the context of appropriate educational mediation) offers a form of redress to the challenge of disadvantagement.

In addition to the challenges presented by the disadvantagement of certain learners within the school educational system, educational authorities and institutions are tasked with serving a society that is extremely heterogeneous (Murphy, 2002). This heterogeneity is born of a plethora of variables that includes (but are not necessarily limited to): race, culture, socio-economic status, historical and present advantage or disadvantagement, and language (Zollezzi, 1999). The importance of an educational context that offers equitable appraisal is advocated in the context of the present investigation.

In summary, within the South African educational context the central challenges to the provision of effective service delivery include the provision for the redress of past and present disadvantagement; and the recognition of and provision for the equitable management of a very heterogeneous student population.

1.2.1 UNIVERSITY SELECTION AND THE PREDICTION OF ACADEMIC PERORMANCE

The challenges of disadvantagement and heterogeneity within the educational system are of particular concern to South African universities. When selecting students for admission to various curricula, they are tasked with the equitable appraisal of advantaged and disadvantaged learners, and with a fair consideration of a heterogeneous student population (Murphy, 2002). In addition to their selection procedures, it may be asserted that they are obliged to follow suite with the broader South African educational policies that advocate outcomes based learning. The focus of the present investigation is, however, limited to the selection of students for university admission.

Nunns and Ortlepp (1994) underscore distributive and procedural fairness to be the cornerstone of equitable selection of university applicants. Distributive fairness necessitates that the correct students are selected. The correct students are considered by universities to be those with a probability of academic success (De

Villiers, 1999). Procedural fairness in the selection of these students necessitates that the process of assortment is not biased by variables that are of a non-academic nature (Nunns & Ortlepp, 1994). In the context of the present investigation, such variables are considered to be those that characterise the noted student population heterogeneity, and the influence of past and present disadvantagement.

The core challenge regarding university admission may be summarised as the selection of students that are likely to succeed academically in a manner that is not biased by population heterogeneities, and that does not further disfavour academically disadvantaged students. Within the context of the present investigation, this assortment practice is referred to as purposeful selection. Taylor (1994) stresses that in order for this challenge to be effectively met, educationalists will have to place more emphasis on potential than skill or specific ability.

1.2.1.1 TRADITIONAL APPROACHES TO THE SELECTION OF UNIVERSITY STUDENTS

Meeting the challenges posed to universities in terms of the prediction of academic success and the concomitant selection of students necessitates a critical reflection on the prevailing assessment instruments and methodologies. Traditionally, practices of academic selection and categorisation have been chiefly informed by a review of the students' matriculation results (Grussendorf, Liebenberg & Houston, 2004). While these results have demonstrated some predictive validity in certain instances, in others they have evidenced significant elements of bias (Murphy, 2002).

The predictive validity of past school performance (as distilled by matriculation results) has been demonstrated to be highly contingent upon the nature of the schooling itself (Calitz, 1998; De Villiers, 1999; Mitchel & Fridjhon, 1993; Sibaya, Hlongwane & Makunga, 1996; Skuy, Zollezzi, Mentis, Fridjhon & Cockcroft, 1996; Zollezzi, 1995). For instance, the performance of students in schools of the old white educational departments offers some utility in predicting academic performance at university (Mitchell & Fridjhon, 1993). The predictive efficacy of past school performance for pupils in schools of the old black (African, Asian and Coloured)

educational departments is, however, very poor (Mirchell & Fridjohn, 1993). In schools that are characterised by discrepancies and deficiencies with regard to facilities, textbooks and quality and quantity of teaching, the usefulness of matriculation scores as predictors of academic performance at university is poor (De Villiers, 1999). The conclusion drawn by many researchers (Calitz, 1998; De Villiers, 1999; Mitchel & Fridjhon, 1993; Sibaya, Hlongwane & Makunga, 1996; Skuy, Zollezzi, Mentis, Fridjhon & Cockcroft, 1996; Zollezzi, 1995) is that in the context of disadvantagement, matriculation scores do not offer good predictions of future academic performance, but rather reflect past disadvantagement. Additionally, researchers have demonstrated significant bias in the predictive efficacy of matriculation results that is born of cultural dissimilarity rather than academic ability (De Villiers, 1999; Englebreche, 1999; Grussendorff, Liebenberg & Houston, 2004; Nel, 1997; Shochet, 1994; Skuy, Zollezzi, Mentis, Fridjhon & Cockcroft, 1996; Zollezzi, 1995).

In keeping with the broader South African educational context, universities are progressively beginning to demonstrate an increased awareness of the challenges presented by cultural heterogeneities and the redress of past and present disadvantagement (De Beer, 2000; De Villiers, 1999; Engelbrecht, 1999; Nel, 1997; Sibaya, Hlongwane & Makunga, 1996; Skuy et al., 1996; Taylor, 1999; Van Eerden, De Beer & Coetzee, 2001). This awareness is explicated in a growing dissatisfaction with the longstanding selection procedures and instruments that are used to select students for curricula (Murphy, 2002). To date the response by universities has been typified by largely unsuccessful attempts to diffuse the influence of matriculation scores through the inclusion of other assessment procedures and instruments (De Villiers, 1999; Sibaya, Hlongwane & Makunga, 1996; Zollezzi, 1995). The results of such endeavour have, however, yet to facilitate significantly better predictive efficacy or the greater emphasis on student potential over developed skills and abilities (Murphy, 2002). The movement towards an emphasis on potential over the specific skills that typify traditional approaches is collimated with the broader South African psychometric context.

1.3 SOUTH AFRICAN PSYCHOMETRIC CONTEXT

As with the South African educational context, the psychometric climate over the past two decades has been exemplified by critique and reform (Calitz, 1998; De Villiers, 1999; Owen, 1998; Taylor, 1994, 1999). Much of this critique and reform has similarly centred upon concerns of cultural bias and the perpetuation of disadvantagement. The following challenges are considered central to contemporary psychometrics in South Africa:

- Many of the existing psychometric instruments and procedures are not appropriately standardised for the South African population (Foxcroft, Roodt & Abrahams, 2001). The standardisation of instruments and development of norms for a population as diverse as that of South Africa embodies a significant contemporary psychometric predicament (Murphy, 2002). For example, in order for persons to fairly engage with a psychometric instrument or procedure they would need to understand that procedure. In a population where eleven official languages are recognised, this elemental psychometric consideration is potentially very difficult and cumbersome to exact.

- Considerable portions of the South African population have either historically been, or are currently, subject to disadvantagement in terms of socio-economic, political and educational opportunities (Nzimande, 1995; Owen, 1998). As a result of significant discrepancies in terms of such opportunities, there exists a potential for psychometric instruments to offer little more than a measure of such disadvantagement. For instance, a person who has had little or no schooling is unlikely to perform well on a mathematically based psychometric instrument. This person's poor score would not, however, reflect a poor mathematical ability, but rather their historical lack of opportunity.

The present psychometric context in South Africa is characterised by dissatisfaction and a growing call for the rectification of the central challenges presented above (Foxcroft, Roodt & Abrahams, 2001; Murphy, 2002; Nzimande, 1995; Owen, 1998; Taylor, 1999). Over the past decade and a half, this call has incited a paradigmatic

shift towards new assessment philosophies. The present research asserts that the ideology of such a philosophy should necessarily be able to meet the challenge of equitable appraisal and the simultaneous redress of past and present disadvantagement. South African researchers and psychometricians are increasingly stressing the importance of an emphasis on individuals' intellectual potential as a means by which to facilitate this paradigmatic shift (Bendixen, 2000; De Beer, 2000; De Villiers, 1999; Nzimande, 1995; Owen, 1998; Skuy, et al., 1996; Taylor, 1994, 1999).

1.3.1 TOWARDS A DYNAMIC ASSESSMENT OF LEARNING POTENTIAL

While the field of intelligence assessment comprises numerous theories and measures of intellective faculty, it may be broadly delimited to two central paradigms: static intelligence assessment and dynamic intelligence assessment. Within the context of the present research, dynamic intelligence assessment is held to embody the psychometric paradigm shift that facilitates an emphasis on intellectual potential.

Static intellective instruments place emphasis on the products of prior learning rather than the processes of learning, thinking and problem solving (Haywood & Brown, 1990). This emphasis necessitates the supposition that the sample of individuals using the instruments have enjoyed similar opportunities to learn and develop the specifically examined competencies (Elliot, 2003). In the South African context where individuals are exposed to varying degrees of disadvantagement and to widely dissimilar cultures (Zollezzi, 1995), the adoption of such an assumption allows for potentially spurious and discriminatory results (Bolig & Day, 1993). Further, the emphasis on summative intelligence products disregards the learning processes of the assessed individuals (Jitendra & Kameenui, 1993). In so doing, static assessment methods fail to recognise individuals' potential to succeed with appropriate environmental support.

The traditional methods of selecting students for university curricula are characterised by the static assessment paradigm. The employ of matriculation scores are specifically geared toward assessing the products and competencies of prior learning. In the present South African educational context of disadvantagement

and heterogeneity, such instruments risk simply perpetuating disadvantagement and confirming difference. In the context of the present research, it is hypothesised that an emphasis on individuals' intellectual potential to learn would offer greater predictive efficacy, and would redress concerns of bias and disadvantagement. The psychometric assessment paradigm that emphasises intellectual potential to learn is that of dynamic intelligence assessment.

In contrast to static intelligence assessment, where emphasis is placed on the products of prior learning, dynamic assessment is geared towards assessing the process of learning itself. Assessing the intelligence of an individual in a dynamic fashion allows for the circumvention of many of the potentially spurious and discriminatory challenges typically associated with static intelligence measures. In particular, dynamic measures of intellectual functioning have demonstrated considerable promise in regard to the "non-discriminatory" (Brown & Haywood, 1990, p. 411) assessment of learning potential of culturally different and language different persons (Brown & Haywood, 1990; Haywood & Tzuriel, 2002). In the South African context of cultural diversity and disadvantagement, researchers have found that learning potential scores of intellectual potency have the potential to be better predictors of academic performance than the matriculation marks or other static tests of intellectual ability (Day, Engelhardt, Maxwell & Bolig, 1997; De Beer, 2000; De Villiers, 1999; Lopes, Root & Mauer, 2001; Sibaya, Hlongwane & Makunga, 1996; Van Aswegen, 1997; Van Eerden, De Beer & Coetzee, 2001; Zollezzi, 1995). Within the context of the present study, it is asserted that the psychometric philosophy of dynamic intelligence assessment embodies a promising avenue of response to the call for an emphasis on individual potential in educational determination.

1.4 STATEMENT OF THE RESEARCH PROBLEM: DYNAMIC ASSESSMENT IN AN ACADEMIC INSTITUTION

The discussions presented in this chapter serve to emphasise the challenges posed by disadvantagement and population heterogeneity to both the educational and psychometric contexts in South Africa. In general, education in South Africa is characterised by reform and a move towards an emphasis on individual potential as a means by which to reduce discrimination and redress disadvantagement. More

specifically, the relevance of these contextual considerations and reformatory ethos were considered from the perspective of the selection of students for university curricula. The specific challenges of non-discriminatory selection and the redress of disadvantagement were emphasised as key challenges for universities and as a central focus of the present research. As with the broad educational context, the importance of an emphasis on individual potential when selecting students for university admission was highlighted.

Juxtaposed with the need for greater emphasis on individual potential as a means to reduce bias and redress disadvantagement in the selection processes for university students, is the collimated paradigmatic shift in psychometric cognitive assessment. The paradigmatic shift from static intelligence assessment to dynamic intelligence assessment demonstrates an explication of the broader desire within the South African psychometric context to emphasise potential and cognitive processes over the static products of prior learning.

The shared emphasis on intellectual potential as a means by which to reduce bias and redress disadvantagement, highlights an area of promising contemporary pedagogic and psychometric research, namely that of dynamic intelligence assessment within the context of an academic institution. The present investigation purports to complement this area of research endeavour by addressing the central research problem **to determine whether dynamic intellective assessment has practical utility for selecting students for courses at a South African academic institution**.

1.5 RESEARCH AIMS AND HYPOTHESES

In order to address the central research problem, primary and secondary aims were delimited. These aims are then expressed in summated form as null and alternative hypotheses in order to facilitate a quantitative empirical examination. Motivations and discussions regarding the research aims are presented in detail in 4.3.

1.5.1 PRIMARY RESEARCH AIM: THE UTILITY OF DYNAMIC ASSESSMENT

The primary aim of the present investigation is **to determine the utility of a dynamic intellective assessment process in predicting the future academic performance of first year university students**. Examination of this aim is facilitated by means of examining the following null and alternative hypotheses:

- H_o: There is no correlation between learning potential scores and future academic performance scores of first year university students.

- H_a: There is a significant correlation between learning potential scores and future academic performance scores of first year university students.

1.5.2 SECONDARY RESEARCH AIMS

In order to facilitate the realisation and examination of the primary research aim, three secondary research aims are examined. The secondary research aims inform the primary research aim and serves to complement and assist in its realisation (Struwig & Stead, 2001). These aims and associated hypotheses are described in the following sections.

1.5.2.1 PREDICTIVE EFFICACY OF DYNAMIC ASSESSMENT VS. STATIC ASSESSMENT

The first secondary aim is **to compare the predictive efficacy (of academic performance of first year university students) of a dynamic intellective assessment process with the traditionally employed static intellective measure of a matriculation score**. This objective is explicated in the following null and alternative hypotheses:

- H_o: The relationship between learning potential scores and future academic performance scores will not differ significantly from the relationship between matriculation scores and future academic performance scores.

- H_a: The relationship between learning potential scores and future academic performance scores will differ significantly from the relationship between matriculation scores and future academic performance scores.

1.5.2.2 DYNAMIC ASSESSMENT VS. STATIC ASSESSMENT OF INTELLECTUAL FACULTY

This next secondary aim is **to determine whether or not (in the case of first year university students) dynamic intellective assessment measures an aspect of intellective performance that is dissimilar from the static intellective assessment measure of a matriculation score**. This aim is developed in the following null and alternative hypotheses:

- H_o: There is no correlation between learning potential scores and matriculation scores.

- H_a: There is a significant correlation between learning potential scores and matriculation scores.

1.5.2.3 DYNAMIC ASSESSMENT IN CONJUNCTION WITH STATIC ASSESSMENT

This final secondary research aim serves **to determine whether or not the employ of dynamic intellective assessment in conjunction with the traditional static intellective measure of a matriculation score facilitates the optimal correlation of assessment scores with future academic performance of first year university students**. This aim is expressed in the following null and alternative hypotheses:

- H_o: The variance of future academic performance scores is not best explained when employing both learning potential scores and matriculation scores as prediction criteria.

- H_a: The variance of future academic performance scores is best explained when employing both learning potential scores and matriculation scores as prediction criteria.

1.6 RESEARCH DESIGN AND METHODOLOGICAL CONSIDERATIONS

The present investigation employed a quantitative research design in order to examine the noted research problem, aims and hypotheses. A sample of first year university students from the BA Extended Degree course at the University of Johannesburg was employed in order to facilitate an empirical analysis of the constructs of dynamic assessment, static assessment, and future academic performance. A dynamically underpinned learning potential score was operationalised by means of the Ability, Processing of Information and Learning Battery Short Version (APIL-B SV). Matriculation scores were examined as an operationalisation of a static measure traditionally employed by universities in South Africa. Future academic performance was determined by computing a comparable aggregate score of academic performance during the first year of study. Descriptive and inferential statistics are employed within the context of the present investigation in order apply the collected score data to an examination of the noted hypotheses. A detailed account of the research design and methodological consideration is described in Chapter 4.

1.7 THESIS OUTLINE

The remainder of the present investigation is delimited as follows:

- Chapter 2 consists of a review of the pertinent literature on intelligence assessment.
- Chapter 3 explores the South African educational and psychometric contexts in greater detail and emphasises the contemporary research findings on dynamic cognitive assessment in the context of academic institutions.
- Chapter 4 documents the design and methodology followed during the fieldwork.
- Chapter 5 comprises a presentation of the research results.

- Chapter 6 embodies a discussion of the research results, limitations, implications and directions for future research.

1.8 CONCLUSION

The present study serves as an empirical investigation into the application of a dynamic cognitive assessment technique within the context of an academic institution. It forms a research response to the challenges of disadvantagement and heterogeneity as they apply to the broad educational and psychometric contexts. More specifically, the present investigation aims to augment the contemporary body of knowledge regarding the employ of dynamic cognitive assessment for the purposes of university selection that is both equitable and that redresses disadvantagement.

Prior to further elaboration on the precise nature, findings and conclusions of the present research, it is important to engage in a comprehensive review of the specific models and theories which were explored and applied. In Chapter 2 a detailed description is presented on specific models and theories of intelligence assessment that informed the framework of the present investigation.

CHAPTER 2
APPROACHES TO INTELLIGENCE ASSESSMENT

2.1 INTRODUCTION

The assessment of intellective cognitive factors for the purposes of educational determination and the prediction of academic performance underpins a central research interest for educationalists and psychologists. Within the context of this chapter the dominant paradigms of intelligence assessment are explored. Their advantages and shortcomings are considered so as to facilitate an informed research response to the use of intelligence assessment practices within a South African university context. Explicit discussion of the South African psychometric and university contexts are presented in Chapter 3

2.2 APPROACHES TO INTELLIGENCE ASSESSMENT: STATIC AND DYNAMIC

Formulations of the construct of intelligence continue to arouse considerable deliberation amongst educationalists and psychologists. The historical development and theoretical determination of psychometric intelligence measures is characterised by plethoric definition and differentiated research conjecture (Murphy, 2002; Sternberg, 1997). Precise accounts of this elusive and multifaceted concept may credibly forever retain a degree of enigmatical research allure (Murphy, 2002). At best, one may accord to Neisser et al.'s (1996) observation that the multitudinous contemporary theories and measures of intelligence are simply attempts to clarify and organise complex sets of intellective phenomena. At the root of intelligence appraisal lies a predictive and descriptive pursuit of phenomenological yields of mental process and behaviour. As noted in 1.3.1, the intelligence assessment ideologies that categorise these predictive and descriptive pursuits may be broadly delimited to the two central paradigms of static intelligence assessment and dynamic intelligence assessment (Daniel, 1997; De Villiers, 1999; Murphy, 2002; Taylor, 1994, 1999). Within the context of the present chapter, static cognitive intelligence assessment doctrines are explored and juxtaposed with an examination of dynamic cognitive intelligence assessment.

2.3 STATIC APPROACHES TO INTELLIGENCE ASSESSMENT

The static paradigm of intelligence assessment is underpinned by a view of intelligence (or a set of intelligences or abilities) as a stable and possibly innate endowment which different people have in different quantities (Taylor, 1994). The term "static" reflects the presumption that intelligences or aptitudes may be measured as relatively fixed and quantifiable constructs (Taylor, 1994). Whether these constructs pertain to the ability to process information or simply to prior learning experiences, they are regarded as exclusively indicative of an inherent intellectual faculty (Guthke, 1993; Lipson, 1992). Intelligence assessment instruments and procedures evolving from this school are thus exclusively geared towards the identification of stable traits. School assessment methodologies are largely informed by this philosophy. As explored in detail in 3.3.1 and 4.8.3, the statically determined matriculation score examined within the context of the present investigation embodies a traditional and quintessential static measure of amalgamated intellectual academic faculty.

There are numerous philosophies of intelligence and intelligence assessment that accent a fundamentally static view. These various theories are, however, typically characterised within the following two broad delimitations (Murphy, 2002; Taylor, 1994):

- The structural approach;
- The information processing approach.

2.3.1 THE STRUCTURAL APPROACH

This approach is chiefly guided by attempts to measure performance along dimensions that are purported to constitute the fundamental structure of the psychological domain in question (Taylor, 1994). Typically, such approaches rely upon the statistical comparison between normalised groups and individuals (Murphy, 2002). The term "structuralist" derives from the acceptance within this approach that

cognitive abilities consist of one or more stable entities or structures (De Villiers, 1999).

Spearman (1927) is commonly recognised as the initiator of the employ of factor analytic techniques to identify underlying structures in the cognitive domain. Developing Binet and Simon's (1905) and Stern's (1912) notions of intelligence as a agglomerated constant entity, Spearman (1927) concluded that performance in any cognitive task requires a certain quantity of "g", namely the general intellectual energy of all brain neurons (Jooste, 2004). In addition to this general factor, Spearman (1927) concluded that any task additionally requires one or more specific abilities. He referred to these as "s-factors" and concluded that they entailed specific intellectual energies of certain groups of brain neurons that are activated more highly to perform a specific task in addition to the typical intellectual energy of the brain in general (Jooste, 2004). Relative contributions of g- and s-factors to a given activity were considered to be contingent on the precise nature of that activity. As people with a higher g-factor also tend to have greater s-factor competencies (Mouton, 1990), Spearman regarded the g-factor to provide the most meaningful basis for the prediction of academic performance (De Villiers, 1999).

The factor analytic tradition has received considerable augmentation and evolution since the proximal work of Spearman. Employing factor analytic techniques, researchers such as Ackerman (1988), Catell (1940; 1971), Gardner (1983; 1993), Guilford (1967), Horn (1986), Snow and Lohman (1984), Sternberg (1985) and Vernon (1962) expounded Spearman's notions of g-factors and s-factors to theories of intelligence as a multivariate phenomenon. While these various theories differ in aspects pertaining to the nature and interaction of the various intelligence facets, they are all unified by the theoretical conviction of fundamental constitutional psychological intelligence structures. The principle of both a stable general g-factor and a collection of more specific multiple intelligence factors continue to be advocated by the structuralist school of thought (Haywood & Switzky, 1992).

2.3.2 THE INFORMATION PROCESSING APPROACH

The information processing approach represents a qualitative remove from the structuralist paradigm. Whereas the structuralist tradition focuses on relatively stable abilities distilled through factor analysis, the information processing approach centres on the mechanistic workings of the brain (Murphy, 2002). Tests based on neuropsychological-processing models emphasise operational processes, and focus on specific physiological regions responsible for different aspects of functioning (Daniel, 1997). Central to the information processing perspective is the view of intelligence as deriving from the ways in which people mentally represent and process information (Zollezzi, 1995). In essence, this approach broadens the concept of intelligence by focussing on cognitive processes rather than end products of problem solving (as is commonly the case with factor analytically underpinned instruments) (Hamers & Resing, 1993).

Established in the 1960s, the information processing approach was strongly influenced by the salience of computational thinking (Murphy, 2002). Human functioning was interpreted in highly cognitive-rational terms (Taylor, 1994), and the elementary cognitive processes of this functioning were acutely examined (Newell & Simon, 1972). Taylor (1994) notes the emphasis placed on the pursuit of "fine grained" (p. 186) measures of fundamental cognitive activities. This fine grained measurement entails the reduction of mental activities to as elemental a unit of behavioural process as possible. Once these fundamental processes are isolated, the information processing approach purports to assess their relative capacity (between individuals) for competence.

Underpinning assessment of capacity for cognitive competence is the notion that the human information processing system contains one or more bottlenecks that limit the flow of information (Taylor, 1994). Within the information processing paradigm, individuals who are able to process information faster in these bottlenecks are presumed to be more competent at problem solving and other real-life tasks, and to have a generally higher intellective ability (Taylor, 1994). Informed by these distilled notions of elemental units of processing behaviour, theorists within this paradigm have explicated various tiers of systemic interaction and operation between

processing units and systems of processing units (Newell & Simon, 1972; Sternberg, 1985; 1994).

The focus placed by information processing theories of intelligence on interactional and operational processes facilitates measurement of intellective faculty that is characterised by rudimentary neuropsychological mental competencies. In contrast to the structuralist emphasis on settled abilities, this approach to intelligence and assessment facilitates an examination of intellective process. In so doing, the information processing approach offers an important complement to the stable structural orientations.

2.4 REVIEW OF STATIC APPROACHES TO INTELLIGENCE ASSESSMENT

While differentiated primarily by a focus on task as opposed to process operations, the structuralist and information processing approaches share a common assessment philosophy. Both assessment methodologies adopt a view of intelligence as an established (whether in a structural or process manner) and innate endowment that different people have in different quantities (Taylor, 1994). In principle, both approaches to assessment are chiefly concerned with the definitive measurement of these innate attributes and their subsequent comparison with selected referent groups (Fabio, 2005).

The following two cases offer generic examples of structural and information processing assessment:

- A structurally underpinned instrument may assess deductive reasoning by way of a series of wide ranging general knowledge questions. The assessment process would then facilitate a comparison of performance outcomes with a relevant age group. In this manner a ratio of mental age to chronological age may be determined. Such a measure could be used to form a constituent of an intelligence quotient.

- An information processing philosophy may entail assessing simple task performance speeds (for instance on a puzzle completion game) and comparing these speeds with an appropriate norm group. The deviation of specific scores from the standard or expected norm score would allow for inference regarding intellective abilities.

The essential similarity between the two generic examples given is the conviction that intellective assessment is best served by determining a relevant summative product that may be contrasted with appropriate benchmarks. Regardless of whether this product is informed by a structural or information processing mandate, the chief output is assumed to be a static entity that best encompasses the particular theoretical construct. Many of the traditional intelligence quotient tests employ assessment methodologies that draw on both the structuralist and information processing paradigms (Murphy, 2002; Sternberg, 1994). Within the context of the present research, the term "static" is taken to include the ideologies of both of these paradigms. The following sections explore the central advantages and criticisms pertinent to these prototypical static approaches to intelligence assessment

2.4.1 ADVANTAGES OF STATIC APPROACHES

An important benefit of employing static approaches to measure intelligence concerns economic and pragmatic utility. Once developed, static instruments are commonly easy to administer relatively cheaply on a large scale (Haywood & Tzuriel, 2001). The standardised nature of these instruments facilitates ready statistical comparison between persons and criterion, and they are generally able to offer consistently reliable scores (i.e. a given person will typically score the same over a number of test administrations) (Jooste, 2004; Taylor, 1990). The purported ability to tailor static instruments to the measurement of specific multiple intelligences presents a theoretically prudent means of designing intellective assessments to specific required predictive outcomes (Ackerman, 1988; Cattell, 1940, 1971; Gardner, 1983, 1993; Guilford, 1967; Horn, 1986; Snow & Lohman, 1984; Sternberg's, 1985, 1994; Thurston, 1938, 1941; Vernon, 1962). For instance, certain types of intelligence may be considered more important predictions of competence for certain types of jobs. Many tests currently employed in the South African context

are designed in such a manner as to measure these more specific intelligences, such as mechanical ability, verbal ability and spatial ability (Taylor, 1994).

An additional advantage to the use of static approaches relates to the convenience of scientific scrutiny. The quantifiable nature of static instruments and procedures facilitates the ready statistical analysis of validity and reliability determinants. As a result, most of the mainstream and sanctioned instruments have been extensively used and research, thereby allowing for a good understanding of their performance (Taylor, 1990). While the ease with which an instrument may be examined does not necessarily suggest that it is a good instrument, the ability to easily empirically consider static instruments has facilitated much reliable and logical development.

The central advantages of static approaches may be summarised as follows:

- Static intelligence assessment approaches facilitate economic and pragmatic utility;
- Static intelligence assessment approaches allow for expedient scientific scrutiny.

The following section explores the various critiques of static approaches to intelligence assessment.

2.4.2 CRITIQUE OF STATIC APPROACHES

Static assessment strategies are designed to measure manifest functioning by way of product-based evaluations (Zollezzi, 1995). These instruments serve to distil an index of an individual's repertoire of amalgamated strategies and knowledge relative to a particular intellective construct. The constructs measured in this manner afford assessors a means by which to make predictions and comparisons, but offer no insight into the underlying causes and systems of the intellective process (Haywood & Tzuriel, 2002). For example, on a mathematically based reasoning test one person or population group may score higher than another person or group. The statically underpinned reasoning test in this example would facilitate a measure of

difference, but would yield no direct evidence about the cognitive operations that underlie mathematical competence.

As no direct evidence about underlying cognitive operations is generated by static measures, their utility is derived through the meaningful comparison of scores with appropriate norm groups (Jitendra & Kameenui, 1993). The implicit assumption behind such norm referencing is that the population to which the assessment is administered is reasonably comparable in terms of psychological and societal variables (Owen, 1998; Shochet, 1986; Taylor, 1990). These variables may include race, culture, socio-economic status, historical and present advantage or disadvantagement, and language (Zollezzi, 1995). Within the South African context, the risk in assuming the population to be homogenised and comparable is considerable. The South African population is characterised not only by extreme heterogeneity, but additionally the challenge of wide ranging past and present disadvantagement (Sibaya, Hlongwane & Makunga, 1996). Contemporary psychometric challenges in the South African context are explored in greater detail in 3.1.1.

Consideration of heterogeneity and disadvantagement offers a cardinal explication of the potential for spurious conclusion to be born of inappropriate norm-referenced comparison. Individuals from different groups will have different opportunities and means of developing repertoires of knowledge and intellective operation. Disadvantaged persons are likely to have fewer opportunities and means by which to develop their knowledge and skills. Comparisons with norm groups that do not take account of heterogeneity and disadvantagement are likely to yield a record of difference and disadvantagement rather than intellectual faculty (Jitendra & Kameenui, 1993; Shochet, 1989; Taylor, 1990).

The concern that static intelligence instruments produce records of disadvantagement and difference rather than pure indications of intellective faculty informs a central criticism of the assessment paradigm. As static instruments consider intellective ability to be best assessed as a summative product, they implicitly negate considerations of potential for intellectual development (Jitendra & Kameenui, 1993; Swanson & Lussier, 2001). Taylor (1990, p.8) observes that these

tests “look back rather than look forward”. In so doing, they mitigate deliberation as to the potential for an individual to improve and develop intellective cognitive operations in the future (Zollezzi, 1995). In the context of heterogeneity and disadvantagement prospective indications of individuals’ potential to perform intellective tasks is arguably crucial to the practice of equitable appraisal and the redress of disadvantagement (Nzimande, 1995; Sibaya, Hlongwane & Makunga, 1996).

The central criticisms of static intelligence instruments may be summarised as follows:

- Static intelligence instruments do not yield data regarding the underlying causes and systems of intellective process;
- Static intelligence instruments have a high potential for bias in situations where appropriate norms are either unavailable or unattainable;
- Static intelligence instruments focus exclusively on previously acquired knowledge and skills. This emphasis negates the potential for the development and expansion of intellective faculties.

These noted criticisms hold the greatest potential to yield spurious results in the assessment of intellective faculty when employed within the context of heterogeneous and disadvantaged populations (Sibaya, Hlongwane & Maunga, 1996; Zollezzi, 1995). The following section explores the various attempts undertaken to reduce the spurious influence of these noted criticisms within such contexts.

2.5 ATTEMPTS TO REDRESS THE CRITICISMS OF STATIC APPROACHES

Attempts to redress the noted critiques have historically been bound to the structural alterations and scoring mechanisms of the instruments. Zollezzi (1995) highlights the following approaches that have been employed in order to modify static psychometric practice so as to alleviate the criticisms born of testing heterogonous and disadvantaged populations:

- The adherence to the conventional structure and contents of the instrument, while simultaneously employing different norms for different populations;
- The construction of different tests for different populations;
- Maintenance of the conventional structure, while altering some tasks in a manner that allows for consideration of individual functioning within a cultural and developmental context;
- The incorporation of pictorial and non-verbal modes of presentation so as to reduce language and cultural bias.

While approaches of this nature do demonstrate some merit (Owen, 1998), the statistical mechanics of the test formulation and scoring are still limited for the fact that one is attempting to redress what is arguably an inherent bias in static testing (Zollezzi, 1995). As individuals from different populations or subpopulations will have experienced different forms of acculturation (whether for heterogeneity or disadvantagement) and consequent learning, the formulation of their intellective faculties will exhibit distinction (Feuerstein, 1979). It follows that individuals from significantly different populations will perform differently on any given static criterion of performance. Altering the test context through the manipulation of test facets and scoring may thus be considered inadequate, so long as static goals of performance are preserved. For instance, should one attempt to assess an individual's ability to perform at Cognitive Task A, no matter what the psychometric manner of assessment, the ultimate goal of assessing the performance of task A is preserved.

Feuerstein (1980, as cited in Zollezzi, 1995) emphasised that any change in the task or norms of an instrument reflects an implicit belief that socio-economically

disadvantaged individuals (or differently acculturated individuals) differ not only quantitatively, but also qualitatively in intelligence from different socio-economic and cultural groups. Expanding such logic to its eventual conclusion would allow for the evidently ludicrous supposition that individuals differ in intelligence potential because of membership in one or another group. An example of such a conclusion would be that English language speakers are not as intelligent as African language speakers.

Feuerstein (1979; 1980) highlighted the tautological quandary that altering structural and scoring processes of psychometric instruments presents: motivated by a desire to measure differences in regard to a static goal, one attempts to alleviate said differences without actually altering the static goal. It is because of this fundamental paradox that many researchers and psychometricians are advocating the need for a paradigmatic evolution away from static assessment and towards a focus on the dynamic interplay of intellective cognitive processes during the testing procedure (Bendixen, 2000; De Beer, 2000; De Villiers, 1999; Nzimande, 1995; Owen, 1998; Skuy, et al., 1996; Taylor, 1994, 1999). Rather than maintaining a static goal and attempting to 'fix' the measurement of capacity in regard to the goal, such dynamic procedures make measurement of the underlying processes of static outputs the goal.

In emphasising underlying processes rather than static outputs, dynamic measures are able to elicit indications of individuals' potential to develop and learn novel intellective competencies. In contrast to confirming differences in regard to performance vis-à-vis a specific static goal, individual processes of response are assessed as a means to explore potential to increase learning and meet intellective goals in the future (Feuerstein, 1979, 1980). The psychometric paradigm that emphasises intellective process and potential to learn and develop is that of dynamic assessment.

2.6 DYNAMIC APPROACHES TO INTELLIGENCE ASSESSMENT

Dynamic intelligence assessment encompasses a broad assessment philosophy that is characterised by a measurement emphasis on examinees' responsiveness to intervening conditions (Embretson, 2000; Grigorenko & Sternberg, 1998; Hamers, Sijtsma & Ruijssenaars, 1993; Lidz & Elliot, 2000). Processes of instruction and feedback are built into the testing procedure and are differentiated on the basis of an individual's performance (Elliott, 2003). The amount of mediated assistance provided is directly contingent upon the testee's performance and modifiability (Elliot, 2003). This practice of instruction and feedback allows for an examination of intellective process and estimation of an individual's potential to develop skills in the context of appropriate mediation. In essence, by adopting a test-teach-test assessment operation it is possible to measure a general intellectual ability to learn (learning potential) in response to task specific instruction (Laughon, 1990).

In contrast to static intelligence assessment, where emphasis is placed on the products of prior learning, dynamic assessment is geared towards assessing the process of learning itself. In facilitating and measuring a mediated learning experience, dynamic assessment procedures offer a representation of potential to learn and expand functioning in the future (Embretson, 2000). The term "dynamic" is employed in reference to the assessment of the actual processes of intellective cognitions, and for the occurrence of a mediated teaching element in the assessment procedure (Haywood & Brown, 1990).

Generically, dynamic intelligence assessment procedures and instruments adhere to the following graduated processes (Jooste, 2004):

1. The measurement of an initial base of competency in a given area of intellective functioning;
2. Training in the given area of intellective functioning;
3. The subsequent assessment of the application of the newly acquired intellective competencies.

The dynamic aspect of the assessment procedure pertains to the second process, namely that of training. The influence of this training or mediation process is estimated by computing the difference between the initial and subsequent measures of intellective functioning, i.e. between the first and third processes listed above. The magnitude of this difference is regarded as a learning potential score indicating an individual's potential to develop intellective competencies in the context of appropriate mediation (Bendixen, 2000; Swanson & Lussier, 2001)

An assumption underlying all forms of dynamic assessment is that failure to perform on a given static trial is at least partly due to deficient instructional procedures and learning experiences rather than to primary causal deficits within individuals (De Villiers 1999). The origins of such deficits may be born of historically determined learning opportunities or implicit cultural bias in the nature of the trial itself (Zollezzi, 1995). Assuming that such deficits speak less of innate deficiencies regarding intra-psychic cognitive process and modality, and more of specific task bias, appropriate mediation may be reasonably assumed to bridge the potential to perform on the trial, and actual performance on the trial. Evidence that an individual can learn effectively in a dynamic assessment context (where mediated learning is incorporated in the assessment procedure) is an indication that performance deficiencies are born of the quality of past instruction, learning experiences, and culture, rather than a lack of ability (Bransford, Declos, Vye, Burns & Hasselbring, 1987).

In reviewing an individual's responsiveness to mediation an indication is given of the measure of abilities that are still developing and modifiable rather than actualised and fixed (De Villiers, 1999). Central to dynamic testing is the quantification of development potential underlying the processes and products of learning (Feuerstein, 1979). With the elucidation of such processes, insight is gained into the degree to which an individual may benefit and change if the opportunity to do so is provided.

Valsiner and Voss (1996) report physiological evidence for cognitive modifiability, asserting that the brain is in a process of continual adaptation to ever-changing environmental demands. This novelty of change with emerging situations can be likened to potential that resides in individuals who, never presented with the

opportunity or challenge to adapt and change, may never do so. A cornerstone of intellective potential philosophy is that change regarding cognitive process may be physiologically charted and measured (Changeux & Konishi, 1996 as cited in Murphy, 2002). This assertion does not mitigate the important role that genetic endowment plays in regard to individual capacity, but rather emphasises that "genetic inheritance aspects thought not to be expressed in individuals may come to the fore under amenable circumstances" (Murphy, 2002, p.18). In essence, dynamic assessment philosophy does not require a navigation of the quagmire of a nature-nurture, endowment-potential debate, but rather offers a means to infer potential to perform given amenable intervention. It is for this reason that the term "learning potential" rather than "intelligence" is often employed to reflect the yields of such assessment endeavour.

The following concepts underpin the core tenet of the dynamic cognitive assessment of learning potential:

a) Although the level of endowed intelligence potential may be fixed, no individual completely explores this potential (Hamers & Resing, 1993). Dynamic assessment procedures highlight the relationship between what Vernon (1962) and De Groot (1985) referred to as intelligence-as-inborn-capacity and intelligence-potential. The ability of traditional static instruments to formulate a summative representation of past learning is relatively sound. The ability to investigate the intelligence-potential, even within the context of potentially limited intelligence-as-inborn-capacity, represents the qualitative assessment evolution presented by dynamic assessment procedures. In the context of dynamic assessment philosophy, intelligence is considered to be the capacity (or indeed, potential) of the individual to utilise experience (Feuerstein, 1979). The measurement of what has been experienced is deemed secondary to underlying cognitive faculties that would mediate any future experience.

b) The best assessment of any performance is a sample of the actual performance (Elliott, 2003). Rather than attempting to generalise future task capability on the basis of broad and presumed indexical summative products (as is the case in most traditional assessment philosophies), dynamic assessment procedures

pursue a sample of requisite underlying cognitive facets (Murphy, 2002). Namely, they purport to assess the capacity to utilise, integrate and apply novel experiences. In so doing, they elucidate underlying processes responsible for cognitive outputs.

c) In the context of impediments and differences in individuals' application and development of specific intellective competencies, an emphasis on potential yields more valuable data regarding possible future competencies (Jitendra & Kameenui, 1993; Murphy, 2002; Skuy, et al., 1996). In contexts where there exists significant cultural heterogeneity or disadvantagement, the development of intellective and metaintellective structures and strategies will differ between individuals (Haywood & Tzuriel, 2002). Assessment procedures that are able to account for and reduce the influence of such potentially spurious contextual factors afford a better indication of potential to perform intellective tasks in the future than to do those that are geared to past learning experiences and opportunities (Jitendra & Kameenui, 1993; Zollezzi, 1995).

Within the broad philosophical ambit of dynamic intelligence assessment there are many different approaches that rely on some form of appraisal of intellective process. The various procedures supporting these different views are, however, chiefly influenced and informed by the works of two central researchers, namely: Lev Vygotsky (1978) and Reuven Feuerstein (1979; 1980). The contributions made by these theorists to the psychometric measurement of intellective potential are detailed in the following sections. They represent the fundamental constituents of a quintessential psychometric approach to dynamic assessment and inform the choice of dynamic intelligence instrument used within the context of the present investigation (as discussed in 4.2.1).

2.6.1 VYGOTSKY'S THEORY OF THE ZONE OF PROXIMAL DEVELOPMENT

Central to Vygotsky's (1978) theory is the notion of a zone of proximal development (ZDP). The ZDP refers to the difference between the level of performance an individual can reach unaided and the level of attainable performance possible when guided by someone more knowledgeable in the given performance domain (Fabio,

2005). The breadth of the zone is understood to vary between individuals and across domains of learning within an individual (Campione, Brown, Ferrara & Bryant, 1984).

Vygotsky (1978) asserted that the distillation of the ZPD would allow for the determination of an individual's readiness, or intellectual maturity, in a specific domain. If, for instance, one were to employ traditional static IQ measures to determine comparable scores for two individuals of similar age, experience and historic opportunity, one would not be able to make assumptions as to the differing courses of their future development. If, however, one were to consider such IQs as starting points and not as definite (static) measurements, performance tasks with greater levels of complexity than indicated by the IQ measure would offer important information on potential. The difference between the complexity of task indicated by the static IQ test and any newly attained levels of task complexity (in the context of mediated assistance) would embody the span of the individual's intellective potential.

Fabio (2005) offered an example of the ZPD in asking for the consideration of two children both with the chronological and mental age (as corroborated with an IQ test) of 8 years. Consider, hypothetically, that in the context of mediated assistance from an adult that the one child demonstrates an ability to solve problems at an IQ of a mental age of 9 years and the other child at an IQ of a mental age of 12. The differential between 9 and 8, and 12 and 8 reflects the respective differences pertaining to the span of the individuals' ZPDs. The information so derived yields significantly more insight into the potential of these individuals to perform in the future.

The practical implication of the notion of the analysis of individuals' zones of proximal development is that it offers a psychometric means of gaining insight into the internal dynamics of the developmental process of learning itself (De Villiers, 1999). The notion of ZPDs informs an important theoretical motivation for the exploration of diagnostic and prognostic measurements regarding developmental capacity. Similarly concerned with the influential role played by the mediating experiences of competent others, Feuerstein (1979, 1980) expounded a cognitive map of the psychological process fundamental to psychological functioning.

2.6.2 FEUERSTEIN'S THEORY OF STRUCTURAL COGNITIVE MODIFIABILITY

Grounded in the field of cognitive development, Feuerstein (1979; 1980) complemented much of Vygotsky's thinking. He espoused a framework that accounts for deficit cognitive functioning of population groups typically defined as disadvantaged or different (De Villiers, 1999). Feuerstein (1979; 1980) emphasises mediated learning and modifiability, and rejected notions of intelligence faculties as static and unchangeable. Like Vygotsky, he espoused a focus on mediated learning experience (MLE) and on investigation of the potential for modification of structural intellective process (Sternberg & Grigorenko, 2001).

Feuerstein's (1980) concept of MLE emphasises the interactional process in which an adult (or more experienced peer) interposes himself or herself between the assessee and the task. Both the task and the assessee are modified through the MLE. Typically, tasks are modified by adjusting the frequency, order, complexity and context of task components (Sternberg & Grigorenko, 2001). The assessee's process is modified to the extent that he or she is aroused to a higher level of interest and attention, to a level at which intellective structural changes may be facilitated (Sternberg & Grigorenko, 2001). The concept of MLE circumscribes the process by which cultural characteristics of thinking, perceiving, learning and problem solving are transmitted to children (and indeed adults) through influential persons and societal institutions (De Villiers, 1999).

The mediation of direct experiences with the environment facilitates the development of cognitive structures that ultimately allow the individual to internalise the mediation role and perform a given task autonomously. In the case of a significant and pervasive lack of mediated learning experiences (as in the case of marginalised and deprived persons), individuals will exhibit poor ability to interact with direct experiences in an effective manner (De Villiers, 1999). Additionally, the cultural import of MLEs cannot be mitigated. Exposure to cultures significantly dissimilar from the ones in which MLEs have predominated will similarly result in poor direct interaction with less familiar cultures (Feuerstein, 1980).

The contemporary South African context offers adept examples of MLE shortfalls both in terms of historic disadvantagement and marginilisation, and in terms of significant cultural heterogeneity. South Africa's historical socio-political dispensations have engendered long-standing disparities and inadequate opportunity for MLEs (Nzimande, 1995; Sibaya, Hlongwane & Maunga, 1996). Further, because of extreme heterogeneity in South Africa (Owen, 1998), it is necessary to be cautious against expectations of alacritous processing of novel direct experiences. For instance, the implicit expectations of a western orientated education system may necessarily demand cognitive structures peculiar to that context; structures that may differ significantly to those fostered in individuals from different cultures.

Operating from an ideological paradigm that recognised the modifiability of cognitive structures through appropriate mediated learning experiences, Feuerstein (1979) advocated a flexible, individualised, and highly interactive form of testing. Such testing aimed to assess the nature and extent of individual deficiencies, as well as the amount and type of training or mediated learning needed to facilitate utility of direct learning experiences (Jitendra & Kameenui, 1993). To this end, Feuerstein developed the Learning Potential Assessment Device (LPAD), which links assessment procedures to examiner interventions. Improvement in performance resulting from mediation of cognitive structures pertaining to a specific test task is held to indicate an individual's intellectual potential (Feuerstein, 1979). It is this format of test-teach-test that epitomises contemporary dynamic assessment philosophy.

Whereas Vygotsky (1978) seeks to reach for the bounds of proximal development, Feuerstein (1979, 1980) attempts to modify underlying intellective structures (with respect to specific test tasks). Both researchers demonstrate a belief that processes underlying eventual cognitive output are of central import to the prediction of future intellective performance. Additionally, they both advocate the importance of considering potential in scenarios where extrinsic factors (such as heterogeneity and disadvantagement) rather than intrinsic factors can be presumed to frustrate the actualisation of the inherent intellective structures and processes (Feuerstein 1979; Vygotsky, 1978).

2.6.3 ALTERNATE APPROACHES TO DYNAMIC INTELLIGENCE ASSESSMENT

The theories presented by Vygotsky (1978) and Feuerstein (1979; 1980) underpin the fundamental tenets of dynamic intelligence assessment (De Beer, 1999). It is from their seminal notions of intellective process considerations and learning potential that dynamic intelligence assessment as a doctrine has evolved (Murphy, 2002). While there are a myriad of dynamically underpinned testing approaches, these approaches represent elaborations of Vygotsky (1978) and Feuerstein's (1979, 1980) notions rather than qualitative alterations. Several of the principle contemporary dynamic intellective assessment approaches include:

- Budoff's (1968, 1974, 1987a, 1987b) test-train-test assessment;
- Campoine and Brown's (1978, 1984, 1987) graduated prompting assessment;
- Carson and Wiedl's (1978, 1979) testing-the-limits assessment;
- Guthke's (1993) learning ability test concept;
- The continuum of assessment services model (Brandford, et al., 1987; Burns, Haywood, Delclos & Siewert, 1987; Tzuriel & Klein, 1987).

Within the context of the current study, focus is placed on a generic dynamic assessment approach. As such, detailed examination of all dynamic theories is averted in favour of an emphasis on the prototypical foundations of Vygotsky (1978) and Feuerstein (1979; 1980).

2.7 REVIEW OF DYNAMIC APPROACHES

Dynamic approaches to intelligence assessment are linked by a canonic attempt to identify and explore the processes that underpin intellectual task performance (Haywood & Tzuriel, 2002). In so doing, they are able to determine individuals' potential to learn and develop novel intellective competencies. The distillation of this potential is essentially accomplished through the employ of mediated learning experiences (Feuerstein, 1979, 1980) that allow for estimations of an individual's zone of proximal development (Vygotsky, 1978). The following sections explore the

central advantages and criticisms pertinent to this generic dynamic intelligence assessment philosophy espoused by Vygotsky (1978) and Feuerstein (1979; 1980).

2.7.1 ADVANTAGES OF DYNAMIC APPROACHES

Dynamic approaches to intelligence assessment have demonstrated considerable promise in their ability to circumvent the influence of non-intellective factors (such as heterogeneous distinction and disadvantagement) in the measurement of intellective faculty (Haywood & Tzuriel, 2002). In particular, they present a means by which to assess intelligence in a manner that reduces the risk of simply producing records of disadvantagement and cultural difference. The central advantage of dynamic assessment pertains to the potential that it affords for an encompassing consideration of the processes that underpin intelligence yields in individuals (Haywood & Switzky, 1992). Dynamic approaches to intelligence assessment have evidenced promise for improving on the criticisms of static intelligence assessment in the following areas:

- Psycho-educational assessment with persons who have had less than normal educational opportunity (usually through disadvantagement) and with persons from dissimilar cultural backgrounds (Haywood & Brown, 1990; Murphy, 2002; Taylor, 1990, 1994; Zollezzi, 1995);
- Provision of prospective measures of abilities that are in the process of developing (Bendixen, 2000; Coosner, 1999; Jitendra & Kameenui, 1993; Palincsar, 1990).

2.7.2 CRITIQUE OF DYNAMIC APPROACHES

While dynamic approaches to intelligence assessment demonstrate considerable potential to redress many of the shortcomings of static approaches (see 2.4.2), there remain certain immutable limitations applicable to the generic school of dynamic assessment. The chief limitations of dynamic approaches to intelligence assessment include:

- Construct fuzziness;
- Measurement integrity;
- Procedural integrity;
- Predictive applicability;
- Costs and labour intensiveness.

These limitations are explored in more detail below.

2.7.2.1 CONSTRUCT FUZZINESS

Validity in psychometric practice pertains to the degree of correlation between a measurement and some specific criterion (Howell, 2002). As a whole, dynamic assessment approaches tend to lack a definitive creed both regarding the nature of such measurement (e.g. a learning potential score) and to the particular associative criterion (e.g. academic performance) (Jitendra & Kameenui, 1993). The assumptions adopted by the different models of dynamic intelligence assessment often exhibit incomplete overlap and are characterised by differences in definition, theoretical foundation and procedural requirements (Bendixen, 2000). For example, in a graduated prompting assessment model learning is considered to take place within a social context, where interactions account for the majority of the learning experience (Campione & Brown, 1987). This ideology contrasts with the testing-the-limits assessment philosophy, where learning is primarily influenced by an individual's innate cognitive ability and personality.

In addition to a lack of clarity regarding criterion definition, theoretical foundations and procedural requirements across different models, certain approaches explicate deficiencies regarding internal theoretical consistency (Jitendra & Kameenui, 1993). Inadequacies in some definitions of the concepts within particular models make it difficult to draw conclusions about various techniques. For example, the cognitive functions of Feuerstein's LPAD are not closely related to one another by a consistent theory of cognitive functioning (De Villiers, 1999; Jitendra & Kameenui, 1993). Nor are these functions well differentiated from one another with regard to the particular domains that they purport to measure (Buchel & Scharnhorst, 1993; Jiterndra & Kameenui, 1993). Further, many models fail to fully dispute the commonly levelled criticism that instruments such as Feuerstein's LPAD serve to modify scores in a manner that can be confused with coaching rather the genuine base intellective modification (Lipson, 1992).

In essence, the validity or "correctness" (Murphy & Davidshofer, 2001, p. 74) of dynamic approaches in distilling meaningful intellective measures by sound method and appropriate criterion association, is impinged due to the lack of clarity concerning construct definition. Jitendra and Kameenui (1993, p.8) reflect on this lack of clarity as a "fuzziness" born of indistinct research, theoretical and methodological pursuit. Murphy (2002) accentuates this point by observing the relative paucity of present research into dynamic intelligence assessment doctrines, and the need for more rigorous theoretical and psychometric development.

2.7.2.2 MEASUREMENT INTEGRITY

In addition to the lack of clarity regarding construct definition is the critique pertaining to the measurement rigour of dynamic assessment instruments. The tenet of constancy of test scores, or reliability, has traditionally informed the empirical mandates of testing procedures and means (Murphy & Davidshofer, 2001). A reliable test should yield the same scores when a given person takes two alternate forms of the test or when he or she takes the same test on two or more different occasions (Howell, 2002). This mandate presents something of a paradox when applied to dynamic assessment where it is precisely a differential between similar tests that is encouraged and measured.

Feuerstein (1979) goes so far as to assert that the concept of reliability is not applicable to dynamic procedures because learning potential is not a stable characteristic of individuals, but something that is developed with the help of the examiner during the test administration. Griesel (2000, p.6) corroborates this sentiment, emphasising that "…attempts to measure stable performance are bound to produce spurious information in a context where education deliberately intervenes to change individuals' levels of preparedness". The argument that the emphasis placed on process necessitates a paradigmatic shift in terms of rigorous appraisal of reliability measures is compelling, but leaves a conundrum regarding the nature of appropriate psychometric scruple.

A further challenge to measurement integrity pertains to the concept of difference scores. Measurement of gain of post-mediation scores over pre-mediation scores is confounded by the fact that the reliability of a gain score is reduced by the error of measurement in the pretest and posttest scores (Boeyens, 1989a). The reliability of the difference score will thus always exhibit a lower reliability than that demonstrated by the pretest and posttest scores. Thus, even when able to attest to acceptable levels of reliability for pretest and posttest scores, it is not necessarily possible to attest to the reliability of the difference score (Murphy, 2002). The cumulative effect of error of measurement presents an important psychometric consideration for dynamic assessment.

Compendiously, the chief measurement problem of dynamic assessment is the reliable demonstration of psychometric soundness in a manner that does not necessitate a recantation of the cardinal emphasis on process and the notion of potential for cognitive structure development and modification. The integration of measurement theory concepts (in particular reliability and validity) with the ideologies of process orientation and cognitive modifiability informs a central critique of dynamic assessment (Jitendra & Kameenui, 1993). Research into such ameliorative integration is characterised by investigation into alternative forms of reliability and validity quantification. Current research trends in this regard are generally focused upon modern item response theory (IRT) (Murphy, 2002). Item response theory attempts to redress reliability and bias concerns by employing a model that treats certain components of variance as systematic which would have traditionally been

regarded as error (Taylor, 1994). It is important to note, however, that there is at present a considerable dearth in research pertaining to the measurement integrity of dynamic assessment approaches (Murphy, 2002).

2.7.2.3 PROCEDURAL INTEGRITY

Research into dynamic assessment is particularly vernal, with relatively little reviewed empirical operationalisation of assessment models into assessment procedures. Typically, it is the developers of the theories that have carried out the empirical testing and authentication of the resultant dynamic assessment procedure (Haywood & Tzuriel, 2002). It is for this contemporary lack of research that Lidz (1991) reflects on the poor state of metric data pertaining to dynamic assessment instruments and their concomitant psychometric properties. For instance, many dynamic assessment procedures do not facilitate effective standardisation and control of examiner mediation and appraisal. In order to meet the mandate for psychometric soundness in the practical explication of theoretical models, greater calibration and empirical examination of administrative procedures and scoring is required (Murphy, 2002).

2.7.2.4 PREDICTIVE APPLICABILITY

Closely aligned to the problem of translating assessment models into actual procedures is the divorce of dynamic assessment outputs from practical academic correlates. Jitendra and Kameenui (1993) observe that a present criticism of many dynamic assessment procedures is that they are often too domain general and lack the domain specificity needed for more practical application and concomitant reliable correlation. The nature of the tasks and measured intellective structures tend to be removed from practical academically mandated requisites (Murphy, 2002). In order for dynamic assessment to demonstrate its potency as an efficacious predictor of academic performance, greater research regarding such prediction is compelled (Elliot, 2003). Within the context of the present investigation this research mandate is emphasised.

2.7.2.5 COSTS AND LABOUR INTENSIVENESS

A further practical consideration regarding the application of dynamic approaches pertains to costs and labour intensiveness. The time required for mediation and the expertise and training demanded of mediators is one of the most cited criticisms of dynamic assessment (Haywood & Brown, 1990; Jitendra & Kameenui, 1993; Murphy, 2002). Because of the large amount of time that it may take to assess individuals using the mediation approaches of many of the dynamic assessment procedures, the implementation of dynamic assessment on a large scale is often considered practicably unfeasible (Jitendra & Kameenui, 1993; Murphy, 2002). Compromise between the individualised mediatory aspects of dynamic approaches and the practical constraints of cost, expertise, time and the assessment of large numbers of individuals informs an important consideration in dynamic intelligence assessment (Taylor, 1994).

2.8 CONCLUSION: STATIC VS. DYNAMIC ASSESSMENT

The pursuit of an ideal intelligence assessment approach is characterised by compromise and consideration of theoretical ideology, practicable constraints and contextual demands. Theoretically and conceptually, many researchers assert that dynamic and static approaches to cognitive assessment are diametrically opposed (Murphy, 2002). The evolution of such a view is understandable, given that considerable development in the field of dynamic assessment has been motivated by opposition to conventional static techniques (De Villiers, 1999). There is, however, a more composed view that holds dynamic and static approaches as complementary sources of information (Murphy, 2002).

The defining difference between static and dynamic approaches resides in the interaction and reciprocity of the descriptive and remedial components of dynamic assessment (Grigorenko & Sternberg 1998; Lipson, 1992). It is because of these components that dynamic assessment is able to redress many criticisms of static approaches (as discussed in 2.4.2), and contribute rich and novel information regarding cognitive process (as described in 2.7.1). The benefit of this novel information and circumvention of certain static criticisms is, however, counterpointed

against the incumbent disadvantages of this approach. Whereas dynamic assessment serves to redress the critiques born of a static emphasis on products, it demonstrates difficulties with establishing psychometric integrity with respect to validity and reliability (Jitendra and Kameenui, 1993). Additionally, the employ of dynamic approaches on a large scale in a standardised manner presents considerable practical challenges (Murphy, 2002).

In essence, static and dynamic approaches both offer distinct advantages and disadvantages. Rather than exhibiting diametric opposition, they encapsulate differing philosophical and practical agendas regarding the best means by which to predict and describe the phenomenological yields of intellective mental processes and behaviour. These ideologies do not necessarily contradict each other, but rather serve as complementary considerations of different facets of the "elusive multifaceted diamond" that is intelligence (Murphy, 2002, p.4). The challenge of optimal psychometric practice is thus not best served through the abandonment or dissolution of either approach. Rather, the importance of employing the optimal approach (or even combinations of approaches) relative to the context (or angle from which the diamond is best visible) is paramount (Zollezzi, 1995).

The following chapter details the South African psychometric and university contexts that inform the present investigation regarding the employ of dynamic assessment within the context of an academic institution.

CHAPTER 3
INTELLECTIVE APPRAISAL AT SOUTH AFRICAN UNIVERSITIES

3.1 INTRODUCTION

The treatise presented in Chapter 2 reviewed the two dominant approaches to intellective assessment, namely static and dynamic. Static intellective approaches demonstrate advantage for their economic and pragmatic utility (Haywood & Tzuriel, 2001), and for their convenience of scientific scrutiny (Taylor, 1990). They are, however, subject to criticisms of spurious yields when employed within the context of heterogeneous and disadvantaged populations (Sibaya, Hlongwane & Maunga, 1996; Zollezzi, 1995). Dynamic intellective approaches were shown to present a psychometric alternative to the static approaches. In particular, the dynamic emphasis on underlying intellective process evidences the advantage of greater validity in the assessment of heterogeneous and disadvantaged populations (Haywood & Brown, 1990; Murphy, 2002; Taylor, 1990; 1994; Zollezzi, 1995). These advantages were, however, contrasted against criticisms pertaining to the psychometric properties and large-scale practicability of dynamic approaches (Jitendra & Kameenui, 1993).

Chapter 2 concluded with a discussion regarding which assessment doctrine embodied an ideal psychometric approach to the appraisal of intellective faculty (see 2.8). The importance of considering the challenges and needs particular to a specific context was held to inform an optimal response. In essence, an ideal response was shown to be achieved by selecting an assessment philosophy (or combination of philosophies) that best served the particular assessment context.

The present chapter explores the challenges and contextual considerations relevant to the South African psychometric environment in general and to South African universities in particular.

3.2 AN OVERVIEW OF CONTEMPORARY PSYCHOLOGICAL ASSESSMENT IN SOUTH AFRICA

Contemporary psychological assessment in South Africa is characterised by critical reflection and an emphasis on transformation. Since the late 1980s various researches have concluded and reported that many of the tests employed within the country were unsuitable for use with groups other than the groups on whom they were normed (Murphy, 2002). These dissentions and dissatisfactions continued to grow into an "anti-test movement" (Murphy, 2002, p.41) that informs many of the challenges and criticisms pertaining to present day psychometrics. Foxcroft, Roodt and Abrahams (2001) summarise the central critiqued trends that characterised early test development in South Africa as follows:

- The standardisation of psychometric tests on and for the white population only;
- The subsequent employ of biased norms on different population groups;
- The resultant process of erroneous conclusion about test results that served to perpetuate a cycle of misuse of these results; ultimately reaffirming biased notions with respect to certain race and cultural groups.

Nzimande (1995) echoes these sentiments, stressing the significant impact that South African political history has had on present psychometrics. He reflects that prevailing psychometric consideration is fundamentally shaped by apartheid and an historical reliance on eurocentric assessment precepts. With the 1994 change in political dispensation, greater emphasis has been given to notions of redress and equity in psychometric practice (Owen, 1998). This impetus is driven by an accord to the extremely heterogeneous nature of the South African population, a desire to more effectively employ the manpower and potential available, and a moral motivation to remediate inequalities and disadvantagement of the past (Owen, 1998; Taylor, 1990). Within the context of growing dissatisfaction with psychometric testing, the political, legal and social changes that have occurred over the past decade and a half have incited a paradigmatic shift towards new assessment approaches.

The chief shifts and challenges in the assessment arena may be summarised as follows:

- Increasing sensitivity to issues of fairness and bias born of a multicultural society that is characterised by extreme heterogeneity and significant past and prevailing disadvantagement (Owen, 1998). The Employment Equity Act 55 of 1998 clearly mandates that the reliability and validity of all tests must be demonstrated to be fair and non-biased towards any population grouping.

- Attempt to redress a legacy of race-based tests (many of which served to perpetuate disadvantagement and inequality). The constitutional and governmental commitments to affirmative action as an instrument to redress past historical imbalances pose significant challenges to psychometric development (Nzimande, 1995; Zollezzi, 1995).

In essence, the paradigmatic shift in psychological testing in South Africa requires an ideology that is able to meet the challenge of culture-fair testing and of the simultaneous redress of past and present disadvantagement. It is in response to these challenges that dynamic assessment philosophy has begun to gain prominence (Owen, 1998). As circumscribed in 2.5, 2.6 and 2.7, this prominence has largely been encapsulated as a theoretical and research motivation to shift from a static assessment approach that emphasises the summative products of past learning (thereby confirming disadvantagement and distinction) towards a theoretical accent on potential. As Taylor (1994, p. 197) observes:

> "If we are to address the inequalities…in South Africa, …educationalists will have to place more emphasis on potential rather than skill or specific ability and will have to be prepared to give those with high potential the opportunities to develop specific skills through educational, training and other development programs".

3.3 UNIVERSITY SELECTION AND THE PREDICTION OF ACADEMIC PERFORMANCE

The dual challenges to meet culture-fair appraisal and categorisation, and to simultaneously redress past and present disadvantagement underpin the purposeful selection of students to positions in higher educational institutions (De Villiers, 1999). The adaptation of a dynamic assessment philosophy as a means by which to address these challenges informs the central focus of the present research. In order to explore the responsive fit of dynamic assessment, it is important to reflect on the present and historical selection practices and considerations of higher education institutions.

3.3.1 CURRENT PRACTICES OF UNIVERSITY SELECTION AND THE PREDICTION OF ACADEMIC PERFORMANCE

As noted in 1.2.1, the basis for fair selection practice at higher educational institutions needs to be informed by the establishment of accurate predictors of future academic performance (Bokhorst, Foster & Lea, 1990; Nunns & Ortlepp, 1994). In essence, it is against the criteria of effective utilisation of limited teaching resources that these institutions are tasked with equitable selection and the redress of disadvantagement (De Villiers, 1999). They face the purposeful selection challenge of ensuring that appraisal and assortment procedures are unbiased in that they do not place one group of students at an advantage or disadvantage (De Villiers, 1999). Further, they are required to ensure that the racial composition of student bodies resemble the broader South African population (De Villiers, 1999).

Traditionally, practices of academic selection and categorisation have been informed by the review of students' matriculation results (De Villiers, 1999; Grussendorff, Liebenberg & Houston, 2004; Murphy, 2002; Skuy, et al., 1996). The formulation of these results (which is discussed in more detail in 4.6.3) is guided by the fundamental static tenet of an emphasis on summative intellective products of past performance. Consequently, these scores are subject to many of the criticisms associated with static methodologies. As noted in 2.4.2, these criticisms centre upon a lack of information regarding underlying intellective processes, a high potential for

bias, and a myopic accent on previously acquired knowledge and skills. In a university context, these criticisms explicate in the poor ability to predict academic performance at university based on the amalgamated academic performance at school level (De Villiers, 1999; Murphy, 2002). In the context of past and present disadvantagement and cultural heterogeneity, this poor predictive ability has been demonstrated to worsen even further (Murphy, 2002). Zollezzi (1995) stresses that the employ of past school performance as a predictor of future academic success is based on the assumption that all students have previously been exposed to similar educational opportunities. While this assumption may hold for homogenous societies wherein all students benefit from more or less comparable educational prospects, in a South African context it embodies a spurious premise (Taylor, 1989).

At present in South Africa, there still exist gross discrepancies and deficiencies in schools with regard to facilities, textbooks and quality and quantity of teaching (De Villiers, 1999). Research into the predicative efficacy of school performance (as embodied in matriculation results) demonstrates poor validity at best and generally a "complete lack of relationship" (Zollezzi, 1995 p. 5). Typically, academic performance in schools offers some predictive applicability for pupils in schools of the old white educational departments (Mitchell & Fridjhon, 1993). Such performance, however, offers very poor prediction of performance for pupils in schools of the old black (African, Asian and Coloured) educational departments (Mitchell & Fridjhon, 1993). Calitz (1998) emphasises the legacy of disadvantagement born of apartheid that continues to present socio-political challenges today. As a result, many students in the South African education system can be regarded as being at a considerable disadvantage when competing for admission to universities.

In an attempt to redress such disadvantagement in an equitable manner, many universities have established moves towards the employ of aptitude or admission tests as an alternative to or in conjunction with the matriculation results (De Villiers, 1999). The problem with these instruments, however, is that (as with matriculation scores) they are generally of the static school and are thus subject not only to the bias engendered by socio-economic disadvantagement but also to that born of cultural heterogeneity. Such models may assist in reducing the weight of

matriculation results, but arguably still reflect inequality in schooling and socio-economic opportunity, and cultural differences.

Criticisms pertaining to bias born of disadvantagement and cultural heterogeneity predominate contemporary South African education policy. Effective as of 2008 a new assessment protocol for secondary schools comes into effect (Department of Education: Republic of South Africa (RSA), 2005a). This protocol shifts the nature of the secondary education system towards an outcomes based philosophy that is purportedly less biased and more centred on student potential (Department of Education: RSA, 2005b). Of particular significance to universities is the resultant change in the nature of the matriculation record. The efficacy and meaning of the new National Senior Certificate (Department of Education: RSA, 2005b) presents a novel consideration for higher educational institutions. The predictive utility of this certificate will undoubtedly hold considerable research interest in the future.

At present, many universities are corresponding with these broader philosophical shifts towards considerations of student potential (Murphy, 2002). In pursuit of less biased and more effective predictive performance measures, many researcher are beginning to advocate a focus on candidates' potential to learn or benefit from tuition, as a means by which to assess suitability for various curricula (Swanson & Lussier, 2001). Central to this argument is the notion that effective and fair assessment of candidates requires a methodology that focuses less on historic and static distinctions, and more on the potential to perform in a given academic setting. Effective assessment of such potential would allow not only for balanced and equitable selection procedures, but may even provide direction as to the subsequent education of candidates (a philosophy very much in line with that of outcomes-based education) (Haywood & Tzuriel, 2002).

The essential question being asked is whether there are students that might currently not be functioning at a high level, but who have the potential to develop and benefit from educational opportunities (De Villiers, 1999). In the context of poor research results regarding the predictive efficacy of past school performance and aptitude tests (Zollezzi, 1995), researchers and universities are giving impetus to the

development of dynamic approaches as a means by which to effectively redress past and present inequality and offer equitable selection practice.

3.4 DYNAMIC INTELLECTIVE ASSESSMENT IN A UNIVERSITY CONTEXT – SOUTH AFRICAN RESEARCH FINDINGS

The employ of dynamic assessment as a means by which to redress disadvantagement and facilitate equitable selection practice has held research interest in South Africa for many decades. Researchers such as Lloyd and Pidgeon (1961) provided substance to this position as early as the 1960s. It was not until the mid 1980s and early 1990s, however, that significant research into the utility of dynamic assessment for purposes of learning potential delimitation emerged. Researchers such as Shochet (1986), Hoffenberg (1988), Gaydon (1988), Murray (1988), Boeyens (1989a; 1989b), Henley (1989), Zollezzi (1992) and Lipson (1992) began to explore the central potentials and possible shortfalls of this assessment paradigm. Their early findings and conclusions emphasised the following themes:

- Traditional static tests exhibit bias and poor predictive validity for large portions of the South African populations (Boeyens, 1989a; 1989b; Gaydon, 1988; Henley, 1989; Lipson, 1992; Murray, 1988; Shochet, 1986; Zollezzi, 1992).

- Dynamic assessment offers a compelling alternative to static tests because of the emphasis placed on learning potential over past learning experience (which may be significantly perturbed by disadvantagement) (Gaydon, 1988; Henley, 1989; Lipson 1992; Murray, 1988; Shochet, 1986; Zollezzi, 1992).

- Psychometric concerns predominate dynamic assessment philosophy and practice. Problems with standardisation, reliability and validity pose significant challenges to dynamic assessment practice (Boeyens, 1989a; Boeyens, 1989b; Gaydon, 1988; Hoffenberg, 1988; Lipson, 1992; Murray, 1988; Shochet, 1986; Zollezzi, 1992).

- The practical cost in terms of time, effort and money pose difficulties to the pragmatic utilisation of dynamic assessment philosophy (Boeyens, 1989a; 1989b; Gaydon, 1988; Hoffenberg, 1988; Lipson, 1992; Murray, 1988; Shochet, 1986; Zollezzi, 1992).

Following the disbandment of apartheid and the assumption of a new political dispensation in 1994, momentum into dynamic assessment research further increased (Murphy, 2002). The potential to redress disadvantagement and facilitate a reduction in cultural bias (Sibaya, Hlongwane & Makunga, 1996; Zollezi, 1995) brought dynamic assessment to the fore as an ideological response to the challenges of intellective categorisation and selection practice at South African universities (Murphy, 2002). The central research findings, in a university context, underpinning contemporary reasoning on dynamic intellective assessment in South Africa include:

- Dynamic assessment offers a means to redress disadvantagement and reduce cultural bias in categorisation and selection practices;
- Dynamic assessment is an important response to selection challenges at universities;
- Dynamic assessment presents certain psychometric and practical challenges.

Each of these findings is now discussed in more detail.

3.4.1 DYNAMIC ASSESSMENT AS MEANS TO REDRESS DISADVANTAGEMENT AND REDUCE CULTURAL BIAS IN INTELLECTIVE CATEGORISATION AND SELECTION PRACTICES

Early research findings and theoretical conjecture that dynamic assessment offers a less biased assessment approach continues to prevail (De Beer, 2000; De Villiers, 1996; Lopes, Roodt & Mauer, 2001; Sibaya, Hlongwane & Makunga, 1996; Van Aswegen, 1997; Van Eerden, De Beer & Coetzee, 2001; Zollezzi, 1995). In particular, these approaches are demonstrated to offer practical alternatives to circumvent many of the criticisms and biases inherent in static instruments (Haywood

& Tzuriel, 2002). Chief amongst these partialities are the poor performance of educationally disadvantaged learners and inaccurate results born of cultural dissimilarities (Murphy, 2002). Importantly, studies are demonstrating that the construct of learning potential as measured by dynamic assessment procedures exhibits integrity and validity (Zollezzi, 1995). As there is no significant relationship between current levels of summated ability (as assessed by static measures) and learning potential scores (Zollezzi, 1995), these approaches offer an important and novel intellective appraisal.

In general, the research findings regarding the utility of dynamic assessment as a means by which to redress disadvantagement and reduce cultural bias in intellective categorisation and selection practices are positive. While investigations in this field are still relatively recent, the findings thus far definitely encourage future research endeavour (Murphy, 2002).

3.4.2 DYNAMIC ASSESSMENT AS AN IMPORTANT RESPONSE TO SELECTION CHALLENGES AT UNIVERSITY

Dynamic assessment for the purpose of intellective categorisation and selection of individuals for university curricula has demonstrated considerable research promise (De Beer, 2000; De Villiers, 1999; Engelbrecht, 1999; Nel, 1997; Sibaya, Hlongwane & Makunga, 1996; Skuy, et al., 1996; Taylor, 1999; Van Eerden, De Beer & Coetzee, 2001). Investigation in this area has typically focused on academic selection and admission programmes aimed at assessing and selecting students from potentially high risk groups (Murphy, 2002). These high-risk students are generally characterised as being in some manner previously educationally disadvantaged or culturally marginalised (Zollezzi, 1995). While far from being exhaustive, research in this field offers particularly promising results and encourages further enquiry (Owen, 1998). Several South African higher educational institutions have explored or are exploring the utility of dynamic intellective assessment procedures. A collection of these institutions is listed in the Table 3.1 on the following page (Murphy, 2002).

Table 3.1: Dynamic Intellective Assessment at South African Academic Institutions

Name of institution	Region
Durban University of Technology	Durban, Pietermartizberg
Nelson Mandela Metropolitan University	Port Elizabeth
North-West University	Mafikeng, Manakwe, Potchefstroom, and Vanderbijlpark
Tshwane University of Technology	Pretoria
University of Cape Town	Cape Town
University of Johannesburg	Johannesburg
University of KwaZulu-Natal	Durban, Pietermaritzburg, Pinetown, and Westville
University of Pretoria	Pretoria
University of Stellenbosch	Stellenbosch
University of the Witwatersrand	Johannesburg

Unified by a desire to facilitate equitable selection and the redress of disadvantagement, universities in South Africa are increasingly exhibiting an awareness of the potentialities afforded by dynamic intellective assessment.

3.4.3 PSYCHOMETRIC AND PRACTICAL CHALLENGES ASSOCIATED WITH DYNAMIC ASSESSMENT

While theoretical surmise and research findings emphasise the potentialities of dynamic intellective assessment, researchers continue to accent psychometric and practical concerns. Psychometric concerns are typically centred upon issues pertaining to construct fuzziness, measurement and procedural integrity, and predicative applicability (Andrews, 1996; Coosner, 1999; Engelbrecht, 1999; Gewer, 1998; Jitendra & Kameenui, 1993; Nel, 1997; Taylor, 1999; Van Eeden, De Beer & Coetzee, 2001; Zollezzi, 1995). The recognised practical concerns typically pertain to time and cost factors (Coosner, 1999; Engelbrecht, 1999; Gewer, 1998; Shochet, 1994; Skuy, et al., 1996; Taylor, 1999; Zollezzi, 1995). These psychometric and

practical challenges associated with dynamic intellective assessment were presented in detail in 2.7.2 and will thus not be discussed further.

In response to the criticisms offered against dynamic assessment, researchers and test developers have begun to formulate and utilise South African standardised instruments as a means by which to reduce cost and labour intensiveness and to offer better psychometric integrity. These instruments do not specifically rely on high degrees of mediator intervention, but rather address mediation of novel learning as an intrinsic part of the instrument completion. This form of dynamic assessment is increasingly regarded as a necessary response to practical limits and psychometric constraints (Murphy, 2002). The following instruments are examples of such devices, and have demonstrated promise in South Africa in the past decade:

a) Learning Ability Battery (LAB)

This instrument has demonstrated reasonable predictive validity as to the utility of future training (Murphy, 2002). Research does, however, suggest that revisions in test items are necessary in order to enhance instrument efficacy (Tayler, 1996).

b) Transfer, Automatisation, Memory and Understanding Learning Potential Battery (TRAM)

As with the LAB, this instrument has demonstrated a good ability to distil a learning potential construct as a predictor of future performance (Van Aswegen, 1997).

c) Conceptual Reasoning Test (CRT)

This instrument has been demonstrated to have utility in identifying students who have potential to succeed within accelerated condition and to do so without reliance on prior learning (Nunns & Ortlepp, 1994).

d) Learning Potential Computer Adaptive Testing (LPCAT)

This instrument employs Item Response Theory (IRT) and Computer Adaptive Testing (CAT) in order to explicate a dynamic assessment procedure in a highly

practical manner. De Beer (2000) demonstrated this South African standardised instrument to be psychometrically robust and suitable for equitable testing.

e) Ability and Processing of Information Learning Test Battery (APIL-B) and the Ability and Processing of Information Learning Test Battery Short Version (APIL-B SV)

The APIL-B and APIL-B-SV have demonstrated good psychometric properties and predictive utility (Engelbrecht, 1999; Lopes, Roodt & Mauer, 2001; Murphy, 2002; Nel, 1997; Taylor, 1994, 1999, 2004). As with the LPCAT, research on the APIL emphasises considerable promise for future application of a dynamic assessment philosophy in a practicable manner (Murphy, 2002).

The instruments and procedures listed above are associated by a common goal to rigorously and systematically measure a general concept of learning potential in a dynamic fashion. They are, however, subject to the criticism of construct fuzziness as discussed in detail in 2.7.2.1. In essence, a lack of clarity exists between these instruments as to the precise nature of the measured learning potential construct (Murphy, 2002). These tests do, however, facilitate a standardised and rigorous assessment methodology that serves to assist in redressing the criticisms of measurement and procedural integrity, predictive applicability, and cost and labour effectiveness. Fundamentally, these instruments embody a response to the growing call to explore and develop the implementation of a dynamic assessment of learning potential in a psychometrically practicable manner. The present investigation purports to augment and refine this current trend to explore and develop psychometrically practical dynamic intellective appraisal of a learning potential construct within an academic institution. The measurement and operationalisation of the construct of learning potential within context of the present investigation is explored in detail in 4.8.1.

3.5 CONLUSION

The exploration and development of dynamic intellective assessment theory and practice, as a practical response to the challenges of disadvantagement and heterogeneity amongst university candidates, demonstrates considerable research

promise. Contemporary findings suggest that dynamic assessment is able to surmount many of the criticisms typically associated with static assessment and to contribute novel and useful information regarding the intellective faculties of prospective university students.

Despite the demonstrable relevance of dynamic intellective assessment to the South African psychometric context in general and to South African universities in particular, this approach has only received close attention over the past two decades. As a result the body of research in this field, while promising, is still relatively limited. Certainly, Murphy's (2002, p. 42) contention that "the need for future dynamic assessment research speaks for itself" characterises present conceptions in the field. The present investigation addresses the call to contribute to the body of knowledge of dynamic assessment in South Africa by exploring the utility of psychometrically sound and practicable means of predicting academic performance in a university context. The methodological fashion in which this research mandate is developed is described in the following chapter.

CHAPTER 4
RESEARCH METHODOLOGY

4.1 INTRODUCTION

The reviewed literature and research described in chapters 2 and 3 emphasise both the theoretical prudence and practical utility of employing dynamic assessment within the context of an academic institution. As an assessment philosophy it is demonstrated to offer novel and useful information regarding intellective process (De Villiers, 1999; Haywood & Tzuriel, 2001; Taylor, 1994). This manner of assessment presents at least a partial solution to challenges associated with static cognitive assessment doctrines (Taylor, 1994; 1999). Notably, it offers promise for its ability to more effectively and equitably appraise intellective functioning in the context of educational disadvantagement and cultural heterogeneity (Sibaya, Hlongwane & Maunga, 1996; Zollezzi, 1995).

To date, the present literature and research within the South African context has demonstrated considerable potential (Sibaya, Hlongwane & Makunga, 1996; Skuy, et al., 1996; Nel, 1997; Engelbrecht, 1999; De Villiers, 1999; De Beer, 2000; Taylor, 1999; Van Eerden, De Beer & Coetzee, 2001). There is, however, a clear need for further investigation to augment what is at present a relative paucity in contemporary research (Murphy, 2002). Centrally, the present investigation purports to facilitate such augmentation by exploring the utility of dynamic assessment for the purposes of selecting students for courses at an academic institution. The methodology whereby this broad research problem is reduced to a practicable and exactable project is delimited in the present chapter.

4.2 STATEMENT OF THE RESEARCH PROBLEM

The central research problem, from which the primary and secondary aims of the present study were derived, is **to determine whether dynamic intellective assessment has practical utility for selecting students for courses at a South African academic institution**.

4.3 RESEARCH AIMS AND HYPOTHESES

The research aims and hypotheses now presented expound upon the summarised account introduced in Chapter 1. These aims and associated hypotheses are recapitulated in Chapter 5 and Chapter 6 in order to elucidate the central research themes and facilitate the analytical discourse of the present investigation.

4.3.1 PRIMARY RESEARCH AIM: THE UTILITY OF DYNAMIC ASSESSMENT

The primary research aim of the present investigation is **to determine the utility of a dynamic intellective assessment process in predicting the future academic performance of first year university students**. As discussed in 1.2.1 and 3.3, the basis for fair selection practice at universities is informed by the establishment of accurate predictors of future academic performance that are not biased by population heterogeneities and that do not further disfavour disadvantaged students (Bokhorst, Foster & Lea, 1990; De Villiers, 1999; Nunns & Ortlepp, 1994). The challenge to optimally predict academic performance while accounting for potential biases underpins the notion of purposeful selection and informs the theoretically espoused motivation for dynamic intellective assessment. The variable of a learning potential score facilitates the operationalisation of a quantifiable dynamic intellective assessment output. Additionally, the variable of a score of academic success is used to operationalise the concept of academic performance. The nature of the correlation of these two variables allows for an examination of the primary research aim, and is explicated by means of the following null and alternative hypotheses:

- H_o: There is no correlation between learning potential scores and future academic performance scores of first year university students.

- H_a: There is a significant correlation between learning potential scores and future academic performance scores of first year university students.

4.3.2 SECONDARY RESEARCH AIMS

As was noted in 1.5.2, three secondary aims were expressed in order to facilitate the primary aim and the central problem statement of the present investigation. The variables used to describe the secondary research aims include a learning potential score yielded by a dynamic assessment procedure, a score of academic success, and a score yielded by a static assessment procedure. As discussed in 3.3.1 and 4.8.3, the predominant static intellective selection measure used by universities in South Africa is that of a matriculation score. It is thus this score that is held within the context of the present research to be the centrally investigated static measure of academic intellective faculty. A detailed account of the three secondary research aims is now expounded and the associated hypotheses presented in terms of the noted variables.

4.3.2.1 PREDICTIVE EFFICACY OF DYNAMIC ASSESSMENT VS. STATIC ASSESSMENT

The hypothesis associated with the primary research aim (as noted above) attends to the determination of association between learning potential scores and future academic performance of first year university students. The result of analysing this hypothesis allows for the examination of an aspect of the utility of dynamic assessment for the purposes of selecting students for university admission. A second aspect of utility that is not accounted for by this hypothesis pertains to the comparative practicability of dynamic assessment with the traditionally employed static assessment measure of a matriculation score.

As discussed in 2.5, 2.6 and 2.7, dynamic assessment embodies a theoretical paradigmatic shift in assessment focus. This theoretical shift is confirmed, to a degree, by the contemporary research conducted on this form of measurement (as described in 3.4). In order to fully investigate the utility of employing a dynamic assessment procedure, it is necessary to investigate its comparative benefits to the static procedure that currently dominates South African university admission assessment ideology. The secondary aim pertaining to this relative examination is thus **to compare the predictive efficacy (of academic performance of first year**

university students) of a dynamic intellective assessment process with the traditionally employed static intellective measure of a matriculation score. This objective is explicated in the following null and alternative hypotheses:

- H_o: The relationship between learning potential scores and future academic performance scores will not differ significantly from the relationship between matriculation scores and future academic performance scores.

- H_a: The relationship between learning potential scores and future academic performance scores will differ significantly from the relationship between matriculation scores and future academic performance scores.

4.3.2.2 DYNAMIC ASSESSMENT VS. STATIC ASSESSMENT OF INTELLECTIVE FACULTY

The aim described in 4.3.2.1 guides an examination of the differences in correlation with future academic performance between dynamic assessment and the traditionally employed static measure of a matriculation score. This examination facilitates the exploration of the comparative difference in predictive efficacy of the two assessment doctrines. It does not, however, necessarily differentiate the two doctrines on the basis of what they measure.

In order to fully investigate the utility of dynamic intelligence assessment, it is necessary to determine the extent to which it measures a different aspect of intellective cognition to the traditional static intelligence measure of a matriculation score. The pursuit of such an investigative goal facilitates an examination of the theoretical conjecture and contemporary research findings that dynamic intelligence assessment represents a paradigmatic divorce from the traditionally employed static intelligence assessment measures and procedures (see 2.5, 2.6 and 2.7). The objective of exploring the qualitative differences in measurement between a dynamic intelligence assessment measure and a static intelligence assessment measure traditionally of import to university selections underpins the second research aim. This aim may be expressed as a desire **to determine whether or not (in the case**

of first year university students) dynamic intellective assessment measures an aspect of intellective performance that is dissimilar from the static intellective assessment measure of a matriculation score. This secondary research aim is developed in the following null and alternative hypotheses:

- H_o: There is no correlation between learning potential scores and matriculation scores.

- H_a: There is a significant correlation between learning potential scores and matriculation scores.

4.3.2.3 DYNAMIC ASSESSMENT IN CONJUNCTION WITH STATIC ASSESSMENT

The final secondary aim of the present investigation serves to explore the utility of dynamic intellective assessment as a complement rather than an alternative to static intellective assessment. The secondary aims discussed in 4.3.2.1 and 4.3.2.2 facilitate a comparative investigation between the utility of the two assessment doctrines for the purpose of selecting first year university students. The third aim, however, explores the notion expounded upon in 2.8 and 3.1 that optimal intellective assessment does not necessarily require an abandonment or dissolution of either the static or dynamic approach (Zollezzi, 1995). Rather, it examines the concept that the joint employ of these approaches (in a manner appropriate to context) may afford greater utility than either approach could on its own. This aim serves **to determine whether or not the employ of dynamic intellective assessment in conjunction with the traditional static intellective measure of a matriculation score facilitates the optimal correlation of assessment scores with future academic performance of first year university students**. This secondary research aim is expressed in the following null and alternative hypotheses:

- H_o: The variance of future academic performance scores is not best explained when employing both learning potential scores and matriculation scores as prediction criteria.

- H_a: The variance of future academic performance scores is best explained when employing both learning potential scores and matriculation scores as prediction criteria.

4.4 RESEARCH DESIGN

Having expounded the central research problem into the noted primary and secondary research aims and the associated hypotheses and variables, the research design serves to delimit the practical architecture of the investigation (Mouton, 2001). In the context of the present research, descriptive design was used to facilitate the exploration of the associative relationships between static and dynamic intellective measures, and future academic performance. The design is considered to be non-experimental and descriptive because it does not involve a controlled experimental intervention, but rather seeks to describe the correlation of intellective measures with future academic performance (Mouton, 2001).

The intellective variable of learning potential was measured for each respondent in the sample by means of the Ability, Processing of Information and Learning Battery Short Version (APIL-B SV). A matriculation score was used in order to determine the static measure predominantly employed by universities in South Africa. The variable of an academic performance score was computed by amalgamating an aggregate mark for each of the sampled respondents throughout the academic year. The measurement and operationalisation of the variables of learning potential scores, matriculations scores and academic performance scores are discussed in detail in 4.8.

4.5 SAMPLING TECHNIQUE

The data pertaining to intellective measures and future academic performance were obtained by using a sample of convenience of students registered in 2006 for the first year of the BA Extended Degrees Programme of the University of Johannesburg. This programme was implemented by the University to allow students with low matriculation scores, which would have generally otherwise prevented their admission to university, to study for a BA degree (E. Cornelius BA Extended Degree

Course Coordinator, personal communication, June 12, 2006). The academic material covered in the course of the degree is the same as would be the case with a standard BA degree (University of Johannesburg, 2008a). The course is, however, distinguished from the standard BA degree by the fact that it can only be completed in four years as opposed to the general standard of three years (University of Johannesburg, 2008a). Additionally, all of the subjects to be taken in the first of the four years are standardised and must be taken by all students (E. Cornelius BA Extended Degree Course Coordinator, personal communication, June 12, 2006). The basic intention of the degree is to spread the first year of a standard BA over two years so as to provide more focused and assisted teaching than would be the case in a standard degree (E. Cornelius BA Extended Degree Course Coordinator, personal communication, June 12, 2006).

Admission to the BA Extended degree in 2006 was determined at the discretion of the BA Extended Degrees Committee based on a qualitative interview and consideration of the results from various assessments that were completed by the majority of applicants (E. Cornelius BA Extended Degree Course Coordinator, personal communication, June 12, 2006). Included among these assessments were the students' matriculation scores and scores for the APIL-B SV (E. Cornelius BA Extended Degree Course Coordinator, personal communication, June 12, 2006).

The central convenience benefit of using the class of first year students registered for the BA Extended Degree Programme in 2006 pertains to the homogenised nature of the course itself. Whereas most university degrees allow students to take different subjects and even the same subjects at different times, the first year of the BA Extended Degree Course is completely standardised. In effect this means that that the end of year results achieved by all of the students are comparable because they were determined over the same time, and as a product of the same lectures and exams. This comparability facilitates the meaningful contrast of the academic performance (as determined by the end of year results achieved) of the sampled students. The determination of matriculation scores and the administration of the APIL-B SV was conducted in a similarly standardised manner, with all of these scores being determined just prior to the students' admission to the degree course (E. Cornelius BA Extended Degree Course Coordinator, personal communication,

June 12, 2006). The standardisation afforded in the data gathering process is a necessary requisite for the meaningful correlation of the variables that inform the research hypotheses discussed in 4.3 (Howell, 2002).

It is important to note, however, that since convenience sampling is a form of non-probability sampling, it is conducted within a sampling frame that is chosen for convenience and is not necessarily applicable to all university students (Struwig & Stead, 2001). In other words, because not all students at the university have a chance to be in the sample, it cannot be considered to be probabilistically representative of all students at the university. The noted standardisation benefits of convenience to the sample are, however, compelling and arguably essential to the successful realisation of the research design and examination of the research hypotheses.

4.6 SAMPLING PROCEDURE

The sample of convenience used within the context of the present investigation sought to include all of the 99 first year students originally registered for the BA Extended Degree Course in 2006. The desire to use the maximum possible number of persons was motivated by the central limit theorem which states that as the sample size increases so the sampling distribution approaches normality (Howell, 2002). With an increased likelihood of a normal distribution of the variables under investigation, the veracity of subsequent parametric statistical examination is increased (Murphy & Davidshofer, 2001). In essence, the more people included within the sample, the smaller the chance of spurious and biased results being determined for reasons that do not pertain to the specific variables under investigation (Howell, 2002).

The inclusion of all 99 students was not, however, possible as certain data elements needed to be excluded from the study. Students were excluded from the study if the data were not available for the variables of future academic performance, and static and dynamic intellective appraisal. In the absence of scores for any of these variables, it is not possible to examine the hypotheses noted in 4.3. An additional exclusionary criterion was applied to students who were registered for the degree,

but who had previously studied at university. Data for these students were excluded in order to avoid potentially erroneous results caused by prior learning and possible cognitive structural modification as a result of their previous experiences at university.

In total, thirteen students were excluded because of a self-motivated termination of studies prior to the completion of the academic year. As a result of prematurely concluding their studies, no final year mark could be determined to indicate the variable of future academic performance. A further ten students were excluded as they had for various idiographic reasons failed to sit for the APIL-B SV assessment, which is needed to inform the variable of learning potential. A final five students were excluded because they had previously engaged in studies at university. Having excluded a total of 28 persons from the originally intended sample of 99, the remaining 71 students embodied the design sample from which learning potential scores, matriculation scores and academic performance scores were interpreted. A description of the realised sample is presented in the following section.

4.7 DESCRIPTION OF THE REALISED SAMPLE

The statistic composition of the 71 participant realised sample is described in terms of gender, age, home language and language of preference for education. Figure 4.1 on the following page depicts the demographic composition of the realised sample's gender, and indicates a predominance of females (43 persons) over males (28 persons).

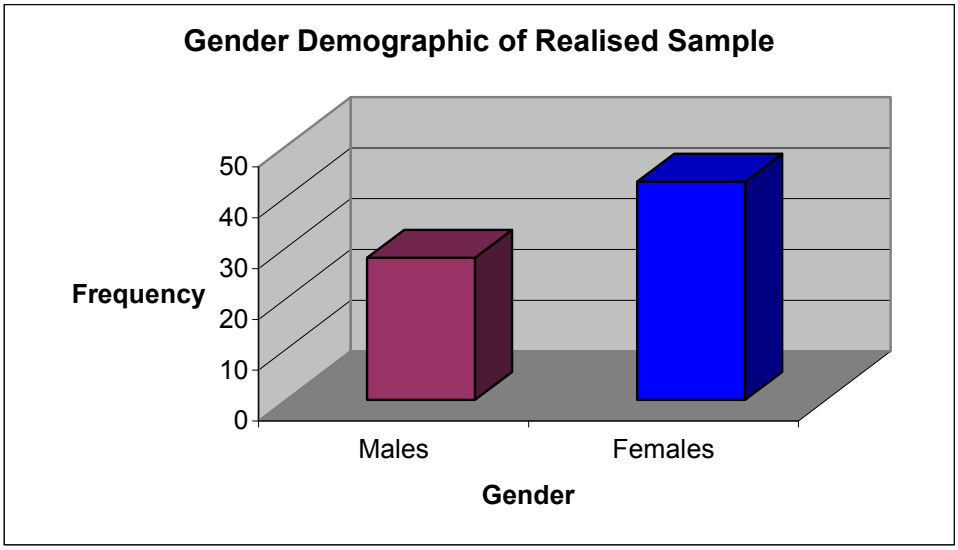

Figure 4.1: Realised Sample Gender Composition

The statistics pertaining to the age parameters of the realised sample demonstrated an average age of 18.93 years with a standard deviation of 2.93 years. The minimum age evidenced in the sample is 17 years and the maximum age is 34 years. A frequency distribution describing these age parameters is presented in Table 4.1 below. The frequency distribution table of age data is determined by dividing the range of ages into equal width interval and counting the number of data values in each interval. The frequencies thus determined demonstrate the relative proportions of age spans within the realised sample.

Table 4.1: Age Frequency Distribution of the Realised Sample

Age Category	Frequency	Percentage (%)	Cumulative Frequency	Cumulative Percentage (%)
17 – 19	58	81.69	58	81.69
20 – 22	9	12.68	67	94.37
23 – 25	1	1.41	68	95.78
26 – 28	0	0	68	95.78
29 – 31	2	2.82	70	98.63
32 – 34	1	1.41	71	100

The demographics pertaining to the home languages of the realised population reflect the native language learning within the students' home environments. Table 4.2 below describes a frequency distribution of these languages.

Table 4.2: Home Language Frequency Distribution of the Realised Sample

Language	Frequency	Percentage (%)	Cumulative Frequency	Cumulative Percentage (%)
English	27	38.03	27	38.03
Zulu	13	18.31	40	56.34
Tswana	9	12.68	49	69.02
South Sotho	5	7.04	54	76.06
Sesotho	4	5.63	58	81.69
Afrikaans	3	4.23	61	85.92
Sepedi	3	4.23	64	90.15
Xhosa	2	2.82	66	92.97
Italian	1	1.41	67	94.38
Tshivemda	1	1.41	68	95.79
Portuguese	1	1.41	69	97.2
Swahili	1	1.41	70	98.61
Xitsonga	1	1.41	71	100

The languages in which formalised instructive assistance is available in the BA Extended Degree (and generally at the University of Johannesburg) are English and Afrikaans (E. Cornelius BA Extended Degree Course Coordinator, personal communication, June 12, 2006). Accordingly, the language of preference for educational instruction was recorded for all of the students in the sample. These preferences are reflected in Figure 4.2 on the following page.

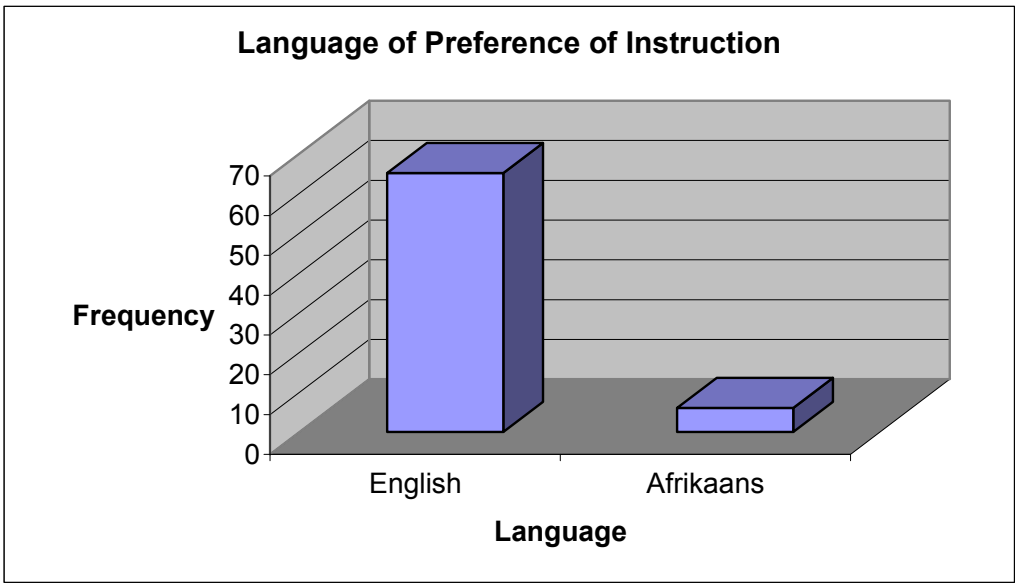

Figure 4.2: Language of Preference of Instruction of the Realised Sample

The descriptive statistics pertaining to home language and language of preference for formalised instruction indicate certain distinctions. Most notably, the choice of language of preference for instruction between English (indicated by 65 students) and Afrikaans (indicated by 6 students) is substantially more limited than the range of home languages noted in Table 4.2. This considerable range may be interpreted to offer an indication of the previously noted significant cultural heterogeneities evident in the South African population.

4.8 MEASUREMENT AND OPERATIONALISATION OF VARIABLES

As discussed in 4.4, the operationalisation and measurement of the variables introduced within the context of the present investigation serves to facilitate the examination and testing of the noted research aims and hypotheses (Mouton, 2001). As cited in 1.6, 4.3.1 and 4.3.2, the principle operative variables that inform the noted hypotheses and for which data are gathered from the described sample include:

- Learning potential scores (yielded by a dynamic intellective assessment procedure);
- Future academic performance scores of first year university students;

- Matriculation scores (yielded by a static intellective procedure).

The manner in which these variables are measured for the purposes of testing the noted hypotheses is now discussed in detail.

4.8.1 LEARNING POTENTIAL – ABILITY, PROCESSING OF INFORMATION AND LEARNING BATTERY SHORT VERSION (APIL-B SV)

4.8.1.1 DESCRIPTION OF THE APIL-B SV

The construct of learning potential is operationalised in the context of the present investigation by means of the APIL-B SV. Developed for the South African population by Dr Terry Taylor (2004), this instrument employs a dynamic assessment philosophy in order to derive a quantification of learning potential. The instrument is suitable for application to individuals with education levels equivalent to grade ten and higher (Taylor, 1997, 2004). The APIL-B SV is an abbreviated version of the full APIL battery and may be administered in a relatively shorter time period (Taylor, 2004). The APIL-B SV is differentiated from the full Ability, Processing of Information and Learning Battery (APIL-B) by a contracted number of peripheral subscales measuring various cognitive capabilities. Whereas the APIL-B comprises eight constituent subscales, the APIL-B SV includes only four. Both the APIL-B and the APIL-B SV do, however, measure a similar central construct of learning potential (Taylor, 2004).

The focus of Taylor's test is on the manner in which test takers are able to learn and develop new skills throughout the testing process (Jooste, 2004). The test epitomises contemporary dynamic assessment philosophy for its format of test-teach-test (for a detailed discussion of this philosophy, see 2.6). During the assessment procedure, comprehensive standardised lessons are incorporated on the material presented for learning and subsequent testing (Taylor, 2004). The test-teach-test procedure facilitates the assessment of intellective processes and of individuals' potential to a greater extent than static instruments, which tend to emphasise stable skills and abilities (Taylor, 1997; Lopes, Roodt & Mauer, 2001).

The ABIL-B SV comprises a set of tests that are predominantly non-verbal and presented in a geometric-diagrammatic format (Taylor, 2004). The employ of this medium reduces the potentially spurious influence of cultural content, language bias and previous educational disadvantagement (Taylor, 1994; 1997). From the tests, four component scores are produced (Taylor, 2004):

- Conceptual Reasoning or Fluid Intelligence;
- Learning Rate;
- Level of Performance at the Conclusion of the Learning Rate;
- Memory and Understanding of the Learning Material.

The scores for these constructs are consolidated into an overall measure of learning potential that is referred to as the Global Score (Taylor, 2004).

4.8.1.2 EMPLOYING THE APIL-B SV AS A MEAURE OF DYNAMIC INTELLECTIVE ASSESMENT

Within the context of the present investigation, the global score generated by the APIL-B SV serves as a suitable operationalisation of the key concept of a quintessential learning potential score. It embodies the prototypical theoretical constituents of a mediated learning experience that allows for estimation of an individual's zone of proximal development (as explicated by Feuerstein (1979; 1980) and Vygotsky (1978) respectively). The APIL-B SV is designed specifically for the South African population (Taylor, 1994, 1997, 2004) and is suitable for administration to persons applying for admission to tertiary educational institutions (Taylor, 1997; 2004).

The ability to administer the APIL-B SV in a group context facilitates the relatively large-scale evaluation necessary for assessing applicants to university curricula. Specifically, one administrator can assess up to 15 individuals (Taylor, 2004). Where additional examiners are required for larger groups, the ratio of 15-to-1 may be maintained by additional administrative assistants (Taylor, 2004). Another key benefit related to large-scale administration of the APIL-B SV over the full APIL

battery pertains to practical time constraints. Whereas the APIL-B takes up to four hours to administer (Taylor, 1997), the APIL-B SV may be administered in two hours (Taylor, 2004). In the context of the present investigation where the emphasis is only on a global intellective construct of learning potential, the information afforded by the additional scales in the full APIL battery is superfluous.

4.8.1.3 PSYCHOMETRIC PROPERTIES OF THE APIL-B SV

As was noted in Chapter 2 (2.7.2), in addition to concerns pertaining to the potential cost and labour intensiveness of dynamic approaches to assessment, there are challenges appertaining to psychometric veracity. Section 2.7.2.2 highlighted the implicit difficulty in measuring reliability in the context of an assessment where the goal of measurement is to gauge changes during the process. In the case of the APIL-B SV, this potential difficulty was met by determining split-half reliability estimates (Taylor, 2004). In this procedure, the test sessions that took place pre-mediation and post-mediation were both split into two halves. The results of such a split yields four scores: (1) pre-mediation session first half; (2) pre-mediation session second half; (3) post-mediation session first half; and (4) post-mediation session second half (Taylor, 2004). Taylor (2004) used these scores to determine reliabilities of measurement within sessions. Additionally, he determined a reliability coefficient for the gradient of learning that extended over the pre-mediation and post-mediation sessions. This was computed as a correlation between the product of Post-mediation session first half divided by Pre-mediation session first half, and the product of Post-mediation session second half divided by Pre-mediation session second half (Taylor, 2004). A sample of 615 first year university students yielded coefficients greater than .8 for both reliability measures. While these measures do not necessarily circumvent the implicit reliability challenges noted in 2.7.2 and 3.4.3, they do indicate a degree of psychometric integrity that recommends the APIL-B SV as veracious dynamic instrument.

In addition to the reliability studies conducted on the APIL-B SV, there have been two validity studies (Taylor, 2004). Both of these studies emphasised the predictive validity of the APIL-B SV in the context of an academic institution and yielded coefficients ranging from .31 to .67 (Taylor, 2004). The predictive validity of the

learning potential score yielded by the APIL-B SV is emphasised within the context of the present investigation.

Overall, the APIL-B SV presents a feasibly standardised instrument by which to determine an intellective measure of learning potential for the purposes of examining the predictive efficacy of dynamic assessment within the context of an academic institution.

4.8.2 FUTURE ACADEMIC PERFORMANCE OF FIRST YEAR UNIVERSITY STUDENTS

Within the context of the present investigation, the variable of future academic performance is comprised of an end-of-year aggregate of all of an individual's subject percentages. As noted in 4.5, because all of the students within the population sample attended the same courses, this aggregate mark is comparable. The exclusive employ of an end-of-year aggregate as determined (through equal weighting of subjects) by the University of Johannesburg is guided by the central research problem and primary aim to explore only general future academic performance. Exploration of performance within specific subject domains exceeds the bounds of the present research and as such is not considered.

The overall aggregate mark is comprised of the following subjects (University of Johannesburg, 2008a):

- MAPS for Humanities;
- Argument in the Humanities;
- Basic Numeracy A;
- Cross Cultural Communication B;
- Contextual Studies 1000;
- Introduction to Language and Text Studies 1000.

4.8.3 MATRICULATION SCORES

In the context of the present investigation and as per prototypical South African university policy, matriculation scores (colloquially referred to as m-scores) are believed to indicate past intellective performance at school (De Villiers, 1999; Engelbrecht, 1999; Grussendorff, Liebenberg & Houston, 2004; Miller, 1998; Nel, 1997; Schoeman, 2002; Shochet, 1994; Sibaya, Hlongwane & Makunga, 1996; Skuy, et al., 1996; Taylor, 1999; Van Eeden, De Beer & Coetzee; Zollezzi, 1995). While some universities have explored additional assorted static aptitude and admission tests to be used as an alternative to, or in conjunction with matriculation scores, matriculation scores remain the paramount measure used for the selection of first year students (De Villiers, 1999; Murphy, 2002; Skuy, et al., 1996; Zollezzi, 1995). As these scores represent an amalgamation of past intellective performance, they embody a form of static assessment (see 2.3, 2.4 and 3.3.1). The dominant employ of matriculation scores throughout universities in South Africa distinguishes them as a pertinent generic static intellective measure against which to contrast a dynamic intellective assessment doctrine.

Within the context of the present investigation, the matriculation scores were computed according to the standard policy of the University of Johannesburg (University of Johannesburg, 2008b). The computation of matriculation scores is relatively standardised amongst South African universities (De Villiers, 1999), and the method applied by the University of Johannesburg approximates those of other South African academic institutions. In accordance with this method, matriculation scores are determined by associating each matriculation mark achieved by a student in their final school year with a value between 0.5 and 6.5. These values are then summed to determine an overall matriculation score for the individual. Table 4.3 on the following page describes the scores associated with matriculation mark categories (University of Johannesburg, 2008b).

Table 4.3: Calculation of Matriculation Scores from Matriculation Marks

UJ Matriculation Score	Matriculation Mark Category	
	Higher Grade Subjects	Standard Grade Subjects
6.5	A (95%)	
6	A (90% - 94%)	
5.5	A (85% - 89%)	A (90% - 94%)
5	A (80% - 84%)	A (85% - 89%)
4.5	B (75% - 79%)	A (80% - 84%)
4	B (70% - 74%)	A (75% - 79%)
3.5	C (65% - 69%)	B (70% - 74%)
3	C (60% - 64%)	B (65% - 69%)
2.5	D (55% - 59%)	C (60% - 64%)
2	D (50% - 54%)	C (55% - 59%)
1.5	E (40% - 49%)	D (50% - 54%)
1	E (35% - 39%)	D (45% - 49%)
0.5		E (40% - 44%)

The following section now delimits the manner in which the variable data for the APIL-B SV global learning scores, the academic performance scores and the matriculation score were obtained from the sampled students.

4.9 DATA COLLECTION PROCEDURE

The APIL-B SV global learning potential scores and matriculation scores were obtained by the Student Services Bureau of the University of Johannesburg prior to the students being admitted to the BA Extended Degree. The administration and interpretation of the APIL-B SV was conducted by a registered assessing psychologist (W. Reenen, Head of Student Services Bureau, personal communication, June 28, 2006). Additionally, the matriculation scores were computed by the Student Services Bureau (W. Reenen, Head of Student Services Bureau, personal communication, June 28, 2006). The resultant scores and

interpretations were presented to the BA Extended Degree Committee to facilitate a discretionary selection procedure that was based on students' scores and an unstructured interview (E. Cornelius BA Extended Degree Course Coordinator, personal communication, June 12, 2006).

In order to obtain access to the data for the purposes of the present research, permission was sought from the BA Extended Degree Coordinator, Mrs Eleanor Cornelius and the Chairperson of the BA Extended Degree Committee, Prof Louis Gründlingh. Having obtained their permission, the students registered for the course were approached and asked to sign consent to having their score data and end of year results used within the present study. Explanation as to the purposes of the study and the confidential and anonymous use of the data was communicated to all of the students. This explanation was presented both verbally and in writing by the researcher and by the BA Extended Degree Coordinator, Mrs Eleanor Cornelius. A copy of the permission letter presented to students on 18 August 2006 is provided in Appendix A. All of the students consented to the use of their data for the purposes of the present investigation.

Having obtained permission to use the variable data from the BA Extended Degree Coordinator, Eleanor Cornelius, the Chairperson of the BA Extended Degree Committee, Prof Louis Gründlingh, and the students comprising the sample, formal permission to access the primary scored data was sought from the Head of the Student Services Bureau, Mrs van Reenen. A copy of the letter requesting access to this data is included in Appendix B. Permission to access this data was granted and the APIL-B SV global scores, matriculation scores and end or year results were collected from the Bureau.

4.10 DATA ANALYSIS

Descriptive and inferential statistics were employed in order to describe and analyse the variable data gathered during the collection procedure, and to test the hypotheses noted in 4.3. The statistical descriptive and analytical procedures were completed using the Statistical Package for the Social Sciences (SPSS) version 16.0. The descriptive statistics served to present the sample parameters for the

global learning potential scores of the APIL-B SV, the matriculation scores and the end of year results. The descriptive procedures used include measures of score count, average, standard deviation and range.

Inferential statistics were used in the present investigation to determine the statistical significance of relationships between the variables and to statistically contrast these relationships. Pearson product-moment correlations were explored in order to determine the significance of the associative relationships of global learning potential scores and matriculation scores with end of year academic performance. The differences between these associative relationships were statistically examined. Finally, a stepwise regression was used in order to determine the magnitude of variance in end of year results that can be explained by the global learning potential scores and by the matriculation scores. Explanations and results of the analyses and their relations to the hypotheses noted in 4.3 are presented in greater detail in Chapter 5.

4.11 CONCLUSION

The research methodology detailed within the present chapter describes the systematic examination of the broad research problem to determine whether dynamic intellective assessment has practical utility for selecting students for courses at a South African academic institution. The central concepts of static and dynamic intellective appraisal, and future academic performance were applied to a specific research sample so as to facilitate the statistical analysis of the research aims and associated hypotheses. The following chapter details the process and results of this statistic analysis.

CHAPTER 5
RESEARCH RESULTS

5.1 INTRODUCTION

The process and results of the data analyses conducted in the present investigation are demonstrated in this chapter. Following a descriptive statistical analysis of the variables investigated, inferential statistics are used in order to examine the aims and hypotheses introduced in Chapter 4.

5.2 DESCRIPTIVE STATISTICAL ANALYSES

Descriptive statistics were employed in order to summarise collections of data into a coherent and simple representation (Struwig & Stead, 2001). They are referred to as descriptive because they are primarily aimed at describing the attributes of the variables under investigation (Howell, 2002). As discussed in Chapter 4, within the context of the present research the variables under investigation included:

- Learning potential scores as operationalised by means of the APIL-B SV global score;
- Future academic performance scores as operationalised by an end-of-year aggregate of all an individual's subject percentages;
- Matriculation scores as computed by means of a standardised university policy algorithm.

The results yielded by a descriptive analysis of these variables are reflected in Table 5.1 on the following page.

Table: 5.1: Basic Descriptive Statistics of Analysed Variables

Variable	Count	Average	Standard Deviation	Minimum	Maximum
Learning Potential Scores	71	47.8451	8.56679	31	76
Academic Performance Scores	71	57.06%	8.29	36%	84.67%
Matriculation Scores	71	9.67606	1.65852	6	15.5

5.3 INFERENTIAL STATISTICAL ANALYSES

In order to examine the research aims and associated hypotheses presented in Chapter 4, inferential statistics were used to determine the nature and statistical significance of relationships between the variables described in Table 5.1, and to statistically contrast these relationships.

Pearson Product Moment-Correlations (r) were used in order to determine the magnitude of covariance (degree of relationship) between variables (Field, 2005). Two-tailed *t*-tests, which yield a probability value (p-value), were employed in order to determine whether or not these noted relationships were statistically significant. The two-tailed *t*-tests allowed for the statistical determination as to whether or not the computed Person Product Moment-Correlations (r) were significantly different from zero (or no correlation) (Howell, 2002). Additionally, two-tailed *t*-tests were used to ascertain the significance (or non-significance) of differences between two correlations. Two-tailed *t*-tests (or non-directional tests) were used instead of one-tailed *t*-tests (directional tests) as none of the hypotheses sought to determine the direction in which a significant difference (either greater or less than zero) may exist, but simply that a significant difference did exist (Howell, 1999).

In addition to computing the Pearson Product Moment-Correlation (r) for the variables under investigation, Coefficients of Determination (R^2) were used in order to measure the amount of variability of one variable that is explained by another

variable (Field, 2005). This coefficient is calculated by squaring the Pearson Product Moment-Correlation so as to formulate a percentage account of the magnitude of associative variation (Field, 2005). Greater examination of magnitudes and statistical significance of Coefficients of Determination (R^2) was facilitated in the context of the present results by means of a stepwise multiple regression model.

The manner in which the noted inferential statistics were employed in order to examine the research aims and associated hypotheses is now explored in greater detail. The results of these analyses are presented in the order in which the research aims and hypotheses were stated in 4.3.

5.3.1 RESULTS IN RESPECT OF THE PRIMARY RESEARCH AIM AND ASSOCIATED HYPOTHESIS: THE UTILITY OF DYNAMIC ASSESSMENT

As noted in 4.3.1, the primary research aim **to determine the utility of a dynamic intellective assessment process in predicting the future academic performance of first year university students** was explicated in the following null and alternative hypotheses:

- H_o: There is no correlation between learning potential scores and future academic performance scores of first year university students.

- H_a: There is a significant correlation between learning potential scores and future academic performance scores of first year university students.

In order to facilitate an examination of this aim and testing of the hypotheses, a Pearson Product Moment-Correlation (r) between learning potential scores and academic performance scores was computed. As discussed in 5.3, a two-tailed *t*-test procedure that yields a Probability Value (p-value) was used to determine whether the computed correlation coefficient was statistically significantly different from zero. The correlation coefficient and two-tailed *t*-test p-value are provided in Table 5.2 on the following page.

Table 5.2: Pearson Product-Moment Correlation Between Academic Performance and Learning Potential

Pearson Product Moment-Correlation	Number of pairs of data values	P-value
0.4293	71	0.0002

The results in Table 5.2 indicate that there was a significant relationship between the learning potential scores and the academic performance scores, r = 0.4923, p (two-tailed) < 0.001.

5.3.2 RESULTS IN RESPECT OF SECONDARY RESEARCH AIMS AND ASSOCIATED HYPOTHESES

The results for the statistical analyses of secondary research aims, which inform the primary research aim, were presented in the order in which they were expounded in 4.3.1.

5.3.2.1 PREDICTIVE EFFICACY OF DYNAMIC ASSESSMENT VS. STATIC ASSESSMENT

As noted in 4.3.2.1, the secondary research aim **to compare the predictive efficacy (of academic performance of first year university students) of a dynamic intellective assessment process with the traditionally employed static intellective measure of a matriculation score** is explicated in the following null and alternative hypotheses:

- H_o: The relationship between learning potential scores and future academic performance scores will not differ significantly from the relationship between matriculation scores and future academic performance scores.

- H_a: The relationship between learning potential scores and future academic performance scores will differ significantly from the relationship between matriculation scores and future academic performance scores.

In order to test these hypotheses, it is necessary to make use of a procedure referred to as: Testing The Difference Between Two Non-Independent Pearson Product-Moment Correlation Coefficients (Howell, 2002). The correlations between which a difference is computed are those pertaining to learning potential scores and academic performance scores, and to matriculation scores and academic performance scores. These two correlations are considered non-independent because the variables are all computed using the same sample group (as discussed in 4.5). In order to take account of the potential lack of independence when comparing these coefficients, it is necessary to incorporate consideration of the degree to which the variables of learning potential scores and matriculation scores correlate (Howell, 2002; Williams, 1959; Steiger, 1980). The correlation coefficients and two tailed *t*-test p-values for the 71 data elements of all three variables under investigation within the context of the present aim and hypotheses are presented in the correlation matrix in Table 5.3 on the following page.

Table 5.3: Correlation Matrix of Learning Potential Scores, Matriculation Scores, and Academic Performance Scores

		Learning Potential Scores	Matriculation Scores	Academic Performance Scores
Learning Potential Scores	Correlation (r)	1	-0.0111	0.4293*
	Sig. (2-tailed)	.	0.9266	0.0002
	N	71	71	71
Matriculation Scores	Correlation (r)	-0.0111	1	0.0868
	Sig. (2-tailed)	0.9266	.	0.4719
	N	71	71	71
Academic Performance Scores	Correlation (r)	0.4293*	0.0868	1
	Sig. (2-tailed)	0.0002	0.4719	.
	N	71	71	71

Where: * $p < 0.001$

As demonstrated in 5.3.1, the data in Table 5.3 indicate that the correlation between learning potential scores and academic performance scores was significant, $r = 0.4923$, p (two-tailed) < 0.001. The correlation coefficient between matriculation scores and academic average scores ($r = 0.0868$) is not, however, significantly different from zero at $p < 0.05$. Similarly, the correlation coefficient between learning potential scores and matriculation scores ($r = -0.0111$) is not significantly different from zero at $p < 0.05$. In essence, Table 5.3 demonstrates a significant correlation between learning potential scores and academic performance, but not between matriculation scores and academic performance or between learning potential scores and matriculation scores.

Having determined correlational coefficients for all of the three variables with each other, it is possible to examine (as is the intention of the present research aim and associate hypotheses) with a two-tailed *t*-test procedure whether differences in these correlations are statistically significant from zero. Table 5.4 on the following page gives the results and *t*-test p-values of the calculation of the difference between the

two non-independent Pearson Product-Moment Correlations of learning potential scores and academic performance scores, and matriculation scores and academic performance scores.

Table 5.4: Difference Between Two Non-Independent Correlations: Learning Potential and Academic Performance Scores, and Matriculation Scores and Academic Performance Scores

Correlation of learning potential score with academic average scores $r_{(LP, AA)}$	r = 0.4293
Correlation of matriculation scores with academic average scores $r_{(M, AA)}$	r = 0.0868
Correlation of learning potential scores with matriculation scores $r_{(LP, M)}$	r = -0.0111
Difference between $r_{(LP, AA)}$ and $(r_{M, AA})$	0.3425
Number of data pairs	71
P-value for difference between $r_{(LP, AA)}$ and $r_{(M, AA)}$	0.03

The results in Table 5.4 indicate that there was a significant difference between the correlation of learning potential scores with academic average scores $r_{(LP, AA)}$, and the correlation of matriculations scores with academic average scores $r_{(M, AA)}$, $r_{(LP, AA)} - r_{(M, AA)} = 0.3425$, p (two-tailed) < 0.05.

5.3.2.2 DYNAMIC ASSESSMENT VS. STATIC ASSESSMENT OF INTELLECTIVE FACULTY

As noted in 4.3.2.2, the secondary research aim **to determine whether or not (in the case of first year university students) dynamic intellective assessment measures an aspect of intellective performance that is dissimilar from the static intellective assessment measure of a matriculation score** is explicated in the following null and alternative hypotheses:

- H_o: There is no correlation between learning potential scores and matriculation scores.

- H_a: There is a significant correlation between learning potential scores and matriculation scores.

As discussed in 5.3.2.1 and shown in Table 5.3, the Pearson Product-Moment Correlation coefficient between learning potential scores and matriculation scores ($r = -0.0111$) is not significantly different from zero at p (two-tailed) < 0.05. In essence, this may be interpreted to mean that there is no statistically significant correlation between learning potential scores and matriculation scores.

5.3.2.3 DYNAMIC ASSESSMENT IN CONJUNCTION WITH STATIC ASSESSMENT

As noted in 4.3.2.3, the secondary research aim **to determine whether or not the employ of dynamic intellective assessment in conjunction with the traditional static intellective measure of a matriculation score facilitates the optimal correlation of assessment scores with future academic performance of first year university students** is explicated in the following null and alternative hypotheses:

- H_o: The variance of future academic performance scores is not best explained when employing both learning potential scores and matriculation scores as prediction criteria.

- H_a: The variance of future academic performance scores is best explained when employing both learning potential scores and matriculation scores as prediction criteria.

In order to examine these hypotheses, multiple regression models were used. Multiple regression models seek to construct a best equation of fit between one or more independent variables and a dependent variable (Howell, 2002). Within the

context of the present investigation the independent variables were considered to be learning potential scores and matriculation scores. Guided by the theoretical findings and research conjectures posited in Chapter 2 and Chapter 3, the present investigation seeks to ascertain the nature of the relationship (or predictive dependency) between academic performance and these two predictor criteria. The term "dependent" does not indicate causality, but rather reflects the direction of investigative inquiry as to which variables may be used to predict other variables (Murphy & Davidshofer, 2001). Labelling the learning potential scores and matriculation scores as independent variables, and academic performance scores as a dependent variable reflects the present research aim to determine an optimal predictive explanation of academic performance scores. A multiple linear regression procedure uses all of the independent variables and the dependent variable to derive an equation that best fits the data within the sample, which in the present case consists of 71 first year BA Extended Degree Students. Once derived, this equation may be tested for its statistical significance for the broader population of first year university students in general. Additionally, the terms and coefficients that comprise the basic linear regression equation inform measures of correlation and variance (Howell, 2002).

In order to optimally construct the best possible regression model, a stepwise regression procedure was employed within the context of the present research. This procedure is characterised by a set of rules for deriving an optimal basic regression by adding or subtracting one independent variable at a time from the basic regression equation (Howell, 1999). In the context of the present research, a backward regression model was employed. The model is termed a backwards model as it begins with a basic regression that includes all independent variables (that is to say learning potential scores and matriculation scores), and then examines step by step whether it is optimal to remove any of these variables. The first step in which all independent variables are regressed is demonstrated in Table 5.5 on the following page.

Table: 5.5: Stepwise Regression Analysis of Academic Performance: Step 1

Parameter Estimates of Step 1 Basic Linear Regression Model			
Parameter	**Beta Estimates (ß)**	**Standard Error**	**P-Value**
Constant	32.7124	7.3901	$p < 0.0001$
Learning Potential Score	0.41638	0.105436	0.0002
Matriculation Score	0.457512	0.544612	0.4038

Summary of Fit of Step 1 Basic Linear Regression Model	
R-Squared Adjusted (R^2)	0.168936*
Standard Error of Estimate	7.5669
Mean Absolute Error	5.22145

Where: * $p < 0.001$

The data presented in Table 5.5 show the results of fitting a linear regression model to describe the relationship between academic performance scores and the two independent predictor variables of learning potential scores and matriculation scores. The basic linear regression model derived indicates that a significant portion of the variance in academic performance scores is explained when employing both learning potential scores and matriculation scores, $R^2 = 0.168936$, $p < 0.001$. The R^2 value indicated means that the computed regression equation explains 16.8936% of the variance in academic performance scores.

In order to determine whether the basic linear regression derived using both independent variables can be further simplified, the stepwise regression procedure considered the significance of the beta estimates as shown in Table 5.5 above. The beta estimate of learning potential scores is significant, ß = 0.41638, p (two-tailed) < 0.0001. The beta estimate of matriculation scores is, however, not significant at $p < 0.05$. These findings indicated that while the independent variable of learning potential scores contributes to a significant explanation of the variance in academic

performance scores, matriculation scores do not. As such, a second basic linear regression was computed without using the independent variable of matriculation scores. The results of this second step in the stepwise regression are presented in Table 5.6 below.

Table 5.6: Stepwise Regression Analysis of Academic Performance: Step 2

Parameter Estimates of Step 2 Basic Linear Regression Model			
Parameter	**Beta Estimates (ß)**	**Standard Error**	**P-Value**
Constant	32.71865	5.11247	7.27368
Learning Potential Score	0.4153695	0.105205	3.94843

Summary of Fit of Step 2 Basic Linear Regression Model	
R-Squared Adjusted (R^2)	0.17248*
Standard Error of Estimate	7.54055
Mean Absolute Error	5.33

Where: * $p < 0.001$

The data presented in Table 5.6 show the results of fitting a linear regression model to describe the relationship between academic performance scores and the independent predictor variable of learning potential scores. The basic linear regression model derived indicates that a significant portion of the variance in academic performance scores is explained when employing only the learning potential scores, $R^2 = 0.17248$, p (two-tailed) < 0.001. The R^2 value indicated means that the regression equation explains 17.248% of the variance in academic performance scores. As the beta estimate of the learning potential scores variable is significant, ß = 0.4153695, $p < 0.0001$, and there are no other independent variables to consider, the basic linear regression cannot be further simplified. In essence, the variance of academic performance scores is best explained when employing only the independent predictor variable of learning potential scores.

5.4 CONCLUSION

The research results presented within the present chapter facilitate both a description of the variable data collected and a presentation of the inferential statistical examinations needed to examine the research aims and hypotheses. Interpretations and discussion of these data and inferential examinations are detailed in the following chapter.

CHAPTER 6
DISCUSSION AND CONCLUSION

6.1 INTRODUCTION

Chapter 5 demonstrated the process and results of the statistical examination of the research aims and associated hypotheses noted in the research methodology. Within the context of the present chapter, the results of these examinations are interpreted and discussed in relation to the reviewed literature and research presented in Chapter 2 and Chapter 3. The main trends within the research data are explored in order to elucidate the salient findings of the present investigation. The significance of these findings relative to the present research problem in particular and to dynamic cognitive assessment literature and theory in general is emphasised. The chapter concludes with an examination of limitations particular to the present investigation and recommendations with respect to areas for future research enquiry.

6.2 DISCUSSION OF THE RESULTS IN RESPECT OF THE RESEARCH PROBLEM AND AIMS

The central research problem **to determine whether dynamic intellective assessment has practical utility for selecting students for courses at a South African academic institution** was addressed by means of examining the primary and secondary research aims described in Chapter 4 (see 4.3.1 and 4.3.2). The results of the empirical examination of these aims and associated hypotheses are now interpreted and discussed in the order in which they were presented and analysed.

6.2.1 DISCUSSION OF THE RESULTS IN RESPECT OF THE PRIMARY RESEARCH AIM: THE UTILITY OF DYNAMIC ASSESSMENT

The primary research aim **to determine the utility of a dynamic intellective assessment process in predicting the future academic performance of first year university students** was facilitated by means of the following null and alternative hypotheses:

- H_o: There is no correlation between learning potential scores and future academic performance scores of first year university students.

- H_a: There is a significant correlation between learning potential scores and future academic performance scores of first year university students.

The results of the statistical analyses in 5.3.1 demonstrated that there was a moderate positive significant relationship between learning potential scores and academic performance scores, $r = 0.4293$, p (two-tailed) < 0.001. Consequently, the null hypothesis (H_o) was rejected and the alternative hypothesis (H_a) supported. Within the context of the present investigation, this statistical dictation establishes that a dynamic intellective assessment process as operationalised by means of an APIL-B SV global learning potential score predicted with statistically significant utility the academic performance scores of the sampled first year students.

This finding corroborates the theoretical conjecture that a learning potential measure derived by means of a dynamic intellective assessment process may be used to indicate an individual's potential to perform intellective tasks in the future. As discussed in 4.8.1, the APIL-B SV global learning score embodies a quintessential distillation of a learning potential score through the employ of mediated learning that allows for estimations of an individual's zone of proximal development. The results derived in respect of the primary research aim lend credence to the assertion that this zone of proximal development (as indicated by a learning potential score) may be efficaciously used as a prospective measure of intellective abilities (as indicated by academic performance) that are in the process of developing (Bendixen, 2000;

Coosner, 1999; Jitendra & Kameenui, 1993; Palincsar, 1990). These findings support the central dynamic assessment assertion that a consideration and measurement of the processes that underpin cognitive task performance is both a possible and practicable form of intellective assessment.

In addition to affirming broad dynamic assessment notions of the relevance of considering underlying intellective processes, the results in respect of the first primary aim support the practical applicability of such measures within a South African university context. In particular, the utility demonstrated within the context of the present investigation affirms the contemporary South African findings that dynamic assessment procedures offer a promising means by which to predict the development of individuals' academic competencies at university (De Beer, 2000; De Villiers, 1999; Engelbrecht, 1999; Nel, 1997; Sibaya, Hlongwane & Makunga, 1996; Skuy, et al., 1996; Taylor, 1999; Van Eerden, De Beer & Coetzee, 2001).

6.2.2 DISCUSSION OF THE RESULTS IN RESPECT OF THE SECONDARY RESEARCH AIMS

As has been previously discussed, the results in respect of the secondary research aims and hypotheses serve to complement the results relating to the primary research aim and hypotheses. In particular, they facilitate a more detailed examination of the nature of the evidence utility of a dynamic assessment process within the context of an academic institution.

6.2.2.1 PREDICTIVE EFFICACY OF DYNAMIC ASSESSMENT VS. STATIC ASSESSMENT

The secondary research aim **to compare the predictive efficacy (of academic performance of first year university students) of a dynamic intellective assessment process with the traditionally employed static measure of a matriculation score** was facilitated by means of the following null and alternative hypotheses:

- H_o: The relationship between learning potential scores and future academic performance scores will not differ significantly from the relationship between matriculation scores and future academic performance scores.

- H_a: The relationship between learning potential scores and future academic performance scores will differ significantly from the relationship between matriculation scores and future academic performance scores.

The results presented in 5.3.2.1 indicated that there was a significant difference between the correlation of learning potential scores with academic average scores $r_{(LP,\ AA)}$, and the correlation of matriculations scores with academic average scores $r_{(M,\ AA)}$, $r_{(LP,\ AA)} - r_{(M,\ AA)} = 0.3425$, p (two-tailed) < 0.05. Consequently, the null hypothesis (H_o) was rejected and the alternative hypothesis (H_a) supported. In addition to evidencing a lack of significant difference between correlations, the results described in 5.3.2.1 demonstrated that while there was a significant correlation between learning potential scores and academic performance scores, r = 0.4293, p (two-tailed) < 0.001, there was not a significant relationship between matriculation scores and academic performance scores.

These results support the present South African research findings that the statically underpinned intellective assessment of the matriculation score demonstrates poor validity at best (Calitz, 1999; De Villiers, 1999; Mitchel & Fridjhon, 1993; Skuy et al., 1996), and in general a "complete lack of relationship" when used to predict academic performance at university (Zollezzi, 1995, p. 5). Broadly, these findings corroborate the contemporary dissatisfaction in the South African psychometric context with statically underpinned assessment instruments (Calitz 1999; De Villiers, 1999; Murphy, 2002; Owen, 1998; Taylor, 1990; 1994). Within the context of the present research, the predominant efficacy of a dynamic assessment means over a static assessment means supports the assertions by Nzimande (1995) and Taylor (1994) that in order to address present inequalities and engendered disadvantagement in psychometric assessment, it is necessary to place more emphasis on learning potential assessment than on the static assessment of previously developed skills.

In general, the results in respect of the present research aim support broad notions and research findings (as discussed in Chapter 3) that dynamic assessment instruments are not only relevant to the South African population, but additionally that they offer advantages over static assessment instruments (Murphy, 2002; Taylor, 1990; 1994). More specific to the present investigation, these results support the determinations that dynamic intellective assessment is contemporarily relevant to the intellective categorisation and selection practices of South African universities (De Beer, 2000; De Villiers, 1996; Lopes, Roodt & Mauer, 2001; Murphy 2002; Sibaya, Hlongwane & Makunga, 1996; Van Aswegen, 1997; Van Eerden, De Beer & Coetzee, 2001; Skuy, et al., 1999; Zollezzi, 1995). The importance of the increasing use by South African universities of dynamic assessment, either in conjunction with or in favour of static matriculation scores (as discussed in 3.4.2) is validated by the present findings.

6.2.2.2 DYNAMIC ASSESSMENT VS. STATIC ASSESSMENT OF INTELLECTIVE FACULTY

The secondary research aim **to determine whether or not (in the case of first year university students) dynamic intellective assessment measures an aspect of intellective performance that is dissimilar from the static intellective assessment measure of a matriculation score** was facilitated by means of the following null and alternative hypotheses:

- H_o: There is no correlation between learning potential scores and matriculation scores.

- H_a: There is a significant correlation between learning potential scores and matriculation scores.

The results of the statistical analyses presented in 5.3.2.2 demonstrated that there was not a significant relationship between learning potential scores and matriculation scores. Consequently, there was a failure to reject the null hypothesis (H_o).

The results in respect of the present research aim serve to demonstrate that the dynamically derived learning potential score of the APIL-B SV measures a different aspect of intellective cognition to the static intelligence measure of the matriculation score. This finding serves to corroborate the notion that dynamic intelligence assessment and static intelligence assessment measure qualitatively distinct aspects of intellectual cognition.

As discussed in Chapter 2, the dynamic emphasis on individuals' potential to develop and learn novel intellective competencies embodies a paradigmatic shift from the static accent on stable and previously acquired knowledge and skills. Within the context of the present investigation, the statistical demonstration of this qualitative paradigmatic distinction serves to buffer the contemporary research conjecture that psychological testing in South Africa would be aided by an ideological shift towards a consideration of potential (Murphy, 2002; Nzimande, 1995; Taylor, 1990; 1994). As Zollezzi (1995) reflects, a psychometric assessment philosophy that is enhanced by a consideration of learning potential facilitates the development of an ideology that is better able to fit the South African context. In essence, the ability to measure intellective performance in different ways allows for a greater possibility of assessing individuals' intellective competencies in a relevant manner. Within the context of the present investigation, this relevance was clearly demonstrated by the results discussed in 6.2.2.1 above, where it was established that learning potential scores exhibited a significant correlation with academic performance scores where matriculation scores did not.

6.2.2.3 DYNAMIC ASSESSMENT IN CONJUNCTION WITH STATIC ASSESSMENT

The secondary research aim **to determine whether or not the employ of dynamic intellective assessment in conjunction with the traditional static intellective measure of a matriculation score facilitate the optimal correlation of assessment scores with future academic performance of first year university students** is facilitated by means of the following null and alternative hypotheses:

- H_o: The variance of future academic performance scores is not best explained when employing both learning potential scores and matriculation scores as prediction criteria.

- H_a: The variance of future academic performance score is best explained when employing both learning potential scores and matriculation scores as prediction criteria.

The results of the stepwise regression analysis presented in 5.3.2.3 indicated that the variance of academic performance scores was optimally explained when employing only the independent variable of learning potential scores as a predictor criterion. This regression explained 17.248% of the variance in academic performance scores, $R^2 = 0.17248$, p (two-tailed) < 0.001. As the optimal regression equation included only the independent variable of learning potential scores and not that of matriculation scores, the null hypothesis (H_o) was rejected and the alternative hypothesis supported (H_a).

The results in respect of the present research aim serve to facilitate an exploration of the utility of a dynamically determined learning potential score in conjunction with the static intellective measure of a matriculation score traditionally employed by South African universities. Whereas the first secondary research aim sought to contrast the significance of these independent predictor variables, the present aim explores the utility of employing them in conjunction to predict academic performance scores. As discussed in 2.8, and supported by the findings detailed in 6.2.2.2 above, static and dynamic approaches both yield different measures of intellective functioning. Rather than exhibiting diametric opposition, they encapsulate differing philosophical and practical agendas regarding the best means by which to predict and describe the phenomenological yields of intellective functioning (as discussed in detail in Chapter 2). The challenge to optimise the predictive utility of intellective assessment methodologies is thus theoretically best served through employing the optimal approach (or combination of approaches) relative to context.

This theoretical assertion was not, however, corroborated by the determinations in regard to the present research aim. Rather, the results indicated that the statically based matriculation scores did not contribute a significant explanation of the variance in academic performance scores. This conclusion lends further support to the South African research findings that matriculation scores are poor predictors of future academic performance (as discussed in 3.4.2 and 6.2.2.1) (Calitz, 1999; De Villiers, 1999; Mitchel & Fridjhon, 1993; Skuy et al., 1996; Zollezzi, 1995). Further, it serves to corroborate the results and findings in respect of the first secondary hypothesis regarding the predictive efficacy of dynamic assessment versus static assessment. It is important to note, however, that these results do not necessarily refute the utility of conjointly using any dynamic and static intellective measures, but only the utility of matriculation scores in the explanation of variance of academic performance scores in the sampled population. In essence, these results corroborate the findings noted in 6.3.2.1 that the APIL-B SV learning potential scores demonstrated significant covariance with academic performance scores, while matriculation scores did not. Additionally, they affirm the finding in respect of the primary research aim that dynamic intellective assessment should be considered an important form of intellective appraisal for the purpose of the categorisation and selection of first year university students at South African universities.

6.3 SUMMARY OF THE RESEARCH RESULTS

The results presented and discussed in respect of the research aims serve to delimit the findings particular to the present investigative design and sample. These findings may be summarised as follows:

- A dynamic intellective assessment as operationalised by means of the APIL-B SV global learning potential score demonstrated significant practical utility for selecting students for courses at a South African academic institution. The dynamically informed scores explained 17.248% of the variance in academic performance of first year students over their first year of university study.

- The traditionally employed static intellective measure of the matriculation score did not demonstrate significant utility for selecting students for courses at a South African academic institution. These statically informed scores did not explain a significantly non-zero portion of the variance in academic performance of first year students over their first year of university study.

- A dynamic intellective assessment as operationalised by means of the APIL-B SV global learning potential score predicted future academic performance of first year students significantly better than the traditionally employed static intellective measure of a matriculation score.

- A dynamic intellective assessment as operationalised by means of the APIL-B SV global learning potential score measured a different aspect of intellective performance to that measured by the traditionally employed static intellective measure of a matriculation score.

6.4 RESEARCH CONCLUSIONS AND IMPLICATIONS

The present investigation was developed from a consideration of the psychosocial and psychometric challenges posed in the South African context to the employ of cognitively geared psychometric instrumentation within an academic institution. In particular, the present study primarily explored the practical utility of a dynamic assessment measure of intellectual aptitude for the purposes of selecting students for courses at university. Secondary research aims investigated this utility in greater detail by contrasting the predictive efficacy of a dynamic assessment measure with a traditional static predictor of academic performance. The present research findings and implications are now explored and discussed in relation to the contextual motivations for the study in general, and to the central research problem in particular. Additionally, limitations of the present research are noted and directions for future research suggested.

6.4.1 SOUTH AFRICAN EDUCATIONAL CONTEXT: FINDINGS AND IMPLICATIONS

As discussed in Chapter 1 and Chapter 3, the educational context in South Africa is at present characterised by critical reflection and reform (De Villiers, 1999). Centrally, this critical reflection and call for reform is underpinned by the desire for non-biased forms of assessment that are able to address the challenges of past and present disadvantagement and significant population heterogeneity (Bendixen, 2000; De Villiers, 1999; Nzimande, 1995; Murphy, 2002). In accord with recently introduced outcomes-based assessment ideologies (Department of Education: Republic of South Africa, 2005a; 2005b), researchers are increasingly advocating the necessity of emphasising individuals' academic and intellectual potential as a means by which to meet these challenges (De Villiers, 1999; Nunns & Ortlepp, 1994; Sibaya, Hlongwane & Makunga, 1996; Skuy, et al., 1996; Zollezzi, 1999).

Within the context of the present investigation, the finding that a dynamically derived learning potential score was able to demonstrate utility in predicting the future academic performance (see 6.2.1) strengthened these theoretical conjectures and research findings. Additionally, the finding that the traditionally employed matriculation score did not significantly chart academic performance at university (see 6.2.2.1 and 6.2.2.3) supports the contention that present assessment methodologies employed in South African educational contexts are not necessarily effective indicators of ability and potential. In sum, the implications of the present research findings for the South African educational context, in general, is that there is support for the contentions that present (and largely) static assessment ideologies and methodologies are not effective and that an increased accent on student potential is meritorious.

6.4.2 SOUTH AFRICAN PSYCHOMETRIC CONTEXT: FINDINGS AND IMPLICATIONS

As is the case with the educational context, the South African psychometric context is contemporarily qualified by critiques and motivations for transformation. Centrally, these critiques are circumscribed by the challenges to facilitate culture-fair testing and to redress past and present disadvantagement within the South African population (as discussed in Chapter 3). In response to these criticisms, dynamic assessment philosophy has begun to gain prominence amongst researchers (De Villiers, 1999; Murphy, 2002; Nzimande, 1995; Owen, 1998; Sibaya, Hlongwane & Makunga, 1996; Skuy, et al., 1996; Taylor, 1990; 1994). As discussed in Chapter 2, theoretically this prominence is motivated by the notion that a dynamic informed assessment of underlying cognitive processes is able to reduce the potentially spurious influence of non-cognitive factors (such as heterogeneous distinction and disadvantagement) on static instruments (Haywood & Tzuriel, 2002). In the broader South African context, the practical implication of this theorising is the increasing research interest in, and motivation for, a paradigmatic shift to include a greater accent on dynamic assessment ideology.

Within the context of the present investigation, the results demonstrated in 6.2.2 corroborate the contemporary research findings that dynamic assessment theory and practice have practical utility. The finding that a dynamically derived learning potential score measures an aspect of intellective faculty that is distinct from that measured by a traditionally employed static intellective measurement (as discussed in 6.2.2.2) supports the notion espoused in Chapter 2 that dynamic assessment is an important complement to static assessment. Additionally, the determinations within the context of the present research that a dynamically derived score was a significantly better predictor of academic success than the static matriculation score supports the present criticisms of static scores, and the call for the inclusion of dynamic assessment theory and practice.

6.4.3 FINDINGS AND IMPLICATIONS IN RESPECT OF THE CENTRAL RESEARCH PROBLEM

As emphasised in Chapter 1 and Chapter 3, the considerations pertaining to the South African educational and psychometric contexts inform the central research problem. In keeping with the broader South African educational context, universities are progressively beginning to demonstrate an increased awareness of the challenges of cultural heterogeneities and of the redress of past and present disadvantagement (De Villiers, 1999; Murphy, 2002; Nunns & Ortlepp, 1994; Nzimande, 1995; Skuy, et al., 1996). A key area of concern for these academic institutions pertains to a growing dissatisfaction with the longstanding selection procedures and instruments. In particular, there is the fear that the traditionally employed static matriculation scores may be of spurious utility in the context of cultural heterogeneity and disadvantagement (De Villiers, 1999; Skuy, et al., 1996; Zollezzi, 1995). Consequently, many universities are currently embracing the philosophical shift towards a consideration of student potential. This increased interest in considering student potential collimates with the present ideological shift towards dynamic assessment in the broader South African psychometric context. The contemporary research discussed in Chapter 3 described both the growing interest in, and the demonstrable relevance of dynamic assessment as an efficacious means by which universities may select students for academic curricula (De Beer, 2000; De Villiers, 1999; Murphy, 2002; Van Eerden, De Beer & Coetzee, 2001). It was, however, reflected that while present findings are promising, greater research within this specific area of applied dynamic assessment is imperative (Murphy, 2002).

The present investigation sought to explore and develop research into the applied field of dynamic cognitive assessment by addressing the central research problem to determine whether dynamic intellective assessment has practical utility for selecting students for courses at a South African university. The results discussed within the context of the present chapter indicated that a dynamically determined learning potential score was able to demonstrate utility in predicting the future academic performance of the sampled students, and consequently that it has utility as a selection method. The findings that the learning potential scores evidence utility

where the traditionally employed static matriculation scores did not, served to further support the significance of a dynamic assessment selection ideology.

In essence, guided by the central research problem, the present investigation served to corroborate the conjecture and findings that dynamic and static assessment ideologies offer distinct philosophical and practical agendas regarding the best means by which to predict and describe the phenomenological yields of intellective process. The utility of a dynamic assessment measure of intellectual aptitude for the purposes of selecting students for courses at university was supported. Additionally, the ability of a dynamic assessment measure to predict academic performance at university in a manner that had benefit over the traditional static predictor of matriculation scores was affirmed.

When interpreting these findings, it is important to note and explore certain limitations associated with the present research design and process. These limitations do not refute the noted results and conclusions, but rather serve to indicate areas and directions for future scholarship. Limitations and directions for future research relevant to the present investigation are thematically circumscribed as sampling and variable limitations. These are explored in the following sections, after which directions for future research are indicated.

6.4.3.1 SAMPLE LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

As discussed in 4.5, the homogenised nature of the selected sample facilitated the integral analytical comparisons between the variable of learning potential scores, matriculation scores, and academic performance scores. In essence, the data gathered for all of these variables were only comparable because the sampled students all attended the same courses, by the same lecturers, at the same time, and wrote the same examinations. While the convenience mandated selection of the first year BA Extended Degree sample was thus necessary, it is important to note the potential limitation of this form of non-probabilistic sampling. In particular, this form of sampling limits the ability to incautiously generalise the noted results from the sample to the broader population of first year university students. This limitation does not confute the findings presented in this chapter, but rather encourages

replications of the present study with different samples in order to corroborate the derived conclusions.

An additional limitation applicable to the sampling conducted within the present investigation concerns the size of the realised sample. While the maximum possible number of 71 first year student participants was included with the present investigative analysis, this number is relatively modest. As with the challenge of the convenience nature of the sample, this limitation does not confute the presented findings but similarly encourages replications of the present investigation with additional samples.

6.4.3.2 VARIABLE LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

Within the context of the present investigation, the measured and operationalised variables (as discussed 4.6) of the APIL-B SV global learning potential score, the matriculation score, and the academic performance score, were used to examine the particular constructs under investigation. It is important to note that while these variables facilitate a realistic operationalisation of the concepts of dynamic intellective assessment, static intellective assessment and academic intellective faculty respectively, they do not exhaustively delimit the various constructs.

The global learning potential score generated by the APIL-B SV is underpinned by the quintessential dynamic intellective assessment precept that gauges learning within the context of a mediated learning experience (Feuerstein, 1979; 1980) in order to estimate a mode of proximal development (Vygotsky, 1978). It is not, however, reasonable to assume that the APIL-B SV global learning score completely accounts for all dynamic intellective assessment theory and practice. Similarly, while the matriculation score is certainly a statically based intellective measure, it is not necessarily representative of all static intelligence assessment processes. To generalise the relevance of its evidenced utility as a static measure to other forms of static intelligence assessment would be spurious. Similarly, the aggregate academic performance score, while facilitating a useful and relevant index of general academic

intellective performance at university, does not necessarily account for all domains of academic performance.

As with the noted sample attributes, the cautions pertaining to rash assumptions that the examined variables exhaustively represent the investigated constructs do not refute the reported findings. Rather, they give additional direction to the future research endeavour by encouraging scholarship that explores and develops the present findings in regard to the examined constructs and variables.

6.4.3.3 SUMMARY OF DIRECTIONS FOR FUTURE RESEARCH

The directions for future research indicated by the sample and variable considerations elucidate key areas for future investigative enquiry relating to dynamic cognitive assessment within the context of an academic institution. These central areas may be summarised to promote further research in the following directions:

a) Replications of the present investigation to further augment the body of literature and research on dynamic assessment in the context of academic institutions. This would facilitate an augmentation of the growing body of literature relating to dynamic assessment in general and its application to academic institutions in particular. Such augmentation would serve to strengthen the integrity of research in this field.

b) Replications of the present investigation that facilitate the consideration of broader and differing samples of students. Research directed in this manner would facilitate greater probabilistic rigour and significance to findings relating to dynamic cognitive assessment with the context of academic institutions.

c) Research directed towards a more focused consideration regarding the constituent nature of the constructs under investigation within the present study. Greater investigation into the nature of dynamic assessment, static assessment and academic performance would enhance understandings as to the significance and implications of the present findings. Such scholarship may, for instance, facilitate greater insight into the underlying causes of the currently evidenced

differences in the significance of predictive efficacy between dynamic and static measures.

6.5 CONCLUSION

As has been previously discussed, the present investigation embodied a research response to the challenges that cultural heterogeneity and the redress of past and present disadvantagement pose to the South African educational and psychometric contexts in general. In particular, the present study examined the central research problem regarding the utility of employing a dynamic cognitive assessment ideology for the purpose of selecting students for courses at a South African university. In response to a growing dissatisfaction with longstanding selection procedures and instruments at South African universities, the utility of a dynamically derived learning potential score was explored and contrasted with the traditionally employed static intellective measure of the matriculation score.

The present research findings supported the notion that a dynamically determined learning potential score was able to efficaciously predict academic performance of first year university students, and accordingly, that it has utility as a selection method. Additionally, the contrast between dynamic and static measures evidenced that these differing assessment ideologies quantified distinct cognitive processes, and that the dynamic measure of the APIL-B SV global learning score had decided benefits over the traditionally employed static matriculation score.

Broadly, the findings of the present investigation support theoretical conjecture and research findings that static assessment ideologies and methodologies have limitations within the South African educational and psychometric contexts, and that these limitations may, to a degree, be meritoriously addressed by dynamic assessment procedures. More specific to the central research problem, they emphasise both the utility of dynamic assessment and the potential failing of traditional static assessment for the purpose of selecting students for university curricula in South Africa.

In summary, the present investigation has served to augment the contemporary body of knowledge regarding the value of employing dynamic cognitive assessment within a South African academic institution. The positive findings in this regard support and encourage further investigation into dynamic assessment in general and to its utility in academic institutions in particular.

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APPENDICES

APPENDIX A

18 August 2006

Dear Student

RE: Research on BA Extended Degree Programme

The BA Extended Degree envisages affording learners, who demonstrate sufficient potential, access to a supportive tertiary higher educational environment. In order to develop and enhance this service, consideration is constantly being given to various aspects of the course. As part of a Master's Dissertation for the Department of Psychology at the University of Johannesburg, research is being conducted on the efficacy of the assessment criterion for entry into the programme.

In order to facilitate this research, students enrolled in the course are requested to allow access to personal course data. In particular, access to matriculation results, examination results, and enrolment assessment results are required. Information obtained will be treated with the strictest confidence, and the anonymity of students is assured.

In order to accord to this request for data, please complete the form at the bottom of this page.

Should you require any further information in regard to this research, please do not hesitate to contact either Mr Graham du Plessis, or Mrs Eleanor Cornelius.

Yours sincerely,

Graham du Plessis

Student Psychologist – Department of Psychology (University of Johannesburg)
Phone: 083-256-2259
Email: graham.duplessis@gmail.com

Eleanor Cornelius

BA Extended Degree Coordinator

I (name and surname)_____,
Student Number _____ , give permission for access to the aforementioned information, under the condition that it will be treated with strict confidentiality and anonymity.

_____
Signature

APPENDIX B

PO Box 4416
Northcliff
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2195

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graham.duplessis@gmail.com

28 August 2006

Dear Mrs van Reenen

RE: Research on BA Extended Degree Programme

As per our discussions on 15 August 2006 and 28 March 2006, I would like to approach the Student Services Bureau for access to psychometric data pertaining to the students registered for the BA Extended Degree programme.

I have been in collaboration with Mrs Eleanor Cornelius (BA Extended Degree Coordinator) since the start of the year in regard to this research. Further, Prof Louis Gründlingh (Chairperson of the BA Extended Degree Committee) has agreed to allow the research to proceed. Please find enclosed a copy of the research proposal that has been approved by the Higher Degree Committee.

In conjunction with Mrs Eleanor Cornelius, I am in the process of obtaining written permission from all of the students in the Program to access their psychometric and examination data. At present 80% of the students have given such permission. The remainder of the students will be approached during the course of the next week.

I would greatly appreciate your assistance in accessing the psychometric data collected on these students, prior to their inclusion in the Program. The following instrument is noted in the Research Proposal as means by which to operationalise key variables:

- Ability, Processing, Information and Learning Battery (APIL-B);

Should you require any further information please do not hesitate to contact either myself or my research supervisor, Dr Coetzee (011-489-3133).

Thank you for your kind assistance in this regard.

Yours sincerely,

Graham du Plessis
Student Psychologist – Department of Psychology (University of Johannesburg)

Enc.