

***EDUCATORS' PERCEPTIONS OF LEARNERS'  
INTELLIGENCES***

By

Ishara Maharaj  
872877702

Submitted in partial fulfillment of the requirements for the  
Degree of Masters of Arts (Educational Psychology)

Supervisor: Professor N. J. Mkhize

School of Psychology  
University of KwaZulu-Natal  
Pietermaritzburg

December 2006

## **ACKNOWLEDGEMENTS:**

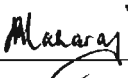
I would like to express my sincere gratitude to the following people and organizations:

- My mother for her love, encouragement and patience.
- Mr. Irshad Motala for his support and encouragement.
- The Sukyo Mahikari Organisation for the strength to persevere.
- Professor N.J. Mkhize for the NRF grant and his invaluable guidance on academic writing and research.
- The Regional Senior Manager, Mr. N.C. Ngcobo, Department of Education & Culture for granting me permission to visit the schools in the Midlands region.
- The Principals and educators who participated in the study.
- Mr. Jacob Wambugu for his guidance with the statistical analysis of the study.

This study was partially sponsored by NRF grant no. GUN 2063961

## DECLARATION

I, Ishara Maharaj hereby declare that the present research study is the original work of the author unless otherwise stated to the contrary.

  
\_\_\_\_\_  
Ishara Maharaj (Ms)

## **ABSTRACT**

Educators from schools located in the Midlands region of KwaZulu Natal were approached to participate in the present study with the aim of investigating educators' perceptions of their learners' intelligence. School type differences in educator estimates of their learners' overall and multiple intelligences, and the best predictors of learners' overall intelligence were investigated. Information was elicited pertaining to educators' views on intelligence and the multiple intelligences most valued in pedagogical practice. A questionnaire was administered to educators from Previously Disadvantaged High and Primary Schools, and Ex-Model C High and Primary Schools.

Educators from Previously Disadvantaged High Schools gave comparatively lower estimations of their male and female learners' intelligences. Mathematical and verbal intelligence were shown to predominate as the foundations for academic intelligence, especially for male learners, while cultural and social intelligences were included as best predictors of female learners' overall intelligence. A preponderance of the Western associated academic intelligences (mathematical and verbal) was demonstrated in pedagogical practices. The study highlights the need to engage with educators' implicit perceptions of intelligence to facilitate change in education.

## TABLE OF CONTENTS

ACKNOWLEDGEMENTS	I
DECLARATIONS	II
ABSTRACT	III
TABLE OF CONTENTS	IV
LIST OF TABLES	VIII
LIST OF FIGURES	X
<b>CHAPTER 1: INTRODUCTION</b>	
<b>Background to the study</b>	1
<i>The Historical and Contemporary South African Educational Context</i>	1
<i>Contemporary Theories of Intelligence</i>	2
<i>The Context of South African Schooling as it Relates to the Present Study</i>	3
<b>Research Problem and Hypotheses</b>	5
<i>Research Questions</i>	5
<i>Hypotheses</i>	6
<b>Justification for the Research</b>	6
<i>The Rationale for Studying Educators' Perceptions of Intelligence</i>	7
<i>Foundational Studies</i>	8
<i>The Purpose of Studying Gender Evaluations</i>	9
<i>The Purpose of Studying Conceptions of Intelligence within the Educational Context</i>	10
<b>A Brief Description of the Methodology</b>	10
<b>Definitions</b>	11
<b>Delimitations of Scope of the Study</b>	12
<b>Outline of Thesis</b>	13
<b>Conclusion</b>	13
<b>CHAPTER 2: LITERATURE REVIEW</b>	
<b>Introduction</b>	14
<i>The Historical Development of the Construct of Intelligence and Intelligence Testing</i>	14
<i>General Cognitive Ability – the 'g' Factor</i>	16
<i>Nature &amp; Nurture</i>	17
<i>The IQ Score and Schooling</i>	19
<i>Contemporary Assessment of Intelligence</i>	21
<b>Conceptions of Intelligence</b>	22

<i>Theories of Intelligence</i>	23
<i>Theories of Intelligence</i>	25
<i>The Psychometric Approach</i>	25
<i>Piaget's Genetic Epistemology</i>	26
<i>Vygotsky's Socio-Cultural Theory of Mind</i>	28
<i>The Theory of Multiple Intelligences</i>	29
<i>The seven intelligences.</i>	30
<i>Implications for schooling.</i>	33
<i>A Critique of Gardner's MI Theory.</i>	34
<i>The Triarchic Theory of Intelligence &amp; Successful Intelligence</i>	36
<i>The three components of intellectual ability.</i>	36
<i>Triarchic theory of intelligence: Implications for schooling.</i>	37
<i>A critique of Sternberg's Theory.</i>	39
<b>Gender and Intelligence</b>	39
<i>Gender Effects in the School Context</i>	41
<i>Gender Effects in the South African Educational Context</i>	42
<i>Studies on Lay Conceptions of General and Multiple Intelligences</i>	43
<b>Culture and Intelligence</b>	45
<i>The Cultural Variation Approach</i>	46
<i>Variations in Conceptions of Intelligence</i>	46
<i>Constructions of Self</i>	47
<i>Acculturation, Assimilation and Integration Processes</i>	47
<i>Variations in Estimates of Intelligence</i>	48
<i>The Cultural Intelligence Approach</i>	49
<b>Social Class and Intelligence</b>	50
<b>Schooling and Intelligence</b>	52
<i>Thinking Styles and Teaching Styles</i>	53
<i>Curriculum 2005 in South African Schools</i>	55
<b>Conclusion</b>	56
 <b>CHAPTER 3: METHODOLOGY</b>	
<b>Introduction</b>	57
<b>Research Design</b>	57
<b>Research Sample</b>	57
<i>Sample Frame</i>	57
<i>Sample Selection</i>	58
<i>Sample Demographics</i>	58

<b>Research Instrument</b>	60
<i>Validity and Reliability of the Research Instrument</i>	62
<b>Procedure</b>	64
<b>Statistical Analysis</b>	65
<b>Ethical Considerations</b>	66
<b>Conclusion</b>	66

## **CHAPTER 4: RESULTS**

<b>Introduction</b>	67
<i>Educator Estimates of Learners' Overall and Multiple Intelligences</i>	67
<i>Educator Estimates of Male Learners' Multiple Intelligences by School Types</i>	68
<i>Educator Estimates of Female Learners' Multiple Intelligences by School Type</i>	70
<i>Summary</i>	72
<i>Educators' Best Predictors of Learners' Overall Intelligence by School Type</i>	72
<i>Best Predictors of Male Learners' Overall Intelligence by School Type</i>	75
<i>Summary</i>	74
<i>Best Predictors of Female Learners' Overall Intelligence by School Type</i>	75
<i>Summary</i>	77
<i>Educators' Views on Intelligence and IQ Testing</i>	77
<i>Have you ever taken an intelligence test?</i>	78
<i>Do you believe they (IQ tests) measure intelligence fairly well?</i>	79
<i>Do you believe males are on average more intelligent than females?</i>	80
<i>Do you believe intelligence is primarily inherited?</i>	81
<i>Do you believe IQ tests are useful in educational settings?</i>	82
<i>Do you believe some races are more intelligent than others?</i>	83
<i>Multiple Intelligences Incorporated into Pedagogical Practice According to School Type</i>	84
<i>Multiple Intelligences Tapped the Most in Classroom Activity</i>	85
<i>Summary</i>	88
<i>Multiple Intelligences Tapped the Least in Classroom Activity</i>	89
<i>Summary</i>	91
<i>Multiple Intelligences Incorporated the Most in Assessment Practices</i>	91
<i>Summary</i>	94
<i>Multiple Intelligences Incorporated the Least in Assessment Practices</i>	95
<i>Summary</i>	96
<b>Conclusion</b>	96

## **CHAPTER 5: DISCUSSION**

<b>Introduction</b>	98
<b>Educators' Estimations of their Learners' Intelligences according to School Type</b>	98
<i>The Comparatively Lower Ratings of Intelligences in Previously Disadvantaged High School Types</i>	99
<i>Discourses of Disadvantage</i>	99
<i>Discourses of Difference</i>	100
<b>Educators' Perceptions of the Best Predictors of Overall Intelligence</b>	102
<i>Best Predictors of Overall Intelligence in Ex-Model C Primary Schools</i>	103
<i>Best Predictors of Overall Intelligence in Ex-Model C High Schools</i>	104
<i>Best Predictors of Overall Intelligence in Previously Disadvantaged High Schools</i>	106
<i>Best Predictors of Overall Intelligence in Previously Disadvantaged Primary Schools</i>	107
<i>Gender Differences in Best Predictors of Overall Intelligence</i>	108
<b>Educators' Views on Intelligence and Intelligence Testing</b>	109
<i>Intelligence Testing</i>	109
<i>Educators' Perceptions of Gender Differences in IQ</i>	110
<b>Intelligences Incorporated in Classroom Activity and Assessment Practices</b>	111
<b>Summary</b>	113

## **CHAPTER 6: CONCLUSION**

<b>Introduction</b>	115
<b>Background to the Study</b>	115
<b>Conclusions about the Research Questions and Hypotheses</b>	116
<b>Conclusions about the Research Problem</b>	118
<b>Implications for Theory</b>	119
<b>Implications for Policy and Practice</b>	120
<b>Implications for Future Research</b>	121
<b>Limitations of the Study</b>	122
<b>Conclusion</b>	124

<b>REFERENCES</b>	125
-------------------	-----

## **APPENDICES**

<b>Appendix A: Questionnaire: How intelligent are your learners?</b>	138
<b>Appendix B: The Gender Demographic in the Province of Kwa-Zulu Natal</b>	140



## LIST OF TABLES

Table 1:	Total number of male and female educators in the Province of Kwa-Zulu Natal as at 31.06.2006 (Adapted from Appendix 2).	59
Table 2:	Number of male and female educators reflected in the educator cohort of the present study.	59
Table 3:	Educators' estimates of male learners' multiple intelligences by school type.	68
Table 4:	Educators' estimates of female learners' multiple intelligences by school type.	70
Table 5:	Educators' best predictors of male learners' overall intelligence in Previously Disadvantaged High Schools.	73
Table 6:	Educators' best predictors of male learners' overall intelligence in Ex-Model C High Schools.	73
Table 7:	Educators' best predictors of male learners' overall intelligence in Previously Disadvantaged Primary Schools.	74
Table 8:	Educators' best predictors of male learners' overall intelligence in Ex-Model C Primary Schools.	74
Table 9:	Summary of best predictors of overall intelligence for male learners according to school type.	75
Table 10:	Educators' best predictors of female learners' overall intelligence in Previously Disadvantaged High Schools.	75
Table 11:	Educators' best predictors of female learners' overall intelligence In ex-Model C High Schools.	76
Table 12:	Educators' best predictors of female learners' overall intelligence in Previously Disadvantaged Primary Schools	76
Table 13:	Educators' best predictors of female learners' overall intelligence in Ex-Model C Primary Schools.	77
Table 14:	Summary of best predictors of overall intelligence for female learners according to school type.	77
Table 15:	Educators' responses to taking an IQ test or not.	79
Table 16:	Educators' Responses to whether IQ tests are a fair measure of intelligence.	80
Table 17:	Educators' Responses to whether males are more intelligent than females.	81
Table 18:	Educators' responses to whether IQ is inherited or not.	82
Table 19:	Educators' responses to whether IQ tests are useful in educational.	83
Table 20:	Educators' responses to whether some races are more intelligent than others.	84
Table 21:	Number of educators that selected verbal intelligence as the intelligence most used in classroom activity.	85

Table 22:	Number of educators that selected mathematical intelligence as the intelligence most used in classroom activity.	86
Table 23:	Number of educators that selected spatial intelligence as the intelligence most used in classroom activity.	86
Table 24:	Number of educators that selected musical intelligence as the intelligence most used in classroom activity.	87
Table 25:	Number of educators that selected interpersonal intelligence as the intelligence most used in classroom activity.	88
Table 26:	Number of educators that selected intrapersonal intelligence as the intelligence most used in classroom activity.	88
Table 27:	Cumulative percentages of intelligences tapped the most in classroom activity by educators according to school type.	89
Table 28:	Number of educators that selected verbal intelligence as the intelligence most used in classroom assessment.	91
Table 29:	Number of educators that selected mathematical intelligence as the intelligence most used in classroom assessment.	92
Table 30:	Number of educators that selected spatial intelligence as the intelligence most used in classroom assessment.	93
Table 31:	Cumulative percentages of intelligences tapped the most in assessment by educators according to school type.	94

## **LIST OF FIGURES**

Figure 1:	Number of Male & Female Educators in the Educator cohort of the present study.	60
Figure 2:	Educators' responses to, "Have you ever taken an intelligence test?"	79
Figure 3:	Educators' responses to, "Do you believe that they (IQ Tests) measure intelligence fairly well?"	80
Figure 4:	Educators' responses to, "Do you believe that males are on average more intelligent than females?"	81
Figure 5:	Educators' responses to, "Do you believe intelligence is primarily inherited?"	82
Figure 6:	Educators' responses to, "Do you believe IQ tests are useful in educational settings?"	83
Figure 7:	Educators' responses to, "Do you believe some races are more intelligent than others?"	84
Figure 8:	Cumulative percentages of intelligences tapped the most in classroom activity by educators according to school type.	89
Figure 9:	Cumulative percentages of intelligences incorporated the most in assessment by educators according to school type.	94

## CHAPTER ONE

### INTRODUCTION

#### **Background to the study**

The focus of the present study is the investigation of educators' implicit perceptions of intelligence. These are conceptions of intelligence that reside within the mind of these individuals and groups, possibly serving to organize their understanding and guide their actions (Sternberg, 1987, 2000, 2004; Armour-Thomas & Gopaul-McNicol, 1998) in terms of pedagogy. Educators are tasked with the development of male and female learner competencies predicated on a set of beliefs about the learner and what constitutes success or failure. Some of these beliefs are explicit as they are based on theories of intelligence that have informed educational policy and practice, while others are implicit perceptions of intelligence held by individuals. The present study aims to investigate educators' implicit perceptions of intelligence as they apply to male and female learners within different contexts of the South African schooling system demarcated as Previously Disadvantaged High, Previously Disadvantaged Primary, Ex-Model C High, and Ex-Model C Primary.

With the investigation of educators' perceptions of intelligence, the researcher hopes to inform an understanding of educators' conceptions about intelligence in different schooling contexts, and what are perceived to be valued competencies in different schooling contexts. The study also hopes to inform an understanding of the school gender dynamic as it is situated within the context of pedagogical attitudes and practices, so that both male and female learners can meet and experience equal learning opportunities and development.

#### *The Historical and Contemporary South African Educational Context*

Educational practice in South Africa was historically premised on a hegemonic Eurocentric Western model of education which conditioned society to associate intelligence with traditional school-based achievement and competencies (Soudien & Baxen, 1997; Mickelson, Nkomo & Smith, 2001). According to this perspective, the conceptions of intelligence, cognitive development and learning were driven by market forces that relied on achievement, individualism, competition, and merit. The rigidly prescriptive, linear and reductionistic

educational framework directed pedagogy into the terrains of standardization and uniform outcomes which served to classify learners as successes or failures.

This study falls within the context of the phasing in of Curriculum 2005, the National Curriculum Framework that was introduced into schools in January 1998. Curriculum 2005 encompasses a new approach to learning and teaching and was formulated to transform the education system so that it serves the interests of all South Africans in a democratic and equitable manner (Burger, 2005; Hartshorne, 1999; Smit, 2005). According to Legassick (2003), one of the positive features of Curriculum 2005 is the break away from the old authoritarian and rote learning styles of the past. What is welcomed is its commitment to equality in teaching (ibid.). In other words, educators are encouraged to be responsive to diverse learner characteristics and pluralistic social standards. Traditionally, academic competence was judged in large measure by what most learners at a specific developmental level could do and what society agreed to as necessary to succeed in a Western industrialized society. Human diversity and equity were secondary issues to the issue of curriculum delivery.

### *Contemporary Theories of Intelligence*

Contemporary research and theories of intelligence (Gardner, 1983; Sternberg, 1987) have rejected notions of intelligence as a single general ability and the notion of intelligence as fixed or stable. Broader conceptions of intelligence are propounded that recognize the dynamic and complex nature of intelligence. These conceptions further recognize the diversity of learner needs, learning styles, and cultural and environmental contexts that are dialectically related in the development of various competencies.

The present study is informed by Howard Gardner's Theory of Multiple Intelligences (1983). Gardner (ibid.) questions the traditional conceptions of intelligence as a general ability and challenges the focus on abilities that relate to success in school at the expense of cultural and social competencies. The Theory of Multiple Intelligence (MI Theory) represents a diverse view of intelligence suggesting a need to expand the spectrum of intelligences in school based programs or curricula. According to Gardner (1983), every child is capable of intellectual functioning in at least seven relatively autonomous intelligences with strengths or weaknesses in one or more areas. The multiple intelligences proposed are: (1) verbal/linguistic, as used in

reading a book or writing an essay; (2) logical/mathematical, as used in solving a mathematical problem; (3) spatial, as used in reading a map; (4) musical, as used in composing a symphony or singing a song; (5) bodily/kinaesthetic, as used in playing soccer; (6) intrapersonal, as used in understanding oneself; and (7) interpersonal, as used in interacting with others.

MI Theory has major implications for educational reform with the focus on recognizing diverse learner needs. Thus, a learner-centered pedagogy is proposed as opposed to a linear curriculum delivery. MI Theory encourages a perspective that educators are able to develop each child's dominant as well as less dominant intelligences. It informs pedagogical styles of teaching and assessment so that there is equitable recognition of all abilities. Educators are tasked with developing all intelligences as opposed to the traditional verbal and linguistic forms.

The seven intelligences proposed by Gardner (1983) have been utilized in studies investigating lay perceptions of male and female intelligence (Furnham, 2001; Furnham & Budhani, 2002; Rammstedt, Rammsayer & Thomas, 2001) by eliciting estimations (of self and other) of overall and multiple intelligences. Implicit theories of intelligence provide a window of understanding into how individuals direct and evaluate themselves and others, and what competencies are valued. According to Sternberg (1987), most instruction and assessment of intelligence is based on implicit rather than explicit theories of intelligence.

### *The Context of South African Schooling as it Relates to the Present Study*

The present study aims to investigate educators' perceptions of their male and female learners' overall and multiple intelligences. Educators from four distinctly different urban school types were selected for the purpose of the study. These included historically advantaged or so called *Ex-Model C High Schools* and *Ex-Model C Primary Schools*, and historically disadvantaged so called *Previously Disadvantaged High Schools* and *Previously Disadvantaged Primary Schools*. The school types will be delineated in terms of their characterization and historical legacies. The reason to draw the comparison was to determine whether educators from the distinctly different historical contexts and the two levels of schooling differed or shared similar conceptions of intelligence.

The South African learning environment inherited a fragmented system of education created by the apartheid government. Schools were racially structured with White schools being the most advantaged and Black schools, the most disadvantaged. A blatantly discriminatory and iniquitous system resulted in gross disparities in education. Schools serving learners of the White population group had more funding, better qualified educators, and superior facilities as compared to those schools that served Black learners (Mackenzie, 1993). This subsequently resulted in the Black education crisis. This was characterized by a shortage of schools for Black learners, a lack of physical resources and teaching aids, overcrowded classrooms, unqualified educators, and low levels of literacy and numeracy (Fiske & Ladd, 2004; Mackenzie, 1993; Steyn, 2003).

Education was used to legitimize racial classification, and the curriculum was used both implicitly and explicitly to perpetuate and validate racial separation and hierarchy with presumptions of White superiority and Black inferiority (Mickelson, Nkomo & Smith, 2001; Soudein & Baxen, 1997). Educational practice was designed to the advantage of a White Eurocentric minority with a complete disregard of the contextual socio-economic difficulties promoted by an apartheid ideology.

South African society has undergone substantial transformations however, it still remains highly stratified by gender, ethnicity and social class with pervasive inequalities (Mickelson, Nkomo, & Smith, 2001; Soudien & Sayed, 2003). Previously disadvantaged urban schools continue to constitute only Black educators and learners. The school type is still influenced by the disparities and procedures inherited from the apartheid past (Fiske & Ladd, 2004; Steyn, 2003). These disparities still exist in terms of physical resources and conditions, a shortage of qualified educators to teach specialized subjects such as mathematics and science, high learner-educator ratios, poor management and administration skills, and poor relationships between principal, educators, learners and parents (Steyn, 2003; Yamauchi, 2004).

In contrast Ex-Model C Schools that were largely advantaged under the apartheid era, continue to be so in terms of facilities, and material and human resources. There has been some degree of racial integration, although the catchment areas of schools usually fall within defined racial and class parameters, with mostly children from middle class socio-economic areas attending more advantaged schools (Fiske & Ladd, 2004; Steyn, 2003).

According to Yamauchi (2004), for the period 1996 to 2000, the inequity in school education did not change and in some cases the disparity increased for historically disadvantaged high schools. Lemon (2004) propounds that “class rather than race” is now the main determinant of educational opportunity (p.269). However, class and race in post apartheid South Africa are still not mutually exclusive.

In conclusion, at the heart of change in schools are the mediating perceptions of educators which would provide insight into the effectiveness of educational innovations. Educators take on a vital role in the development of learners’ intelligences. Their beliefs about intelligence have been found to influence what is valued as learning and opportunities to learn (De Witt & Booysen, 1995; Hopf & Hatzichristou, 1999). Thus, it becomes vital to engage in discourses that improve understandings of educators’ conceptions of intelligence. According to Bruner (1999) theories of pedagogy and the practice of education require engagement with educators’ implicit perceptions of intellectual development, teaching and learning and any innovation in education will involve understanding these theories.

### **Research Problems and Hypotheses**

The primary aim of the research was to investigate educators’ perceptions of their learners’ intelligence. The research sought to investigate whether comparative differences existed in the perceptions of educators from disadvantaged urban high and primary schools, and educators from advantaged urban high and primary schools in relation to their learners’ overall and multiple intelligences. It sought to investigate how educators from the different school types estimated the overall and multiple intelligences of their male and female learners; as well as the best predictors of overall intelligence for male and female learners as perceived by educators from the different school types.

### *Research Questions*

The research questions to be addressed by the study include the following:

- Do school type differences exist in the educator estimates of female learners’ overall and multiple intelligences?



- Do school type differences exist in the educator estimates of male learners' overall and multiple intelligences?
- What are the best predictors of learners' overall intelligence as perceived by educators from the different school types?
- What are educators' views with regard to intelligence in the different school types?
- Which are the multiple intelligences incorporated the most and the least in pedagogical practices?

### *Hypotheses*

The following hypotheses have been founded on the review of literature and past studies in the area of study:

H1: Educators from the advantaged school types will estimate their learners' overall and multiple intelligences higher than educators from disadvantaged school types.

H0: There will be no differences in terms of how educators from the different school types estimate their learners' overall and multiple intelligences.

H2: Intelligences traditionally associated with schooling, namely, logical/mathematical, verbal, and spatial intelligence, will be the significant predictors of male and female learners' overall intelligence as perceived by educators from the different school types.

H0: There will be no significant predictors of overall intelligence.

H3: The traditionally associated academic intelligences, namely, logical/mathematical and verbal intelligences, will be tapped the most in pedagogical practice.

H0: All of the intelligences will be tapped equally in pedagogical practice.

### **Justification for the Research**

Implicit theories of intelligence have taken on increasing significance in research (Sternberg, 1987, 2000; Furnham, 2001) as they provide an understanding of judgments and evaluations made about intelligence. These understandings may provide a framework for implementing

meaningful educational strategies that meet both universal and diverse standards of educational achievement.

### *The Rationale for Studying Educators' Perceptions of Intelligence*

Very few studies have actually explored educators' implicit perceptions of intelligence, especially within the South African context. A study conducted by Furnham and Budhani (2002) investigated sex differences in the estimated intelligence of school children in which they compared children's self-estimations with those of parents and educators. The rationale for including educators' estimates of learners' intelligences was that educators have the "potential for considerable influence over the children's self perceptions" (ibid., p.204). It has been demonstrated that biased expectancies can essentially affect reality and create self-fulfilling prophecies, educator expectations of learners being one of the most powerful predictors and influences of student achievement (Rosenthal & Jacobson, 1968).

Educator expectation refers to the predictions that are made about the future behaviour or academic achievement of learners, based on their implicit beliefs. The effect of educator expectation influences learner outcomes because of the actions that educators take in response to their own expectations (Deaux & Majors, 1987; Labouvie-Vief, Orwoll & Manion, 1995; Ryan & Ryan, 2005). Studies have indicated that educators' expectations play important roles in facilitating learner self perceptions regarding beliefs about purpose, competence and success, and these variables largely influence the individual's cognitive development and performance in an achievement context (Ryan & Ryan, 2005; McKay, 1994; Hopf & Hatzichristou, 1999). According to Furnham and Budhani (2002), it has been well accepted that educators' expectations and attitudes can influence the effectiveness of learning processes.

The present study compares educators' conceptions of intelligence in advantaged and disadvantaged schooling contexts. The justification for the demarcation of historically advantaged and disadvantaged school types was informed by studies that have documented significant effects of quality schooling (Baral & Das, 2004; Warwick, 2000) which have demonstrated that better facilities, recreational activities, physical space, as well as better methods of teaching and administrative policies lead to higher scores in academic reasoning ability and analytical skill.

Studies have demonstrated that the quality and quantity of formal schooling has a positive correlation to general cognitive ability (Falch & Sandgren, 2006; Husen & Tuijnman, 1991; Kamin, 1998; Mc Donald, 1998). Intelligence has been closely associated with Western educational success and these studies have shown that schooling confers on children the knowledge base and skills, especially the development of verbal and logical cognitive abilities, that are implicated in the observed changes in measured IQ.

The study aims to investigate whether educators in transitional educational contexts are influenced largely by Western conceptions of intelligence or more diverse conceptions of intelligence. The study also aims to investigate whether advantaged and disadvantaged schools are associated with differences in IQ estimations. These differences, if they exist may reflect actual differences in abilities of males and females in different school types or may suggest socialisation processes that have resulted in different perceptions of males and females. It may also reflect differences in conceptions of intelligence, or beliefs about what constitutes success or failure.

#### *Foundational studies*

Using the research methodology pioneered by Furnham (2000, 2001) and colleagues (Furnham & Baguma, 1999; Furnham & Budhani, 2002; Furnham & Mkhize, 2003), the study investigates educators' perceptions of their male and female learners' overall and multiple intelligences. One of the aims of the studies mentioned was to evaluate whether perceptions of male intellectual superiority were prevalent in school age children. These studies also investigated the best predictors of overall intelligence. Traditional Western intelligences which include verbal, spatial and mathematical intelligence have been found to have the closest correlations to overall intelligence (Furnham, 2000, 2001; Furnham & Budhani, 2002). These (ibid.) studies have indicated the prevalence of sex differences in estimates of intelligences with males receiving higher estimates (self and other) in mathematical and spatial intelligences (Furnham, 2000, 2001; Furnham & Baguma, 1999; Furnham & Budhani, 2002) and females receiving higher estimates for verbal intelligence and musical intelligence (Furnham, Clark & Bailey, 1999; Rammstedt & Rammsayer, 2002).

Gender and cultural differences in estimations of intelligences were also demonstrated in studies across cultures (Furnham & Baguma, 1999; Furnham, Callahan & Akande, 2004;

Furnham, Fong & Martin, 1999; Furnham, Mkhize & Mndaweni, 2004) demonstrating male and ethnic superiority in the estimation of intelligences. According to Furnham, Callahan and Akande (2004), results from studies of self estimated intelligence are important not only for the insight provided on lay theories of intelligence but also for understanding the “possible self-fulfilling nature of self-evaluations of ability” (p.286). Expectation effects of success or failure and ultimately of performance are embedded within social and educational processes which emanate from individual and group perceptions.

Drawing from the aims of the studies mentioned above, the present study seeks to investigate educators’ estimations and conceptions of intelligence for male and female learners in different historical and educational contexts. The variable of gender was used in previous studies to account for the findings which showed gender differences in perceptions of intelligence. However, this was not viable in the present study due to a preponderance of female educators in the different school types which reflects the gender disproportion of educators in the Province of Kwa-Zulu Natal (see Appendix 2).

### *The Purpose of Studying Gender Evaluations*

The evaluations of traits and abilities associated with different genders are problematic when individuals and groups decide that some traits and abilities associated with a particular group are inferior or superior to another. For example, mathematical and spatial intelligence which are male normative intelligences are highly valued in industrialized societies, implying the superiority of these male associated abilities. These perceptions and gender role expectations have been found to be perpetuated in socialization processes and educational practices with males and females receiving gender differentiated messages (Halpern, 1997; Hopf & Hatzichristou, 1999). Despite the efforts towards gender equity, gender stereotypes (beliefs about different genders) have been found to be perpetuated in pedagogical practices preventing girls from advancing their studies in a range of academic pursuits that are male-typed, predominantly mathematics and science (De Witt & Booyesen, 1995; Hopf & Hatzichristou, 1999; McKay, 1994; Smith, 2000). The present study aims to investigate the different predictors of overall intelligence, which may be associated with gender role expectations in different schooling contexts.

### *The Purpose of Studying Conceptions of Intelligence within the Educational Context*

Traditional conceptions of intelligence which have informed pedagogy and assessment still play an important role in our society's educational practices. However, they have come under increasing scrutiny in recent years. Many educators and stakeholders in education have questioned the extent to which traditional assessment practices measure behaviour as it occurs in the real world, outside of school (Gardner, 1983, 1993; Sternberg, 1987, 1997, 2004). The contemporary theories of intelligence, such as those proposed by Gardner (1983, 1993) and Sternberg (1987) encourage conceptually broader conceptions of intelligence to tap a wider range of competencies. These theories have informed the expanding interest in researching lay conceptions of intelligence in an attempt to understand what is fundamental to adaptation in different socio-cultural and educational settings.

Thus to conclude, the present study aims to investigate educators' perceptions of their learners' intelligences. A comparison is drawn between educators from historically disadvantaged school types that continue to face disparities in educational resources, and educators from advantaged school types, as well as primary and secondary levels of schooling. The study does not focus on causal hypotheses between variables but seeks to establish associations between variables. It is hoped that the results would provide insights into possible recommendations aimed at broadening conceptions of intelligence and a greater responsiveness to diverse learner needs. The intention is also to inform an understanding of perceptions of gender as it is situated within different educational contexts. The educational environment is an arena for change and transformation and the discourse on conceptions of intelligence is a pertinent point of departure.

## Definitions

**Assessment:** Within the context of traditional theories of intelligence, assessment is defined as a process of gathering evidence about an individual's performance on a given task and making interpretations and inferences about cognitive ability on the basis of such evidence for a variety of purposes. In schools the purpose of assessment is to determine whether the learner has achieved the required developmental outcomes to proceed into the next grade.

According to more contemporary theorists, like Gardner (1993), assessment is defined as a way to attain "information about the skills and potential of individuals, with the dual goals of providing useful feedback to the individuals and useful data to the surrounding community" (p. 174). The term is used in the traditional context when traditional theories of intelligence are discussed, and in the more contemporary context in relation to contemporary theories of intelligence.

**Black/White:** The terms 'Black' and 'White' are used to describe the ethnicity of educators from advantaged and disadvantaged school types and is not meant to uncritically refer to the classifications intended under apartheid. It is made necessary with regard to the historical legacy of inequality among the racial groups.

**Ex-Model C Schools:** Ex-Model C Schools were state-aided schools that were historically advantaged and that promoted racial segregation. They continue to be state-aided and have higher fee rates in order to provide the kinds of human and physical resources that are necessary to sustain the high academic quality of the institution.

**Intelligence:** Intelligence is varied in its conceptions and definitions and the construct requires interpretation in the correct epistemological context. It is defined in its narrow traditional sense as a fixed general ability that can be quantified using standardized tests of ability. Contemporary theories of intelligence (Gardner, 1983, 1993; Sternberg, 1987) define the construct more broadly to incorporate a range of different competencies and abilities that are context and culture dependent. Gardner defines intelligence as "the capacity to solve problems or to fashion products that are valued in one or more cultural settings" (Gardner & Hatch, 1989, p.5). In this regard, he argues for a cultural as well as a biological basis for multiple intelligences. In reference to intelligence in the study, other terms including cognitive abilities, aptitudes, and competencies may be used.

**Intelligent Quotient or IQ:** A standardized score on a particular mental test, e.g. The Wechsler, which represents a form of assessment that is designed to enable systematic observation of individual and group differences.

**Internalization:** Cultural activity appears on the social plane and then on the psychological plane. First it appears between people as an inter-psychological category and then within the individual child as an intra-psychological category. Internalisation transforms the process itself and changes its structure and functions (Vygotsky, 1978).

**Modern/Modernity:** Derived from Modernization theories that hold that educational institutions are secular national institutions that serve economic growth and political stability.

**Pedagogy:** The aspects of teaching that require an understanding of learning and content knowledge together to develop effective teaching practice and assessment.

**Previously Disadvantaged Schools:** This term is used to describe the historically disadvantaged schools attended by Black learners. This school type continues to bear the disadvantage as has been noted by Yamauchi (2004) who asserts that even after apartheid, Black and White schools are still unequal in South Africa.

### **Delimitations of Scope of the Study**

The key delimiting factors of the study are the school types from which the samples of educators were derived. The unambiguous demarcation of the two historically advantaged and disadvantaged school types, and the levels that educators taught at provided a secure basis for planning the study, reporting its findings and assessing its reliability. The geographical delimitation was the Province of Kwa-Zulu Natal, Midlands region, which included the regions of Howick, Hilton, Pietermaritzburg, Edendale, Wartburg, and Sobantu.

The sample of educators from Disadvantaged Schools represented a more homogenous element (only Black South African educators), however the sample derived from Ex-Model C Schools may be less homogenous but largely constituted White South African educators. Furthermore, due to the gender disproportion in the study, the findings may be reflective of the perceptions of a largely female educator cohort, especially in the case of primary schools.

## **Outline of Thesis**

What follows is a brief outline of each chapter of the thesis.

Chapter One forms the introductory chapter of the thesis outlining the background for the present study with particular emphasis on education in the South African context. The research questions and hypotheses are explicated followed by a brief justification for the study. The methodology is briefly described and certain concepts used in the thesis are defined. The delimitations of the study follow. Chapter Two provides a critical review of the literature in the area of intelligence and places the construct of intelligence within a particular historical and contemporary perspective that lends insight into its place in the educational context. Theories of intelligence are explicated. The literature review also addresses the discourse on intelligence as it relates to culture, race, class, gender, and schooling. Chapter Three describes the research design and methodology used to collect the data from the sample population used in the study. Chapter Four presents the patterns of results that were revealed from the analysis of the data. Chapter Five discusses the results attained in the previous chapter in the context of the research problem, questions and hypotheses. It uses supporting theories and past research studies to address the research problems identified, and refute or accept the hypotheses of the study. Chapter Six concludes with a brief background to the study and the conclusions arrived at with regard to the research problem and the research questions. It discusses implications for theory, policy and practice, and future research, and the limitations of the study.

## **Conclusion**

This introductory chapter has laid the foundations for the study on Educators' Perceptions of Learners' Intelligences. It introduced the aim of the research, the research problems, and presented the hypotheses. The background of the research contextualised the study within the South African context of schooling to ensure clarity in terms of the school types demarcated by the researcher. The research was justified, definitions were presented, and the methodology was briefly described. The study was outlined and the delimitations were provided. On these foundations, the study can proceed with a review of the literature that pertains to the area of study.



## CHAPTER TWO

### LITERATURE REVIEW

#### Introduction

The objective of this chapter is to survey and critically comment on the literature on historical and contemporary theories of intelligence and how these have impacted on conceptions of intelligence, with special emphasis on schooling. The literature review focuses on the historical development of the construct of intelligence and intelligence testing. Implicit theories of intelligence are discussed in terms of their epistemology and their influence on learning. The key theories of intelligence will also be discussed ranging from the traditional psychometric approaches and developmental approaches to the more contemporary approaches. The literature review also describes the progressive development of the intelligence discourse as it relates to culture, race, gender, social class and schooling.

#### *The Historical Development of the Construct of Intelligence and Intelligence Testing*

Historically, the construct of intelligence emerged out of a distinctive Western Eurocentric cultural context with subsequent implications for education and educational practice. The popular conception that informed education was largely influenced by traditional unitary conceptions of intelligence. Society was conditioned to associate general cognitive ability with school-based achievement and the intelligence test took on increasing significance. The popular belief was that intelligence tests measured the innate capacity or potential of the learner.

Compulsory schooling for the masses in Europe motivated an interest in the need to distinguish individual cognitive ability. In 1904, the French psychologist, Alfred Binet was provided with the impetus to formulate a diagnostic test that could be used to differentiate between school children of normal ability and children who were too weak to benefit from the curriculum, and therefore in need of special intervention (Howe, 1997; Kaufman, 1990; Warwick, 2000). The tests were produced with the express purpose of predicting scholastic ability.

Revisions of the test like the Binet-Simon scale comprised a variety of tasks that were thought to be representative of typical children's abilities at various ages, devising norms within a very specific Western cultural experience. The intellectual ability of the child was calculated by subtracting the mental age from the child's actual age or chronological age. After many revisions, the Stanford-Binet test emerged in conjunction with the intelligent quotient (IQ), or ratio between mental age and chronological age. The purpose of this scale of normal functioning was to compare children's mental abilities to those of their normal peers. However, what was originally used to discover intellectual shortcomings or weaknesses to assist in augmenting the learning process, quickly became an instrument to rank students (Anastasi, 1990).

The intelligence test found its efficacy in evaluation and diagnosis within child development practices, and predicting different occupations for adults with different intellectual potential. Correlations between IQ and school achievement demonstrated the best evidence of validity, and it was demonstrated to be a good predictor not only of academic achievement but also of lower criminality, better mental health, lower rates of marital failure, and higher rates of occupational attainment (Kaufman 1990; Miller, 2004). It was used not only to decisively stratify the work sphere with the 'most intelligent' individuals procuring the best jobs, but also led to the construction of an educational system capable of discovering cognitive ability and matching it with opportunity for advancement.

The method of factor analysis contributed to the development of heterogeneous test batteries that provided separate scores for abilities such as verbal comprehension, arithmetic reasoning, numerical aptitude, spatial visualisation and perceptual speed, and revealed a global score or total IQ score. This advancement in understanding the construct of intelligence led to David Wechsler's contribution of the dual Verbal and Performance approach to intellectual assessment (Kaufman, 1990).

Unlike the Stanford-Binet scale which determined the intelligence of children by comparing the mental age derived from test results with chronological age, the 1939 Wechsler-Bellevue Adult Intelligence Scale adopted the principle of the deviation IQ which converted raw scores to scaled scores, with a population mean of 10 for subtests and standard deviation of 3; while the global IQ had a population mean of 100 with a standard deviation of 15. This means that two-thirds of the population will lie within one standard deviation of the mean. The

distinctive profile that emerged out of such a test became far more useful in providing information about strengths and weaknesses (Neisser et al., 1996).

However, even though the predictive power of IQ measures of specific adaptive outcomes became an important index of the validity of conceptions of intelligence, its limitations were apparent in that intelligence tests were culturally biased, and did not constitute a valid test of intelligence (Anastasi, 1990; Foxcroft, 2002; Miller, 2004).

The intelligence test went on to enjoy growing popularity until the controversy that heightened in the sixties brought the realisation that IQ testing limited the range of human abilities and also led to group bias. Miller (2004) describes how the narrow constructs tapped by IQ tests privileged only groups who displayed these types of abilities and disadvantaged other groups who displayed abilities valued for their adaptive experience. The intelligence test discourse that emerged from this period led to fundamental assumptions about the IQ test. However, three relevant issues require some clarification before these assumptions are outlined. These include the 'g' factor or general cognitive ability; the nature/nurture debate; and the IQ test within the context of schooling.

### *General Cognitive Ability – the g Factor*

The theoretical development of intelligence reflected the strong influence of the positivist era and found its niche within the Psychometric tradition of standardized measures of intelligence, and more definitively with the intelligence quotient or IQ. Intelligence theory was historically rooted in the belief that differences in cognitive ability lay in individuals' inherent qualities rather than in their experiences.

Intelligence was traditionally defined as “scores on cognitive tests, including standard intelligence tests and factors from tests of specific cognitive abilities” (Sternberg & Grigorenko, 1997, p.4). The IQ score which was a measure of intelligence represented an underlying quality that facilitated an individual to succeed at these tests and similar mental and problem solving tasks. Intelligence came to be most commonly associated with *general* intelligence which the intelligence quotient was most strongly correlated to.

Charles Spearman, an innovative thinker in the field of intelligence, came up with a Two-factor theory of intelligence, a general factor and specific factors. According to the Two-

factor theory of intelligence, all mental abilities were manifestations of a single general ability which he called *g*, which was available to the same individual to the same degree for all intellectual acts, and of 'specific factors' which were depended on the particular task and which varied in strength (Armour-Thomas & Gopaul-McNicol, 1998; Howe, 1997; Warwick, 2000). General intelligence or *g* was believed to measure overall cognitive intelligence which was genetically inherited.

According to Jensen (1987), the *g* factor reflected mostly genetically conditioned or innate individual differences and tended to sift out most of the environmental variance leading him to conclude that approximately 20% of the variance in IQ is attributable to environmental influences and 80% to heredity.

The aim of intelligence testing was predictability thus the implication was that if one knew how an individual performed on one task that was highly weighted with *g*, one could confidently predict a similar level of performance for another highly *g* weighted task. Thus, a *g* estimate became very significant descriptive information to have about an individual's intellectual ability.

Reviews of the status of *g* have discounted it as simply another statistically inaccurate attempt at measuring a construct that is diversely defined and therefore insubstantive (Bouchard, 1997; Gardner, 1983; Howe, 1997; Sternberg, 1997). It has been suggested that the general factor resulted largely because the tests were limited to a class of fairly academic and narrow tasks which weakened when a broader range of tasks were utilized. Proponents for the usefulness of *g* saw its function in determining the cognitive ability of an individual reared under a "normal range of circumstances" (Bouchard, 1997, p. 128). The implication was that environmental variations, like cultural and educational contexts could impact on one's general cognitive ability.

### *Nature and Nurture*

One of the most controversial issues in intelligence theory is the nature (heredity) and nurture (environment) debate. The earliest differential psychologists to address the question of differences in cognitive ability tended toward either nature or nurture. The Environmentalists believed that intelligence developed due to the environment in which an individual is born and bred, and thus purported the importance of parental child rearing styles, life experiences

and the environment as important determinants of a child's intellectual development. Hereditary theorists believed that intelligence was inherited and saw the major source of intellectual difference as originating from genetic differences. Contemporary research has veered away from the reductionistic paradigm of either subscribing to the Nature theories or the Nurture theories, and has sought to understand the complex interaction that is essential in the development of intellectual ability (Neisser et al., 1996; Sternberg & Grigorenko, 1997, 2004; Gardner, 1995; Warwick, 2000). According to Matsumoto (2004), the challenge in future research is to find how both biological variables and environmental variables work together to produce the real differences and similarities observed across individuals and groups.

Variations in IQ scores were supported by empirical evidence that attributed individual and group differences to genetic factors (Hernnstein & Murray, 1995; Jensen, 1969). The misconception that was supported by these studies was that hereditary means consistent, stable, or unchangeable, implying no need for ameliorative programmes. However, evidence offered by Flynn (1987) presented a dilemma to the above beliefs. What became known as the "Flynn effect" refers to the fact that throughout the world, average IQ test scores have been increasing steadily over time (Kamin, 1998; Mc Donald, 1998; Husen & Tuijnman, 1991).

The "Flynn effect" challenged the determinism of Hereditarianism by demonstrating the continued generational rise of IQ test scores. The average rate of rise appeared to be around three IQ points every ten years and was put down to improved nutrition, better education, prenatal care and smaller family units (Kamin, 1998; Wang et al., 2004).

A wide range of environmental factors have been found to impact on the development of intelligence. Research has indicated a correlation between nutrition and intellect. Links have been made to prolonged malnutrition and long term intellectual deficiency, and micronutrient supplementation and IQ increases however, this area needs further exploration (Eysenck & Schoenthaler, 1997).

More contemporary views of intelligence recognize that both hereditary and the environment play a role in the development of intelligence. Bidell and Fischer (1997) propose the framework of *constructive epigenesis* which views hereditary and environment as intrinsically

connected integrative systems. The development of intellectual ability is determined by the dynamic constructive activity of many participating systems which include the “biological, cognitive-behavioral and socio-cultural level” (p. 236). Changes in such systems are a product of self-organizing activity consistent with a particular history and context of a given developmental process.

The framework lends insight into the complex pathway to the development of intellectual abilities. The perspective also emphasizes the importance of human agency. Individuals are seen to be active participants as they adapt to the environment as well as transform the environment.

These theories have significant implications for educational practice which include the need for intervention programmes to consider cognitive ability as an expression of the dynamic biological and socio-cultural interaction process. Thus, pedagogical processes need to incorporate the learner as an active, socially and culturally directive participant. Cognitive development needs to be viewed as part of a process of changing contexts rather than a linear, didactic process of exchange.

### *The IQ Score and Schooling*

The implications purported by the traditional conceptions of intelligence, namely in terms of it being largely fixed and inherent, subsequently led to the question of the effects of formal schooling on IQ and intelligence. Jensen (1969) unequivocally expressed the view that compensatory education is unsuccessful, implying the ineffectiveness of intervention in schooling programmes. Herrnstein and Murray (1996) supported this view in *The Bell Curve* stating, “the goal of raising intelligence among school-age children more than modestly, and doing so consistently and affordably, remains out of reach” (p. 402). These views did not accommodate for the view that intelligence reflects various mental abilities that have been acquired. However, evidence offered by Flynn (1987) demonstrated that the average IQ test scores have been increasing steadily over time (Kamin, 1998; Mc Donald, 1998; Husen & Tuijnman, 1991).

Flynn (1987) questioned what IQ tests measured and concluded that they “do not measure intelligence but rather a correlate with a weak causal link to intelligence” (p. 190). He attributed the huge generational changes in IQ to environmental effects. Numerous studies

have proven that formal schooling has a positive correlation with IQ scores leading to the conclusion that IQ tests are heavily dependent upon the level and quality of formal schooling (Kamin, 1998; Mc Donald, 1998; Husen & Tuijnman, 1991). These studies have shown that schooling provides children with the academic knowledge base and skills, especially the development of verbal and logical cognitive abilities that are implicated in the observed changes in measured IQ.

The quality and level of schooling have been demonstrated to promote the development of significant intellectual skills (Neisser et al., 1996; Kamin, 1998; Mc Donald, 1998; Husen & Tuijnman, 1991). Significant effects of quality schooling have been documented (Baral & Das, 2004; Warwick, 2000) which have demonstrated that better facilities, recreational activities, physical space, as well as better methods of teaching and administrative policies lead to a higher scores in academic reasoning ability and analytical skill. Falch and Sandgren (2006) also found that cognitive ability as measured by IQ tests is positively affected by education. In other words the quantity of schooling influences general intelligence or competencies associated with academic intelligence.

The norms on standardised tests have also been questioned as IQ tests incorporate age by means of age norms. The groups of school children on whom these norms are created are age groups often at intervals of one month, across the range of ages for which the test is designed. If a final score on any kind of test is a dual one derived by altering the item score in accordance with the measurement of chronological age then it suggests the hereditarianism hypothesis that supports the idea of a fixed intellectual ability about which predictions can be made (Mc Donald, 1998). The scoring systems of IQ tests are based on the belief that age in class or grade reflects individual ability. However, Cahan and Cohen (1989) have demonstrated that when age in class is controlled, IQ tests standardised on school children measure the effects of the level of schooling rather than developmental age, or length of schooling.

The question has also arisen as to the justification for keeping children back in a class or grade, especially in primary schools, until they are developmentally ready according to age norms. The general conclusion from studies cited in Mc Donald (1998), and Cahan and Cohen (1989) is that once children are in the third or fourth year of schooling any initial differences in performance between younger and older children are levelled out proving that children perform at the level at which they are placed.

Thus, these and many other studies have demonstrated the obsolescence of the age norms that are utilized in IQ tests. Standardisation and standardised testing have also infused educational curricula and assessment, informing the beliefs and assumptions of educators. Academic assessment, very much like the IQ score became linked to the learner's identity which was often assigned to the learner. School assessment procedures operated under the principle of standardisation where all learners were subjected to the same criterion measures. However, the traditional belief that culminated from Hereditarianism that intelligence test scores remain constant throughout life, presented a dilemma when studies began to offer findings of increases in IQ scores (Flynn, 1987) and the impact of environmental factors on these scores (Kamin, 1998; Mc Donald, 1998; Husen & Tuijnman, 1991).

### *Contemporary Assessment of Intelligence*

Cross-cultural studies and an awareness of the limitations of standardized testing provided the impetus for a radical paradigm shift with more empirical sensitivity and a greater scientific depth in the understanding of intelligence. Studies have shown that cultural variations resulted in variations in valued cognitive competencies (Anastasi, 1990; Armour-Thomas & Gopaul-McNicol, 1998, Sternberg & Grigorenko, 2004).

The cultural practice of traditional intelligence assessment falls within a particular cultural framework. Consequently, variations in cultural content and form were disregarded largely resulting in tests being culturally biased and losing validity. The ethical considerations of intelligence testing thus came under serious scrutiny in the twentieth century.

During the colonial era in Africa, intelligence testing was unethically utilized to limit Black children's access to education and educational advancement (Serpell & Haynes, 2004). The distortion created by the use of psychometric tests provided the impetus for cross-cultural research in several indigenous African cultures. This incited the need for a critical evaluation of standardized scales and their appropriateness to indigenous contexts.

New conceptions of intelligence included a combination of abilities and competencies required for survival and advancement within a particular culture in a purposeful manner (Anastasi, 1990; Armour-Thomas & Gopaul-McNicol, 1998; Howe, 1997). It was formulated that intelligence should be regarded as a descriptive rather than as an explanatory concept and that intelligence tests provided useful information with regard to an individual's level of



ability at a particular point in time in a particular cultural context. It was also recommended that the goal of testing should be to assist the individual by contributing to the individual's self understanding and personal development. Thus, the focus of assessment should be the individual rather than comparative test scores.

The research that culminated questioned the ethics of using tests developed in a Western context, in multicultural contexts (Foxcroft, 2002). Contemporary conceptions of intelligence needed to take into account intellectual competencies that were valued in adapting to different social and cultural contexts. The assessment context needed to consider using age appropriate indigenous norms ethically, being sensitive to background factors such as cultural or socio-economic backgrounds, and providing meaningful or practical feedback that would benefit the group (Foxcroft, 2002).

Western tests of intelligence are still used to a large degree in multicultural contexts however, it has become widely recognized by scientists that the function of assessment should be to identify individual strengths and needs within a differentiated profile of competencies. The information is recommended to be utilized for supportive intervention and monitoring development within the individual's own performance goals (Serpell & Haynes, 2004).

### **Conceptions of Intelligence**

Intelligence has been defined and studied under a number of different labels including cognitive abilities, aptitudes and more recently competencies. However, what has been most apparent about the construct is the diverse conceptions of intelligence that are steeped in particular beliefs, interests and experiences that may be explicit or implicit, objective or subjective. Objective conceptions of intelligence are developed from expert observations of intellectual differences resulting in theories of intelligence that may inform policy and practice. Subjective conceptions develop from preconceived ideas or beliefs that form a framework for understanding intelligence and are referred to as lay theories of intelligence. These are contingent on social or cultural beliefs and assumptions, and from explicit theories of intelligence that reflect the personal qualities of individuals.

Traditional Western conceptions of intelligence predominated most of the world with the emphasis on explicit cognitive competence. Global education and mass schooling also took

on a Western bias with the emphasis on individualization and competition. Studies of implicit theories of intelligence exposed lay conceptions of intelligence that have shown considerable deviations from the normative popular conceptions of intelligence. Lay conceptions have been found to provide a framework for understanding how people make judgments with regard to their own and others' intelligence. In schools, educators are required to make judgments about their learners' performances based on both explicit formal criteria laid down by the national curriculum, as well as their own implicit conceptions of intelligence.

### *Implicit Theories of Intelligence*

Sternberg (2000, 2002, 2004; Sternberg & Grigorenko, 2004) has pioneered studies in implicit theories of intelligence. Explicit objective theories appear to carry more credence since they are based on scientific observation of tasks presumed to measure intelligent functioning however; implicit theories have provided a window of understanding into diverse conceptions of intelligence (Sternberg, 2000, 2004; Armour-Thomas & Gopaul-McNicol, 1998). Implicit theories provide insight into how people direct and evaluate themselves and others. It facilitates an understanding of diverse social and cultural conceptions of intelligence, and how competencies are shaped and developed.

Cross-cultural studies of intelligence have revealed that Western notions of intelligence are not shared by other cultures (Sternberg, 2000, Sternberg & Grigorenko, 2004; Sternberg, 2004, Mpofu, 2002, 2004; Baral & Das, 2004). According to Sternberg (1987), although differences are evident in people's implicit theories of intelligence across groups and within cultures, a common core runs through the belief systems of individuals in all groups in what he calls "mainstream culture" (p.66). The common core identified in Western lay conceptions of intelligence include: (1) practical problem solving, (2) verbal ability, (3) social competence, and (4) a motivational factor. He (ibid.) has also found laypersons' conceptions of intelligence to be similar to those of experts, with the two groups agreeing to what behaviors were characteristic of and important in defining the ideally intelligent person.

Differences amongst cultures in conceptions of intelligence have been recognized for some time now. The knowledge of the physical world and cognitive functioning valued by the West has been contrasted with Eastern and African conceptions of intelligence where explicit knowledge of the social and spiritual world are valued (Li, 2001; Baral & Das, 2004; Mpofu,

2004). In Indian (Baral & Das, 2004), Japanese (Sato, Namiki, & Hatano, 2004) and Chinese (Shi, 2004) cultures, effort is considered to be the most important factor in the acquisition of knowledge, skills and in success in life, and intellectual development is considered a product of social forces. In African cultures (Mpofu, 2004; Serpell & Haynes, 2004; Sternberg & Grigorenko, 2004), interpersonal relationships and social responsibility are seen as important characteristics of intelligence. In Zambia, intelligent children were expected to be respectful to adults; and in Kenya, parents emphasized responsible participation in family and social life as important aspects of intelligence (Serpell, 1974, 1977, 1982 cited in Sternberg & Grigorenko, 2004). Thus, African and Eastern conceptions of intelligence have been found to be context oriented emphasizing the adaptive potential of individuals in different aspects of life.

In some sub-cultures these conceptions of intelligence may differ as a result of Western influences of modernity. It has been found that Ugandan educators and groups influenced by Western ideas characterized intelligence in terms of task completion speed (Wober, 1974 cited in Armour-Thomas & Gopaul, 1998), and in Kenya, fluency and quickness in verbal comprehension on complex tasks and interpersonal relationships were applied to children (Super, 1983 cited in Armour-Thomas & Gopaul, 1998).

Both implicit and explicit theories play a substantive role in how educators perceive and discriminate their learners, and how they estimate their ability to intervene for the purpose of their educational aims. Sternberg (1987) asserts that most assessment and instruction of intelligence in the real world are based on implicit rather than explicit theories. A study by Fry (1984, cited in Sternberg, 2000) investigated primary, secondary, and tertiary level educators' conceptions of intelligence. It was found that primary level educators emphasized social factors such as popularity, friendliness, respect for norms and an interest in the environment; while secondary level educators emphasized verbal factors such as verbal fluency and energy. Tertiary level educators emphasized cognitive factors such as reasoning ability and applying knowledge.

Parents and educators may differ in their conceptions of intelligence, especially if there are cultural or socio-economic differences. A study in the United States found that educators representing the more dominant culture gave more emphasis to cognitive factors than to the social factors that were emphasized by parents (Sternberg & Grigorenko, 2004).

Furthermore, the study demonstrated that educators had a tendency to reward those children who were socialized into a view of intelligence that matched that of the educator.

Thus, the study of implicit theories of intelligence fosters the awareness that there is no universal concept of intelligence. It also provides an understanding that cultural and group variations in notions of intelligence provide important frameworks in the understanding of how individuals evaluate themselves and others. Implicit theories have served to question the hegemony of Western theories of intelligence that are rooted in a positivist notion of knowledge and an empiricist approach toward its understanding. Implicit theories of intelligence may also inform educational practices in terms of what is valued as learning, opportunities to learn, and the way information is learned.

### *Theories of Intelligence*

What follows is an explication of some of the theories of intelligence that have influenced notions of intelligence in the educational arena. The Psychometric theory of intelligence is one of the most pervasive objective theories to have influenced pedagogical practice and assessment. Two developmental theories that have augmented the understanding of cognitive development are Piaget's (1972) *Genetic Epistemology* and Vygotsky's (1978) *Socio-Cultural Theory*, and two contemporary theories that have made an impact on the educational discourse include that of Gardner's (1983) Theory of Multiple Intelligence and Sternberg's (1985) Triarchic Theory of Human Intelligence. Conceptions of intelligence as a multifaceted construct have surfaced in recent years. These more contemporary theories view intelligence as a cognitive process that develops within a particular social and cultural context.

### *The Psychometric Approach*

The Psychometric approach has already been elucidated as one of the pioneering theories in the understanding of intelligence, leading to the development of intelligence testing and ability testing in schools. The aim was to allow educators and other decision makers to specify the intellectual and thinking abilities of individuals either for the sake of further augmenting these abilities or for the selection of individuals for various educational and occupational opportunities. However, over the years intelligence testing has been exposed for its inherent flaws and limitations, leading to questions pertaining to what it was that was

actually tested, cultural bias, invalid norms and hidden agendas. Some of these have already been mentioned.

The task force commissioned by the American Psychological Association with reviewing the intelligence debate (Neisser et al., 1996) concluded: “The psychometric approach is the oldest and best established, but others also have much to contribute. We should be open to the possibility that our understanding of intelligence in the future will be rather different from what it is today” (p.80). This statement not only acknowledges the value of the psychometric approach but also recognises the need for such approaches to take cognisance of changing contexts and needs that emerge out of a diverse, dynamic and global environment.

Cognitive assessment that is used within an appropriate context can become a valuable tool that may be used to enrich the understanding of an individual. In the school context, they may be used to determine a student’s current level of academic performance however; the psychometric approach does not specify mental processes in such a way as to guide instruction (Sternberg, 1997).

A recent innovation in the domain of testing is the practice of dynamic assessment (Demetriou & Papadopoulos, 2004; Sternberg, 2004). The approach suggests that children require support to demonstrate their full potential, thus learning opportunities within the context of testing are provided to enable learning to occur. Dynamic assessment is based on Vygotsky’s (1978) zone of proximal development, which characterizes the difference between one’s actual developmental level and one’s potential capability, and is formulated on the notion that cognitive abilities are modifiable with appropriate feedback and support. Contemporary assessment appears to be moving in this direction in contemporary educational contexts.

### *Piaget’s Genetic Epistemology*

Jean Piaget (1972) developed a theory that viewed children as passing through stages of thinking. Piaget appeared uninterested in individual cognitive differences and instead focused on the qualitative characteristics of intelligence at the different stages of development. The focus of the theory was always placed on the epistemic subject, or the characteristics common to the ideal subject at a particular developmental age. He posited that as children interact

with the environment, they organise information into existing mental structures and form new mental structures to integrate information.

In Piaget's stages of cognitive development, *sensory-motor*, *concrete operational* and *formal operational*, each stage is based on an increasingly complex process of tasks that need to be built upon consecutively. The child progresses from egocentricity and subjectivity to an awareness of her own thinking and the ability to distinguish between the subjective experience and the external reality. Thus, increasingly complex intellectual processes are built on the foundations laid in earlier stages of development.

Implications for educational practice meant that educational outcomes were matched to these developmental stages which were used as universal laws for cognitive development. However, the use of these universal stages of development has been cautioned against. Research has shown that intellectual capacities develop at different rates and the development of these capacities is dependent on the environmental context that facilitates unique development (Gammage, 1982; Gardner, 1991). Traditional school curricula subscribed to these stages associated with age. However, different ages may operate at different levels of thinking depending on the developmental and experiential context.

According to Neisser et al. (1996), Piaget's stages of development can serve as measures of individual difference, thus correlating quite well with standardized tests and sharing its culture-specific concept of intelligence. Cross-cultural research has shown that cognitive performance is not immune to cultural context. For example, a culture may value the child's capacity for social responsibility above the need to develop abstract reasoning capacities.

Thus using developmental stages as benchmarks to guide instruction and outcomes becomes limiting as they disregard individual needs and culture specific competencies that may be required for adaptation. The perception is that intellectual development is both interactive and a cumulative process. The danger is that educators can become trapped in Piagetian rhetoric losing the need for more autonomous forms of learning and learner guided directions. Thus, these collective constructs can serve to limit pedagogical practice and assessment.

### *Vygotsky's Socio-Cultural Theory of Mind*

Lev Vygotsky (1978, 1986) studied human cognitive functioning from a developmental perspective. Vygotsky (ibid.) emphasized the importance of socio-cultural mediation in the understanding of thinking and its development. From this perspective, the process of cultural mediation includes learning that occurs in the given context as well as how one functions cognitively (p.141). Thus, intelligence would be seen as a characteristic of the child as well as the activities of the child with others. According to Vygotsky (ibid.), the sequence of ages, as he called it, are determined by the interaction between children's existing and emerging competencies on the one hand and their social situation of development on the other. Vygotsky's theory has attracted attention as it provides an alternative to classical psychological approaches that disregarded the role of social factors in the development of intelligence.

Vygotsky saw the socio-cultural context shaped by historically evolved tools and sign systems (especially language) as central to the understanding of cognitive development. The individual behaves in a way that is cognitively useful for adaptation within this context. The theory is primarily applicable to the formal school setting. Many authors (Gauvain & Cole, 2000; Grigorenko, 2004) saw the theory as outlining a psychology of pedagogy.

The social organization of pedagogy which is central to the educational process provides a socialization of children's thinking. The school discourse uses symbol systems like language in classroom interactions. The educator who acts as the facilitator of meaning-making mediates the development of the individual cognitive process. The process of internalization occurs through imitation and the modeling of language and non-verbal symbols where the external and social become internal to the individual. According to Meadows (1993), "internalization brings about the socio-cultural determination of the human mind as the cultures' psychological tools become involved in controlling one's own mental processes" (p. 246). Thus, one's perceptions, cognitions, ideations, emotions and symbols are all formulated as a result of the dialectical relationship that exists between the individual's socio-cultural environment and the meaning given to this context.

According to Vygotsky (1986), the development of thinking is closely related to a child's education and a child's education is the result of a child-adult relationship that borders her

“zone of proximal development.” The zone of proximal development can best be understood in terms of the actual developmental level of the child and the potential development. The actual level of development can be changed. Learning thus stimulates cognitive functions that are still in a state of maturation. Thus, in the zone of proximal development, a child can change her level of achievement as a result of the collaboration with the more knowledgeable educator. The role of the educator who is knowledgeable of the skills, strategies and processes for effective learning is to scaffold the process so that internalization takes place. Moll and Whitmore (1993), neo-Vygotsky theorists, propose the existence of a “collective” zone of proximal development in schools with the understanding that the learning system is mutually and actively created by educators and learners mediating the continuous and fluid learning process.

The Vygotsky approach promotes the awareness that learning and intellectual developments are embedded in the history and socio-cultural orientation of the individual, and this orientation reflects the educational outcomes needed for success in the schooling context. According to Vygotsky (1978), the role of the educator encompasses more than organizing a child’s personal experience. It requires the educator to have expert subject knowledge that enables the support that is informed by the child’s individual needs. The traditional notion of knowledge as fixed and outside the experience of the child limits and stunts the mediating process. The theory draws on the general critique of Western conceptions of intelligence which disregards indigenous forms of knowledge however, the theory does not provide a framework for educators to structure activities to enable new content to be mastered.

### *The Theory of Multiple Intelligences*

Gardner’s (1983, 1995) work has been vital in challenging the traditional conceptions of intelligence as fixed and unchanging and has given rise to new waves of change within the educational system. The theory questions the conceptualization of intelligence as a general ability and challenges the traditional IQ test focus on abilities that relate to success in school at the expense of abilities that tap creativity, or practical intelligence or emotional intelligence. Howard Gardner’s (1983) Theory of Multiple Intelligences (MI Theory) contextualizes intelligence through multiple symbol systems. Gardner (1983, 1999) asserts that there is no single, unified intelligence but rather several distinctly different, independent, and modular intelligences that support separate kinds of learning and mental processes.



According to Gardner (1983), every child is capable of intellectual functioning in at least seven relatively autonomous domains, and they may have strengths or weaknesses in one or more areas.

The theory of Multiple intelligences is seen as a meaningful way to account for the knowledge that, “we are not all the same, we do not all have the same kinds of minds, and education works most effectively for most individuals if...human differences are taken seriously” (Gardner, 1995, p.208). Gardner (1983) recognizes the determining effects of cultural practices and values in shaping and transforming the products of the innate intelligences. Societies and cultures value different types of intelligences. Thus, the skills developed would depend on those that are valued and fostered by the culture to best serve the culture.

Gardner defines intelligence as “the capacity to solve problems or to fashion products that are valued in one or more cultural settings” (Gardner & Hatch, 1989, p.5). In this regard, he argues for a cultural as well as a biological basis for multiple intelligences. There has been evidence to suggest that primary elements of different types of learning are found in particular areas of the brain where corresponding connections have occurred. Thus, injury to the Broca’s area of the brain will affect one’s ability to communicate verbally (Gardner, 1983).

Gardner (1983) argues that we should not be looking for collective stages in development but for stages within particular intelligences within particular cultures. In other words, intelligence as a construct cannot be decontextualized. Thus, a Piagetian perspective that delineates specific developmental stages would be discounted for not taking into account the context of individual growth.

### *The seven intelligences.*

The Theory of Multiple Intelligences (MI theory) originally put forward seven multiple intelligences: (1) *verbal- linguistic intelligence*; (2) *logical/mathematical intelligence*; (3) *spatial intelligence*; (4) *musical/rhythmic intelligence*; (5) *bodily/kinesthetic intelligence*; (6) *interpersonal intelligence*; and (6) *intrapersonal intelligence*. These are explicated within the context of MI Theory and relevant literature related to the seven intelligences.

*Logical/mathematical intelligence* is the ability to distinguish logical or numerical patterns and the capacity for logical reasoning and numerical problem solving ability. Individuals that are talented in this intelligence identify and solve problems, have a memory for repetitive patterns and an intuition for logical relationships. Western schooling systems have placed great value on this type of intelligence (McKay, 1994; Brosnan, 1998) and intelligence tests have focused on these skills. This type of intelligence has also been valued by individualist cultures that foster independence and competitiveness (Kitayama & Duffy, 2004). Studies have demonstrated mathematics to be stereotyped as a male normative intelligence and this influences girls to turn away from it (Murray, 1995). Logical/mathematical learning processes focus on the teaching of logic, mathematical processes, working with numbers and sequences (Campbell, Campbell & Dickinson, 1996).

*Verbal/linguistic intelligence* is a proclivity for language and linguistic functions. This type of intelligence is also highly valued in the Western schooling system as it equips one to write and talk fluently, and communicate effectively. Writers and poets are said to have a proclivity for this type of intelligence. It is said to be universally relevant as it is the means of cultural transfer of information and symbols, and is necessary for effective adaptation. Vygotsky (1978) viewed language systems as central to the understanding of cognitive development and the socio-cultural context. This type of intelligence has been stereotyped as a female domain (De Witt & Booyesen, 1995; Murray, 1995). Americans place great emphasis on verbal skills in parenting and in explicit teaching because of the emphasis on information transfer (Shapiro & Azuma, 2004). Verbal/linguistic learning processes focus on speaking reading and writing (Campbell, Campbell & Dickinson, 1996).

*Musical intelligence* is the ability to produce and appreciate musical expression. This type of intelligence has traditionally been regarded as a special talent of ability that few people possess (Gardner, 1993). It has not been associated with academic intelligence. MI theory has positioned musical intelligence as an autonomous intelligence equivalent to studying mathematics or science. Gardner (1993) proposed that musical intelligence can serve as a form or a means of learning. The value placed on musical ability varies amongst cultures. In some cultures, musical intelligence is highly valued (Shapiro & Azuma, 2004). Musical learning processes focus on singing, musical notation, curriculum songs, and musical instruments (Campbell, Campbell & Dickinson, 1996). According to Kassell (1998), musical intelligence leads to an understanding of sound/symbol notational systems, and facilitates the

acquisition of listening skills. Rhythmic or melodic patterns can also facilitate the memorization of facts and figures (ibid.). Musical intelligence can also provide what Gardner (1993) refers to as 'multiple entry point' or an impetus for learning all kinds of content.

*Spatial intelligence* is the capacity to perceive the visual-spatial world accurately and to manipulate one's initial perceptions. Spatial abilities are typical of cultures where tracking, hunting and visual recognition of the environment are important (Gardner, 1983), but it is just as important in present day architecture, engineering and mathematical careers. Individuals with this ability are able to visualize the world with great accuracy. Males have traditionally been associated with superior spatial ability as compared to females, and this has been used as an explanation for the male domination of spatial disciplines such as mathematics, science, computers, and architecture (Brosnan, 1998). Spatial learning processes focus on pictorial representation, flow charts, visualization, board and card games, architecture, and visual arts (Campbell, Campbell & Dickinson, 1996).

*Bodily/Kinesthetic intelligence* is the ability to control one's body movements and to handle objects skillfully. Individuals who demonstrate this proclivity tend to learn best when they are involved in some kind of physical activity or practical skill. Since it is not associated with academic intelligence in Western culture, it is not valued as much as mathematical or verbal intelligence. Bodily/kinesthetic learning processes focus on drama, creative movement, dance, manipulation, classroom games, physical education, and exercise (Campbell, Campbell & Dickinson, 1996).

*Interpersonal intelligence* is the capacity to understand and respond appropriately to the affect, disposition, behaviour, and motivation of other people. Individuals with strong interpersonal intelligence are able to relate well to people and feel comfortable in social situations. Even though there is a strong emphasis on group work in contemporary curricula, not all individuals have the inherent skill to interact effectively with others. According to Collinson (1999), this type of intelligence which involves maturity and wisdom requires the empathy to understand others, honesty and trust, respect, tolerance of different views, the setting aside of the ego, good communication skills, and political awareness. This type of intelligence is highly valued by collectivist cultures that foster interdependence and social responsibility (Kitayama & Duffy, 2004). Interpersonal learning processes focus on positive interpersonal environments, conflict management, learning through service, appreciating

differences, multiple perspectives, problem solving, and multicultural education (Campbell, Campbell & Dickinson, 1996).

*Intrapersonal intelligence* is the capacity to understand one's own feelings and to utilize this knowledge to direct behaviour, and capitalize on strengths and weaknesses. The development of this type of intelligence leads to personal ethics and dispositions that shape judgments, behaviour, and decisions required for accurate self-understanding and the capacity for reflection and self-maturity (Collinson, 1999). Intrapersonal learning processes focus on self-esteem, goal setting, thinking skills, emotional expression and self-directed learning.

#### *Implications for schooling.*

MI Theory challenges the limitations of traditional educational systems that have emphasized verbal and mathematical competencies, basing learning success on assessment in these two areas. Educators are encouraged to broaden their conceptions of intelligence and to move away from restricted educational programs that focus on practices that minimize different abilities and talents. The focus is on understanding the learner and directing pedagogy towards actualizing the potential of the learner within a particular cultural context. Shearer (2004) recommends that a change is required in educators' core beliefs regarding the nature of intelligence. Thus educators are to engage in critical self reflection and inquiry into their pedagogical practices.

According to Gardner (1993) any of the multiple intelligences can be developed through schooling and learning. He (ibid.) explains that each of the intelligences may be exploited as a means of transmission, what he refers to as 'a multiple entry point' or an impetus for learning all kinds of content.

Learners need a range of pedagogical approaches to facilitate the engagement of their intelligences with any particular learning area. Educators are thus required to equip themselves with a structured knowledge of concepts, techniques, and perspectives of disciplinary understanding and the means by which this can be presented.

MI Theory encourages educators to move beyond the limitations and misconceptions associated with traditional systems of merit and success, and to engage in meaningful

assessment that build on individual strengths. Assessment tools such as portfolios, continuous assessment, etc. are recommended to provide learners with a profile of their strengths and abilities in the various intelligences. Intrapersonal competence is enhanced when educators and learners are made aware of the learner's unique profile, and are given practical strategies and intervention for using strength to maximize learning (Shearer, 2004). Assessment should be done in a culture-dependent manner as performance is linked to an individual's familiarity and experience with the material, and the demands of assessment (Gardner & Hatch, 1989). This differs from traditional forms of assessment that are culture biased, and that disregard contextual issues.

There is evidence that the Multiple Intelligences approach has contributed to improved motivational levels and a greater sense of self in children (Armour-Thomas & Gopaul-McNicol, 1998; Shearer, 2004; Dillihunt, 2004). Less traditional school associated intelligences like musical intelligence are placed on an equivalent level to the more traditionally associated academic intelligences and the focus is strength-based and individualized educational planning. The approach makes a unique contribution to the classroom experience because it broadens educators' definitions of what constitutes intelligent behavior. Educators have also used MI theory as an instructional organizer to critically examine teaching beliefs and classroom practices and to make pedagogical decisions about how to structure learning to suit learner needs (Goodnough, 2001; Shearer, 2004).

#### *A critique of Gardner's MI Theory.*

MI Theory has influenced the development of many revised curriculums, especially at primary levels of schooling. Critiques of MI theory (Klein, 1998; Sternberg, 2004; Williams, 2000) believe that the theory is conceptually, empirically, and pedagogically unsound. The validity of the theory is questioned since there is overwhelming evidence supporting the existence of an executive process within the brain that coordinates different types of intelligence and MI theory does not accommodate for this integrative function (Sternberg, 1983). The choices of intelligences appear to be subjective and arbitrary, limited to Gardner's preference (Sternberg, 2004). Intelligences may include far more than those limited to those delineated by Gardner, for example spiritual intelligence.

MI Theory also lacks empirical support (Klein, 1998; Sternberg, 2004), especially in terms of psychometrically strong assessments. The assessments proposed by Gardner (1993) which provide a profile of a learner's strengths and weaknesses provide information that could be useful for intervention however, there are no standards or norms that guide these assessments, and therefore there are no ways to validate these findings.

The use of MI strategies requires careful consideration as poorly selected strategies can lead to wasted time, a distraction away from core outcomes, an emphasis on less important skills and a false sense that learning has taken place when it has not (Potter, 2005; Shearer, 2004). Furthermore, a lack of resources such as computers and textbooks suggest a need for innovativeness and creativity in teaching methods. However, traditional methods of teaching do not accommodate such teaching styles.

Gardner (1993) proposes that each of the multiple intelligences should be encouraged and assessed through task performances relevant to that which is valued by the specific culture; however he neglects to elucidate the role of knowledge in real life experience. Furthermore, measures of interests, motivation and personality account for variance in school achievement, as well as educators' evaluations of personal and social adjustment, leadership and achievement. The Theory of Multiple Intelligences does not take these factors into account sufficiently.

The key to successful MI teaching strategies is to decide on the educational outcomes that need to be achieved by the learner, and then to choose the strategies that take these into account. The theory requires careful consideration and critical evaluation at an educator development level to enable more effective implementation at a pedagogical level. Educational outcomes will always reflect a biased cultural hegemony which requires critical reflection. Furthermore, the theory is limited with respect to the complexity of intelligence as it relates to personality styles and motivational levels in the development of the intelligences proposed by Gardner (1983). In effect, MI Theory should not be viewed as a panacea for curriculum and assessment issues. However, it does encourage educators to consider broader conceptions of intelligence and to engage in discourses that encourage closer reflection on the purpose of education, educational practices and their belief systems

### *The Triarchic Theory of Intelligence and Successful Intelligence*

Robert Sternberg (1987) defines intelligence in terms of “purposive behaviours in the real world that are relevant or potentially relevant to an individual’s life which facilitates adaptation to selective environments, which may involve environmental shaping or shaping by the environment” (p.46). Sternberg (1997) later developed on this conception of intelligence in terms of what he refers to as ‘*successful intelligence*’, or the ability to adapt to, shape, and select environments for the purpose of accomplishing individual goals as well as the goals of society and culture (Sternberg, 2004). The theory is based on findings that intelligence and ability tests are limited in their criteria of success. Success is defined by one’s cultural context and intelligence differs from culture to culture. Very similar to Gardner (1983), Sternberg (1987, 1997) focuses on multiple abilities and argues that traditional educational systems underutilize children’s multiple abilities as a result of educators valuing analytical abilities at the expense of creative and practical abilities.

#### *The three components of intellectual ability.*

According to the Triarchic Theory of Human Intelligence and its development, all aspects of intelligence comprise a common set of processes which are assumed to be universal and comprise three parts for describing and measuring intellectual ability. These include the *componential*, *experiential* and *contextual*, all of which serve a range of purposes in real world contexts.

*Componential intelligence* which is most often referred to as analytical ability is associated with the traditional notion of intelligence. It would include verbal and mathematical skills, and abstract thinking and logical reasoning ability. Componential intelligence describes the internal information processing process. It facilitates the primary function of problem solving and comprises three universal processes. This includes executive process or *metacomponents* which plan what to do, monitor things as they are done, and evaluate problems as they are solved. Thus a problem needs to be recognized, the nature needs to be defined, a strategy needs to be decided on for solving the problem, and the solution needs to be evaluated in the aftermath. *Performance components* execute the higher order processes and provide feedback. Knowledge-acquisition components are used to learn how to solve problems. These components become part of one’s practical experience which one applies within

contexts of adaptation in the environment, shaping of existing environments, and selection of new environments.

*Experiential intelligence* often called creative intelligence is synonymous with divergent thinking or the generation of new ideas. It reflects the notion that experience with a certain task will procure greater competency in that task and the ability to deal with novel situations. Thus cognitive development will result from the dialectic relationship between the intrinsic characteristics of the individual and the skill that is learned. The inherent characteristics of an individual will be developed if one's cultural and social context allows these skills to develop.

*Contextual intelligence* often called practical intelligence reflects the ways in which intelligence is demonstrated in specific contexts. It is referred to as 'street smarts' and defines the ability to apply knowledge in the real world and the ability to shape and choose one's environment according to one's skills and values. Tacit knowledge is a key aspect of practical intelligence as it is knowledge that one needs to know to succeed in a given environment that is not explicitly taught or verbalized. Sternberg (2002) illustrates his notion of contextual intelligence when he describes a study by Carraher, Carraher and Schlemann of a group of Brazilian street children who demonstrated contextually relevant mathematical skills required to earn a living, but lacked the mathematical skill for classroom success. One's culture and socio-economic context can have a pervasive influence on the development of contextual intelligence.

#### *Triarchic theory of intelligence: Implications for schooling.*

Sternberg's (1987, 1997) definitions of intelligence incorporate and emphasise the importance of practical intelligence. Practical intelligence has been disregarded by traditional schooling practice and intelligence tests. Sternberg (1997) views the acquisition of tacit knowledge as a key aspect of practical intelligence. Tacit knowledge is knowledge that needs to be known to succeed in one's environment and is not explicitly taught or verbalized. However, practical intelligence tends not to be related to academic intelligence, especially within the range for which it is sought to predict future success, yet it has been found to predict job performance and adjustment to school environment.

Vygotsky's notion of *internalisation* aptly describes the way in which practical intelligence is tacitly constructed by the individual. Tacit knowledge is observed in the socio-cultural



environment and becomes internally reconstructed. This knowledge is just as important as the analytical knowledge that is valued in academic programs, as it facilitated adaptation to the environment. Sternberg & Grigorenko (2004) give significant recognition to the role of educators in scaffolding the learning process to facilitate learning which is contingent on the zone of proximal development, which is measured as the difference between performance before and after instruction.

Sternberg (2000) views multiple abilities as central to success. Classroom practice and assessment should balance the use of analytical, creative, and practical intelligences. The theory opposes the notion of general intelligence or *g* which implies that an intelligent individual is one that constitutes someone who is good at everything. What is advocated is the need for educators to provide learners with knowledge of their strengths and weaknesses so that strengths are capitalized on and weaknesses are compensated for, or ameliorated. Learner success should be defined in terms that are meaningful to their goals and their socio-cultural context.

Sternberg (1987, 1997) and Sternberg and Grigorenko (2004) challenge conventional methods of evaluating intelligence and propose the need for accuracy with regard to learner fit. The aim of Sternberg's theory is to facilitate the matching of learners' aptitudes, to instruction and methods of assessment. Sternberg (1997) states, "Teachers as well as students in all subject-matter areas have seen the costs of mismatching among abilities, instruction, and assessment" (p. 345). Studies carried out by Sternberg (2004) and his colleagues (Sternberg & Grigorenko, 2004) have demonstrated that learners whose instruction matched their pattern of abilities performed significantly better than learners who were mismatched. They (ibid.) also found that prediction of course performance was improved by taking into account creative and practical, as well as analytical skills. A psycho-educational model of *abilities, instruction, and assessment* is proposed which would be applied in such a way that learners of "varying patterns of abilities all receive a variety of kinds of instruction and assessments" (p.353). Thus, educators would be required to utilize a variety of creative instructional and assessment methods to meet the diverse ability needs of learners.

The Triarchic theory and the theory of successful intelligences have many commonalities with Gardner's (1983) Theory of Multiple Intelligences and Vygotsky's (1978) socio-cultural theory of cognitive development. Sternberg (1987, 1997) and Gardner (1983) propose more diverse conceptions of intelligence, with successful intelligence being more process-oriented

and multiple intelligences being more content-focused. Both perspectives influence a move away from traditional curricula that are biased towards analytical intelligence, and verbal and linguistic intelligences. The recommendation is a pedagogy that is focussed at learner understanding and socio-cultural contexts. Both theorists propose educational interventions that are based on a multiple abilities model of schooling, and view the educator as playing a vital role in providing the learner with a valuable profile of strengths and weaknesses, using this information for the purpose of actualising the learner's potential.

#### *A critique of Sternberg's Theory.*

Unlike Gardner (1983), Sternberg (1997) does look at the role of knowledge in real life experience, as well as that of personality and motivation, but the scope is limited. There is a need for a theoretical perspective that takes into account the relationship between abilities, knowledge, and personality in intellectual functioning, or a framework for distinguishing intelligence from knowledge in cognitive processing as well as distinguishing these from motivational and affective aspects of cognitive processing. However, like Gardner, 1983, Sternberg (1997) also encourages broader conceptions of intelligence and closer reflection of pedagogical practices and belief systems.

### **Gender and Intelligence**

Gender differences in intelligence have been a contentious issue as a result of past inequalities, prejudice, and discrimination preventing the self determination of females. There has been no evidence supporting consistent gender difference (Gulgoz & Kagitcibasi, 2004; Halpern, 1997) however, reliable differences have been found on some tests of cognitive abilities (Deaux & Major, 1987; Halpern, 1997, Quaiser-Pohl & Lehmann, 2002). Females have been found to score higher on tasks that assess the ability to use verbal information, and males have been found to do well on tests of mathematical achievement and visual spatial ability (Halpern, 1997). Different theoretical perspectives have accounted for these gender differences, including biological determinants, and socialization and psychological processes (Halpern, 1997). However, the issue for consideration is not whether these gender differences exist but how the different abilities are evaluated in terms of a hierarchy, and whether gender stereotypes prevent the self determination of individuals. Thus, socialization and gender schema theories will be discussed in greater detail.

Bem's (1981) Gender Schema Theory defines 'sex-typed' behaviour as conforming to society's definition of gender appropriate behaviors. Attributes that are perceived by society to be more desirable for a man represents masculinity, while attributes which are perceived by society to be more desirable for a woman represents femininity. Through the process of internalization and socialization 'sex-typed' individuals are motivated to engage in gender appropriate behaviors. Thus individuals build up a gender schema which encompasses knowledge of gender behaviors, activities and interests, and once formed males and females behave consistently with the gender schema that reflects the expected cultural gender roles.

Numerous studies have demonstrated a strong correlation between stereotypically masculine behaviors and spatial ability in children at a very early age (Brosnan, 1998; Halpern, 1997). Play with boys' toys has been related to the development of spatial rather than verbal abilities for children of both sexes, while play with girls' toys is related to higher verbal than visual-spatial skills. Cognitively, males are expected to do better on mathematical and spatial tasks, while girls are expected to do better on verbal and interpersonal related tasks. Thus, the early acquisition of gender-related behaviour as a consequence of gender-typed parental child rearing practices and gender- typed behaviour in children's play, and different achievement related self concepts for male and female children (Brosnan, 1998; Quaiser-Pohl & Lehmann, 2002) have been identified as determinants of differential gender expectations.

Gender differences have been demonstrated in self-evaluation, causal attributions, and interactive patterns that illustrate a more positive formulation of the male self and a more deprecating formulation of the female self (Deaux and Majors, 1987; Labouvie-Vief, Orwoll & Manion, 1995; Ryan & Ryan, 2005). The male identity is encouraged to be more self enhancing while the female identity is more undermining and reactive to external evaluations of the self.

Attributional patterns and stereotypes thus arise inductively through experience, and are both explicitly and implicitly learned playing vital roles in gender differences. These stereotypes influence motivational, affective, and cognitive processes. The individual perceptions of self and context, and schema regarding beliefs about purpose, competence, and success influence the individual's cognitive engagement and performance in an achievement context.

### *Gender Effects in the School Context*

Contemporary national school curricula have been formulated to propagate gender parity in pedagogical practice. However, despite these efforts gender inequity is found to be perpetuated in pedagogical practices preventing girls from advancing their studies in a range of academic pursuits that are male-typed, predominantly mathematics and science (De Witt & Booyesen, 1995; Hopf & Hatzichristou, 1999; McKay, 1997; Smith, 2000). According to Smith (2000), research on gender and schooling shows a persistent replication of skewed gender relations marked by male normative abilities and activities in the classroom.

Rosenthal and Jacobson (1968) demonstrated in their study many years ago that educators' expectations act as self fulfilling prophecies. In other words an educator's belief, which may be explicit or implicit leads to behaviour that makes the belief come true. However, a second kind of expectation effect that has demonstrated to be far more common is the 'sustaining effect' which refers to situations where educators fail to recognize learners' potential and therefore do not respond to them in a way that encourages them to fulfill their potential (Good, 1987). Hopf and Hatzichristou (1999) found that this effect prevents educators from responding to individual needs.

Studies have demonstrated differential educator beliefs for causal attributions, assessment of competencies, and expectations for future achievement for boys and girls, with a clear stereotyped perceptual bias that is more detrimental to girls' achievement than boys' (Hopf & Hatzichristou, 1999; Tiedemann, 2000). Tiedemann (2000) demonstrated that male educators are more likely to be susceptible to gender stereotypes. The study (ibid.) demonstrated that educators attributed unexpected failure more to lower ability in girls, and to lack of effort in boys. Thus, the female identity is more susceptible to gendered intellectual activity, and while they may excel in school achievement in early childhood, they start to show poor self esteem and an evasion of achievement related and gender stereotyped subjects like Mathematics and Science (Hopf & Hatzichristou, 1999; Tiedemann, 2000).

Quaiser-Pohl and Lehmann (2002) indicated in their study that attitudes, in particular achievement-related attitudes, have an impact on test performance. The study demonstrated that girls had less experience with activities crucial for the development of spatial skills and they rated their spatial abilities lower than boys. Girls' spatial test performance was shown to

be closely related to their achievement-related self-concept with regard to spatial abilities. Studies have demonstrated that more experience resulted in better spatial test performance in females which emphasizes the discrepancy between actual potential and one's subjective perception of one's potential (Halpern, 1997; Quaiser-Pohl and Lehmann, 2002). Girls may be relatively unaware of their own capabilities.

Some studies have demonstrated varying degrees of gender differences in the schooling context, and have suggested that competence-related biases are rooted in culture specific aspects of school settings (Stetsenko et al., 2000). Thus, a cross cultural approach is a feasible strategy to understand gender effects in school children. The socio-cultural contexts and belief dimensions of both learner and educators are associated with gender expectations.

Social and cultural forces are pervasive in the formation of gendered identities and the issue lies not with acknowledging differences but rather with the extent to which these gendered identities result in an unequal sense of worth and subsequently unequal opportunity. Although in many areas objective differences in intellectual performance may have decreased or even reversed, the gendering of intellectual activity continues to have implications for the individual. Thus, intervention strategies need to address issues that prevent the self determination of the female learner in the school context.

### *Gender Effects in the South African Educational Context*

South Africa has been immersed in a political history of oppression and patriarchy. Social and economic inequality was perpetuated in the educational system resulting in the pervasive marginalization of women, a poor quality of education and largely low achievement expectations. Martineau (1997) indicates that despite the increased educational opportunities the gender disparities are the greatest for Black girls and women. The education of Black women in South Africa has been characterized by low enrollment, early school drop-outs, teenage pregnancy, and social and cultural stereotypes that have largely been detrimental to the self determination of Black women (ibid.).

Studies have suggested that gendered identities are reinforced in schools however; socio-cultural contexts have also been highlighted (Gaganakis, 1999; Martineau, 1997). Girls are pressured by sex role expectations to conform to norms of femininity as they relate to science

and technology careers. Farmer et al. (1995) found that mothers tend to have the expectation of their sons outperforming their daughters in science and mathematics which impacts on girls' poor performance in these subjects. Societal and parental expectations and beliefs have been shown to be presented in classroom practices where gender differences in gendered subjects like mathematics and science are structured to steer girls away from these subjects (Ryan & Ryan, 2001; Martineau, 1997).

The primary cause of the difference in intellectual performance has been linked to gender role differences that are perpetuated by socio-cultural stereotypes (Ryan & Ryan, 2005). Ryan and Ryan (2005) document extensive research that shows that stereotype threat, which amounts to the insidious effects caused by negative stereotypes, exists and impairs performance. Gaganakis (1999), in her review of gendered performance of black adolescent girls in South African schools, adopts the view that girls between the ages of twelve and sixteen lose self-confidence and tend toward more limiting norms of feminine behaviour.

The studies mentioned above demonstrate that lower achieving girls, girls from disadvantaged socio-economic groups and girls of minority groups have not improved their achievement and participation in gendered subjects and career paths. Policies and interventions directed at addressing the gender disparity in the South African context require constant evaluation in terms of its effectiveness, and the deeper issues of socio-cultural belief systems and stereotyped perceptual bias require deconstructing. Studies of lay conceptions of intelligence reveal vital information about the belief systems that inform stereotypical judgments and practices.

### *Studies on Lay Conceptions of General and Multiple Intelligences*

More recent studies conducted in relation to intelligence, more specifically, self estimates of Howard Gardner's original (1983) multiple intelligences (Furnham, 2000; Furnham, Clark & Bailey, 1999; Furnham & Budhani, 2002; Furnham, Fong & Martin, 1999) have confirmed that gender differences are perpetuated in society. Gardner's Theory of Multiple Intelligences (1983) has provided a useful way to study lay people's perception of intelligence.

Furnham (2000) investigated how parents estimated their own intelligence and their children's multiple intelligence types. The results demonstrated that the mothers gave lower

estimates than fathers on their own logical-mathematical and spatial intelligence, while both parents rated their sons as having greater logical-mathematical, spatial, and intrapersonal intelligence than their daughters. This is suggestive of consistent gender differences with respect mainly to logical-mathematical and spatial intelligence. According to Furnham (2000), spatial and mathematical intelligence form the basis of lay people's conception of general intelligence which inevitably leads to perceptions of intelligence being male normative.

Contrary to this study, Furnham and Mkhize (2003) found that South African mothers showed few significant differences in their estimates of their sons and daughters' overall or multiple intelligences; however they rated their daughters' interpersonal intelligence higher than those of their sons, and their sons' bodily/kinaesthetic intelligence higher than those of their daughters. The researchers (*ibid.*) allude to Wober's (1974) findings that African parents have more diverse conceptions of intelligence than Western parents who adhere to male normative conceptions of intelligences.

Furnham, Fong and Martin's (1999) study of self estimations of young people from Britain, Hawaii, and Singapore of their own, their parents' and their siblings multiple intelligences revealed some significant sex differences. Males gave higher multiple intelligence scores on average and females rated themselves lower on the logical/mathematical, spatial, and bodily/kinesthetic intelligences.

A study conducted by Rammstedt and Rammsayer (2002), which investigated gender differences in self-estimated intelligence of children and young adults, found that boys in contrast to girls, rated their abilities higher in mathematical and spatial intelligence, perceptual speed, and logical reasoning while girls rated their musical intelligence higher than males. The effect sizes of gender difference in both primary and high school groups suggested the tendency for specific gender differences in pre-pubertal children which stabilizes and becomes significant in pubertal children. Rammstedt, Rammsayer and Thomas (2001) developed the study further by associating gender differences in self-estimated intelligence to gender role orientation. The study revealed that males estimated their mathematical, logical, and spatial abilities significantly higher than females and that for males self estimates of specific aspects of intelligence were markedly influenced by gender-role orientation (p. 369).



These two studies are significant in showing that sex role identification may have direct implications for shaping multiple intelligence profiles dependent largely on which intelligences are valued by a specific culture for the different sexes.

These results have significant implications for intervention programmes especially at the level of achievement-related attitudes which may be impacted upon within the school environment. The discourse on gender development and gender effects in intelligence suggests that socio- cultural practices give formation to gendered identities that may serve to constrain intellectual potential. If gender differences exist, the evaluations given to them should not be hierarchical but rather embraced on equitable levels. The study of discourses that make up social institutions and cultural practice is essential in constructing interventions that are focussed at achieving equitable learning experiences and changes in particular contexts.

### **Culture and Intelligence**

Contemporary definitions of culture (e.g. Armour-Thomas & Gopaul-McNicol, 1998; Sternberg & Grigorenko, 2004) have highlighted the deep and complex interface between human competencies and culture. Culture can be defined as a body of learned symbols, beliefs, values, and behaviors that shape the perceptions and provide a system of meaning that facilitates adaptation to the environment. The pervasiveness of culture leads one to conclude that competence is culturally determined. Wang et al. (2004) have conceptualized culture as a process of symbolic mediation that manifests itself in actions, thoughts, emotions, beliefs, and moral values, thereby regulating intrapersonal and interpersonal psychological functions. Similarly, Vygotsky (1978) posited that culture equips individuals with tools for intellectual adaptation which facilitates adaptive thinking and problem solving strategies. It is within the cultural backdrop that children's mental development occurs thus, educational outcomes need to encompass cultural variation in competencies, as well as the competencies required to adapt optimally in multi-cultural contexts.

Two central contemporary research perspectives need to be considered in the discourse on intelligence and culture. Sternberg (1987, 1997, 2002, 2004) and others have adopted the Cultural Variation perspective, while others like Earley and Ang (2003), and Ng and Earley (2006) have adopted the perspective of Cultural Intelligence, which is rather recent in its



formulation. Both these perspectives offer a conceptual framework which attempts to integrate both culture and intelligence.

### *The Cultural Variation Approach*

The Cultural Variation of intelligence approach recognizes that culture and context inform the concept of intelligence and therefore its conceptualization will differ across cultures. Cultural contexts are dynamic and define specific cognitive domains or sets of representations leading to the development of specific areas of knowledge. Wang et al. (2004) provide a framework that divides culture into a number of discrete domains which are generally characterized as the “realms of the physical world (natural objects, living matter), the world of man-made artifacts (tools, art works, language), and the social world (people in one’s immediate and distal contexts)” (p. 231). These realms are prevalent in all cultures but vary in the ways in which they are defined and evaluated and in the forms of knowledge associated with each.

### *Variations in Conceptions of Intelligence*

Researchers (Li, 2000; Sternberg & Grigorenko, 2004; Sternberg, 2004; Wang et al., 2004) compare the adept cognitive functioning valued by the West to Japanese or Indian or African conceptions of intelligence where explicit knowledge of the social world is valued more than knowledge of the physical world or cognitive achievement. Studies have empirically demonstrated similarities and variations in the notion of intelligence across cultures. For example, studies have been cited that have shown that African conceptions of intelligence tend to encompass social factors such as wisdom, trustworthiness, social attentiveness, and responsibility (Furnham, Mkhize & Mndaweni, 2004; Li, 2001; Mpofu, 2004). Grigorenko and O’Keefe (2004) describe a study developed in Brazil that looked into applied mathematics or trade related skills and formal or school like skills. The research indicated that street mathematics has a greater social significance in this culture than the formal skills recognized in school. Brazilian street children are able to solve mathematical problems that are required in street wise business but are unable to do school mathematics.

Such empirical findings have shown that cognitive domains arise in response to the demands of the physical and social environments in which children develop, and the domains in turn facilitate the development of relevant cognitive competencies. Thus, the cultural context can

facilitate some cognitive competencies while making it difficult to attain others. These competencies are deeply rooted within a culture and serve to facilitate adaptation and participation within the culture.

### *Constructions of Self*

Some theorists (Kitayama & Duffy, 2004; Markus & Kitayama, 1991) purported how the different forms of self are constructed across different cultures. The notion of the autonomous, independent self is a characterization of Western culture, while the notion of the relational, interdependent self is a characterization of Eastern and African cultures. These ‘modes of being’ are culturally and collectively constructed (Kitayama & Duffy, 2004). The independent self is commonly associated with egocentric practices and a market economy driven by competitiveness, self expression and individual pursuits which have influenced traditional Western schooling culture. The interdependent self is socially oriented and associated with cultural practices of conformity and adjustment and an obligation to others. Thus, the social intelligences like interpersonal intelligence will be given emphasis. However, the independent self which is typically associated with self enhancing tendencies also includes forming social relations by seeking to influence others according to egocentric needs. The interdependent self is typically self critical, adjusting to others and external eventualities which typifies African cultures (Dasen, 1984 cited in Zambrano & Greenfield, 2004; Mpofu, 2004). Formal schooling is associated with a more individualistic, independent development of the self (Zambrano & Greenfield, 2004) which is assimilated by Western educators as part of their professional practice.

### *Acculturation, Assimilation and Integration Processes*

Cultural variation may also be understood as adaptations to differing contexts which may require adjusting to other cultures, which is in most cases the more dominant culture. This process is referred to by Berry (2004) as the process of acculturation. Schooling around the world has largely been influenced by Western models of achievement. Assimilation is seen as less desirable as it depicts the loss of one’s heritage culture and the imposition of the dominant culture (ibid.). The process of integration is more desirable as it places value on all cultures equally so that competence is developed to facilitate adaptation across the diverse range of cultures. It requires what Earley and Ang (2003) refer to as *cultural intelligence*.

### *Variations in Estimates of Intelligence*

A number of studies have looked at cultural differences in the estimates of multiple intelligences as defined by Gardner (1983, 1993). Furnham and Baguma (1999) compared the self estimates of Ugandan, American and British university students. The Ugandan students gave the highest estimates of their own overall intelligence. The Americans gave themselves higher scores on numerical (logical/mathematical and spatial) and cultural (musical and bodily/kinaesthetic) intelligences. Compared with the American and British students, the Ugandan students were less likely to have taken an IQ test and less likely to believe in the usefulness of these tests in educational settings. They were also less likely to believe in higher male than female gender differences or that some races are more intelligent than others.

Furnham, Callahan and Akande (2004) compared the self and familial estimated intelligence of Black and White South African, and Nigerians. The study demonstrated more ethnic differences than gender differences with Whites giving higher self and familial ratings on mathematical intelligence, and higher familial ratings of verbal intelligence than Black South Africans. The self and familial estimates of intelligence were generally lower than those of White South Africans. The researchers allude to actual differences that may exist in ability, and to the humility effect resulting in more modest scores given by Black South Africans as a corollary of being socialized in a racist society. Furnham, Callahan and Akande (2004) cite a study by Furnham and Akande (2004) which demonstrated national differences in four Southern African countries which are argued to be a function of the varied conceptions of intelligence, the participants' educational backgrounds, and the limited exposure to intelligence tests. Furnham, Mkhize and Mndaweni (2004) found ethnic differences in two South African groups, with Black South Africans giving higher estimates of intelligence than Indian South Africans. The researchers alluded to the varied conceptions of intelligence and the participants' educational backgrounds as possible explanations for the differences in estimations of intelligence.

Furnham (2000) argues that Western parents' conceptions of intelligence are male normative since these are valued competencies. However, in a study conducted by Furnham and Mkhize (2003) of Zulu (Black South African) mothers' beliefs about intelligence, it was argued that the participants have much broader conceptions of intelligence than Western parents.

The cultural variation demonstrated in studies of estimates of multiple intelligences has contributed much to the understanding of culture specific competencies and how these are developed within an ongoing dialectical relationship of dynamic interactions within cultures.

### *The Cultural Intelligence Approach*

A more recent approach to research that aims to integrate culture and intelligence is the work on Cultural Intelligence (CQ). This approach seeks to understand the ability to adapt effectively to new cultural settings or across cultural contexts (Earley & Ang, 2003). Earley and Ang (2003) propose CQ to have four features: meta-cognition (strategies to acquire and develop coping strategies), cognition (information about different cultures), motivation (desire and self efficacy), and behaviour (a range of culturally suitable behaviors). The reason that such research has gained in relevance is that the ability to adapt across cultures may be open to intervention since individuals with high CQ are able to adapt faster and more effectively.

The Cultural Intelligence approach appears to reflect the etic research perspective of intelligence which views intelligence from outside the culture, whereas the Cultural Variation approach reflects the emic perspective which views intelligence from within the cultural experience. Sternberg (2002) describes a study conducted in Kenya where it was found that the children's tacit knowledge of natural herbal medicine was negatively correlated to their performance in tests of crystallized abilities. The researchers were able to draw deductions based on an emic perspective highlighting the importance of having an inside perspective into people's implicit theories of intelligence. The etic perspective views intelligence as an ability that transfers across cultures. Earley and Ang (2003) view the concept of CQ as culture-free since it does not make reference to any specific culture but evaluates the capability to be effective across cultures, therefore emphasizing the need for the meta-cognitive component which may include integrating different values and suspending judgment (Ng & Earley, 2006). Ng and Earley (2006) demonstrate how the two perspectives may be integrated as CQ is the ability that is required to be effective across cultures. While an individual may be culturally intelligent in a particular culture, the individual may not be effective in another cultural setting, if CQ is lacking.

In conclusion, the concept of Cultural Intelligence is still in its stage of infancy and researchers are still faced with the challenges of construct validity and measurement techniques however, there is much that emerges out of both approaches, Cultural Variation and Cultural Intelligence, that may have important practical implications for the consideration and implementation of educational innovations. Knowledge of different cultural conceptualizations of intelligence are as important as knowing how to adapt effectively across cultures in multicultural global environments. What we can certainly hope to achieve by future research integrating the two perspectives is a more comprehensive and integrated theory of intelligence that is applicable to a global multicultural world, and curricula that encompasses cultural intelligence.

### **Social Class and Intelligence**

Intelligence has been closely associated with educational success, which in turn is closely linked to socio-economic status, which also has some bearing on achievement and socio-economic reward (Sternberg, 1997; Miller, 2004) in modern capitalist societies. According to Scarr (1997), the association between intelligence and socio-economic status where those from lower socio-economic groups are found to have lower IQ scores (as measured by Western IQ testing methods), is attributed to social injustice and unequal opportunities for people who come from disadvantaged backgrounds.

The observation that individuals who come from middle or upper middle class socio economic backgrounds tend to have higher IQ scores than individuals from working class or low socio-economic backgrounds serves to perpetuate society's gate-keeping structure. Only those individuals who have the competencies that are thought to offer value to that society are admitted into positions of status. According to Gale and Densmore (2000), educators are tasked with socializing learners into the dominant culture and norms of appropriate behaviour, and learners that do not succeed are considered to be lacking in some quality important for academic achievement.

Numerous studies have demonstrated how class, gender, and racial dynamics are closely related in social formation (Gale & Densmore, 2000; Gaganakis, 1999; Goduka, 1998; Miller, 2004). These studies show that social inequality is perpetuated in the education system and that education does not facilitate social change. Public schooling is commonly believed to be

a positive social force, providing everyone with equal opportunity, despite the disparities in resources. However, public education in Western industrialized societies does not equally foster the academic achievement of children from disadvantaged backgrounds or from marginalized groups (Gale & Densmore, 2000). It is essential to recognize the dynamic role of inequality and poverty as products of an iniquitous society, which continues to promote the stratification of society.

According to McDonald (1998) disadvantaged schooling has resulted in children learning so little that they fall behind the national IQ norms in modern societies. Poverty is seen as a major deterrent to self determination and it has been indicated that the success of educational initiatives in disadvantaged communities depends on political determination, learner-centered education, and parent involvement (Gaganakis, 1999). The above discourses of disadvantage do not take into account the need for conceptually broader conceptions of intelligence that encapsulate diversity and wider ranges of competencies.

Discourses of difference recognize variations rather than deviations from the dominant norm. Sternberg's (1987) Triarchic Theory of intelligence portrays intelligence not only in terms of analytical skills but also synthetic or creative abilities as well as street wise or practical intelligence. The competencies that are required to adapt more effectively under socio-economically deprived conditions need to be recognized within the schooling system. Thus the social processes that produce standards by which judgments are made about the relative worth of a group should be carefully considered (Gale & Densmore, 2000).

Children from low socio-economic groups experience school differently, and therefore school-based competencies are dissonant from these children's immediate needs of food, safety and well-being (Grigorenko & O'Keefe, 2004; Barab & Duffy, 2000). Learners who have limited access to resources and opportunities tend to be alienated from the Western middle class learning experiences.

Thus, it is important when creating intervention programmes to view the discrepancies in cognitive competencies in the context of a biopsychosocial model which delineates the full complexity of cognition. A research context should explore cross-cultural differences against a background of similarities in all relevant basic processes, however it is essential to recognise that cognitive competence is relative to specific cultures and to the specific social

and physical contexts that are encountered, as well the social and cultural demands that are perceived by the individual.

### **Schooling and Intelligence**

According to Eisner (1994), schools as institutions of education should foster the learner's ability to understand the world, to deal effectively with problems, and facilitate the acquisition of a wide variety of meanings from interactions with the world. He (ibid.) sees the development of intelligence as the primary means to these ends. Traditional conceptions of intelligence in the school context have been very limiting, confining it to analytical skills, with the emphasis on verbal and mathematical intelligences. Cultural diversity, multiple contexts, differing social standards, and language differences, were variables that were largely ignored in favor of the hegemonic Western modernist culture that predominated.

School achievement tests, aptitude tests and other similar assessment devices which were used as predictors of academic achievement focused on valued Western cognitive abilities (Sternberg, 2002; Li, 2001). Gardner (1991) questioned the traditional assumption that all children learn in the same way and asserted that even though educators have noted differences among learners, they have been strongly inclined to believe that all students can learn in similar ways. He (ibid.) emphasizes the need for individual differences to be taken into account in both pedagogy and assessment. Contemporary critique has particularly remarked that the knowledge of children's cognitive abilities and their relationship to future achievement does not adequately inform the type of treatment that should be implemented to improve future achievement (Yen, Konold & McDermott, 2004). The past decade has witnessed substantive transformations in curricula and pedagogical practices.

Contemporary theorists (Gardner, 1983, 1991; Sternberg & Grigorenko, 2004) have proposed pedagogical interventions that are responsive to diverse learner needs. Socio-cultural factors, and sources of identity and socialization, have important influences on the development of competencies that facilitate adaptive functioning and learning. These variables influence educators' conceptions of competence in facilitating the learning process.

Class, cultural, ethnic, gender, and language diversity are all possible influences on the way in which knowledge may be acquired. Other influencing factors are thinking or learning styles, motivation and personality.

### *Thinking Styles and Teaching Styles*

Sternberg (1997) has proposed that curricula promote the teaching of thinking or learning styles. This is based on the principle that people think in different ways. Adey and Shayer (2002) cite Nisbet's (1997) prediction that "before the century is out, no curriculum will be regarded as acceptable unless it can be shown to make a contribution to the teaching of thinking" (p1).

Sternberg (1997) has developed a theory of thinking styles and argues that thinking styles are even more important than abilities, as a thinking style will determine how individuals capitalize on the abilities they have. He (ibid.) advocates the need for a good match between thinking style profile and environment. This ascertains that different levels of schooling and different subject areas reward different styles, resulting in a good or poor performance depending on how the profile matches up with the environmental expectations and evaluations.

The three thinking styles that Sternberg (1997) has formulated include the *legislative style*, the *executive style*, and the *judicial style*. *Legislative people* tend to make their own rules and like creating and planning things, and therefore tend not to fit into schools too well. *Executive people* are those that enjoy implementation and tend to prefer guidance as to how or what needs to be done. *Judicial people* tend to appraise or analyse rules and procedures and to judge things. Sternberg highlights the variables that are relevant in the development of thinking styles. These include culture, gender, age, parenting styles, and schooling. Sternberg sees society and socialization as important contributors of thinking styles as all of these areas will reward or punish the various thinking styles according to the needs of the society and culture, however, styles are adopted not only in relation to what is external, but also in relation to the self.

Sternberg's (1997) theory highlights the importance of schools being critical and aware of learner thinking styles and teacher styles, as well as the way in which a subject is taught and the way a student thinks. These styles are especially relevant in considering that different



learners will respond in different ways to different styles of teaching. Sternberg (1997) posits that for learners to benefit maximally from instruction and assessment that at least some their thinking styles should be matched.

Teaching styles such as those proposed by Henson and Borthwick (1984) could also be used to inform the best fit for learners. Some of these include *the cooperative planner*, where an instructional venture is planned by the educator with the learner but the educator leads the task; *the child centered style*, where a task structure is provided by the educator with the learner given options according to their interests; *the learning centered style* where equal concern is shown by the educator for both the learner and subject content, guiding the learner in their development; and *the emotionally exciting style* where emotional zeal is exhibited by educators in their attempts to make the learning experiences stimulating for the learner. Sternberg's (1987) legislative thinking style learner may benefit from a child-centered style where the learner is given the choice to plan and create the learning experience according to his or her interests. Henson and Borthwick (ibid.) suggest that these styles of teaching are only of value if they are matched with the appropriate learning styles. Both flexibility and a variance of styles are as important for learners as it is for educators.

Learners should be viewed as active constructors of their own knowledge and meanings. Learners selectively experience elements of their own world, conceptualize, and assimilate symbols and relationships. According to Gordon (1995), the intellectual development should be directed towards improving the ability of the learner to interpret critically, understanding from multiple perspectives, and applying one's intellect to the solution of novel as well as practical life problems.

Thus, if educators want to engage beneficially with learners they need the flexibility to teach to different styles of learning or thinking which would require varying their teaching styles to suit different styles of learning. Educators need to have an ongoing practice in developing and creating their own models of learning and teaching that they are able to apply within their own contexts to optimally benefit the learner styles. Thus, curricula and pedagogy need to facilitate the development of systems of teaching, learning, and assessment that take into consideration the diverse characteristics of learners, the variance in cultural competencies, and the cultural intelligence for adaptation in multi-cultural contexts.

### *Curriculum 2005 in South African Schools*

Curriculum 2005 which encompasses a new approach to pedagogy and learning in South African schools was phased in between 1998 and 2003 (Hartshorne, 1999). The aim of the curriculum was to establish a just and equitable education which is relevant and accessible to all learners, irrespective of race, colour, gender, age, religion, ability, or language (ibid.). The strong focus of Curriculum 2005 is learner centred education. It recognises and builds on the learners' knowledge, values and life experience, and encourages pedagogical responsiveness to learner needs (Curriculum 2005, n.d.). It takes into consideration different learning styles and rates of learning and acknowledges the ways in which different cultural values and experiences affect the construction of knowledge incorporating these into the development and implementation of learning programmes (ibid.). It also encourages the development of competencies for adaptation in a competitive global economic system. It recognises that there are educationally relevant differences among individuals in terms of abilities and interests and different levels of mastery, and it encourages educators to explore diverse pedagogical approaches. Thus, educators are encouraged to give learners the opportunity to cope with the performance standards at their own pace, moving away from values of competitiveness and meritocracy.

Learning programmes are recommended to foster respect for cultural and linguistic diversity. Educators are also encouraged to balance the value of traditional academic knowledge with social knowledge. Thus, interpersonal intelligence is encouraged as a vital component of the curriculum.

The aims and objectives of Curriculum 2005 are idealistic yet highly sought after in the current atmosphere of transformation in a new democracy. Smit (2005) aptly remarks that the new curriculum was not implemented "onto a blank slate, rather, it was shaped in a context of multiple social disparities and various educational contexts" (p. 293). She (ibid.) highlights the social and historical context and subjective realities of educators that "construct, filter, mediate, and shape their educational practice" (p. 295). Thus, implicit perceptions of intelligence and perceptions of what constitutes knowledge may affect how the new curriculum is perceived and implemented. Her qualitative study (ibid.) of educators' understandings of educational policy highlights the factors that may result in unsuccessful or inadequate implementation of the new curriculum.

Smit (2005) conducted interviews with educators to elicit their understandings of new education policy and its implementation. It was found that resistance to policy change was attributed to fear and anxiety; and to the idiosyncratic behaviour of experienced educators (ibid.). Resistance to change was experienced when educators perceived the curriculum to be imposed on them, disregarding the educators' contextual experience and, if there was significant change that was expected of them in their pedagogical practice. According to Smit (ibid.), policy and curriculum changes appear threatening when it "affronts deeply embedded assumptions about the interaction of education, power, culture, and society" (p.301). She (ibid.) also found that experienced and older educators appear to be reluctant to abandon their established practices that have demonstrated success in their classroom practice. Smit (2005) emphasises the importance of taking educators' experiences and understandings into consideration when formulating curriculum change.

Contemporary curricula like Curriculum 2005, demonstrate progressive approaches to education, learning and teaching however, effective implementation is multi-factorial and is process driven. Perceptions, knowledge, understandings and behaviour will lend diverse interpretations to the implementation of such curricula. Thus it is essential that the voice, experiences and understandings of all role players in their varying contexts are considered at all levels, from formulation of educational policy to its implementation.

### **Conclusion**

The literature review has attempted to deconstruct the intelligence discourse from its historical to its present contemporary notions. It has followed the course of the pervasive hegemonic Western influence on the development of the construct of intelligence, with special emphasis on its influences in education, to its contemporary ideological influences. The historical development of the construct of intelligence and intelligence testing is explicated. Implicit theories of intelligence were discussed in terms of their epistemology and their influence on learning with the pioneers of studies on implicit theories (Sternberg, 2000, 2002, 2004; Sternberg & Grigorenko, 2004) being highlighted. The key theories of intelligence were discussed ranging from the traditional psychometric approaches and developmental approaches to the more contemporary approaches. The literature review also focused on the progressive development of the intelligence discourse as it relates to culture, race, gender, social class and schooling.

## **CHAPTER THREE**

### **METHODOLOGY**

#### **Introduction**

The present chapter provides a description of the research design and methods utilized in the collection of the data. The quantitative approach was adopted. A brief account of the rationale for this method is included. The research sample is delineated in terms of the sample frame, the sampling process and the sample demographics. The research instrument is described with an account of its reliability and validity. The procedure for data collection is described followed by an account of the statistical analysis procedures used to analyse the data, and the ethical considerations of the study.

#### **Research Design**

The study was conducted using a survey quantitative design. This method has proved to be both cost and time efficient. The sample included a cross section of educators from Previously Disadvantaged High and Primary Schools and Ex-Model C High and Primary Schools. The independent variables used in this study were the type of school and the level of education taught by the educators (i.e. High or Primary School). It was the intention of the researcher to have used the sex of the educator as an independent variable however, the number of male respondents were far too few for a meaningful comparative analysis. The predominance of female educators was also reflective of the provincial gender distribution statistics revealed by the KwaZulu Natal Department of Education as shown below. The dependent variables were the seven dimensions of multiple intelligence as delineated by Gardner (1983) and overall intelligence.

#### **Research Sample**

##### *Sample Frame*

The sample was derived from a target population of educators in the Midlands regions of KwaZulu Natal. The sample frame for the study was based on school type. The pre-existing

levels of stratification included educators from Previously Disadvantaged High and Primary Schools, and advantaged Ex-Model C High and Primary schools. The first section included Ex-Model C School types in the Pietermaritzburg, Howick, and Hilton regions of KwaZulu Natal. The second section included Previously Disadvantaged High and Primary Schools in the regions of Wartburg, Edendale and Sobantu in Kwa-Zulu Natal. Previously Disadvantaged Schools were situated in low socio-economic urban areas while Ex-Model C Schools were situated in middle and upper-middle class urban areas. The frame included Primary Schools that included Grades 0 to 7 and High Schools that included Grades 8 to 12.

### *Sample Selection*

A non-probability or purposive sample of schools was identified by the Kwa-Zulu Natal Department of Education. Twenty four schools that matched the sample frame were visited. Approximately 10 to 15 educators were selected from each school type using the procedure of simple random sampling. In schools with large educator sizes, every second educator was selected to be a participant. In schools with smaller educator sizes, all the educators were selected for participation. The target sample selection size was for fifty participants from each of the four school types. The sample consisted of two hundred and nine participants from the four different school types. Sixty seven educators were from Previously Disadvantaged High Schools, fifty four were from Previously Disadvantaged Primary Schools, thirty were from Ex-Model C High Schools, and fifty were from Ex-Model C Primary Schools. The response rate was between ninety five to one hundred percent for Previously Disadvantaged School types and between fifty to ninety percent for the Ex-Model C School types. Eight questionnaires were discarded because they were incomplete.

### *Sample Demographics*

Sixty one participants were male and one hundred and forty were female. The gender distribution which was skewed towards a preponderance of female educators closely reflected that of the gender distribution of educators in the Province of Kwa-Zulu Natal (see Tables 1 & 2, Figure 1 & Appendix 2). The province of Kwa-Zulu Natal comprises 29.5% of male educators and 70.5% of female educators while the sample in the study comprised 29.4 % of male educators and 70.6% of female educators.

Female educators constituted 55.2% of the educators from the Previously Disadvantaged High Schools, 67.9% from Ex-Model C High Schools, 68.6% from Previously Disadvantaged Primary Schools and 92.7% from Ex-Model C Primary Schools, reflecting a preponderance of females in the education fraternity.

Previously Disadvantaged High Schools had a more proportionate gender distribution than the other school types. The other three school types had a gender proportion which was more skewed in favour of female educators.

Participants were not asked to name the racial group that they belonged to, however, there were certain racial demographics that were clearly observable by the researcher. The racial demographic was different for Ex-Model C Schools and Previously Disadvantaged Schools. Ex-Model C Schools which historically only comprised White educators reflected some racial integration, however majority of the educators were of White ethnicity. Previously Disadvantaged Schools comprised only Black educators. This may be reflective of the geographical delimitation used in the study.

Table 1: Total number of male and female educators in the Province of KwaZulu Natal as at 31.06.2006 (Adapted from Appendix 2).

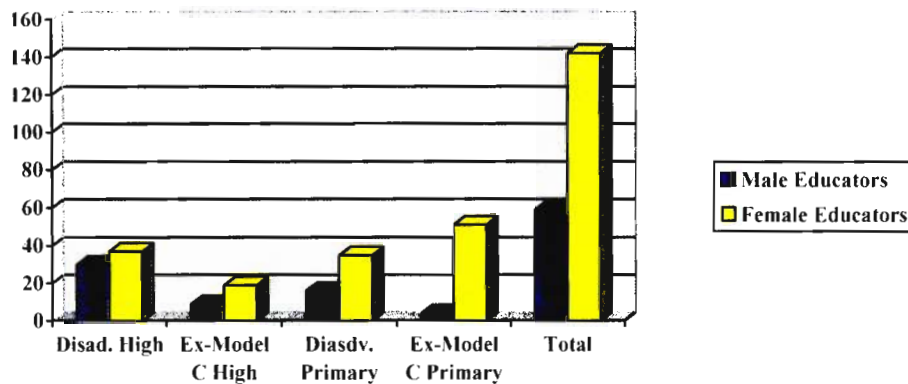
School Type	Male Educators	Female Educators
Total Primary	9658	38240
Total Combined	2192	5164
Total Secondary/High	13091	16232
Total	24941	59636
Percentage	29.5	70.5

Table 2: Number of male and female educators in the educator cohort reflected in the present study.

School Type	Male Educators	Female Educators
Disadvantaged High	30	37
Ex-Model C High	09	19
Disadvantaged Primary	16	35
Ex-Model C Primary	04	51
Total	59	142
Percentage	29.4	70.6



Figure 1: Number of Male & Female Educators in the Educator cohort of the present study



### Research Instrument

A structured questionnaire (see Appendix 1) developed by Furnham and Gasson (1998) was minimally adapted for use by educators. This instrument has been used mostly in studies of self and parent evaluations of intelligence however; it has also been used with educators (Furnham & Budhani, 2002). The research instrument does not restrict the ego/humility error which was detected in the study conducted by Furnham, Callahan and Akande (2004). The ego/humility error occurs as systematic under-estimations in some groups and in others as systematic over-estimations (Neuman, 1994). This effect has been said to account for cross-cultural differences in some studies (Furnham, Callahan & Akande, 2004).

The questionnaire included a simplified definition of each of the dimensions of multiple intelligences (Gardner, 1983). Verbal/linguistic intelligence is described as the ability to use words; Logical/mathematical intelligence as the ability to reason logically and solve number problems; Spatial intelligence as the ability to find your way around the environment and form mental images; Musical intelligence the ability to perceive and create pitch and rhythm patterns; Bodily/Kinaesthetic intelligence as the ability to carry out motor movement, e.g. a dancer or sports person; Interpersonal intelligence as the ability to understand other people; and Intrapersonal intelligence as the ability to understand yourself and develop a sense of identity. These definitions have been used in previous studies (Furnham, 2002). The pilot study, as well as workshops offered on Multiple Intelligence (to Previously Disadvantaged School Types), ensured that each definition was well understood by the educators. A normal distribution graph of typical response scores along with a label, description and prevalence in

a normal population distribution was also provided. The standard deviation included the following: -3 (55) (mild retardation), -2 (70) (borderline retardation), -1 (85) (low average), 0 (100) (average), +1 (115) (high average), +2 (130) (superior) and +3 (145) (gifted). The educators were advised to place a number between 55 and 145 for all learner estimates. A response matrix in the questionnaire was presented for completion by the educators which required the selection of five male and five female learners using the simple random method. A list of five numbers which were selected by the researcher was given to the educators to match to their class list of learners to guide them in the selection of the learners to be estimated. Scoring involved averaging the five scores for male learners and then for female learners to arrive at an estimate for each gender type.

The questionnaire also included six 'yes' or 'no' questions which were used to elicit educators' views of intelligence and intelligence testing. These were as follows:

- Have you ever taken an intelligence test?
- Do you believe they measure intelligence fairly well?
- Do you believe males are on average more intelligent than females?
- Do you believe intelligence is primarily inherited
- Do you believe IQ tests are useful in educational settings?
- Do you believe some races are more intelligent than others?

Additionally, to determine the utility of each of the multiple intelligences in pedagogical practice, each educator needed to list the multiple intelligences tapped the most and least in classroom activity, and the multiple intelligences incorporated the most and the least in assessment practices. These included the following questions:

- Which of the above multiple intelligences do you use the most in classroom activity?
- Which of the above multiple intelligences do you use the least in classroom activity?
- Which of the above multiple intelligences do you use the most in classroom assessment?
- Which of the above multiple intelligences do you use the least in classroom assessment?



The responses to these questions were influenced by learning areas or subjects taught by educators; however these questions provided important information with regard to the emphases on the different multiple intelligences utilized in the school setting.

A pilot study was administered to twelve educators from an Ex-Model C Primary School to test the viability of the instrument, especially in terms of the additional questions which focused on pedagogy. The pilot study revealed that the respondents' interest was aroused and maintained and there did not appear to be any misinterpretations or ambiguities in the terminology used. The final questionnaire was adjusted only in terms of lay out.

Demographic identifiers included the gender of the participants, the subjects they taught, and the level they taught at, i.e. primary or secondary (high). The questionnaire was free of personal and socio-demographic identifiers that may have led to stereotyping of the sample, as the researcher was of the opinion that these were sensitive issues in a transitional society. The questionnaire was only administered in English however, some translation into Zulu was offered at the educators' request. In these instances, the staff development educator who had been briefed about MI theory offered assistance.

#### *Validity and Reliability of the Research Instrument*

The reliability of a research instrument gives consideration to its consistency and the likelihood that similar results will be obtained with repeated measurements (Neuman, 1994). The research instrument has been used in its original form in numerous studies (Furnham, 2001; Furnham & Baguma, 1999; Furnham & Budhani, 2002; Furnham & Gasson, 1998), and has consistently been found to be reliable in producing findings in surveying self estimates and familial estimates of overall and multiple intelligences. In one study, the questionnaire was used to assess educators' perceptions of their learners' overall and multiple intelligences (Furnham & Budhani, 2002). It has also been used in the South African context and has proven to be reliable and valid for use in a multi-cultural context (Furnham & Baguma, 1999; Furnham, Callahan, & Akande, 2004; Furnham, & Mkhize, 2003). In these contexts, it was used to compare estimates of intelligence and predictors of overall intelligence amongst cultural and ethnic groups.

The validity of the research instrument inquires into whether it objectively measures what it is designed to measure and is well grounded on principles of evidence (Neuman, 1994). To ensure its content validity (measuring what it intends to measure) and construct validity (tested and found to be a truthful measure of what it is supposed to measure), the questionnaire explicitly defines each of Gardner's intelligences, and explains the normal distribution graph utilized in the study. The researcher in the present study presented workshops on Gardner's (1983) Theory of Multiple Intelligence ensuring that the participants had an understanding of the variables and the measurement used. These workshops were offered to all schools but were only taken up by educators from Previously Disadvantaged School types.

Furnham and Budhani (2002) identify a useful and valid factor analysis for the seven intelligences outlined by Gardner (1983). Three factors have been identified which include: '*Verbal*' (verbal, interpersonal, and intrapersonal intelligences); '*Numerical*' (mathematical, and spatial intelligences); and '*Personal*' (musical and bodily/kinaesthetic intelligences). Self estimations of overall IQ scores were obtained allowing a multiple regression of the seven types of intelligences onto overall intelligence (Furnham & Budhani, 2002). It was found that only three of the seven types (verbal, logical/mathematics, and spatial intelligence) were significant predictors of the estimations of overall IQ (ibid.).

In the present study the instrument was used to determine how educators from different school types rated their male and female learners' overall and multiple intelligences. Four additional questions were added to provide a general notion of the value given to the different intelligences in the delivery of the curriculum. These questions originated from the perspective that contemporary theories of intelligence embrace more diverse conceptualizations of intelligence.

The pre-test that was carried out to test the adequacy of the research instrument; used a sample group of twelve Ex-Model C Primary School educators which may not have given an accurate account of the instrument in exposing some of the problems that may be encountered in other school types, especially High Schools. One of the limitations of the pilot study in testing the efficacy of the research instrument was that respondents from other school types were not given the opportunity to provide feedback to identify ambiguities and questions that

may have been difficult in a particular context and to assess whether an adequate range of responses were provided.

### **Procedure**

The Department of Education was contacted and a written letter of permission was provided to conduct the study in various districts. This was especially necessary when I approached the principals from Previously Disadvantaged Schools.

A basic enquiry was conducted with the Heads of each school so as to establish the educators' level of understanding of the Theory of Multiple Intelligences. It was necessary to conduct workshops with some of the schools that had a limited understanding of the constructs. The workshops concluded with a brief explanation of the present study and the questionnaire that was presented to the educators. All the Heads of the Previously Disadvantaged Schools requested workshops; and were provided with refreshments as an incentive for the offering of their time and effort. The Heads and educators from Ex-Model C Schools felt confident to participate in the study without any need for an explanation of the study to educators or a workshop on the Theory of Multiple Intelligences. The Heads of the Ex-model C High Schools were particularly reticent about participating in the study which may concur with an ethos of elitism and a closed system; on the other hand the attitude may be expressive of the overwhelming demands felt by educators. Both Previously Disadvantaged High and Primary schools were enthusiastic about the study and kept to the due date for collection of the questionnaires. These schools appeared to view the workshop and the study as an opportunity to enrich their pedagogical practices.

The participants were asked to complete the questionnaires independently without any assistance from any secondary parties. They were requested to direct all questions for clarity or assistance to the researcher who made herself available by providing a telephone number. The participants were advised to select the five girls and five boys from their class through a method of providing numbers that the researcher provided that had to be matched to the class register numbers for the learners. The class register is a record of the male and female learners that is listed in alphabetical order. In this way the researcher ensured that the selection of learners was random and not diluted by any personal bias on the part of the

educator. The task of completing the questionnaire took educators between half an hour to an hour.

### **Statistical Analysis**

The dataset was captured and analyzed using the Statistical Package for Social Sciences (SPSS). Three types of analysis were done, namely, (a) Multivariate analysis (MANOVA); (b) Multiple Regression; and (c) The Pearson's chi-square test ( $\chi^2$ ), with significance set at  $p < 0.05$ .

The mean or arithmetic average was calculated for the estimates of the five male learners and five female learners' overall and multiple intelligences for each survey questionnaire to enable statistical analysis.

MANOVA was used to determine differences among the means of the four school types on the overall intelligence and Gardner's multiple intelligence types. The independent variable was school type while the dependent variables were overall intelligence and the seven multiple intelligences. Probability was set at alpha 0.05 for the main effect of school type. The Bonferroni inequality test was used to adjust for the 0.05 alpha level to control for the overall Type 1 error rate.

Multiple Regression was the statistical procedure applied to determine which of the seven intelligences were the best predictors of overall intelligence. The criterion variable was overall intelligence with the seven intelligences being the predictor variables. The variable with the highest predictive value was determined using the stepwise technique of variable elimination.

The Pearson's chi-square test ( $\chi^2$ ) was the statistical procedure used to analyse the six *yes* or *no* questions pertaining to educators' explicit views of intelligence according to school type as well as the four additional questions used to determine which types of multiple intelligences were used by educators the most and the least in teaching practice and assessment.

## **Ethical Considerations**

Due consideration was given to the fact that schools and educators may perceive this as an evaluation exercise. This needed to be especially considered with Previously Disadvantaged school types as permission was sought from the Department of Education before the researcher had access to the schools.

To alleviate any preconceptions or anxieties related to the above, the researcher reassured educators that school names and participants would remain anonymous for the purpose of the study, and that all responses would be confidential. The Pilot study revealed that a formal informed consent form would be time consuming and deter participants from the task at hand. It also appeared reassuring to the participants that only the researcher and her supervisor would have access to the questionnaires.

The researcher explained the purpose of the study, outlining the benefits in terms of facilitating an awareness of broader and different conceptions of intelligence. The harm of perceiving the study as an evaluation of performance was alleviated in that confidentiality was assured to all educators who participated in the study. The educators were informed of their right to withdraw from the study at any point. Thus, informed verbal consent was obtained from the participants.

It may be worth noting that the Previously Disadvantaged Schools appeared very receptive to the benefits of the study and saw its value. The researcher encountered many challenges with Ex-Model C High schools, ranging from apathy to low numbers of respondents. Some school principals that were approached refused to participate in the study at all, providing reasons of lack of time and heavy work loads.

## **Conclusion**

The present chapter has provided a detailed description of the research design and methodology used in the study. It has set the foundation for the presentation of results and interpretation of results.

## CHAPTER FOUR

### RESULTS

#### Introduction

The present chapter is a presentation of the results acquired from the analysis of the questionnaires completed by educators from the different school types. The different school types depicted are Previously Disadvantaged High Schools, Previously Disadvantaged Primary Schools, Ex-Model C High Schools and Ex- Model C Primary Schools. The presentation begins with an analysis of the multivariate results of educators' estimates of female and male learners' overall and multiple intelligences (Gardner, 1983) according to school type.

The chapter then proceeds to present the multiple regression results showing which of the seven multiple intelligences were selected by the educators from the different school types as the best predictors of overall intelligence.

The chapter finally looks at the explicit questions asked to educators on the nature of intelligence, and then proceeds to present the analysis of the types of intelligences tapped the most and least in teaching practice, and incorporated the most and least in assessment. The Pearson's chi-square test ( $\chi^2$ ) was used to analyse the six *yes* or *no* questions pertaining to educators' views of intelligence according to school type as well as the four additional questions used to determine the extent to which each of the multiple intelligences are accessed by educators.

#### *Educator Estimates of Learners' Overall and Multiple Intelligences*

The following MANOVA results show a breakdown of educator estimates of male learners' overall and multiple intelligences according to school type and then educator estimates of female learners' overall and multiple intelligences according to school type.

### *Educator Estimates of Male Learners' Multiple Intelligences by School Types*

The results of MANOVA on educator estimates of male learners' intelligences across the school types (see Table 3) were statistically significant ( $F(3, 200) = 2.50, p < 0.05$ ). The intelligence estimates that were found to have statistically significant differences were overall, logical/mathematical, and spatial intelligences.

Table 3: Educators' estimates of male learners' multiple intelligences by school type.

IQs	School Types								F value	P value
	P.D.H.S.		E.M.H.S		P.D.P.S		E.M.P.S			
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.		
Overall	99.22	8.18	105.46	8.07	104.37	10.09	106.53	7.78	8.23	0.00
Verbal	99.45	10.12	104.49	9.84	104.16	10.43	104.14	8.41	3.56	0.20
Logical	97.85	10.93	103.39	9.07	102.82	11.12	105.49	8.94	5.88	0.00
Spatial	98.02	11.77	104.14	7.11	105.58	10.49	105.95	8.39	8.23	0.00
Musical	98.54	13.80	99.89	7.05	100.75	11.35	99.86	8.26	0.41	0.74
Bodily	102.77	14.94	103.36	6.76	106.80	11.15	106.14	7.50	1.66	0.18
Inter	101.21	13.71	104.65	10.94	104.90	11.61	102.36	7.61	1.30	0.28
Intra	103.41	11.92	105.62	10.90	104.69	12.64	102.81	7.47	0.54	0.66

**Key:** Overall=Overall Intelligence, Verbal=Verbal/linguistic Intelligence, Logical=Logical/mathematical Intelligence, Spatial=Spatial Intelligence, Musical=Musical Intelligence, Bodily=Bodily/kinaesthetic Intelligence, Inter=Interpersonal Intelligence, and Intra = Intrapersonal Intelligence. P.D.H.S. = Previously Disadvantaged High Schools, E.M.H.S. = Ex Model C High Schools, P.D.P.S. = Previously Disadvantaged Primary Schools, and E.M.P.S. = Ex Model C Primary Schools.

Educators' estimates of *overall intelligence* for male learners were statistically significant for school types ( $F(3, 200) = 8.23, p < 0.05$ ). The mean score for Previously Disadvantaged High Schools was 99.22 (8.18); for Ex-model C High schools, 105.46 (8.07); for Previously Disadvantaged Primary Schools, 104.37 (10.09); and 106.53 (7.78) for Ex-Model C Primary Schools. Follow up analysis using the Bonferroni test indicated that there were statistically significant differences between estimates given by educators from Previously Disadvantaged High Schools and the other three school types. The mean difference between Previously Disadvantaged High Schools and Ex-Model C High Schools was 6.24, with Ex-model C High School educators giving higher estimates than educators from Previously Disadvantaged High Schools. The mean difference between the estimates given by educators from Previously Disadvantaged High Schools and those from Previously Disadvantaged Primary Schools was 5.15, with educators from Previously Disadvantaged Primary Schools giving higher estimates. There was a mean difference of 7.31 between estimates from Previously Disadvantaged High

school educators and Ex-Model C Primary Schools educators. Ex-Model C Primary School educators gave higher estimates.

Educators' estimates of male learners' *logical/mathematical intelligence* were statistically significant for school types ( $F(3, 200) = 3.56, p < 0.05$ ). The mean score for Previously Disadvantaged High School estimates was 97.85 (10.93); for Ex-model C High Schools, 103.39 (9.07); for Previously Disadvantaged Primary Schools, 102.82 (11.12); whilst that of Ex-model C Primary Schools was 105.49 (8.94). Follow up analysis using the Bonferroni test indicated that there was a statistically significant difference between estimates given by educators from Previously Disadvantaged High Schools and those of Ex-Model C Primary Schools. The mean difference between estimates by educators from Previously Disadvantaged High Schools and Ex-Model C Primary Schools was 7.64, with the latter giving higher estimates than the former.

Educator estimates of male learners' *spatial intelligence* were statistically significant for school types ( $F(3, 200) = 8.23, p < 0.05$ ). The mean score for Previously Disadvantaged High Schools was 98.02 (11.77); 104.14 (7.11) for Ex-model C High Schools; 105.58 (10.49) for Previously Disadvantaged Primary Schools; and 105.95 (8.39) for that of Ex-model C Primary Schools. Follow up analysis using the Bonferroni test indicated that there was a statistically significant difference between the estimates given by educators in Previously Disadvantaged High Schools and the other three school types. The mean difference between Previously Disadvantaged High Schools and Ex-Model C High Schools was 6.12 with Ex-model C High School learners receiving higher estimates than Previously Disadvantaged High School learners. The mean difference between estimates in Previously Disadvantaged High Schools and Previously Disadvantaged Primary Schools was 7.56, with educators from Previously Disadvantaged Primary Schools giving higher estimates. There was a mean difference of 7.92 between estimates given by educators in Previously Disadvantaged High Schools and those in Ex-model C Primary Schools. Ex-model C Primary School educators gave higher estimates.

For the following intelligences, differences between the school types were not statistically significant: verbal ( $F(3, 200) = 3.56, p > 0.05$ ), musical ( $F(3, 200) = 0.41, p > 0.05$ ), body/kinaesthetic ( $F(3, 200) = 1.66, p > 0.05$ ), interpersonal ( $F(3, 200) = 1.30, p > 0.05$ ), and intrapersonal ( $F(3, 200) = 0.54, p > 0.05$ ) intelligences.



### *Educator Estimates of Female Learners' Multiple Intelligences by School Type*

The results of MANOVA on educator estimates of female learners' intelligences across the school types (see Table 4) were statistically significant at ( $F(3, 200) = 3.04, p < 0.05$ ). The intelligence estimates that were found to have statistically significant differences were logical/mathematical, spatial, musical, and body/kinaesthetic intelligences.

Table 4: Educators' estimates of female learners' multiple intelligences by school type.

IQs	School Types								F value	P value
	P.D.H.S.		E.M.H.S		P.D.P.S		E.M.P.S			
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.		
Overall	99.99	20.71	102.42	7.19	105.83	9.74	106.12	6.43	2.67	0.05
Verbal	101.18	11.15	101.79	7.57	106.26	12.11	105.39	7.09	3.38	0.02
Logical	93.49	8.55	98.45	7.91	102.19	11.98	102.54	8.19	12.02	0.00
Spatial	95.62	9.83	100.72	6.88	104.10	12.70	105.61	8.87	11.47	0.00
Musical	96.79	12.70	103.39	6.72	102.75	12.87	106.68	8.54	8.10	0.00
Bodily	99.12	11.19	104.64	8.35	104.96	12.17	106.12	7.95	5.50	0.00
Inter	103.34	13.24	103.93	9.68	106.09	12.54	107.70	8.61	1.59	0.19
Intra	103.43	14.28	104.69	8.69	106.30	13.10	106.06	8.07	0.74	0.53

**Key:** Overall=Overall Intelligence, Verbal=Verbal/linguistic Intelligence, Logical=Logical/mathematical Intelligence, Spatial=Spatial Intelligence, Musical=Musical Intelligence, Bodily=Bodily/kinaesthetic Intelligence, Inter=Interpersonal Intelligence, and Intra = Intrapersonal Intelligence. P.D.H.S. = Previously Disadvantaged High Schools, E.M.H.S. = Ex Model C High Schools, P.D.P.S. = Previously Disadvantaged Primary Schools, and E.M.P.S. = Ex Model C Primary Schools.

Educator estimates of female learners' *logical/mathematical intelligence* were statistically significant for school types ( $F(3, 200) = 12.02, p < 0.05$ ). The mean score for Previously Disadvantaged High Schools was 93.49 (8.55); it was 98.45 (7.91) for Ex-Model C High Schools, 102.19 (11.98) for Previously Disadvantaged Primary Schools; and 102.54 (8.19) for Ex-model C Primary Schools. Follow up analysis using the Bonferroni test indicated that there was a statistically significant difference between estimates given by educators in Previously Disadvantaged High Schools as compared to those in Previously Disadvantaged Primary Schools and Ex-Model C Primary Schools. The mean difference between Previously Disadvantaged High Schools and Previously Disadvantaged Primary Schools was 8.70, with educators from Previously Disadvantaged Primary Schools giving higher estimates. The mean difference between Previously Disadvantaged High Schools and Ex-Model C Primary Schools was 9.04, with educators from Ex-Model C Primary Schools giving higher estimates.

Educator estimates of female learners' *spatial intelligence* were statistically significant for school types ( $F(3, 200) = 11.47, p < 0.05$ ). The mean score for Previously Disadvantaged High Schools was 95.62 (9.83); it was 100.72 (6.88) for Ex-Model C High Schools; 104.10 (12.70) for Previously Disadvantaged Primary Schools; and 105.61 (11.47) for Ex-Model C Primary Schools. Follow up analysis using the Bonferroni test indicated that there was a statistically significant difference between estimates given by educators in Previously Disadvantaged High Schools as compared to those in Previously Disadvantaged Primary Schools and Ex-Model C Primary Schools. The mean difference between Previously Disadvantaged High Schools and Previously Disadvantaged Primary Schools was 8.48 with educators from Previously Disadvantaged Primary Schools giving higher estimates than educators from Previously Disadvantaged High Schools. The mean difference between Previously Disadvantaged High Schools and Ex-model C Primary Schools was 9.99 with educators from Ex-Model C Primary Schools giving higher estimates.

Educator estimates of female learners' *musical intelligence* were statistically significant for school types ( $F(3, 200) = 8.10, p < 0.05$ ). The mean score for Previously Disadvantaged High Schools was 96.79 (12.70); for Ex-Model C High Schools, 103.39 (6.72); for Previously Disadvantaged Primary Schools, 102.75 (12.87); and 106.68 (8.54) for Ex-Model C Primary Schools. Follow up analysis using the Bonferroni test indicated that there was a statistically significant difference between estimates given by educators in Previously Disadvantaged High Schools and those in all the other school types. The mean difference between Previously Disadvantaged High Schools and Ex-Model C High Schools was 6.60 with Ex-Model C High school educators giving higher estimates than educators from Previously Disadvantaged High Schools. The mean difference between Previously Disadvantaged High Schools and Previously Disadvantaged Primary Schools was 5.96, with educators from Previously Disadvantaged Primary Schools giving higher estimates. There was a mean difference of 9.89 between Previously Disadvantaged High Schools and Ex-Model C Primary Schools. Educators from Ex-model C Primary Schools gave higher estimates.

Educator estimates of female learners' *bodily/kinaesthetic intelligence* were statistically significant for school types ( $F(3, 200) = 5.50, p < 0.05$ ). The mean score for Previously Disadvantaged High Schools was 99.12 (11.19); for Ex-Model C High Schools, 104.64 (8.35); for Previously Disadvantaged Primary Schools, 104.96 (12.17); and 106.92 (7.95) for Ex-Model C Primary Schools. Follow up analysis using the Bonferroni test indicated that

there was a statistically significant difference between Previously Disadvantaged High Schools as compared to Previously Disadvantaged Primary Schools and Ex-Model C Primary schools. The mean difference between Previously Disadvantaged High Schools and Previously Disadvantaged Primary Schools was 5.85 with educators from Previously Disadvantaged Primary Schools giving higher estimates. There was a mean difference of 7.01 between Previously Disadvantaged High Schools and Ex-model C Primary Schools. Educators from Ex-Model C Primary Schools gave higher estimates.

For the following intelligences, differences between the school types were not statistically significant: overall ( $F(3, 200) = 2.67, p > 0.05$ ) verbal/linguistic ( $F(3, 200) = 3.38, p > 0.05$ ), interpersonal ( $F(3, 200) = 1.59, p > 0.05$ ), and intrapersonal ( $F(3, 200) = 0.74, p > 0.05$ ) intelligences.

### *Summary*

Educators from Previously Disadvantaged High Schools estimated their male learners' *overall*, *logical/mathematical*, and *spatial* intelligences comparatively lower than the other three school types. Educators from Previously Disadvantaged High Schools also estimated their female learners' *logical/mathematical*, *spatial*, *musical*, and *bodily/kinaesthetic* intelligence comparatively lower than the other three school types.

### *Educators' Best Predictors of Learners' Overall Intelligence by School Type*

Multiple regression analysis was done to determine which of the seven intelligences were perceived by educators to be the best predictor of learners' overall intelligence. The analysis was done to determine the best predictors of overall intelligence for male and female learners by school type.

### *Best Predictors of Male Learners' Overall Intelligence by School Type*

The results that follow describe what educators perceived to be the best predictors of male learners' overall intelligence according to school type.

*Previously Disadvantaged High Schools:* Out of the seven intelligences, logical/mathematical, verbal/linguistic and musical intelligences were considered to be predictors of overall intelligence for male learners in Previously Disadvantaged Primary Schools. Logical/mathematical intelligence accounted for 53% of the total variance of IQ with an  $R^2$  of 0.53. Logical/mathematical intelligence was the best predictor of overall intelligence (Beta = 0.71,  $t = 8.11$ ,  $p < 0.05$ ), followed by verbal/linguistic intelligence (Beta = 0.38,  $t = 4.86$ ,  $p < 0.05$ ), and musical intelligence having a negative association with overall intelligence (Beta = -0.19,  $t = -2.26$ ,  $p < 0.05$ ) (see Table 5).

Table 5: Educators' best predictors of male learners' overall intelligence in Previously Disadvantaged High Schools.

	Beta	t	p.
L-Math	0.71	8.11	0.00
Verbal	0.38	4.86	0.00
Musical	-0.19	-2.26	0.02

Key: Verbal=Verbal Intelligence, L-Math =Logical/Mathematical Intelligence, Musical= Musical Intelligence

*Ex-Model C High Schools:* Verbal, interpersonal and logical/mathematical intelligences were considered to be predictors of overall intelligence for male learners in Ex-Model C High Schools. Verbal intelligence accounted for 48% of the total variance of IQ with an  $R^2$  of 0.48. Verbal intelligence was the best predictor of overall intelligence (Beta = 0.59,  $t = 6.20$ ,  $p < 0.05$ ) followed by interpersonal intelligence (Beta = 0.24,  $t = 2.93$ ,  $p < 0.05$ ), and logical/mathematical intelligence (Beta = 0.21,  $t = 2.85$ ,  $p < 0.05$ ) (see Table 6).

Table 6: Educators' best predictors of male learners' overall intelligence in Ex-Model C High Schools.

	Beta	t	p.
Verbal	0.59	6.20	0.00
Inter	0.24	2.93	0.01
L-Math	0.21	2.85	0.01

Key: Verbal=Verbal Intelligence, Inter=Interpersonal Intelligence, L-Math =Logical/Mathematical Intelligence

*Previously Disadvantaged Primary Schools:* The best predictors of the overall intelligence of male learners in Previously Disadvantaged Primary schools were intrapersonal and logical/mathematical intelligences. Intrapersonal intelligence accounted for 37% of the total

variance of IQ with an  $R^2$  of 0.37. Intrapersonal intelligence was the best predictor of overall intelligence (Beta = 0.46,  $t = 4.35$ ,  $p < 0.05$ ) followed by logical/mathematical intelligence (Beta = 0.43,  $t = 4.12$ ,  $p < 0.05$ ) (see Table 7).

Table 7: Educators' best predictors of male learners' overall intelligence in Previously Disadvantaged Primary Schools.

	<b>Beta</b>	<b>t</b>	<b>p.</b>
Intra	0.46	4.35	0.00
L-Math	0.43	4.12	0.00

Key: *Intra* = Intrapersonal Intelligence, *L-Math* = Logical/Mathematical Intelligence

*Ex-Model C Primary Schools:* For male learners in Ex-Model C Primary Schools, the best predictors of intelligence were logical-mathematical and verbal intelligences. Logical/mathematical intelligence accounted for 49% of the total variance of IQ with an  $R^2$  of 0.49. Logical/mathematical intelligence was the best predictor of overall intelligence (Beta = 0.56,  $t = 5.76$ ,  $p < 0.05$ ) followed by verbal intelligence (Beta = 0.38,  $t = 3.91$ ,  $p < 0.05$ ) (see Table 8).

Table 8: Educators' best predictors of male learners' overall intelligence in Ex-Model C Primary Schools.

	<b>Beta</b>	<b>t</b>	<b>p.</b>
L-Math	0.56	5.76	0.00
Verbal	0.38	3.91	0.00

Key: *L-Math* = Logical/Mathematical Intelligence, *Verbal* = Verbal Intelligence

### Summary

Verbal and logical/mathematical intelligence emerged as the best predictors of overall intelligence for male learners in Previously Disadvantaged High schools and in Ex-Model C High and Primary Schools. Musical intelligence was negatively associated with overall intelligence for males in Previously Disadvantaged High Schools. Logical/mathematical and intrapersonal intelligence emerged as the best predictor of overall intelligence for males in Previously Disadvantaged Primary Schools. Interpersonal intelligence also emerged as a



good predictor of overall intelligence for male learners in Ex-Model C High Schools. Table 9 depicts the best predictors of overall intelligence for female learners according to school type.

Table 9: Summary of best predictors of overall intelligence for male learners according to school type.

INTELLIGENCES	PDHS	EMCHS	PDPS	EMCPS
Verbal	√	√		√
Mathematical	√	√	√	√
Spatial				
Musical	-			
Interpersonal		√		
Intrapersonal			√	

**Key:** Verbal=Verbal/linguistic Intelligence, Mathematical=Logical/mathematical Intelligence, Spatial=Spatial Intelligence.

Musical=Musical Intelligence, Interpersonal=Interpersonal Intelligence, and Intrapersonal = Intrapersonal Intelligence.

PDHS = Previously Disadvantaged High School, EMCHS = Ex Model C High School, PDPS = Previously Disadvantaged Primary School.

EMCPS = Ex Model C Primary School.

√ indicates intelligence selected as a good predictor of overall intelligence.

- indicates intelligence negatively associated with overall intelligence.

### *Best Predictors of Female Learners' Overall Intelligence by School Type*

The results that follow describe what educators perceived to be the best predictor of female learners' overall intelligence according to school type.

*Previously Disadvantaged High Schools:* Musical intelligence was perceived to be the only best predictor of overall intelligence for female learners in Previously Disadvantaged High Schools. Musical intelligence accounted for 55% of the total variance of IQ with an  $R^2$  of 0.55. Musical intelligence was the best and only predictor of overall intelligence (Beta = 0.34,  $t = 2.86$ ,  $p < 0.05$ ) (see Table 10).

Table 10: Educators' best predictors of female learners' overall intelligence in Previously Disadvantaged High Schools.

	Beta	t	p.
Musical	0.34	2.86	0.01

**Key:** Musical= Musical Intelligence

*Ex-Model C High Schools:* Verbal, interpersonal and spatial intelligences were the best predictors of overall intelligence for female learners in Ex-Model C High Schools. Verbal

intelligence accounted for 53% of the total variance of IQ with an  $R^2$  of 0.53. Verbal intelligence was the best predictor of overall intelligence (Beta = 0.58,  $t = 5.02$ ,  $p < 0.05$ ) followed by interpersonal intelligence (Beta = 0.58,  $t = 5.02$ ,  $p < 0.05$ ), and spatial intelligence (Beta = 0.23,  $t = 2.20$ ,  $p < 0.05$ ) (see Table 11).

Table 11: Educators' best predictors of female learners' overall intelligence in Ex-Model C High Schools.

	<b>Beta</b>	<b>t</b>	<b>p.</b>
Verbal	0.58	5.02	0.00
Inter	0.26	2.63	0.01
Spatial	0.23	2.20	0.04

Key: Verbal=Verbal Intelligence, Inter=Interpersonal Intelligence, Spatial=Spatial Intelligence

*Previously Disadvantaged Primary Schools:* The best predictors for female learners' overall intelligence from Previously Disadvantaged Primary Schools were intrapersonal and interpersonal intelligences. Intrapersonal intelligence accounted for 33% of the total variance of IQ with an  $R^2$  of 0.33. Intrapersonal intelligence was the best predictor of overall intelligence (Beta = 0.44,  $t = 2.61$ ,  $p < 0.05$ ) followed by interpersonal intelligence (Beta = 0.34,  $t = 2.03$ ,  $p = 0.05$ ) (see Table 12).

Table 12: Educators' best predictors of female learners' overall intelligence in Previously Disadvantaged Primary Schools.

	<b>Beta</b>	<b>t</b>	<b>p.</b>
Intra	0.44	2.61	0.01
Inter	0.34	2.03	0.05

Key: Intra= Intrapersonal Intelligence, Inter = Interpersonal Intelligence

*Ex- Model C High Schools:* For female learners in Ex-Model C Primary Schools, the best predictors of overall intelligence were verbal and logical/mathematical intelligences. Verbal intelligence accounted for 47% of the total variance of IQ with an  $R^2$  of 0.47. Verbal intelligence was the best predictor of overall intelligence (Beta = 0.52,  $t = 5.50$ ,  $p < 0.05$ ) followed by logical/mathematical intelligence (Beta = 0.44,  $t = 4.74$ ,  $p < 0.05$ ) (see Table 13).

Table 13: Educators' best predictors of female learners' overall intelligence in Ex-Model C Primary Schools.

	Beta	t	p.
Verbal	0.52	5.50	0.00
L-Math	0.44	4.74	0.00

Key: Verbal=Verbal Intelligence, L-Math=Logical/Mathematical Intelligence

### Summary

Musical intelligence emerged as the best predictor of overall intelligence for females in Previously Disadvantaged High Schools. Verbal, spatial and interpersonal intelligence emerged as the best predictors of overall intelligence for female learners in Ex Model C High Schools. Intrapersonal and interpersonal intelligence emerged as the best predictors of overall intelligence for females in Previously Disadvantaged Primary Schools. Verbal and logical/mathematical intelligence emerged as the best predictors of overall intelligence for female learners in Ex-Model C Primary schools. Table 14 depicts the best predictors of overall intelligence for female learners according to school type.

Table 14: Summary of best predictors of overall intelligence for female learners according to school type.

INTELLIGENCES	PDHS	EMCHS	PDPS	EMCPS
Verbal		√		√
Mathematical				√
Spatial		√		
Musical	√			
Interpersonal		√	√	
Intrapersonal			√	

Key: Verbal=Verbal/Linguistic Intelligence, Mathematical=Logical/mathematical Intelligence, Spatial=Spatial Intelligence,

Musical=Musical Intelligence, Interpersonal=Interpersonal Intelligence, and Intrapersonal = Intrapersonal Intelligence.

PDHS = Previously Disadvantaged High School, EMCHS = Ex Model C High School, PDPS = Previously Disadvantaged Primary School,

EMCPS = Ex Model C Primary School. √ indicates that this intelligence was selected as a good predictor of overall intelligence.

### Educators' Views on Intelligence and IQ Testing

The Pearson's chi-square test ( $\chi^2$ ) was the statistical procedure used to analyse the six yes or no questions pertaining to educators' explicit views of intelligence according to school type,



as well as the four additional questions used to determine which types of multiple intelligences are utilized the most and least by educators in classroom practice and assessment. Each educator needed to list the multiple intelligences used the most in classroom activity and the multiple intelligences used the least in classroom activity; as well as the multiple intelligences used the most in assessment and the multiple intelligences used the least in assessment.

The six questions which were statistically significant according to school type included the following:

- *Have you ever taken an intelligence test?*
- *Do you believe that they measure intelligence fairly well?*
- *Do you believe IQ test are useful in educational settings?*
- *Do you believe males are on average more intelligent than females?*

The following questions were not statistically significant according to school type:

- *Do you believe intelligence is primarily inherited?*
- *Do you believe some races are more intelligent than others?*

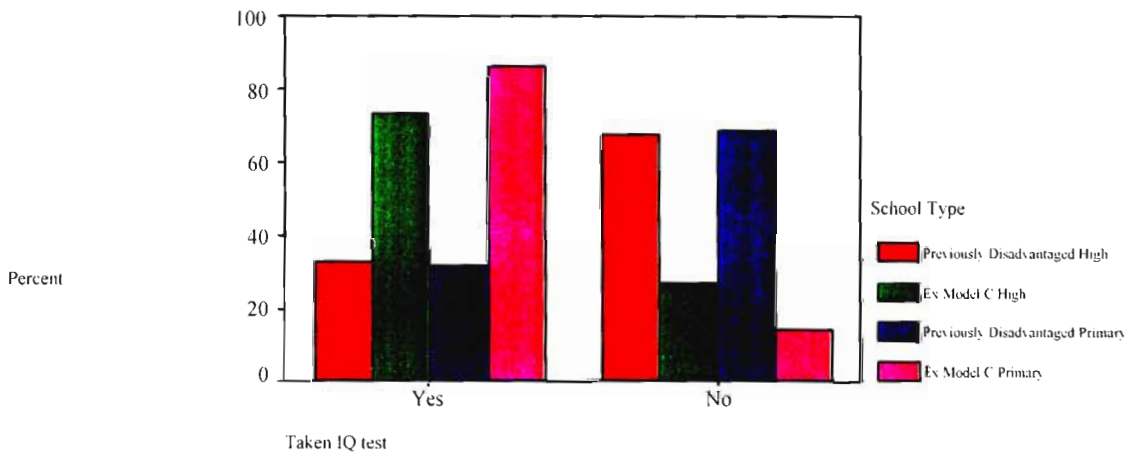
*Have you ever taken an intelligence test?*

There was a statistically significant difference in how the educators from the different school types responded to the question, *have you ever taken an intelligence test?* The Pearson's chi square ( $\chi^2$ ) was valued at  $(1, 3 N = 201) = 47.57, p < 0.05$ . 51.7% of the educators said *yes* and 48.3% said *no* (see Table 15). 32.8% of educators from Previously Disadvantaged High Schools and 34% from Previously Disadvantaged Primary Schools answered that they had taken an intelligence test as compared to 73.7% in Ex-Model C High Schools and 86% in Ex-Model C Primary Schools (see Figure 2).

Table 15: Educators' responses to taking an intelligence test or not

		Taken IQ test		Total
		Yes	No	
School Type	Previously Disadvantaged High	22	45	67
	Ex Model C High	22	8	30
	Previously Disadvantaged Primary	17	37	54
	Ex Model C Primary	43	7	50
Total		104	97	201

Figure 2: Educators' responses to, "Have you ever taken an intelligence test?"



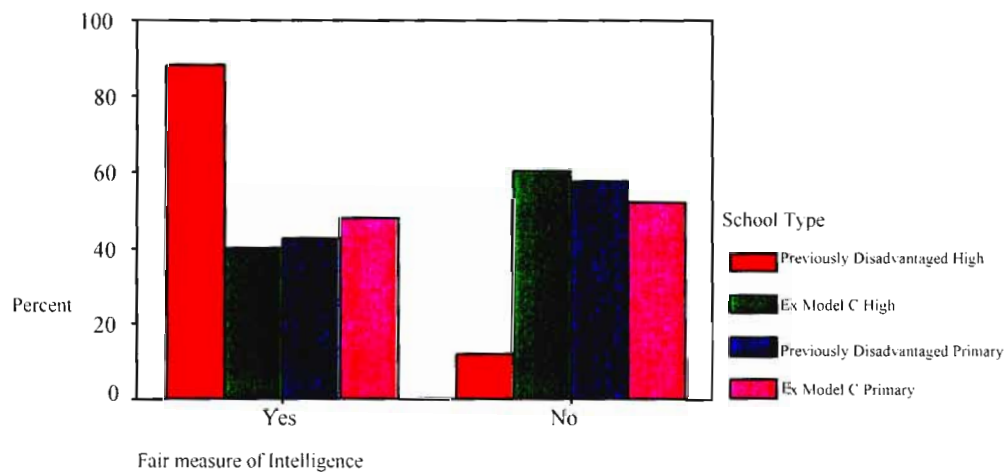
*Do you believe they (IQ tests) measure intelligence fairly well?*

There was a statistically significant difference in how the educators responded to the question, *do you believe they (IQ tests) measure intelligence fairly well*. The Pearson's chi square ( $\chi^2$ ) was valued at  $(1, 3 N = 201) = 36.29, p < 0.05$ . 58.7% of the educators said *yes* and 41.3% said *no* (see Table 14). 88.6% of educators from Previously Disadvantaged High Schools believed that IQ test are a fair measure of intelligence, the highest number comparatively, even though this group of educators had the lowest percentage that had taken an IQ test (32.8%). 40% of educators from Ex Model C High Schools agreed that IQ tests were a fair measure of intelligence even though this group had the highest number that had taken an intelligence test. 42.6% in Previously Disadvantaged Primary Schools and 48% in Ex-Model C Primary Schools agreed that IQ tests were a fair measure of intelligence (see Figure 16).

Table 16: Educators' responses to whether IQ tests are a fair measure of intelligence.

		Fair measure of Intelligence		Total
		Yes	No	
School Type	Previously Disadvantaged High	59	8	67
	Ex Model C High	12	18	30
	Previously Disadvantaged Primary	23	31	54
	Ex Model C Primary	24	26	50
Total		118	83	201

Figure 3: Educators' responses to, "Do you believe that they (IQ Tests) measure intelligence fairly well?"



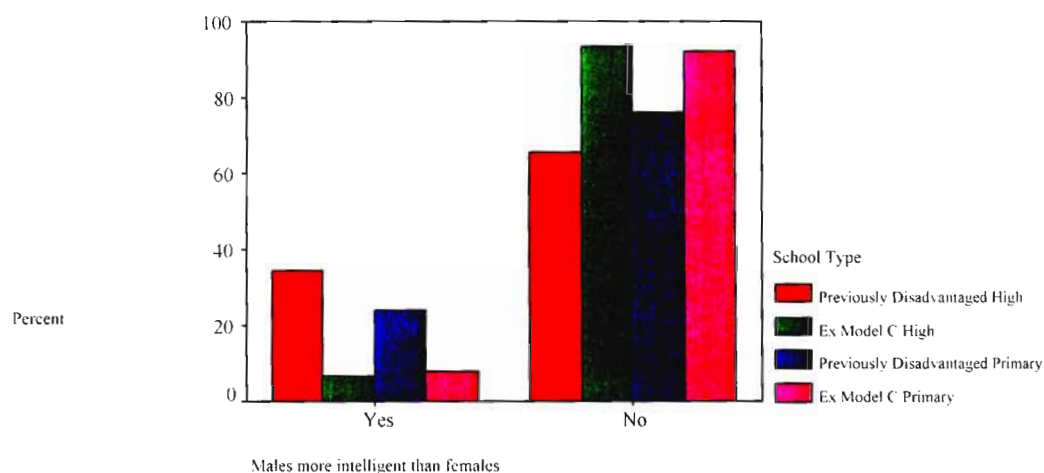
*Do you believe males are on average more intelligent than females?*

There was a statistically significant difference in how the educators responded to the question, *do you believe males are on average more intelligent than females*. The Pearson's chi square ( $\chi^2$ ) was valued at  $(1, 3 N = 201) = 16.35, p < 0.05$ . 20.9% of the educators said *yes* and 79.1% said *no* (see Table 17). 65.7% of educators from Previously Disadvantaged High Schools did not believe that males were on average more intelligent than females, while 34.3% agreed; while in Previously Disadvantaged Primary Schools 75.9% disagreed and 24.1% agreed. Educators from Ex-Model C High Schools and Primary Schools had larger percentages of disagreement to the belief that males are on average more intelligent than females, with 93.3% and 92%, consecutively (see Figure 4).

Table 17: Educators' responses to whether males are more intelligent than females.

		Males more intelligent than females		Total
		Yes	No	
School Type	Previously Disadvantaged High	23	44	67
	Ex Model C High	2	28	30
	Previously Disadvantaged Primary	13	41	54
	Ex Model C Primary	4	46	50
Total		42	159	201

Figure 4: Educators' responses to, "Do you believe that males are on average more intelligent than females?"



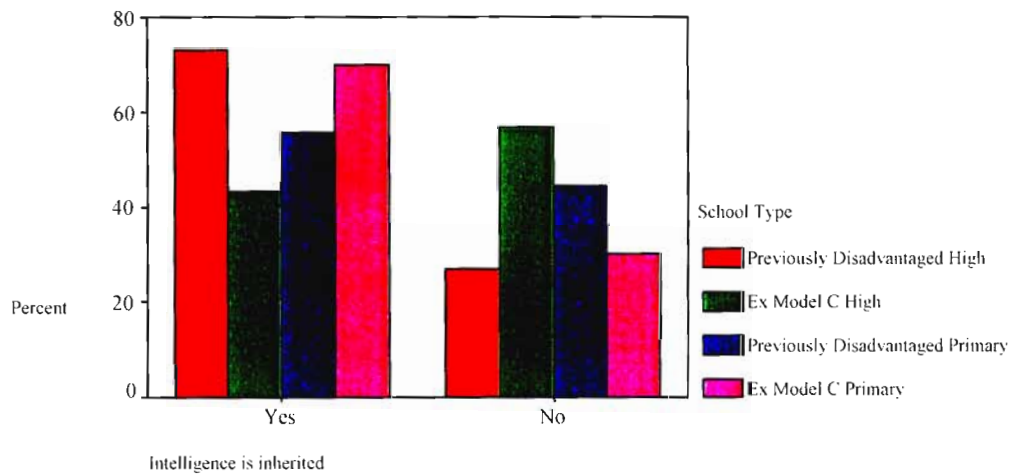
*Do you believe intelligence is primarily inherited?*

There was no statistically significant difference in how the educators responded to the question, *do you believe intelligence is primarily inherited*. The Pearson's chi square ( $\chi^2$ ) was valued at  $(1, 3 N = 201) = 10.28, p > 0.05$ . 63.2% of the educators agreed that intelligence is primarily inherited and 36.8 % disagreed (see Table 18). The largest proportion of educators who believed that intelligence is primarily inherited emanated from the Previously Disadvantaged High School type with 73.1%, and the Ex-Model C Primary School type with 70 %. In the Ex-Model C High Schools, only 43.3% of the educators agreed that intelligence was primarily inherited and in the Previously Disadvantaged Primary Schools, only 55.6% agreed (see Figure 5).

Table 18: Educators' responses to whether intelligence is inherited or not.

		Intelligence is inherited		Total
		Yes	No	
School Type	Previously Disadvantaged High	49	18	67
	Ex Model C High	13	17	30
	Previously Disadvantaged Primary	30	24	54
	Ex Model C Primary	35	15	50
Total		127	74	201

Figure 5: Educators' responses to, "Do you believe intelligence is primarily inherited?"



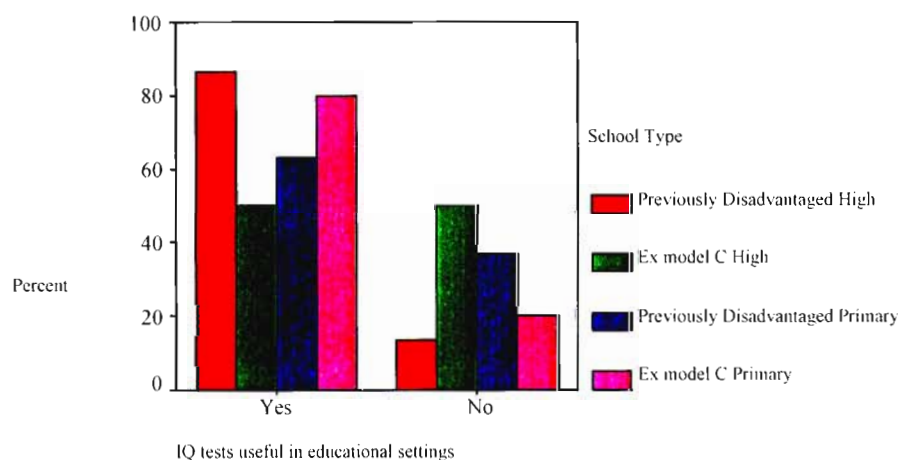
*Do you believe IQ tests are useful in educational settings?*

There was a statistically significant difference in how the educators responded to the question, *do you believe IQ tests are useful in educational settings*. The Pearson's chi square ( $\chi^2$ ) was valued at  $(1, 3 N = 201) = 18.37, p < 0.05$ . 73.1% of the educators said yes and 26.9% said no (see Table 19). Very similar to the previous question, the largest proportion of educators that agreed that IQ tests are useful in educational settings emanated from Previously Disadvantaged High Schools with 86.6% agreeing, and Ex-Model C Primary Schools with 80% agreeing. In Ex-Model C High Schools, 50% of the educators agreed that IQ tests are useful in educational settings and in Previously Disadvantaged Primary Schools, 63% agreed (see Figure 6).

Table 19: Educators' responses to whether IQ tests are useful in educational settings.

		IQ tests useful in educational settings		Total
		Yes	No	
School Type	Previously Disadvantaged High	58	9	67
	Ex Model C High	15	15	30
	Previously Disadvantaged Primary	34	20	54
	Ex Model C Primary	40	10	50
Total		147	54	201

Figure 6: Educators' responses to, "Do you believe IQ tests are useful in education settings?"



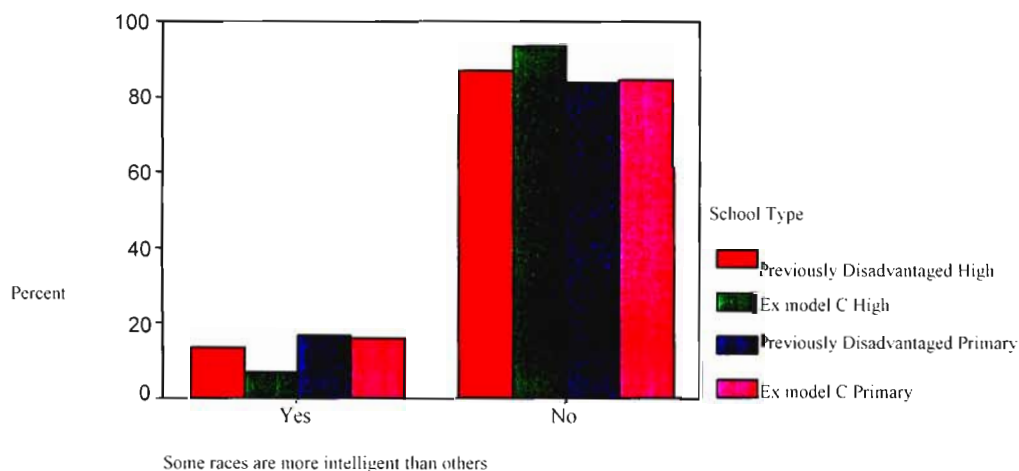
*Do you believe some races are more intelligent than others?*

There was no statistically significant difference in how the educators responded to the question, *do you believe some races are more intelligent than others*. The Pearson's chi square ( $\chi^2$ ) was valued at  $(1, 3 N = 201) = 1.9, p > 0.05$ . 13.9% of the educators believed that some races are more intelligent than others while 86.1% disagreed (see Table 20). The percentage of educators that disagreed includes 86.6% from Previously Disadvantaged High Schools, 93.3% from Ex-Model C High Schools, 83.3% from Previously Disadvantaged Primary Schools, and 84% from Ex-Model C Primary schools (see Figure 7). Generally, educators in all school types did not believe that some races are more intelligent than others.

Table 20: Educators' responses to whether some races are more intelligent than others.

		Some races are more intelligent than others		Total
		Yes	No	
School Type	Previously Disadvantaged High	9	58	67
	Ex Model C High	2	28	30
	Previously Disadvantaged Primary	9	45	54
	Ex Model C Primary	8	42	50
Total		28	173	201

Figure 7: Educators' responses to, "Do you believe some races are more intelligent than others?"



### *Multiple Intelligences Incorporated into Pedagogical Practice According to School Type*

The four additional questions that followed pertained to the multiple intelligences incorporated in most classroom activity and assessment, and tapped on the least in classroom activity and assessment. The responses to these questions are influenced by learning areas or subjects taught by educators however, these questions provide important information with regard to the emphases on the different multiple intelligences that are tapped in the school setting. Each of the seven multiple intelligences was analyzed separately to determine whether they were incorporated into classroom activity and assessment. These included the following questions: which of the above multiple intelligences (Gardner's seven multiple



intelligences) do you use the most in classroom activity; which of the above multiple intelligences do you use the least in classroom activity; which of the above multiple intelligences do you use the most for assessment and; which of the above multiple intelligences do you use the least for assessment.

#### *Multiple Intelligences Tapped the Most in Classroom Activity*

*Verbal/Linguistic Intelligence:* For verbal/linguistic intelligence, there was a statistically significant difference in how the educators responded to the question, *which of the above multiple intelligences (Gardner's 7 multiple intelligences) do you use the most in classroom activity*. The Pearson's chi square ( $\chi^2$ ) was valued at  $(1, 3 N = 201) = 24.87, p < 0.05$ . 69.2% of the educators selected verbal/linguistic intelligence as one of the intelligences used the most in classroom activity, 52.2% from Previously Disadvantaged High Schools, 60% from Ex-Model C High Schools, 72.2% from Previously Disadvantaged Primary Schools, and 94% from Ex-Model C Primary Schools (see table 21).

Table 21: Number of educators that selected verbal intelligence as the intelligence most used in classroom activity.

		School Type				Total
		Previously Disadv. High	Ex Model C High	Previously Disadv Primary	Ex Model C Primary	
Verbal/Linguistic Intelligence	Yes	35	18	39	47	139
	No	32	12	15	3	62
Total		67	30	54	50	201

*Logical/Mathematical Intelligence:* For logical/mathematical intelligence, there was no statistically significant difference in how the educators responded to the question, *which of the above multiple intelligences (Gardner's 7 multiple intelligences) do you use the most in classroom activity*. The Pearson's chi square ( $\chi^2$ ) was valued at  $(1, 3 N = 201) = 4.88, p > 0.05$ . 51.7% of the educators selected logical/mathematical intelligence as one of the intelligences used the most in classroom activity, 46.3% from Previously Disadvantaged High Schools, 40% from Ex-Model C High Schools, 60% from Previously Disadvantaged Primary Schools, and 62% from Ex-Model C Primary Schools (see Table 22).



Table 22: Number of educators that selected mathematical intelligence as the intelligence most used in classroom activity.

		School Type				Total
		Previously Disadv. High	Ex Model C High	Previously Disadv. Primary	Ex Model C Primary	
Logical/mathematical Intelligence	Yes	31	12	30	31	104
	No	36	18	24	19	97
Total		67	30	54	50	201

*Spatial Intelligence:* For spatial intelligence, there was no statistically significant difference in how the educators responded to the question, *which of the above multiple intelligences (Gardner's 7 multiple intelligences) do you use the most in classroom activity.* The Pearson's chi square ( $\chi^2$ ) was valued at  $(1, 3 N = 201) = 4.11, p > 0.05$ . 16.4% of the educators selected spatial intelligence as one of the intelligences used the most in classroom activity, 16.4% from Previously Disadvantaged High Schools, 16.7% from Ex-Model C High Schools, 9.3% from Previously Disadvantaged Primary Schools, and 24% from Ex-Model C Primary Schools (see Table 23).

Table 23: Number of educators that selected spatial intelligence as the intelligence most used in classroom activity.

		School Type				Total
		Previously Disadv. High	Ex Model C High	Previously Disadv. Primary	Ex Model C Primary	
Spatial intelligence	Yes	11	5	5	12	33
	No	56	25	49	38	168
Total		67	30	54	50	201

*Musical Intelligence:* For musical intelligence, there was no statistically significant difference in how the educators responded to the question, *which of the above multiple intelligences (Gardner's 7 multiple intelligences) do you use the most in classroom activity.* The Pearson's chi square ( $\chi^2$ ) was valued at  $(1, 3 N = 201) = 2.87, p > 0.05$ . 5.5% of the educators selected musical intelligence as one of the intelligences used the most in classroom activity, with 4.5% emanating from Previously Disadvantaged High Schools, 0% emanating from Ex-

Model C High Schools, 7.4% from Previously Disadvantaged Primary Schools, and 8% from Ex-Model C Primary Schools (see Table 24).

Table 24: Number of educators that selected musical intelligence as the intelligence most used in classroom activity.

		School Type				Total
		Previously Disadv High	Ex Model C High	Previously Disadv Primary	Ex Model C Primary	
Musical Intelligence	Yes	3	0	4	4	11
	No	64	30	50	46	190
Total		67	30	54	50	201

*Bodily/Kinaesthetic Intelligence:* For bodily/kinaesthetic intelligence, there was no statistically significant difference in how the educators responded to the question, *which of the above multiple intelligences (Gardner's 7 multiple intelligences) do you use the most in classroom activity.* The Pearson's chi square ( $\chi^2$ ) was valued at  $(1, 3 N = 201) = 2.59$ ,  $p > 0.05$ ). 7% of the educators selected bodily/kinaesthetic intelligence as one of the intelligences used the most in classroom activity.

*Interpersonal Intelligence:* For interpersonal intelligence, there was a statistically significant difference in how the educators responded to the question, *which of the above multiple intelligences (Gardner's 7 multiple intelligences) do you use the most in classroom activity.* The Pearson's chi square ( $\chi^2$ ) was valued at  $(1, 3 N = 201) = 24.24$ ,  $p < 0.05$ ). 17.4% of the educators selected interpersonal intelligence as one of the intelligences used the most in classroom activity, 3% from Previously Disadvantaged High Schools, 26.7% from Ex-Model C High Schools, 13% from Previously Disadvantaged Primary Schools, and 36% from Ex-Model C Primary Schools (see Table 25).

Table 25: Number of educators that selected interpersonal intelligence as the intelligence most used in classroom activity.

		School Type				Total
		Previously Disadv High	Ex Model C High	Previously Disadv Primary	Ex Model C Primary	
Interpersonal Intelligence	Yes	2	8	7	18	35
	No	65	22	47	32	166
Total		67	30	54	50	201

*Intrapersonal Intelligence:* For intrapersonal intelligence, there was a statistically significant difference in how the educators responded to the question, *which of the above multiple intelligences (Gardner's 7 multiple intelligences) do you use the most in classroom activity*. The Pearson's chi square ( $\chi^2$ ) was valued at  $(1, 3 N = 201) = 15.85, p < 0.05$ . 12.4% of the educators selected intrapersonal intelligence as one of the intelligences used the most in classroom activity, 1.5% from Previously Disadvantaged High Schools, 13.3% from Ex-Model C High Schools, 13% from Previously Disadvantaged Primary Schools, and 12.4% from Ex-Model C Primary Schools (see Table 26).

Table 26: Number of educators that selected intrapersonal intelligence as the intelligence most used in classroom activity.

		School Type				Total
		Previously Disadv High	Ex Model C High	Previously Disadv Primary	Ex Model C Primary	
Intrapersonal Intelligence	Yes	1	4	7	13	25
	No	66	26	47	37	176
Total		67	30	54	50	201

### Summary

The following table and graphical representation demonstrates that verbal/linguistic and logical/mathematical intelligence were tapped the most by educators in classroom activity (See Table 27, and Figure 8).

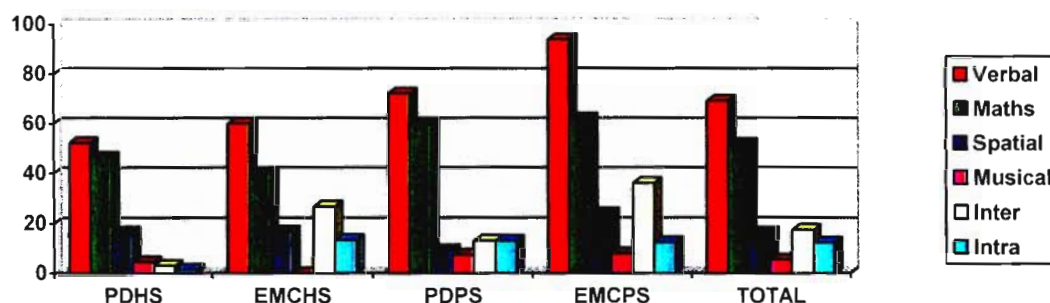
Table 27: Cumulative percentages of intelligences tapped the most in classroom activity by educators according to school type.

	Verbal	Mathematical	Spatial	Musical	Interpersonal	Intrapersonal
PDHS	52.2	46.3	16.4	4.5	3	1.5
EMCHS	60	40	16.7	0	26.7	13.3
P.D.P.S	72.2	60	9.3	7.4	13	13
EMCPS	94	62	24	8	36	12.4
Total %	69.2	51.7	16.4	5.5	17.4	12.4

**Key:** Verbal=Verbal/linguistic Intelligence, Mathematical= Logical/Mathematical Intelligence, Spatial=Spatial Intelligence, Musical=Musical Intelligence, Interpersonal=Interpersonal Intelligence, and Intrapersonal = Intrapersonal Intelligence.

PDHS = Previously Disadvantaged High School, EMCHS = Ex Model C High School, PDPS = Previously Disadvantaged Primary School, and EMCPS = Ex Model C Primary School

Figure 8: Cumulative percentages of intelligences tapped the most in classroom activity by educators according to school type.



#### *Multiple Intelligences Tapped the Least in Classroom Activity*

*Verbal/Linguistic intelligence:* Verbal/Linguistic intelligence was not selected as an intelligence used the least in the classroom.

*Logical/mathematical intelligence:* For logical/mathematical intelligence, there was no statistically significant difference in how the educators responded to the question, *which of the above multiple intelligences (Gardner's 7 multiple intelligences) do you use the least in classroom activity.* The Pearson's chi square ( $\chi^2$ ) was valued at (1, 3 N = 201) = 3.28,  $p > 0.05$ ). Only 5.5% of the educators selected logical/mathematical intelligence as one of the intelligences used the least in classroom activity.

*Spatial intelligence:* For spatial intelligence, there was a statistically significant difference in how the educators responded to the question, *which of the above multiple intelligences (Gardner's 7 multiple intelligences) do you use the least in classroom activity*. The Pearson's chi square ( $\chi^2$ ) was valued at  $(1, 3 N = 201) = 20.58, p < 0.05$ . 7% of the educators selected spatial intelligence as one of the intelligences used the least in classroom activity, 1.5% from Previously Disadvantaged High Schools, 3.3% from Ex-Model C High Schools, 20.4% from Previously Disadvantaged Primary Schools, and 2% from Ex-Model C Primary Schools.

*Musical intelligence:* For musical intelligence, there was no statistically significant difference in how the educators responded to the question, *which of the above multiple intelligences (Gardner's 7 multiple intelligences) do you use the least in classroom activity*. The Pearson's chi square ( $\chi^2$ ) was valued at  $(1, 3 N = 201) = 1.64, p > 0.05$ . 42.8% of the educators selected musical intelligence as one of the intelligences used the least in classroom activity, 40.3% from Previously Disadvantaged High Schools, 53.3% from Ex-Model C High Schools, 40.7% from Previously Disadvantaged Primary Schools, and 42% from Ex-Model C Primary Schools.

*Bodily/kinaesthetic intelligence:* For bodily/kinaesthetic intelligence, there was a statistically significant difference in how the educators responded to the question, *which of the above multiple intelligences (Gardner's 7 multiple intelligences) do you use the least in classroom activity*. The Pearson's chi square ( $\chi^2$ ) was valued at  $(1, 3 N = 201) = 15.18, p < 0.05$ . 39.3% of the educators selected bodily/kinaesthetic intelligence as one of the intelligences used the least in classroom activity, 30% from Previously Disadvantaged High Schools, 46.7% from Ex-Model C High Schools, 27.8% from Previously Disadvantaged Primary Schools, and 60% from Ex-Model C Primary Schools.

*Interpersonal intelligence:* For interpersonal intelligence, there was no statistically significant difference in how the educators responded to the question, *which of the above multiple intelligences (Gardner's 7 multiple intelligences) do you use the least in classroom activity*. The Pearson's chi square ( $\chi^2$ ) was valued at  $(1, 3 N = 201) = 4.79, p > 0.05$ . Only 8% of the educators selected interpersonal intelligence as one of the intelligences used the least in classroom activity.

*Intrapersonal intelligence:* For intrapersonal intelligence, there was no statistically significant difference in how the educators responded to the question, *which of the above multiple intelligences (Gardner's 7 multiple intelligences) do you use the least in classroom activity.* The Pearson's chi square ( $\chi^2$ ) was valued at  $(1, 3 N = 201) = 10.59, p > 0.05$ . Only 13% of the educators selected intrapersonal intelligence as the intelligence used the least in classroom activity.

### Summary

Musical followed by bodily/kinaesthetic intelligence were the intelligences tapped the least in classroom activity. Verbal/linguistic intelligence was not listed as one of the intelligences tapped the least in classroom activity.

### Multiple Intelligences Incorporated the Most in Assessment Practices

*Verbal/Linguistic Intelligence:* For verbal/linguistic intelligence, there was a statistically significant difference in how the educators responded to the question, *which of the above multiple intelligences (Gardner's 7 multiple intelligences) do you use the most for assessment.* The Pearson's chi square ( $\chi^2$ ) was valued at  $(1, 3 N = 201) = 35.35, p < 0.05$ . 65.2% of the educators selected verbal/linguistic intelligence as one of the intelligences used the most for assessment, 41.8% from Previously Disadvantaged High Schools, 53.3% from Ex-Model C High Schools, 77.8% from Previously Disadvantaged Primary Schools, and 90% from Ex-Model C Primary Schools (see table 28).

Table 28: Number of educators that selected verbal intelligence as the intelligence most used in classroom assessment.

		School Type				Total
		Previously Disadv High	Ex Model C High	Previously Disadv Primary	Ex Model C Primary	
Verbal/Linguistic Intelligence	Yes	28	16	42	45	131
	No	39	14	12	5	70
Total		67	30	54	50	201

*Logical/Mathematical Intelligence:* For logical/mathematical intelligence, there was no statistically significant difference in how the educators responded to the question, *which of the above multiple intelligences (Gardner's 7 multiple intelligences) do you use the most for assessment.* The Pearson's chi square ( $\chi^2$ ) was valued at (1, 3  $N = 201$ ) = 8.36,  $p > 0.05$ ). 58.7% of the educators selected logical/mathematical intelligence as one of the intelligences used the most in classroom activity, 62.7% from Previously Disadvantaged High Schools, 46.7% from Ex-Model C High Schools, 48.1% from Previously Disadvantaged Primary Schools, and 72% from Ex-Model C Primary Schools (see table 29).

Table 29: Number of educators that selected mathematical intelligence as the intelligence most used in classroom assessment.

		School Type				Total
		Previously Disadv High	Ex Model C High	Previously Disadv Primary	Ex Model C Primary	
Logical/mathematical Intelligence	Yes	42	14	26	36	118
	No	25	16	28	14	83
Total		67	30	54	50	201

*Spatial Intelligence:* For spatial intelligence, there was no statistically significant difference in how the educators responded to the question, *which of the above multiple intelligences (Gardner's 7 multiple intelligences) do you use the most in assessment.* The Pearson's chi square ( $\chi^2$ ) was valued at (1, 3  $N = 201$ ) = 7.20,  $p > 0.05$ ). 11.9% of the educators selected spatial intelligence as one of the intelligences used the most in assessment, 7.5% from Previously Disadvantaged High Schools, 13.3% from Ex-Model C High Schools, 7.4% from Previously Disadvantaged Primary Schools, and 22% from Ex-Model C Primary Schools (see table 30).



Table 30: Number of educators that selected spatial intelligence as the intelligence most used in classroom assessment.

		School Type				Total
		Previously Disadv. High	Ex Model C High	Previously Disadv Primary	Ex Model C Primary	
Spatial intelligence	Yes	5	4	4	11	24
	No	62	26	50	39	177
Total		67	30	54	50	201

*Musical Intelligence:* For musical intelligence, there was no statistically significant difference in how the educators responded to the question, *which of the above multiple intelligences (Gardner's 7 multiple intelligences) do you use the most in assessment.* The Pearson's chi square ( $\chi^2$ ) was valued at  $(1, 3 N = 201) = 3.67, p > 0.05$ . Only 2.5% of the educators selected musical intelligence as one of the intelligences used the most in assessment.

*Bodily/Kinaesthetic Intelligence:* For bodily/kinaesthetic intelligence, there was no statistically significant difference in how the educators responded to the question, *which of the above multiple intelligences (Gardner's 7 multiple intelligences) do you use the most in assessment.* The Pearson's chi square ( $\chi^2$ ) was valued at  $(1, 3 N = 201) = 1.52, p > 0.05$ . 5% of the educators selected bodily/kinaesthetic intelligence as one of the intelligences used the most in assessment.

*Interpersonal Intelligence:* For interpersonal intelligence, there was a statistically significant difference in how the educators responded to the question, *which of the above multiple intelligences (Gardner's 7 multiple intelligences) do you use the most in assessment.* The Pearson's chi square ( $\chi^2$ ) was valued at  $(1, 3 N = 201) = 15.21, p < 0.05$ . 10.9% of the educators selected interpersonal intelligence as one of the intelligences used the most in classroom activity, 1.5% from Previously Disadvantaged High Schools, 13.3% from Ex-Model C High Schools, 9.3% from Previously Disadvantaged Primary Schools, and 24% from Ex-Model C Primary Schools.

*Intrapersonal Intelligence:* For intrapersonal intelligence, there was no statistically significant difference in how the educators responded to the question, *which of the above multiple intelligences (Gardner's 7 multiple intelligences) do you use the most in assessment.* The



Pearson's chi square ( $\chi^2$ ) was valued at  $(1, 3, N = 201) = 3.73, p > 0.05$ . 14.4% of the educators selected intrapersonal intelligence as one of the intelligences used the most in classroom activity, 9% from Previously Disadvantaged High Schools, 20% from Ex-Model C High Schools, 13% from Previously Disadvantaged Primary Schools, and 20% from Ex-Model C Primary Schools.

### Summary

The following table and graphical representation demonstrates that verbal/linguistic and logical/mathematical intelligence were incorporated the most by educators in assessment (See Table 31 and Figure 9).

Table 31: Cumulative percentages of intelligences tapped the most in assessment by educators according to school type.

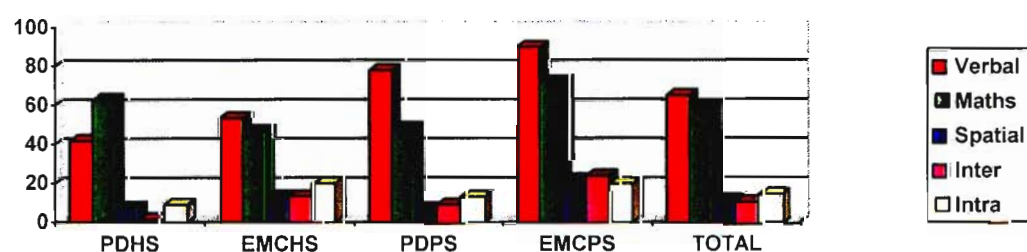
	Verbal	Mathematical	Spatial	Interpersonal	Intrapersonal
PDHS	41.8	62.7	7.5	1.5	9
EMCH.S	53.3	46.7	13.3	13.3	20
P.D.PS	77.8	48.1	7.4	9.3	13
EMC.PS	90	72	22	24	20
Total %	65.2	58.7	11.9	10.9	14.4

**Key:** Verbal=Verbal/linguistic Intelligence. Mathematical=Logical/mathematical Intelligence. Spatial=Spatial Intelligence.

Interpersonal=Interpersonal Intelligence. and Intrapersonal = Intrapersonal Intelligence.

PDHS = Previously Disadvantaged High School, EMCHS = Ex Model C High School, PDPS = Previously Disadvantaged Primary School, and EMCPS = Ex Model C Primary School

Figure 9: Cumulative percentages of intelligences incorporated the most in assessment by educators according to school type.



### *Multiple Intelligences Incorporated the Least in Assessment Practices*

*Verbal /linguistic intelligence:* For verbal/linguistic intelligence, there was no statistically significant difference in how the educators responded to the question, *which of the above multiple intelligences (Gardner's 7 multiple intelligences) do you use the least in assessment.* The Pearson's chi square ( $\chi^2$ ) was valued at (1, 3  $N = 201$ ) = 4.01,  $p > 0.05$ ). Only 4% of the educators selected verbal/linguistic intelligence as one of the intelligences used the least in assessment.

*Logical/mathematical intelligence:* For logical/mathematical intelligence, there was no statistically significant difference in how the educators responded to the question, *which of the above multiple intelligences (Gardner's 7 multiple intelligences) do you use the least in assessment.* The Pearson's chi square ( $\chi^2$ ) was valued at (1, 3  $N = 201$ ) = 4.43,  $p > 0.05$ ). Only 2.5% of the educators selected logical/mathematical intelligence as one of the intelligences used the least in assessment.

*Spatial intelligence:* For spatial intelligence, there was no statistically significant difference in how the educators responded to the question, *which of the above multiple intelligences (Gardner's 7 multiple intelligences) do you use the least in assessment.* The Pearson's chi square ( $\chi^2$ ) was valued at (1, 3  $N = 201$ ) = 5.45,  $p > 0.05$ ). 8% of the educators selected spatial intelligence as one of the intelligences used the least in assessment.

*Musical intelligence:* For musical intelligence, there was no statistically significant difference in how the educators responded to the question, *which of the above multiple intelligences (Gardner's 7 multiple intelligences) do you use the least in assessment.* The Pearson's chi square ( $\chi^2$ ) was valued at (1, 3  $N = 201$ ) = 7.06,  $p > 0.05$ ). 60.8% of the educators selected musical intelligence as one of the intelligences used the least in assessment.

*Bodily/kinaesthetic intelligence:* For bodily/kinaesthetic intelligence, there was a statistically significant difference in how the educators responded to the question, *which of the above multiple intelligences (Gardner's 7 multiple intelligences) do you use the least in assessment.* The Pearson's chi square ( $\chi^2$ ) was valued at (1, 3  $N = 201$ ) = 25.06,  $p < 0.05$ ). 34.3% of the educators selected bodily/kinaesthetic intelligence as one of the intelligences used the least in assessment, 11.9% from Previously Disadvantaged High Schools, 43.7% from Ex-Model C

High Schools, 38.9% from Previously Disadvantaged Primary Schools, and 54% from Ex-Model C Primary Schools.

*Interpersonal intelligence:* For interpersonal intelligence, there was a statistically significant difference in how the educators responded to the question, *which of the above multiple intelligences (Gardner's 7 multiple intelligences) do you use the least in assessment.* The Pearson's chi square ( $\chi^2$ ) was valued at  $(1, 3 N = 201) = 16.29, p < 0.05$ . 18% of the educators selected interpersonal intelligence as one of the intelligences used the least in assessment, 32.9% from Previously Disadvantaged High Schools, 3.3% from Ex-Model C High Schools, 16.7% from Previously Disadvantaged Primary Schools, and 10% from Ex-Model C Primary Schools.

*Intrapersonal intelligence:* For intrapersonal intelligence, there was no statistically significant difference in how the educators responded to the question, *which of the above multiple intelligences (Gardner's 7 multiple intelligences) do you use the least in assessment.* The Pearson's chi square ( $\chi^2$ ) was valued at  $(1, 3 N = 201) = 7.35, p > 0.05$ . 21.9% of the educators selected intrapersonal intelligence as the intelligence used the least in assessment.

### *Summary*

Musical followed by bodily/kinaesthetic intelligence were the intelligences incorporated the least in assessment practices.

## **Conclusion**

Educators from Previously Disadvantaged High Schools gave much lower ratings than all the other school types. Educators from Previously Disadvantaged High Schools rated their boy learners lower on overall intelligence, logical/mathematical intelligence and spatial intelligence, with musical intelligence having a negative association with overall intelligence, while their girl learners were rated lower on logical mathematical intelligence, spatial intelligence, musical intelligence and bodily/kinaesthetic intelligence.

Verbal intelligence and logical/mathematical intelligence emerged consistently as the best predictors of overall intelligence more so for male learners, while cultural and social

intelligences were included as best predictors of female learners' overall intelligence. Gender differences in best predictors of overall intelligence were more significant in the Previously Disadvantaged School types. Ex-Model C School types demonstrated less gender differences.

The highest percentage of educators that answered affirmatively that they had taken an intelligence test, emerged from Ex-Model C High Schools and Primary Schools. Related to the latter question, were the two questions that probed the usefulness of IQ tests in educational settings, with majority of the total educators agreeing that they were useful, and just over fifty percent believing that these tests measure intelligence fairly well. The highest percentage of educators in agreement to both these questions came from Previously Disadvantaged High Schools despite this cohort having the smaller percentage of test takers. Ex-Model C Primary Schools had the second highest percentage of educators that believed that IQ tests are useful in educational setting.

A majority of the total educators did not believe that males are on average more intelligent than females however, a significant percentage of educators from Previously Disadvantaged High Schools still believed that males are on average more intelligent than females.

Over fifty percent of the total educators agreed that intelligence is primarily inherited and a very small percentage agreed that some races are more intelligent than others. There was no significant difference according to school type.

Verbal/linguistic intelligence was listed as the most frequently tapped in classroom activity and assessment with significantly higher percentages of educators listing it in Primary Schools. None of the educators selected verbal/linguistic intelligence as one of the multiple intelligences used the least in classroom activity.

Musical intelligence followed by bodily/kinaesthetic intelligence had the highest frequencies for the intelligence used the least in classroom activity and assessment. Verbal/linguistic intelligence and logical/mathematical intelligence were intelligences that had the highest frequencies for the intelligences used the most in classroom activity and assessment.

## **CHAPTER FIVE**

### **DISCUSSION**

#### **Introduction**

The present chapter discusses the results of the study within the context of past studies and theoretical positions in this field. The research questions are outlined:

- Do school type differences exist in the educator estimates of female learners' overall and multiple intelligences?
- Do school type differences exist in the educator estimates of male learners' overall and multiple intelligences?
- What are the best predictors of learners' overall intelligence as perceived by educators from the different school types?
- What are educators' views with regard to intelligence in the different school types?
- Which are the multiple intelligences incorporated the most and the least in pedagogical practices?

The research questions outlined above will guide the discussion that follows.

#### **Educators' Estimations of their Learners' Intelligences according to School Type**

The results demonstrated a significant school type effect in the educator estimates of learners in Previously Disadvantaged High Schools as opposed to those in the other three school types. Educators from Previously Disadvantaged High Schools rated their male learners lower than the other school types on overall, logical/mathematical and spatial intelligences. Likewise, educators from Previously Disadvantaged High Schools rated their female learners lower on logical/mathematical, spatial, musical and bodily/kinaesthetic intelligences. Overall, logical/mathematical, and spatial intelligence are closely correlated to traditional Western conceptions of academic intelligence (Furnham, 2001; Gardner, 1983, 1991; Sternberg, 2000). These findings partially confirm the hypothesis that educators from the advantaged school types will estimate their learners' overall and multiple intelligences higher than educators from disadvantaged school types.

### *The Comparatively Lower Ratings of Intelligences in Previously Disadvantaged High School Types*

Male learners were rated significantly lower by educators from Previously Disadvantaged High Schools on overall, logical/mathematical, and spatial intelligences, intelligences normally associated with Western and modern conceptions of academic success. Their female learners were rated significantly lower on logical/mathematical, spatial, musical and bodily/kinaesthetic intelligence, the latter two being cultural factors of intelligence. These differences in IQ estimations may be accounted for by discourses of disadvantage or discourses of difference.

#### *Discourses of Disadvantage*

The discourses of disadvantage suggest that social context has an impact on a learners' school performance. Previously disadvantaged high schools have been documented to suffer significant disparities in educational resources, both human and physical (Fiske & Ladd, 2004; Yamauchi, 2004). High school education which is more specialized places far more demands on human resources and physical resources (facilities and equipment) than primary education (Baine & Mwamwenda, 1994). Thus a significant disparity persists in previously disadvantaged high schools as compared to previously disadvantaged primary schools. This may account for the results that demonstrated no significant differences between the estimates given by educators in Previously Disadvantaged Primary Schools and the estimates given by educators from Ex-Model C School types.

Significant effects of quality schooling have been documented (Baral & Das, 2004; Warwick 2000) which have demonstrated that better facilities, recreational activities, physical space, as well as better methods of teaching and administrative policies lead to higher scores in academic reasoning ability and analytical skill. Thus, it may be plausible to argue that the disparity in resources may have contributed to the educators' lower estimations of intelligences for males and females in Previously Disadvantaged High Schools. The estimations given by the Black High School educators may reflect the actual ability of their learners as estimated within the context of a disadvantaged Western schooling system. The comparatively lower scores may also be an indication of the educators' dissatisfaction with

their working conditions resulting in poor morale which is also projected onto learner performances.

Furthermore, it may be inferred that the Black High School educators, as a result of their educational training and profession, belong to a middle class socio-economic background as compared to the learners in this particular school type who tend to come from working class or low socio-economic backgrounds. Studies (Goduka, 1998; Miller, 2004) have shown that low socio-economic groups have lower IQ scores by Western intelligence test standards which serve to perpetuate society's gate-keeping structure. Studies on the impact of class on social transformation show that social inequality is perpetuated in the education system and that education does not facilitate social change (Gale & Densmore, 2000; Gaganakis, 1999; Goduka, 1998; Miller, 2004). It is essential to recognize the dynamic role of inequality and poverty as products of an iniquitous society which continues to promote the stratification of society. This inference is tentatively made since the socio-economic status of the educators and learners was not tested in this study.

Schooling and pedagogical practice have been traditionally structured around Western middle class norms with the emphasis on academic intelligence. According to Gale and Densmore (2000), educators are tasked with socializing learners into the dominant culture and norms of appropriate behaviour, and learners that do not succeed are suggested to be lacking in some quality important for academic achievement. Disadvantages in education are thus seen to contribute to a disparity in learner academic competencies. However, the diversity of learner needs and contexts need to be equally addressed.

### *Discourses of Difference*

Discourses of difference recognize variations in conceptions of intelligence rather than deviations from the dominant norm. Furnham, Callahan and Akande (2004) found that Black South Africans gave lower self estimates of intelligence compared to White South Africans, especially on mathematical intelligence. The researchers (ibid.) allude to the humility effect as a possible reason for the lower estimations amongst Black South Africans. According to the researchers (ibid.), this may lead to a self-fulfilling nature of self-evaluations of ability. This may apply to the Black High School educators' estimations of their learners' intelligences which reflect the humility effect due to socialization effects.

Furthermore, another possible explanation for the comparatively lower estimations of learners is the self-critical nature of collectivist cultures which characterize Black cultures (Kitayama & Duffy, 2004; Mpofu, 2002, 2004). In collectivist cultures, the self is construed as interdependent and socially connected, and a self-critical attitude is seen as an important cultural competency for social acceptance.

It may be inferred that the results in this study demonstrate that Black High School educators may be more critical or more humble in their evaluations of their learners. However, this does not apply to Black educators from Previously Disadvantaged Primary Schools. This may be accounted for by either assimilation or integration effects (Berry, 2004). According to Gale and Densmore (2000), educators are tasked with socializing learners into the dominant culture and learners are equipped with competencies for success in academic achievement. Alternatively, the process of integration may have facilitated educators from Previously Disadvantaged Primary Schools to develop competencies that facilitate adaptation across the diverse range of cultures fulfilling the aims of Curriculum 2005. Educators from Previously Disadvantaged High Schools may be more resistant to assimilation or integration processes (Berry, 2004).

Educators from Previously Disadvantaged High Schools may also be more resistant to the new curriculum as the changes are far more significant in terms of pedagogical practice at High school level than at Primary levels. Smit (2005) found that most resistance to change in education comes from those for whom the most impact is felt. Furthermore, according to Smit (2005), curriculum changes appear threatening when it challenges ingrained assumptions about the “interaction of education, power, culture, and society” (p.301). Curriculum 2005 embraces learner-centred education which has vast implications for change in the classroom dynamic. These changes may be more conducive in primary education than secondary education. Resistance to change processes, especially when educators are not consulted sufficiently, may lead to lower educator morale resulting in educators projecting that learners are less intelligent.

It may be further argued that the educators from Previously Disadvantaged High Schools differ in their perceptions of valued competencies for their learners. Researchers who have speculated about cross-cultural differences have pointed to the different conceptions of intelligence for different groups (Sternberg, 2002; Grigorenko, 2004). Black cultures have



tended to regard intelligence as competence in interpersonal relationships and success with everyday activities (Mpofu, 2002, 2004). The educators from Previously Disadvantaged High Schools gave IQ estimations above 100 for interpersonal and intrapersonal intelligences, compared to IQ estimations below 100 for overall, logical/mathematical and spatial intelligences. Female learners were given IQ estimations above 100 for verbal, interpersonal and intrapersonal intelligences, compared to IQ estimations below 100 for overall, logical/mathematical, bodily/kinaesthetic, and spatial intelligences. These results demonstrate that the social intelligences are valued by these educators. Similarly, Furnham and Mkhize (2003) found that Black South African mothers rated their children's interpersonal and intrapersonal intelligence nearly two standard deviations above the norm. The researchers (*ibid.*) allude to Wober's (1974) study that found Ugandan views of intelligence to be broader thus inferring that this may apply to the South African Black mothers in the study who estimated their children's intelligences. Similarly, it may be inferred that the Black High School educators have broader conceptions of intelligence.

Accordingly, it is important to note that numerical as well as cultural factors were estimated lower for females by educators in Previously Disadvantaged High Schools as compared to the other school types. Musical and bodily/kinaesthetic intelligence were estimated far lower for females than any other school type. We may allude to studies that have demonstrated the female identity to be more susceptible to gendered intellectual activity. While they may excel in school achievement in early childhood, they start to show poor self esteem and an evasion of achievement related and gender stereotyped activities as they reach puberty (Labouvie-Vief, Orwoll & Manion, 1995; McKay, 1997; Gaganakis, 1999; Ryan & Ryan 2005). The estimations of intelligence given by educators from Disadvantaged Primary Schools did not reflect the lower estimations given by educators in Disadvantaged High Schools. Rammstedt and Rammsayer (2001) investigated gender differences in self estimations of children and young adults and found that specific gender differences become more significant in pubertal children. Females tend to be pressured by gender role expectations to conform to norms of femininity which inclines them towards more self-critical tendencies (Gaganakis, 1999). It may be argued that the estimations given to females in Previously Disadvantaged Schools reflect their actual abilities demonstrated in the context of schooling, due to their norms of femininity.

## **Educators' Perceptions of the Best Predictors of Overall Intelligence**

It was hypothesized that educators from all four school types depicted in this study will perceive the intelligences commonly associated with academic intelligence, logical/mathematical, verbal, and spatial intelligence (Sternberg, 2000; Gardner, 1983), to be the best predictors of overall intelligence (H<sub>2</sub>: The traditionally associated academic intelligences, including logical-mathematical, verbal, and spatial intelligence are significant predictors of males and females' overall intelligence as perceived by educators from the different school types). However, all four school types demonstrated some degree of difference in this respect, as well as gender differences in the best predictors of overall intelligence. Verbal and logical/mathematical intelligences were found to be the most common predictors of overall intelligence more especially for male learners, whereas for female learners, non-normative academic intelligences emerged more so than for males as good predictors of intelligence.

### *Best Predictors of Overall Intelligence in Ex-Model C Primary Schools*

Verbal and logical/mathematical intelligences emerged as the best predictors of overall intelligence for males and females in Ex-Model C Primary Schools, providing partial support for hypothesis 2. This was the only school type where the predictors of overall intelligence were the same for males and females.

This may have been influenced by the fact that female educators are far more prevalent in this school type (92.7%) and there may be more sensitivity toward equity issues as a result of feminist ideologies thus demonstrating perceptions of gender parity in terms of their learners' educational expectations. Tiedemann (2000) found that especially male educators were subject to a more male enhancing effect in their estimations of learners' intelligence.

These finding are consistent with Furnham and Budhani's (2002) study which demonstrated that mathematical and verbal intelligence were found to predict educators' conceptions of overall intelligence. Thus, educators in Ex-Model C Primary Schools perceived verbal and mathematical intelligence, which are intelligences traditionally associated with academic achievement to be the best predictors of overall intelligence. These findings were contrary to a study by Fry (1984, cited in Sternberg, 2000), which demonstrated that primary school

educators emphasized social variables such as popularity, friendliness, respect for norms and interest in the environment, in their conceptions of intelligence, while high school educators emphasized verbal factors.

Ex-Model C Primary Schools which were advantaged in the past still continue to enjoy better human and educational resources. This school type was rooted in a hegemonic Eurocentric Western model of education which conditioned society to associate intelligence with traditional school-based achievement and competencies (Soudien & Baxen, 1997; Mickelson, Nkomo & Smith, 2001). Thus, it may be argued that these educators still aspire to the traditional Western perspectives of intelligence with an emphasis on logical/mathematical intelligence and verbal intelligences. Logical/mathematical intelligence and verbal intelligence contribute toward the skills that drive globalization and market forces encouraging achievement, individualism, competition and merit.

Formal schooling is associated with a more individualistic, independent development of the self (Zambrano & Greensfield, 2004), which is assimilated by educators as part of their professional practice. Educators in Ex-Model C Primary Schools appear to be biased toward the more autonomous self in their conceptualizations of intelligence. These are factors that are espoused by individualistic cultures as opposed to collectivist cultures that are much more interpersonally aware (Zambrano & Greenfield, 2004). However, even though a school culture may foster individualism and independence, this does not mean that learners are not encouraged to be interpersonally competent. It may be inferred that educators from Ex-Model C Primary Schools espouse more modern and Western conceptions of intelligence with less emphasis on the cultural factors of intelligence.

#### *Best Predictors of Overall Intelligence in Ex-Model C High Schools*

Ex-Model C High School educators perceived verbal intelligence to be the best predictor of overall intelligence for both male and female learners. Additionally, interpersonal and logical-mathematical intelligences were perceived to be good predictors of overall intelligence for males, while for females interpersonal and spatial intelligence were perceived to be good predictors of overall intelligence.

The results are consistent with the study by Fry (1984, cited in Sternberg, 2000), indicating that High school educators emphasized verbal variables such as verbal fluency and assertiveness in their conceptions of intelligence. Verbal intelligence is highly valued by Western cultures like the United States, where explicit teaching, independence and initiative are espoused facilitating children to be scholastically competent (Shapiro & Azuma, 2004). Verbal intelligence is also associated with social intelligence which is highly valued in Black cultures (Mpofu, 2004). It may be argued that Ex-Model C High School educators value verbal intelligence as a universally relevant means of explicit transfer of information and symbols.

There is also further evidence to demonstrate the value of social intelligence by these educators. Interpersonal intelligence was perceived as an additional predictor of both male and female learners' overall intelligence. Interpersonal intelligence, which focuses on relationships or "people skills", has been valued by Black cultures (Mpofu, 2004). However, an emphasis on social competence may be construed in two ways. Independent, self-enhancing selves that are associated with individualistic cultures form social relations as a means of influencing one another, while interdependent, self-critical selves that are associated with collectivist cultures adjust themselves to one another to form effective social relations. Educators from Ex-Model C High may be inclined to the former due to their Western hegemonic roots, or the latter due to assimilation and integration processes (Berry, 2004) in society.

The results demonstrate that educators from Ex-Model C High Schools value both social and numerical factors of intelligence. Thus, it may be inferred that educators from Ex-Model C High schools espouse broader conceptions of intelligence.

It is also interesting to note the configurations of the intelligences that predict overall intelligence for boy and girl learners. Verbal, interpersonal and logical-mathematical intelligence were perceived to be good predictors of boys' overall intelligence, while verbal, interpersonal and spatial intelligence were perceived to be good predictors of girls' overall intelligence. Thus, the focus is still on the traditional logical-mathematical intelligence for boys, while girls have been associated with an intelligence that has been traditionally perceived as a domain for male intelligence. This may reflect the educators' awareness of the gender gap in terms of the spatial disciplines (Quaiser-Pohl & Lehmann, 2002) such as

mathematics, science, computers, architecture, and topology. Gender equity in these areas is also reflected in the aims of the new curriculum for equity in these areas (Burger, 2005).

Broader conceptions of intelligence may be influenced by integration processes (Berry, 2004). Ex-Model C Schools are reflective of some racial integration in both staff and learners. The results may have been influenced by the lack of the ethnic homogeneity in this sample of educators.

#### *Best Predictors of Overall Intelligence in Previously Disadvantaged High Schools*

The best predictors of male learners' overall intelligence identified by Previously Disadvantaged High School educators were consistent with those identified by educators in Ex-Model C Primary Schools. Logical/mathematical intelligence and verbal intelligence emerged as the best predictors of overall intelligence for males. However, perceptions reflected a difference for females with musical intelligence emerging as the best predictor of overall intelligence. Musical intelligence was also found to be negatively associated with the overall intelligence of males.

These findings partially concur with Furnham and Budhani's (2002) study which found that mathematical and verbal intelligence were found to predict educators' conceptions of overall intelligence. Thus, educators in Previously Disadvantaged High Schools perceive verbal and mathematical intelligence, which are intelligences traditionally associated with academic achievement to be the best determinants of males' overall intelligence.

Conceptualisations of intelligence for males appear to be associated with Western notions of academic intelligence. These results concur with Sternberg and Grigorenko's (2004) findings which show that educators, representing the dominant Western culture, gave more emphasis to cognitive competence skills.

A cultural factor of intelligence, namely, musical intelligence was perceived to be the best predictor for girls by educators from Previously Disadvantaged High Schools. Musical intelligence has traditionally not been associated with academic intelligence but has been valued by African cultures. According to Kassell (1998), musical intelligence as a valued competency facilitates the understanding of sound/symbol notational systems as well as the

acquisition of listening skills and can facilitate the memorization of facts and figures (ibid.). Musical intelligence can also provide what Gardner (1993) refers to as ‘multiple entry points’ or a means of transmission, or impetus for learning all kinds of content. It may be argued that educators from Previously Disadvantaged High Schools value musical intelligence from a cultural, as well as an academic stand point.

The negative association of musical intelligence to overall intelligence in boys may be plausible for educators in Previously Disadvantaged High Schools as a result of sex role attributes (Bem, 1974; 1981). These educators may perceive musical intelligence as less desirable for masculinity. Thus, educators’ may have gender expectations which encompass musical intelligence as a more feminine ability than a masculine ability.

The differential predictors for male and female learners’ overall intelligence are consistent with studies that have demonstrated gender differential educator beliefs for expectations for future achievement (Hopf & Hatzichristou, 1999; Tiedemann, 2000). The studies have demonstrated that these perceptual biases may be more detrimental to female achievement than male achievement.

#### *Best Predictors of Overall Intelligence in Previously Disadvantaged Primary Schools*

Educators from Previously Disadvantaged Primary Schools perceived intrapersonal intelligence and logical/mathematical intelligence to be the best predictors of overall intelligence for boys. Intrapersonal intelligence and interpersonal intelligence were perceived to be the best predictors of overall intelligence for girls. Educators from Previously Disadvantaged Primary Schools were the only educators compared to those from the other school types that selected intrapersonal intelligence as a predictor of overall intelligence.

Intrapersonal knowledge provides the learner with the opportunity to know and understand the self, both strengths and weaknesses, and through deliberate reflection encourages accurate self-understanding and the capacity for introspection and reflection (Collinson, 1999). Intrapersonal knowledge has been valued as one of the factors underlying Taiwanese Chinese conceptions of intelligence (Shi, 2004). Intrapersonal intelligence tends to be encouraged by individualistic cultures as it is associated with autonomy however; it is a factor that facilitates openness to experience and a necessary competence to adapt to emergent contexts. Thus it may be argued that educators from Previously Disadvantaged Primary Schools value

intrapersonal intelligence as an intelligence required for adapting in a dynamic modern industrialized society.

These educators also demonstrated a gender variance in their perceptions of the best predictors of overall intelligence. Logical/mathematical and intrapersonal intelligences were perceived to be the best predictors for boys, while interpersonal and intrapersonal intelligence were perceived to be the best predictors for girls. Furnham and Mkhize (2003) found that Black South African mothers rated only their daughters' interpersonal intelligence higher than that of their sons. This may be influenced by perceptions of gender-role expectations, in that females may be encouraged to fulfill more social roles while males are encouraged to fulfill more modern roles that are associated with logical intelligence.

#### *Gender Differences in Best Predictors of Overall Intelligence*

The most notable findings to emerge is that logical/mathematical and verbal intelligence were consistent across all the school types as the best predictors of male learners' overall intelligence, with the exception of Previously Disadvantaged Primary Schools having excluded verbal intelligence as the best predictor of male overall intelligence. This finding is consistent with other studies (Furnham, 2000, 2001; Furnham & Budhani, 2002) that have found the traditional Western academic intelligences which include verbal and mathematical intelligence to have the closest correlations to overall intelligence. Alternatively, cultural and social factors emerged more so for females than males as best predictors of overall intelligence, especially in Previously Disadvantaged schools. These included musical intelligence for Previously Disadvantaged High School female learners, and interpersonal and intrapersonal intelligence for Previously Disadvantaged Primary Schools female learners. This demonstrates that there are broader conceptions of intelligence for females than for males. This may be accounted for by the socialization and internalization processes that result in norms for femininity and masculinity (Bem, 1981). Thus, male learners appear to be more restricted to masculine expectations which prepare them for expected cultural gender roles in a modern capitalist society, whereas females appear to be motivated to have more diverse competencies that are desirable for their feminine roles in society.

These results have significant implications for school intervention programmes especially at the level of achievement-related expectations within the school environment. The study of



educational discourses that constitute classroom practice is essential in constructing interventions that are focussed at achieving equitable learning experiences in educational contexts.

### **Educators' Views on Intelligence and Intelligence Testing**

Six questions were posed to educators to elicit their views on intelligence. A significant difference was demonstrated for views with regard to intelligence tests and educators' personal experience of intelligence testing, as well as their views on gender differences in IQ.

#### *Intelligence Testing*

Intelligence tests originated within a specific Western cultural framework. The IQ test was premised on the notion of general ability or *g* with the focus on cognitive abilities related to school success. During the colonial era in Africa, intelligence testing was utilized to limit Black children's access to education and educational achievement (Serpell & Haynes, 2004). The intelligence test and its purpose fell into disrepute as it was exposed for its bias and lack of validity with non-Western cultures (Foxcroft, 2002). It is within this context that the following results are interpreted. The questions relating to intelligence tests and testing sought to elicit information regarding educators' intelligence test taking exposure, whether they thought that intelligence tests were a valid measure of intelligence, and their relevance in educational settings.

In studies of estimations of intelligence with African (Furnham and Baguma, 1999) and South African population samples (Furnham & Mkhize, 2003; Furnham, Mkhize & Mndaweni, 2004), it was demonstrated that Black participants were least likely to have taken an IQ test compared to other groups. The results for the present study were consistent with these findings. Below 35% of Black educators from Previously Disadvantaged School types had taken an intelligence test compared with over 78% from Ex-Model C Schools.

Despite the low number of educators exposed to intelligence testing, over 80% of the educators from Previously Disadvantaged High Schools believed that IQ tests are a fair measure of intelligence compared with the significantly smaller percentages in the other school types. Both Previously Disadvantaged High Schools and Ex-Model C Primary



Schools had significantly larger percentages of educators (over 80%) believing that IQ tests are useful in educational settings. It would appear that intelligence tests have retained their popularity for these educators. Furnham, Mkhize, and Mndaweni (2004) found that both African and Indian South African ethnic groups believed in the usefulness of intelligence testing.

There may be two explanations to this finding. The first may be that educators, especially those from Previously Disadvantaged High Schools embrace a Western style education as an instrument of modernization, and therefore intelligence tests offer an appropriate criterion for selection (Serpell & Haynes, 2004). Thus, the educator sample in this study may have conformed to the impact of globalization subscribing to the Western-type tests of cognitive ability that are founded on values of achievement, individualism, competition, and merit. They may also be unaware of the controversy surrounding intelligence tests due to their lack of exposure to these tests.

The second explanation offered is that intelligence tests are valued for the function of facilitating guided participation rather than for the function of selection which facilitates systematic exclusion (Serpell & Haynes, 2004). Intelligence tests can provide a profile of cognitive abilities that may be used to diagnose the strengths and weaknesses of a learner so as to inform instructional needs and interventions to optimize individual potential. Several researchers (Gardner & Hatch, 1989; Gordon, 1996) propose the development of new assessment tools designed for the purpose of addressing diverse learning needs and experiences.

#### *Educators' Perceptions of Gender Differences in IQ*

79% of the total educators did not believe that males are on average more intelligent than females with larger percentages of educators from Ex-Model C Schools believing there were no gender differences in intelligence than educators from Previously Disadvantaged High Schools and Primary Schools. These findings are consistent with the study by Furnham and Baguma (1999) which found that African students as compared to American and British students were more likely to believe that males are more intelligent than females. However, it must be noted that the present study concerns educators' perceptions which has implications for pedagogical practice.

Historically, patriarchal capitalist social and economic systems have largely resulted in the pervasive marginalization of women, a poor quality of education and largely low achievement expectations. South Africa has been immersed in a political history of oppression and patriarchy. Martineau (1997) indicates that despite the increased educational opportunities the gender disparities are the greatest for Black girls and women. The education of Black women in South Africa has been characterized by low enrollment, early school drop-outs, teenage pregnancy, and social and cultural stereotypes (ibid.) that have largely been detrimental to the self determination of Black women.

Educational policies and interventions directed at addressing the gender disparity in the South African context require constant evaluation in terms of its effectiveness, and the deeper issues of socio-cultural belief systems and stereotyped perceptual bias require consideration in curriculum formulation and implementation.

### **Intelligences Incorporated in Classroom Activity and Assessment Practices**

Four additional questions elicited information from educators pertaining to the incorporation of the multiple intelligences in classroom activity and assessment. The responses to these questions were likely to be influenced by learning areas or subjects taught by educators however, these questions provide important information with regard to the emphasis on the different multiple intelligences utilized in the school setting. The questionnaire presented to educators required a basic knowledge of Gardner's (1983) Theory of Multiple intelligences which proposes that all seven intelligences are equally important and should have equal emphasis in the curriculum.

Gardner (1983) views traditional academic intelligence, the examination system, achievements tests and modes of instruction as being biased towards verbal and logical/mathematical intelligences. Learners who showed greater ability in these two areas were generally considered to be 'successful' and more competent while learners who were talented in other intelligences were often regarded as 'failures' and less competent. The activities that were provided to give opportunity for the expression of other intelligences were usually marginalised by traditional schooling practices as 'extra-mural' with lesser learning value ascribed to them.

Gardner (1995) encourages educators to engage in more meaningful pedagogical practices and assessments that build on individual strengths. This requires being responsive to the diverse learner needs in different socio-cultural contexts. Linked to this is Sternberg's (1997) perspective that success and intelligence is defined in numerous ways in different societies and cultural contexts. Perspectives on thinking (Sternberg, 1997) and teaching styles (Henson & Borthwick) encourage the recognition of diverse conceptions of intelligences so that teaching styles are varied to suit different styles of learning.

Verbal/linguistic intelligence was the intelligence that most of the educators incorporated in both classroom activity and assessment practices with significantly higher percentages of educators selecting this intelligence in the Primary Schools. Verbal practices have been traditionally viewed as the best way of fostering academic activities, especially with children at primary levels of schooling (Shapiro & Azuma, 2004). Thus, educators from the different school types emphasize verbal/linguistic practices in their classroom practices and assessments.

Logical/mathematical intelligence followed as the second intelligence most frequently tapped by educators in classroom activity, and incorporated in assessment practices. Interpersonal, spatial, and intrapersonal intelligences followed in rank order with significantly lower percentages of educators tapping these intelligences in classroom activity and even less incorporating these intelligences in assessment practices.

Musical intelligence followed by bodily/kinaesthetic intelligence had the highest frequencies for the intelligence used the least in classroom activity and assessment. Verbal-linguistic intelligence and logical/mathematical intelligence were intelligences that had the highest frequencies for the intelligences used the most in classroom activity and assessment fully supporting hypothesis 3 (H3: There will be a preponderance of the traditionally associated academic intelligences, namely, logical-mathematical and verbal intelligences in pedagogical practice).

These results demonstrate that educators' practices are largely founded on verbal-linguistic and logical/mathematical intelligence, implying that learner success is based on measuring skills mostly in these two intelligences. It is plausible to state that classroom activity and

assessment will focus mainly on speaking, reading and writing; as well as logical, mathematical processes, including working with numbers and sequencing. Thus, despite the aims of Curriculum 2005 to introduce more diverse pedagogical approaches in pedagogical practice, educators from the different school types still conform to the traditional academic intelligences as the vehicles of pedagogical practices. This may be due to their confidence in these tried and tested practices that emanates from teacher training and past experience, or a resistance to change as a result of fears and anxieties related to the change process (Smit, 2005). The results demonstrate the need for the evaluation and monitoring of change processes in education, and Smit (2005) emphasises the importance of taking educators' experiences and understandings into consideration when formulating curriculum change.

### **Summary**

A school effect was demonstrated in that educators from Previously Disadvantaged High Schools gave significantly lower estimations of their learners. It was argued that the sample of Black High School educators gave lower estimations for both males and females, as compared to those given by educators in the other school types, due to factors related to social class, discourses of disadvantage or to factors associated with difference, discourses of difference.

Some differences were demonstrated in what intelligences were perceived to be the best predictors of overall intelligence according to school type. The cognitive factors of intelligence, namely, logical/mathematical and verbal intelligence still predominate in most school types as the foundations for academic intelligence more so for male learners. The social and cultural intelligences emerged as best predictors of overall intelligence more so for female learners than male learners. It was argued that the gender differences that were demonstrated in educators' conceptions of intelligence in Previously Disadvantaged School types were reflections of gender role expectations of feminine ability and masculine ability. Thus perceptions of gender-role expectations differed, in that conceptions of intelligence for females included social and cultural intelligences while male expectations are biased towards more modern roles that are associated with logical intelligence.

Ex-Model C High School educators, in addition to the Western cognitive competencies, perceived interpersonal intelligence to be a good predictor of overall intelligence. Spatial

intelligence, a traditionally male normative intelligence, was associated with female overall intelligence, which may indicate the awareness to fill the gender gap in these areas.

Western formal schooling is associated with a more individualistic, independent development of the self (Zambrano & Greensfield, 2004), which is assimilated by educators as part of their professional practice. Educators in Ex- Model C Primary Schools appear to be biased toward the more autonomous self in their conceptions of intelligence. They espouse more modern and western conceptions of intelligence with less emphasis on the cultural factors of intelligence. Educators from Previously Disadvantaged Schools and Ex-Model C High Schools appear to have competing ethno-theories or multi-layered conceptions of intelligence that operate as part of their professional culture.

Certain beliefs about intelligence require further deconstruction to be fully understood within the context of schooling. Educators from Previously Disadvantaged Schools appear to have had less exposure to intelligence testing yet are more likely to believe that it is a valid measure of intelligence and that it is useful in educational settings. This may be due to the hegemonic Western influence on education. Educators from Previously Disadvantaged Schools also appeared more likely to believe that gender differences existed in intelligence.

Finally, the results confirm the preponderance of the traditionally associated academic intelligences, namely, logical-mathematical and verbal intelligences in pedagogical practice. Thus, the educators from the different school types predominantly utilize the traditional academic, Western intelligences in their pedagogical practices. This is anomalous with the aims of Curriculum 2005 to introduce more diverse classroom practices and assessments to address the diverse needs of learners.

## **CHAPTER SIX**

### **CONCLUSION**

#### **Introduction**

The concluding chapter of this thesis begins with a brief background to the research that culminated in the identification of the research questions and hypotheses. Conclusions about the research questions and hypotheses are summarized followed by a brief conclusion to the research problem. Implications for theory, policy and practice, and future research are discussed in relation to the findings followed by the limitations of the study.

#### **Background to the Study**

The focus of the present study is the investigation of educators' implicit perceptions of intelligence in different historical and educational contexts. The study was founded on the research methodology pioneered by Furnham (2000, 2001) and colleagues (Furnham & Baguma, 1999; Furnham & Budhani, 2002; Furnham & Mkhize, 2003). The present study aimed to compare educators' estimations of their male and female learners in different school contexts demarcated by their historical advantage and disadvantage, and the levels of schooling, namely primary and secondary.

The study was feasible in the light of studies using the same methodology to investigate ethnic and cultural differences in estimates of overall and multiple intelligences (Furnham & Baguma, 1999; Furnham, Callahan & Akande, 2004; Furnham, Mkhize & Mndaweni, 2004). Reference was made to these studies on the grounds of some similarity in the ethnic samples used in these studies. Previously Disadvantaged School types only constituted Black South African educators, while Ex-Model C School types constituted largely White South African educators.

The justification for the demarcation of historically advantaged and disadvantaged school types was informed by studies that have documented significant effects of quality schooling (Baral & Das, 2004; Warwick 2000) which have demonstrated that better facilities, recreational activities, physical space, as well as better methods of teaching and

administrative policies lead to higher scores in academic reasoning ability and analytical skill, competencies associated with Western cultures. This variable assumes significance in an educational context undergoing transformation.

Curriculum 2005 was formulated to transform the education system so that it serves the interest of all South Africans in a democratic and equitable manner (Burger, 2005; Hartshorne, 1999). These aims run concurrently with the framework of contemporary theories of intelligence (Gardner, 1983, 1993; Sternberg, 1987, 1997) which put forward diverse conceptions of intelligence and the need for pedagogy to be responsive to diverse learner needs. Gardner's (1983) Theory of Multiple Intelligence which informs the framework of the present study has challenged biased Western academic conceptions of intelligence. He (ibid.) proposes contextualized conceptions of intelligence that should inform pedagogical styles of teaching and assessment so that there is equitable recognition of all abilities. Despite MI Theory lacking in epistemological analytical support, it has informed a framework for educators to engage in critical self reflection into pedagogical practices and beliefs.

The studies and theories outlined above culminated in the research questions and hypotheses delineated in the study.

### **Conclusions about the Research Questions and Hypotheses**

- The first two research questions enquired into the differences in educators' estimations of overall and multiple intelligences according to school type. The results demonstrated a significant school type effect for Previously Disadvantaged High Schools as compared to Previously Disadvantaged Primary Schools, Ex-Model C High, and Ex-Model C Primary Schools. Male learners were rated significantly lower by educators from Previously Disadvantaged High Schools on overall, logical/mathematical, and spatial intelligences; while female learners were rated significantly lower on logical/mathematical, spatial, musical, and bodily/kinaesthetic intelligences. Inferences were made by the researcher based on discourses of disadvantage and discourses of difference. The former related to past studies that have demonstrated that lower IQs in Western type IQ tests are a corollary of disadvantaged schooling and class status (Baral & Das, 2004; Warwick 2000). The latter related to

studies that demonstrated conceptions of intelligence that are broader and different from Western conceptions (Furnham & Mkhize, 2003). These findings partially confirm the hypothesis that educators from the advantaged school types will estimate their learners' overall and multiple intelligences higher than educators from disadvantaged school types.

- The second research question enquired into the best predictors of overall intelligence according to school type. The hypothesis was partially confirmed (H2: The intelligences traditionally associated with academic intelligence, namely, logical/mathematical, verbal, and spatial intelligence will be significant predictors of male and female learners overall intelligence). The hypothesis was made in reference to past studies that confirmed the traditional academic intelligences to be the best predictors of overall intelligence (Furnham, 2000; Furnham & Mkhize, 2003).

Differences in school type and gender were demonstrated in the present study. Consistent with past studies, verbal and logical/mathematical intelligence were consistently associated with male learners overall intelligence whereas much broader patterns emerged for female learners. Educators from Ex-Model C Primary Schools perceived the traditional Western academic intelligences to be the best predictors of overall intelligence for male and female learners' overall intelligence. Educators from Ex-Model C High Schools appeared to have broader conceptions of intelligence with verbal, interpersonal, and spatial intelligence (a typically male normative intelligence), being the best predictors of overall intelligence for females. Verbal, interpersonal and logical/mathematical intelligences were perceived to be the best predictors for males in Ex-Model C High Schools.

Educators from Previously Disadvantaged Primary Schools perceived intrapersonal and mathematical intelligence as the best predictors for males, while intrapersonal and interpersonal intelligences were the best predictors for girls. Previously Disadvantaged High Schools perceived the traditional academic intelligences, verbal and logical/mathematical intelligences to be the best predictors for males, with musical intelligence being negatively associated with overall intelligence. However, musical intelligence was perceived to be best predictor for females. It was inferred



that gender differences in best predictors of overall intelligence were accounted for by different gender expectations that may be due to cultural or socialization processes.

- The third research question enquired into the views of educators with regards to intelligence. The most significant differences emerged with regard to intelligence testing with educators from Previously Disadvantaged Schools having the least exposure to intelligence testing, yet were the most likely to confirm the validity and usefulness of these tests in educational settings. Ex-Model C Primary School educators also believed that intelligence tests were useful in educational settings despite a small percentage believing it to be a valid measure of intelligence. Another significant difference emerged in terms of beliefs regarding gender differences in intelligence, with educators from Previously Disadvantaged Schools being more likely to believe that males were more intelligent than females.
- The final research question enquired into the incorporation of the multiple intelligences into pedagogical practice. The intelligences associated with Western academic schooling, verbal/linguistic and logical/mathematical intelligences, were the intelligences incorporated the most in both classroom activity and assessment practices with a higher frequency of Primary School educators identifying verbal/linguistic intelligence in their pedagogical practice.

### **Conclusions about the Research Problem**

The findings of the present study have demonstrated comparative differences between educators' estimations of intelligence in disadvantaged high school contexts. Discourses of disadvantage and difference were alluded to by the researcher in this respect. School type differences and gender differences were demonstrated in terms of best predictors of overall intelligence. However, the cognitive factors of intelligence, namely, logical/mathematical and verbal/linguistic intelligence were still shown to predominate in most school types as best predictors of overall intelligence for male learners. More diverse conceptions of intelligence were demonstrated for female learners. Educators from Disadvantaged Schools were more likely to believe in the usefulness of intelligence tests in educational settings despite having

less exposure to them. Verbal/Linguistic and logical/mathematical intelligences were demonstrated to be the most widely incorporated intelligences in pedagogical practice.

### **Implications for Theory**

Studies on implicit theories of intelligence have demonstrated broader conceptions of intelligence that show some variation from the normative academic conceptions of intelligence. The present study has demonstrated some variation in educators' perceptions of their learners' intelligences. However, education and pedagogy have been largely influenced by the hegemony of Western notions of academic intelligence which appear to have left an indelible mark on the belief system of educators. Educators are tasked with facilitating academic success for their learners within the prescribed norms of skills and learning outcomes. The question that arises is whether these outcomes are appropriately responsive to diversity and differences, or are educators using knowledge of different cultures and groups to stereotype their learners? The large body of research that has demonstrated that inequalities are perpetuated in schooling practices requires careful consideration as it leads one to reflect on whether the needs of learners from different socio-cultural contexts are being met. The present study has highlighted the need for a more responsive pedagogy that not only recognizes the diversity of learner needs and backgrounds but understands the dynamic nature of systems of beliefs and power relations that prevent the self determination of the individual.

The present study has furthermore highlighted the process of teaching and learning as being interpreted by different historical contexts, experiences, values, purposes and interests. These multiple facets make learning a process of meaning making and not simply knowledge transmission. Theorists thus need to focus increasingly on the cultural and social nature of the meaning making process and the dialogical nature of the learning process. Perceptions, beliefs and knowledge emanate from discourses and practices in cultural communities and the tools that are used to mediate knowledge need to be incorporated into the learning process of schools.

Furthermore, the impact of globalization has placed multiple demands for various competencies that will facilitate adaptive functioning in multiple contexts, cultures, and languages. Studies concerned with both individual differences and group variations have provided a rich complexity of knowledge from which to draw a consensual framework that

informs future research innovation and intervention. The implications for theory are to engage in discourses that facilitate the process of a collective intelligence where all cultural values are embraced so as to develop more self and collective respect. Epistemic paradoxes are inevitable as cultures are subject to processes of assimilation, acculturation, and integration. However, this theoretical framework will inform a responsive pedagogical intervention to diversity and pluralism.

### **Implications for Policy and Practice**

The present study has highlighted the fundamental issues of diversity and equity in educational contexts. Gardner (1993) and Sternberg (1997) have encouraged more authentic forms of pedagogical practice and assessment that meet the diverse needs of learners. Some of the assessments include learner portfolios, independent projects, and other creative tasks to accommodate diversity and to meet the criteria for educational sufficiency and effectiveness. However, Western traditional notions of intelligence remain pervasive in schooling and pedagogy, and some of these innovations in pedagogical practice will no doubt encounter resistance. Educational forums need to be established that encourage reflective discourses on the development of systems of teaching, learning, and assessment that take into consideration the diverse needs of learners, the variance in cultural competencies, and the cultural intelligence required for adaptation in multi-cultural contexts.

Teacher training programmes need to incorporate skills that facilitate constructivist, reflective and interactionist processes as part of educator excellence and successful education that meet diverse learner needs. These programmes should sensitize future educators to diversity in teaching, learning and assessment, as well as the diverse cultural and social contexts that influence the learning process. Thinking and learning styles should become part of the process of gaining valuable information that will facilitate more effective learning. Assessment strategies like portfolio systems should not be seen as addendums to the curriculum but as an essential part of the learning process.

The Cultural Intelligence approach has been introduced in the literature review. It places emphasis on the ability to adapt effectively to new cultural settings or across cultural contexts (Earley & Ang, 2003). Introducing such an approach to learning areas in schools may be beneficial in highlighting the value of different competencies in different contexts. A

hierarchical evaluation of competencies and abilities needs to be dissuaded. Gender and cultural differences in competencies or abilities need to be embraced as part of a profile of strengths and weaknesses. This profile should be utilized for supportive intervention and monitoring development within one's own performance goals. Thus, intelligence in the school context needs to be situated within a system of meaning that informs practice and assures socio-cultural legitimacy.

Finally, the idealism conveyed by Curriculum 2005 needs to be contextualized against a backdrop of multiple social disparities, varying educational contexts, and diverse conceptions of intelligence. Previously disadvantaged schools which still serve only Black learners have encountered numerous challenges relating to a lack of human and physical resources and large class sizes. Effective transformation in education may be realized if the blatant disparities in education are efficiently and expediently addressed. Furthermore, it is imperative that pedagogy is informed by knowledge of the learners' socio-cultural backgrounds which may require a fundamental re-conceptualization of educational policies and practices that are unique to the social and political context of the country.

### **Implications for Future Research**

The scope of the present study was limited to defined strata of schools and educators. The study could be extended to include educators from all sectors of the South African educational fraternity, as well as parents and learners. Furthermore, an administration of the collectivism-individualism measure could facilitate the classification of subjects as individualistic or collectivist thus determining the intelligences associated with each type. Greater insight would be generated about the varied conceptions of intelligence across cultures, genders, educational levels, ages and levels of professional experience. This framework could contribute to more responsive pedagogical practices.

Qualitative research, such as depth interviews that look into cultural conceptions of intelligence could present findings that may be beneficial in policy formulation and the evaluation of curriculum implementation. Qualitative levels of inquiry reveal nuanced understandings of intelligence that could lead to more focused and in-depth investigations of curriculum implementation.

The investigation of implicit conceptions of intelligence in relation to education has many implications for future research since it facilitates a framework for understanding more diverse conceptions of intelligence and the perpetuation of gender and cultural stereotypes. The question we might like to ask for future study is: ‘what abilities or combinations of abilities are needed to sustain male and female roles that are valued by a particular culture?’

Educational reforms in South Africa have been implemented in a context of multiple social and educational disparities, and educators are tasked with the responsibility of lifting pedagogy from the fetters of traditional and narrow conceptions of competence to broader conceptions that will facilitate its adaptation to a diverse complexity of contexts. Future research endeavors may find epistemological support for a cultural intelligence that facilitates adaptation in diverse contexts.

### **Limitations of the Study**

The limitations of the study require careful consideration as these will have implications for future replication.

The quantitative research design does facilitate the researcher to gain greater clarity on a research problem. It is cost effective and time effective. However, the incorporation of more qualitative methods such as depth (one-to-one) interviews will facilitate interpretive or constructivist enquiry which deals with contextual issues pertaining to educators’ understandings and meaning making in relation to conceptions of intelligence. Furthermore, the research design of the present study introduced the problem of multi-layered groups in educational contexts which is discussed in greater detail below.

The non-probability sampling procedure used for the purpose of this study presented with certain limiting factors. Access to schools required the express consent of the Kwa-Zulu Natal Department of Education. The Department provided the researcher with the district and schools that could be visited expressly with regards to Previously Disadvantaged Schools. A limitation in this regard was that the Department may have provided the names of schools that it perceived as operating at a functional standard as compared to other outlying schools that may be functioning at sub minimum levels. However, the schools were clearly observed to be

disadvantaged in terms of human and physical resources and facilities, but appeared to be functional.

The small sample sizes especially for Ex-Model C High schools may have contributed to the disproportional sample variances. Thus the results need to be interpreted with caution. According to Neuman (1994) the rule of thumb is to have about 50 cases for each subgroup to be analyzed. The sample size for this group was thirty, thus the degree of confidence in these findings may have been compromised.

The gender distribution which was skewed towards a preponderance of female educators closely reflected that of the gender distribution of educators in the Province of Kwa-Zulu Natal (see Appendix 2). Sixty one educators were male and one hundred and forty were female. This precluded any analysis by educators' gender. The variable of gender was used in previous studies (Furnham & Baguma, 1999; Furnham & Budhani, 2002; Furnham & Gasson, 1998). However, the fact that fewer males were sampled especially in the advantaged Ex-Model C School types introduced the bias that the results may be more reflective of the views of female educators. This sampling problem is due in part to the feminization of the teaching profession and the over-representation of female educators at primary school levels.

The distribution of educators by ethnicity across school types reflected that Previously Disadvantaged School types were more likely to be a homogenous group (Black educators) as compared to those from Ex-Model C School types which may have included educators from other ethnic groups however; the probability of this was very small. This introduced the problem of intact samples often associated with educational research (Burststein, 1980). Educators and learners do not gravitate randomly into different school types but may be located there more so as a result of their ethnicity and social class. The group context may differ on background training and education, hierarchical structures in the school, educational orientation, socialisation processes, socio-cultural contexts and many other levels of difference that influence the group members' perceptions, thoughts and practices resulting in multi-level data. Thus, school-type differences observed could be a function of multi-layered group characteristics.

Race, age, social class and educational level were demographics that were not elicited in this study but certain inferences were made in reference to some of these variables based on evidence from secondary sources. These demographics could have improved the explanatory power of the findings.

The instrument used for educators' estimations of their learners' intelligence and multiple intelligences, was validated and utilised in studies of self estimates and familial estimates of other family members. Educators are placed in a unique position in relation to their learners. The educator should have optimum information of the learner however; there are many circumstances that prevent them from gaining this information. These factors may include overcrowding of classrooms, burnout, or learning area or subject specialisation. Educators at primary schools have the opportunity to acquire a more integrated profile of the learner due to the nature of the curriculum which facilitates more time being spent with the learner. However at high schools it becomes increasingly difficult to have an integrated profile of the learner due to subject or learning area specialisation. The instrument used in the study is thus more suitable for use with primary school educators. Furthermore, the instrument required a wider scaled pilot study before it was utilised for the purpose of the present study. The pilot study was conducted only with primary school educators.

Finally, a validation of Gardner's (1983) seven intelligence types across all cultures has not been undertaken but the relevance of the different intelligences was assumed in the present study.

### **Conclusion**

The concluding chapter of the study provided a summation of the background to the study. Conclusions about the research questions and the research problem were delineated. Implications for theory, policy and practice, and future research were discussed followed by the limitations of the study.

## REFERENCES

- Adey, P. & Shayer, M. (2002). Cognitive acceleration comes of age. In P. Adey & M. Shayer (Eds.), *Learning intelligence* (pp. 1-17). London: Open University Press.
- Anastasi, A. (1990). *Psychological testing*. New York: Macmillan.
- Armour-Thomas, E., & Gopaul-McNicol, S. A. (1998). *Assessing intelligence*. USA: Sage.
- Barab, S. A., & Duffy, T. M. (2000). From practice fields to communities of practice. In D. H. Jonassen & S. M. Land, *Theoretical foundations of learning environments* (pp. 27-52). New Jersey: Lawrence Erlbaum Associates.
- Baral, B. D., & Das, J. P. (2004). Intelligence: What is indigenous to India and what is shared? In R.J. Sternberg (Ed.), *International handbook of intelligence* (pp.270-297). U.K.: Cambridge University Press.
- Bem, S. L. (1974). The measurement of psychological androgyny. *Journal of Consulting and Clinical Psychology*, 42, 155 – 162.
- Bem, S. L. (1981). Gender schema theory: A cognitive account of sex typing. *Psychological Review*, 88, 354-364.
- Berry, J. W. (2004). An eco-cultural perspective on the development of competence. In R. J. Sternberg & E. L. Grigorenko (Eds.), *Culture and Competence, Contexts of life success* (pp. 3-22). Washington: American Psychological Association.
- Bidell, T. R., & Fischer, K. W. (1997). Between nature and nurture? The role of human agency in the epigenesis of intelligence. In R. J. Sternberg & E. Grigorenko (Ed's.), *Intelligence, heredity and environment* (pp. 193-242). USA: Cambridge University Press.
- Bouchard, T. J. (1997). IQ similarity in twins reared apart: Findings and responses to critics.



- In R. J. Sternberg & E. Grigorenko (Ed's.), *Intelligence, heredity and environment* (pp. 126-162). USA: Cambridge University Press.
- Brosnan, M. J. (1998). The implications for academic attainment of perceived gender-appropriateness upon spatial task performance. *British Journal of Educational Psychology*, 68, 203-215.
- Bruner, J. (1999). Folk pedagogies. In J. Leach & B. Moon (Eds.), *Learners & Pedagogy* (pp. 4-22). London: SAGE.
- Burger, D. (2005). About S.A. education. South Africa Year Book [Electronic Version]. Retrieved January 16, 2006 from [www.info.gov.za/aboutsa/education.htm](http://www.info.gov.za/aboutsa/education.htm)
- Cahan, S., & Cohen, N. (1989). Age versus schooling effects on intelligence Development. *Child Development*, 60, (5), 1239-1249.
- Campbell, L., Campbell, B., & Dickinson, D. (1996). *Teaching and learning through multiple intelligences*. Allyn & Bacon, Simon & Shuster Education Group: MA.
- Collinson, V. (1999). Redefining teacher excellence. *Theory into Practice*, 38, (1), 4-11.
- Curriculum 2005: Lifelong learning for the 21<sup>st</sup> century. (n.d.). Retrieved November, 8, 2005, from <http://www.polity.org.za/html/govdocs/misc/curr2005.html?rebookmark=1>
- Deaux, K., & Major, B. (1987). Putting gender into context: An interactive model of gender-related behaviour. *Psychological Review*, 94, (3), 369-389.
- Demetriou, A., & Papdopoulos, T. C. (2004). Human intelligence: From local models to universal theory. In R.J. Sternberg (Ed.), *International handbook of intelligence* (pp.445-474). U.K.: Cambridge University Press.
- De Witt, M. W., & Booysen, M. I. (Eds.). (1994). *Socialization of young children*. Pretoria: JL van Shaik Publishers.

- Dillihunt, M. N. (2004). The effects of multiple intelligence and direct instruction on third and fifth grade student achievement, task engagement, student motivation and teacher efficacy. *Dissertation—Abstracts-International-Section A: Humanities and Social Sciences*, 64, 12-A, 4354-4368.
- Earley, P. C., & Ang, S. (2003). *Cultural intelligence: Individual interactions across cultures*. Stanford, CA: Stanford University Press.
- Eisner, E. W. (1994). *Cognition and curriculum reconsidered*. Teachers College Press: New York.
- Eysenck, H. J., & Schoenthaler, S. J. (1997). Raising IQ level by vitamin and mineral supplementation. In R. J. Sternberg & E. Grigorenko (Eds.), *Intelligence, heredity and environment* (pp. 363-392). U.S.A.: Cambridge University Press.
- Falch, T. & Sandgren, S. (2006). The effect of education on cognitive ability [Electronic Version]. *Working Paper Series*, (9). Retrieved June 10, 2006, from [www.svt.ntnu.no/iso/wp/wp.htm](http://www.svt.ntnu.no/iso/wp/wp.htm)
- Farmer, H. S., Wardrop, J. L., Anderson, M. Z., & Risinger, R. (1995). Women's career choices: Focus on science, math and technology. *Journal of Counseling Psychology*, 42, (2), 155-170.
- Fiske, E. B., & Ladd, H. F. (2004). *Elusive equity: Education reform in post-apartheid South Africa*. Washington, D.C.: Brookings Institution Press.
- Flynn, J. R. (1987). Massive IQ gains in 14 nations: What IQ tests really measure. *Psychological Bulletin*, 101, 171 – 191.
- Foxcroft, C. D. (2002). Ethical issues related to psychological testing in Africa: What I have learned (so far). In W. J. Lonner, D. L. Dinnel, S. A. Hayes, & D. N. Sattler (Eds.), *Online Readings in Psychology and Culture* (Unit 5, Chapter 4), retrieved January, 16, 2004, from <http://www.ac.wwu.edu/~culture/index-cc.htm>

- Furnham, A. (2000). Parents' estimates of their own and their children's multiple intelligences. *British Journal of Developmental Psychology*, 18, 583-594.
- Furnham, A. (2001). Self-estimates of intelligence: culture and gender difference in self and other estimates of both general (g) and multiple intelligences. *Personality and Individual Differences*, 31, 1381-1405.
- Furnham, A., & Baguma, P. (1999). Self-estimates of intelligence: A cross-cultural study from three continents. *North American Journal of Psychology*, 1, (1), 69-78.
- Furnham, A., & Budhani, S. (2002). Sex differences in the estimated intelligence of school children. *European Journal of Personality*, 16, 201-219.
- Furnham, A., Callahan, I., & Akande, D. (2004). Self-estimates of intelligence: A study in two African countries. *Journal of Psychology*, 138, (3), 265-289.
- Furnham, A., Clark, K., & Bailey, K. (1999). Sex differences in estimates of Multiple Intelligences. *European Journal of Personality*, 13, 247-259.
- Furnham, A., Fong, G., & Martin, N. (1999). Sex and cross-cultural differences in the estimated multi-faceted intelligence quotient score for self, parents and siblings. *Personality and Individual Differences*, 26, 1025-1034.
- Furnham, A., & Gasson, L. (1998). Sex differences in parental estimates of their children's intelligence. *Sex Roles*, 38, 151-162.
- Furnham, A., & Mkhize, N. (2003). Zulu mothers' beliefs about their own and their children's intelligence. *The Journal of Social Psychology*, 143, (1), 83-94.
- Furnham, A., Mkhize, N., & Mndaweni, T. (2004). Indian and isiZulu-speaking South African parents' estimates of their own and their children's intelligence. *South African Journal of Psychology*, 34, (3), 364-385.

- Gaganakis M. (1999). Failure and success: a critical literature review of gendered performance of black adolescent girls in South African schools. *South African Journal of Education*, 19, (3), 148-153.
- Gale, T., & Densmore, K. (2000). *Just Schooling: Explorations in the cultural politics of teaching*. Philadelphia: Open University Press.
- Gardner, H. (1983). *Frames of Mind: The Theory of Multiple Intelligences*. New York: Basic Books.
- Gardner, H. (1991). *The Unschooled Mind*. New York: Basic Books.
- Gardner, H. (1993). *Multiple Intelligences: The theory into practice*. New York: Basic Books.
- Gardner, H. (1995). Reflections on Multiple Intelligences: Myths and Messages. *Phi Delta Kappan*, 76, 200 – 209.
- Gardner, H. (1999). *Intelligence reframed*. New York: Basic Books.
- Gardner, H., & Hatch, T. (1989). Multiple Intelligences Go to School: Educational implications of the Theory of Multiple Intelligences. *Educational Researcher*, 18, (8), 4-10.
- Gauvain, M., & Cole, M. (Eds.). (2001). *Readings on the development of Children*. New York, Worth Publishers.
- Goduka, I.N. (1998). Educators as cultural awakeners and healers... izangoma: indigenizing the academy in South Africa. *South African Journal of Education*, 12,(2), 49-51.
- Good, T. L. (1987). Teacher expectations. In D. C. Berliner and B.V. Rosenshine (Eds.), *Talks to Teachers* (pp.157-200). New York: Random House.
- Goodnough, K. (2001). Enhancing professional knowledge: A case study of an elementary

- teacher. *Canadian Journal of Education*, 26, (2), 218-236.
- Gordon, E. W. (1995). Toward an equitable system of educational assessment. *The Journal of Negro Education*, 64, (3), 360-372.
- Grigorenko, E. L. (2004). Is it possible to study intelligence without using the concept of intelligence? An example from Soviet/Russian psychology. In R.J. Sternberg (Ed.), *International handbook of intelligence* (pp.170-211). U.K.: Cambridge University Press.
- Grigorenko, E. L., & O'Keefe, P. A. (2004). What do children do when they cannot go to school? In R. J. Sternberg & E. L. Grigorenko (Eds.), *Culture and competence, contexts of life success* (pp.23-54). Washington: American Psychological Association.
- Gulgoz, S., & Kagitcibasi, C. (2004). Intelligence and intelligence testing in Turkey. In R.J. Sternberg (Ed.), *International handbook of intelligence* (pp.248-269). U.K.: Cambridge University Press.
- Halpern, D. F. (1997). Sex differences in intelligence: Implications for education. *American Psychologist*, 52, 1091 - 1101
- Hartshorne, K. (1999). *The making of education policy in South Africa*. Oxford, UK: Oxford University Press.
- Henson, K. T., & Borthwick, P. (1984). Matching styles: A historical look. *Theory into Practice*, 23,(1), 3-9.
- Herrnstein, R., & Murray, C. (1995). *The Bell Curve: Intelligence and class structure in American Life*. New York: Simon & Schuster.
- Hopf, D., & Hatzichristou, C. (1999). Teacher gender-related influences in Greek schools. *British Journal of Educational Psychology*, 69, 1-18.

- Howe, M. J. A. (1997). *IQ in Question: The Truth about Intelligence*. SAGE: London.
- Husen, T., & Tuijnman, A. (1991). The contribution of formal schooling to the increase in intellectual capital. *Educational Researcher*, 20, 17-25.
- Jensen, A. R. (1969). How much can we boost IQ & scholastic achievement? *Harvard Educational Review*, 39, 1-123.
- Jensen, A. R. (1987). Differential psychology: Towards consensus. In S. Modgil & C. Modgil (Eds.), *Arthur Jensen: consensus and controversy* (pp.353–399). New York: Falmer Press.
- Kamin, L. J. (1998). The Flynn effect in IQ testing: Why it's important to African Americans. *The Journal of Blacks in Higher Education*, 20, 112-113.
- Kassell, C. (1998). Music and the theory of Multiple Intelligences. *Music Educators Journal*, 84, (5), 29-32+60
- Kaufman, A. S. (1990). *Assessing adolescent and adult intelligence*. Boston, Mass.: Allyn & Bacon.
- Kitayama, S., & Duffy, S. (2004). Cultural competence-tacit, yet fundamental: Self, social relations, and cognition in the United States and Japan. In R. J. Sternberg & E. L. Grigorenko (Eds.), *Culture and competence, contexts of life success* (pp.55-88). Washington: American Psychological Association.
- Kivilu, J. M., & Rogers, W. T. (1998). A multi-level analysis of cultural experience and gender influences on causal attributions to perceived performance in mathematics. *British Journal of Educational Psychology*, 68, 25-37.
- Klein, P. D. (1998). A response to Howard Gardner: Falsifiability, empirical evidence, and pedagogical usefulness in educational psychologies. *Canadian Journal of Education*, 23, (1), 103-112.



- Labouvie-Vief, G., Orwoll, L., & Manion, M.(1995). Narratives of mind, gender, and the life course. *Human Development*, 38, 239-257.
- Lemon, A. (2004). Redressing school inequalities in the Eastern Cape, South Africa. *Journal of Southern African Studies*, 30, (2), 269-290.
- Li, J. (2001). High Abilities and Excellence: A Cultural Perspective. *Good Work Project Report Series*, Number 12. Retrieved February, 12, 2004, from <http://pzweb.harvard.edu/eBookstore/PDFs/GoodWork12.pdf>
- Mackenzie, C. G. (1993). New models of school management in South Africa: License for change or loophole for separatism? *British Journal of Educational Studies*, 41 (3), 287-301.
- Markus, H. R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review*, 98, 224-253.
- Martineau, R. (1997). Women and education in South Africa: Factors influencing women's educational progress and their entry into traditionally male-dominated fields. *The Journal of Negro Education*, 66, (4), 383-395.
- Matsumoto, D. (2004). Reflections on culture and competence. In R. J. Sternberg & E. L. Grigorenko (Eds.), *Culture and Competence, Contexts of Life Success* (pp.273-282). Washington: American Psychological Association.
- Meadows, S. (1993). *The Child as Thinker*. London: Routledge.
- McDonald, G. (1998). Working its Magic? IQ Rise and the demography of the classroom. *Oxford Review of Education*, 24 (2), 225-234.
- McKay, D. M. (1994). The AAUW Report: How schools shortchange girls. In A. M. Meehan & E. Astor-Stetson (Eds.), *Adolescent Psychology* (pp.54-56). Connecticut: Dushkin Publishing Group.

- Mickelson, R. A., Nkomo, M., & Smith, S. S. (2001). Education, ethnicity, gender, and social transformation in Israel and South Africa. *Comparative Education Review*, 45, (1), 1-35.
- Miller, J. G. (2004). The cultural deep structure of psychological theories of development. In R. J. Sternberg & E. L. Grigorenko (Eds.), *Culture and competence, contexts of life success* (pp.111-138). Washington: American Psychological Association.
- Moll, L. C., & Whitmore, K. F. (1993). Vygotsky in classroom practice: Moving from individual transmission to social transaction. In E. A. Forman, N. Minick, & C. A. Stone, *Contexts for learning*, (pp. 19-42). New York: Oxford University Press.
- Mpofu, E. (2002). Indigenization of the psychology of human intelligence in Sub-Saharan Africa. In W.J. Lonner, D.L.Dinnel, S.A.Hayes, & D. N. Sattler (Eds.), *Online Readings in Psychology and Culture* (Unit 5, Chapter 2). Retrieved February, 12, 2004, from <http://www.ac.wvu.edu/~culture>
- Mpofu, E. (2004). Being intelligent with Zimbabweans: A historical and contemporary View. In R.J. Sternberg (Ed.), *International handbook of intelligence* (pp.364-390). U.K.: Cambridge University Press.
- Murray, B. (1995). Gender gap in math scores is closing. In A. M. Meehan & E. Astor-Stetson (Eds.), *Adolescent Psychology (97/98)* (pp.54-56). Connecticut: Dushkin Publishing Group.
- Neisser, U., Boodoo, G., Bouchard, T. J., Boykin, A. W., Brody, N., Ceci, S. J., Halpern, D. F., Loehlin, J. C., Perloff, R., Sternberg, R. J., & Urbina, S. (1996). Intelligence: Knowns and Unknowns. *American Psychologist*, 51, (2), 77-101.
- Neuman, W. L. (1994). *Social research methods: Qualitative and quantitative approaches*. Boston: Allyn & Bacon.
- Ng, K.-Y., & Earley, P. C. (2006). Culture + Intelligence old constructs, new



frontiers. *Group & Organization Management*, 31, (1), 4 – 19.

Piaget, J. (1972). *The principles of genetic epistemology*. London: Routledge & Kegan.

Quaiser-Pohl, C., & Lehmann, W. (2002). Girls' spatial abilities: Charting the contributions and attitudes in different academic groups. *British Journal of Educational Psychology*, 72, 245-260.

Rammstedt, B., Rammsayer, T. H. & Thomas, H. (2001). Gender differences in self-estimated intelligence in children and early adolescents. *European Journal of Personality*, 15, (3-4), 207-217.

Rammstedt, B., & Rammsayer, T. H. (2002). Gender differences in self-estimated intelligence and their relation to gender-role orientation. *European Journal of Personality*, 16, (5), 369-382.

Rosenthal, R., & Jacobson, L. (1968). *Pygmalion in the Classroom*. New York: Holt, Rinehart & Winston.

Ryan, K. E., & Ryan, A. M. (2005). Psychological processes underlying stereotype threat and standardized math test performance. *Educational Psychologist*, 40 (1), 53-63.

Sato, T., Namiki, H., Ando, J., & Hatano, G. (2004). Japanese conception of and research on human intelligence. In R.J. Sternberg (Ed.), *International handbook of intelligence* (pp. 302-324). U.K.: Cambridge University Press.

Serpell, R., & Haynes, B. P. (2004). The Cultural practice of intelligence testing: Problems of international export. In R. J. Sternberg & E. L. Grigorenko (Eds.), *Culture and competence, contexts of life success* (pp.163-186). Washington: American Psychological Association.

Scarr, S. (1997). Behaviour-genetic and socialization theories of intelligence: Truce and reconciliation. In R. J. Sternberg & E. Grigorenko (Eds.), *Intelligence, heredity and environment* (pp. 3-41). U.S.A.: Cambridge University Press.

- Shapiro, L. J., & Azuma, H. (2004). Intellectual, attitudinal, and interpersonal Aspects of competence in the United States and Japan. In R. J. Sternberg & E. L. Grigorenko (Eds.), *Culture and competence, contexts of life success* (pp.187-206). Washington: American Psychological Association.
- Shearer, B. (2004). Using a Multiple Intelligences assessment to promote teacher development and student achievement. *Teachers College Record*, 106, (1), 147-162.
- Shi, J. (2004). Dilligence makes people smart: Chinese perspectives of intelligence. In R.J. Sternberg (Ed.), *International handbook of intelligence* (pp.325-343). U.K.: Cambridge University Press.
- Smit, B. (2005). Teachers, local knowledge, and policy implementation: A qualitative policy-practice inquiry. *Education and Urban Society*, 37, (3), 292-306.
- Smith, D. E. (2000). Schooling for inequality. *Journal of Women in Culture and Society*, 25, (4), 1147-1151.
- Soudien, C., & Sayed, Y. (2003). Integrating South African schools? Some Preliminary Findings. In Subrhmmanian, R., Sayed, R., Balagopalan, Y. & Soudien, C.(Eds.), *Education Inclusion and Exclusion: Indian and South African Perspectives*. In: IDS Bulletin, 34, 1, Institute of Development Studies, University of Sussex, pp. 29-42.
- Sternberg, R. J. (1987). *Beyond IQ*. New York: Cambridge University Press.
- Sternberg, R. J. (1997). *Successful intelligence*. New York: Plume.
- Sternberg, R. J. (2000). The concept of intelligence. In R. J. Sternberg (Ed.), *Handbook of intelligence*, (pp. 3-15). U.K: Cambridge University Press.
- Sternberg, R. J. (2002). Cultural explorations of human intelligence around the world. In W.J. Lonner, D.L. Dinnel, S.A. Hayes, & D.N. Sattler (Eds.), *Online Readings in Psychology and Culture* (Unit 5, Chapter 1),

(<http://www.ac.wvu.edu/~culture/index-cc.htm>)

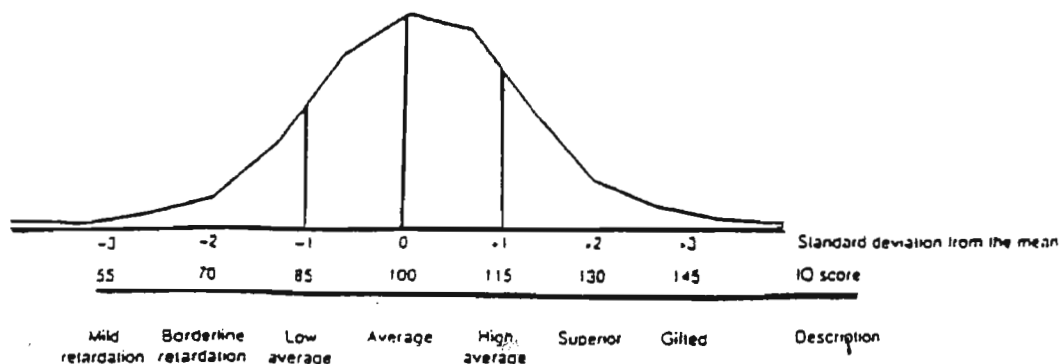
- Sternberg, R. J. (2004). North American approaches to intelligence. In R.J. Sternberg (Ed.), *International Handbook of Intelligence* (pp.411-444). U.K.: Cambridge University Press.
- Sternberg, R. J., & Grigorenko, E. L. (2004). Successful intelligence in the classroom. *Theory into Practice*, 43, (4), 274-280.
- Stetsenko, A., Little, T. D., Gordeeva, T., Grasshof, M., & Oettingen, G. (2000). Gender effects in children's beliefs about school performance: A cross-cultural study. *Child Development*, 71, (2), 517-527.
- Steyn, G. M. (2003). Cardinal shifts in school management in South Africa. *ProQuest Information and Learning Company*. Retrieved February 16, 2004, from [http://www.findarticles.com/p/articles/mi\\_qa3673/is\\_200301/ai\\_n9176390/print](http://www.findarticles.com/p/articles/mi_qa3673/is_200301/ai_n9176390/print)
- Tiedemann, J. (2000). Gender-related beliefs of teachers in elementary school mathematics. *Educational Studies in Mathematics*, 41, (2), 191-207.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, Mass: Harvard University Press.
- Vygotsky, L. S. (1986). *Thought and Language*. Cambridge, Mass: MIT Press.
- Wang, Q., Ceci, S. J., Williams, W. M., & Kopko, K. A. (2004). Culturally situated cognitive competence: A functional framework. In R.J. Sternberg & E. L. Grigorenko (Eds.), *Culture and competence, contexts of life success* (pp. 225-249). Washington: American Psychological Association.
- Warwick, K. (2000). *QI: The Quest for Intelligence*. London: Judy Piatkus
- Williams, K. (2000). Do Howard Gardner's Multiple Intelligences add up? *British Journal of Educational Studies*, 48, (1), 107-108.

- Yamauchi, F. (2004). *Race, Equity, and Public Schools in Post-Apartheid South Africa: Is opportunity equal for all kids?* Food Consumption and Nutrition Division: Discussion Papers, WO 182, IFPRI, Washington DC. Retrieved August, 6, 2005 from [www.ifpri.org](http://www.ifpri.org)
- Yen, C.-J., Konold, T. R., & McDermott, P. A. (2004). Does learning behaviour augment cognitive ability as an indicator of academic achievement? *Journal of School Psychology, 42*, 157-169.
- Zambrano, I., & Greenfield, P. (2004). Ethno-epistemologies at home and at school. In R. J. Sternberg & E. L. Grigorenko (Eds.), *Culture and Competence, Contexts of life success* (pp.253-272). Washington: American Psychological Association.

## Appendix A: Questionnaire: How intelligent are your learners?

How intelligent are your learners?

Intelligence tests attempt to measure intelligence. The average or mean score on these tests is 100. Most of the population (about two-thirds of people) scores between 85 and 115. Very bright people score around 130 and scores have been known to go over 145. The following graph shows the typical distribution of scores.



But there are different types of intelligence. You are required to select 5 boys and 5 girls randomly from your class of learners and estimate their overall IQ and score on the 7 basic types of intelligence. Please complete the questionnaire.

	Estimates									
	Girl 1	Girl 2	Girl 3	Girl 4	Girl 5	Boy 1	Boy 2	Boy 3	Boy 4	Boy 5
Overall Intelligence										
1. Verbal or linguistic intelligence (the ability to use words)										
2. Logical or mathematical intelligence (the ability to reason logically, solve number problems)										
3. Spatial intelligence (the ability to find your way around the environment, and form mental images)										
4. Musical intelligence (the ability to perceive and create pitch and rhythm patterns)										
5. Body-Kinaesthetic intelligence (the ability to carry out motor movements, e.g. sport)										
6. Interpersonal intelligence (the ability to understand other people)										
7. Intrapersonal intelligence (the ability to understand yourself and develop a sense of identity)										

	YES	NO
1. Have you ever taken an intelligence test?	_____	_____
2. Do you believe that they measure intelligence fairly well?	_____	_____
3. Do you believe males are on average more intelligent than females?	_____	_____
4. Do you believe intelligence is primarily inherited?	_____	_____
5. Do you believe IQ test are useful in educational settings?	_____	_____
6. Do you believe some races are more intelligent than others?	_____	_____

7. Which of the above multiple intelligences do you use the most in classroom activity?

\_\_\_\_\_

8. Which of the above multiple intelligences do you use the least in classroom activity?

\_\_\_\_\_

9. Which of the above multiple intelligences do you use the most for assessment?

\_\_\_\_\_

10. Which of the above multiple intelligences do you use the least for assessment?

\_\_\_\_\_

**Please complete the following:**

High School or Primary School educator? \_\_\_\_\_

Gender: \_\_\_\_\_

Are you an educator at an Ex-Model C School? \_\_\_\_\_

Subject/s that you teach? \_\_\_\_\_

## Appendix B: The Educator Gender Demographic in the Province of KwaZulu Natal

**Table 1: Number of male educators in the Province of KwaZulu Natal as at 31. 06.2006 (Personal Contact – Department of Education & Culture).**

**Male Educators (Snap 2006)**

LEVEL	State Permanent Fulltime Male	State Permanent Part-time Male	State Temporary Fulltime Male	State Temporary Part-time Male	State Substitute Fulltime Male	State Substitute Part-time Male	SGB Permanent Fulltime Male	SGB Permanent Part-time Male	SGB Temporary Fulltime Male	SGB Temporary Part-time Male	SGB Substitute Fulltime Male	SGB Substitute Part-time Male
Primary	8703	50	257	34	52	14	388	27	107	23	1	2
Combined	1509	2	123	3	16	2	455	36	36	8	1	1
Secondary	11217	43	910	29	87	8	580	39	157	16	5	0

**Table 2: Number of Female Educators in the Province of KwaZulu Natal as at 31.06.2006 (Personal Contact – Department of Education & Culture).**

**Female Educators (Snap 2006)**

LEVEL	State Permanent Fulltime Female	State Permanent Part-time Female	State Temporary Fulltime Female	State Temporary Part-time Female	State Substitute Fulltime Female	State Substitute Part-time Female	SGB Permanent Fulltime Female	SGB Permanent Part-time Female	SGB Temporary Fulltime Female	SGB Temporary Part-time Female	SGB Substitute Fulltime Female	SGB Substitute Part-time Female
Primary	32681	169	1305	311	375	67	2332	161	725	96	13	5
Combined	3188	9	212	16	39	0	1435	135	100	28	1	1
Secondary	13507	59	1188	61	175	22	894	115	188	15	8	0

**Figure 1: Depicting the total number of male and female educators in the Province of KwaZulu Natal as at 31.06.2006 (Personal Contact – Department of Education & Culture)**

