A systematic review of teachers' perceptions of learners' intelligence in relation to gender, age, and cultural differences

Submitted by Happy Maureen Majola

Student Number: 217080185

Dissertation submitted in partial fulfilment of the requirements for the degree of

Master of Social Science in Educational Psychology

In the

DISCIPLINE OF PSYCHOLOGY

School of Applied Human Sciences, College of Humanities, University of KwaZulu-Natal, Pietermaritzburg, South Africa.

October 2024

Supervised by

Dr. James Barry Munnik

DECLARATION

I, *Happy Maureen Majola*, declare that:

1. The research reported in this thesis, except where otherwise indicated, is my original research.

2. This thesis has not been submitted for any degree or examination at any other university.

3. This thesis does not contain other persons' data, pictures, graphs, or other information, unless specifically acknowledged as being sourced from other persons.

4. This thesis does not contain other persons' writing unless specifically acknowledged as being sourced from other researchers. Where other written sources have been used, then:

a. their words have been re-written, but the general information attributed to them has been referenced, or
b. their exact words have been used, and their writing has been placed inside quotation marks and referenced.

5. This thesis does not contain text, graphics or tables copied and pasted from the internet unless specifically acknowledged with the source detailed in the thesis and the reference section.

Happy Maureen Majola

_____

Supervisor: James Barry Munnik

_____

DEDICATION

To my late parents, Bizani Florence Majola and Vumeluyise Cleopas Majola. I also dedicate this study to all the authors of the studies that I read.

ACKNOWLEDGEMENTS

The challenges that I encountered throughout the research process taught me the importance of fixing my eyes on God, Jesus Christ, and the Holy Spirit, no matter how difficult life could be or has become. I, therefore, thank Him for not giving up on me and for increasing my faith in Him in the midst of unpredictable life challenges.

I will never forget my late parents for their prayers and support. I also thank the KwaZulu-Natal Department of Education for funding my study.

It is with immense humility and sincere appreciation that I wish to say a big thank you to Dr. James B Munnik, my supervisor, for his guidance and support. Dr Munnik's continuous and invaluable support in this regard went a long way to expand my horizon, knowledge, and understanding of academic writing. I, will, therefore, remain indebted to him.

I am grateful for my friends, Dudu Dlamini and Nomathemba Klein; my daughters, Lindeka Zondi, Sanele Dlamini, S'the, Hlengiwe, and Nkule; for being my pillars of strength. Nosicelo Mchiza provided technical support and motivation without fail. May God richly bless you and your generations.

I also would like to extend my sincere gratitude to an expert in the field of psychology who edited this thesis with great care and diligence.

ABSTRACT

This study investigated teachers' perceptions of intelligence with particular reference to learners' gender, age, and cultural differences. A systematic review of relevant existing studies conducted within twenty years (2002 to 2022) on teachers' perceptions of intelligence was undertaken. To implement the study a protocol referred to as Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) and the data search strategy called Population, Intervention, Comparison, Outcome (PICO), were adopted. Guided by these methodological strategies the study collected and synthesised data qualitatively to answer the key questions of the research. To extract and collate the findings from the different relevant sources included in the sample for the review, a qualitative thematic synthesis was used, which yielded the emerging themes.

The findings revealed that:
Learners' intelligence as perceived by teachers is related to age, gender, and culture.
Teachers have two different types of mindsets that influence their perceptions of learners' intelligence which are referred to as implicit theories of intelligence (incremental and entity mindsets or beliefs). Teachers who consider intelligence as malleable/incremental believe that intelligence can develop over time and can suffer interference or improvements from the environment and undergo some changes throughout life. Whereas teachers who consider intelligence as a fixed entity see intelligence as innate and the brain as having little or no plasticity.

There is shortage of data and studies that investigate teachers' perceptions in the field of intelligence, particularly in relation to scholars in the African continent. Such dearth of research is regretted and suggests that there is a need for researchers in the African continent to double their efforts towards conducting studies focusing on teachers' perceptions of intelligence. Implications of these findings were examined and recommendations for improved policy and further research were proffered.

Contents

DECLARATION **2**

DEDICATION **3**

ACKNOWLEDGEMENTS **4**

ABSTRACT **5**

CHAPTER ONE **6**

INTRODUCTION **6**

1.1. Historical Background of intelligence 9
1.2. The development of theories on intelligence 10
1.3. Research Problem 14
1.4. The Research Context and Background 15
1.5. Aims and Rationale of the Study 16
1.6. Research Objectives and Questions 17
1.7. Research Questions 17
1.8. Methodology 17
1.9. Ethical considerations 18
1.10. Definition of Key Terms 18
1.11. Chapter Outline 19
1.12. Conclusion and Summary 20

CHAPTER TWO **20**

LITERATURE REVIEW **20**

2.1. Introduction 20
2.2. An Overview of Theories of Intelligence 21
2.2.1. Implicit Theories of Intelligence ***21***
2.2.2. Gardner's Theory of Multiple Intelligences ***23***
2.3. Theoretical Framework 25
2.3.1. Vygotsky's Sociocultural Theory of Cognitive Development ***25***
2.3.2. The Zone of Proximal Development ***25***
2.3.3. Scaffolding ***26***
2.3.3.1. Characteristics of Scaffolding 27
2.3.3.2. Scaffolding Strategies in the Classroom 28
2.3.3.3. Scaffolding and Enhancement of Intelligence 29
2.3.2. Mediation ***30***
2.4. Intelligence and Gender Differences 31
2.5. Age differences and intelligence 34
2.5.1. Components in the mental system ***37***
2.5.2. Cortical Structure and Cognitive Ability ***39***
2.6. Intelligence and Cultural Influences 41
2.7. Conclusion 47

CHAPTER THREE **48**

METHODOLOGY **48**

3.1. Introduction 48
3.2. Research Design 49
3.3. Research Process and Data Collection 49
3.3.1. Step 1: Complete pre-review tasks ***50***
3.3.2. Step 2: Developing a protocol ***50***
3.3.2.1. PICO Search Strategy Protocol ***50***
3.3.3. Step 3: Conduct literature searches ***51***
3.3.4. Step 4: Manage citations ***51***

3.3.5. Step 5: Screen citations ***51***
3.3.6. Step 6: Assess quality of included studies ***55***
3.3.6.1. Issues of Credibility, Dependability, Transferability, and Confirmability 55
Credibility ***55***
Researcher Reflexivity ***55***
Definition of Data 56
Thick Description 56
Dependability ***56***
Transferability ***56***
Confirmability ***57***
Ethical Considerations ***58***
Independent Review ***58***
Social Value ***58***
Fair Selection ***59***
Issues of Plagiarism and Copyright ***59***
3.3.7. Step 7: Extract data from individual studies ***59***
3.3.7.1. Data Analysis and Data Synthesis 59
Thematic Synthesis ***59***
Process of Thematic Synthesis: ***59***
Coding Text 59
Developing Descriptive Themes 59
Generating Analytic Themes 61
3.3.8. Step 8: Writing the review ***64***
3.4. Conclusion 64

CHAPTER FOUR **65**

FINDINGS AND DISCUSSION **65**

4.1. Introduction 65
4.2. Theme 1: Gender Differences Observed Between Boys and Girls 66
4.2.1. Overall Predictors of Intelligence ***66***
4.2.2. Predictors of Males' and Females' Intelligence ***69***
4.2.3. Teachers' Perceptions of Male learners' Intelligence ***69***
4.2.4 Teachers' Perceptions of Female Learners' Intelligence ***70***
4.2.5. Differences in Males' and Females' Intelligence ***70***
4.3. Theme 2: How Teachers Perceive Learners' Intelligence in Relation to Age 71
4.3.1. Learners' Intelligence in Relation to Age ***71***
4.3.2. Environmental Improvements ***72***
4.3.3. Improvements and Decreases in General, Fluid, and Crystallised Intelligences ***74***
4.3.4. The Notion of Brain Plasticity ***76***
4.3.5. Specific Academic Domains ***77***
4.4. The Cultural Influences Perceived by Teachers to Affect Learners' Intelligence 77
4.4.1. Understanding Cultural and Social Intelligences ***78***
4.4.2.1. African, Eastern, and Western Cultures 79
4.4.2.2. Turkish Culture 80
4.5. Conclusion and Summary 82

CHAPTER FIVE **83**

SUMMARY, IMPLICATIONS, AND CONCLUSION **83**

5.1. Introduction 83
5.2. Summary of the Study 83
5.3. Implications for Theory and Practice 84
5.4. Recommendations for Improved Policy 85
5.5. Recommendations for Improved Assessment Practice 85
5.5.1. Assessment in the Classroom Setting ***86***
5.5.2. Learner evaluation ***87***
5.5.3. Teacher evaluation and feedback ***87***
5.5.4. Providing Extended Support to Learners ***88***

5.6. RECOMMENDATIONS FOR FURTHER RESEARCH 88
5.7. LIMITATIONS OF THE STUDY 89
5.8. CONCLUSION 89
REFERENCES **90**
APPENDIX A **106**
APPENDIX B **107**
APPENDIX C **117**
APPENDIX D **118**
APPENDIX E **137**

List of Tables

Table 1. Summary Table of included Studies with Descriptive Themes……..……..……..…….62

List of Figures

Figure 1: Adapted PRISMA Flow Diagram……..……..53

Figure 2: An example of the colour-coding used in the research……..……60

Figure 3: Diagram with descriptive and analytic themes…….……66

CHAPTER ONE

INTRODUCTION

1.1. Historical Background of intelligence

The history, background, and concerns surrounding intelligence and intelligence tests date back to 1904, when the Minister of Public Instruction in France, commissioned French psychologist Alfred Binet (1857-1911) and his colleagues to develop a means of identifying primary-grade students who were at risk of academic failure, in order to provide them with remedial attention (Armstrong, 2009). In response to this request, Alfred Binet and his colleague Theodore Simon developed the first then modern intelligence tests in 1905, which was later improved in 1908. These tests were later popularized and exported to the United States, where they gained widespread use and became benchmark for future psychological tests (Armstrong, 2009; Foxcroft et al., 2018, p 16). From this early history, it is evident that the primary aim of intelligence tests was to support students with special needs from an early age.

The origin of psychological testing is a fascinating story, and intelligence tests still have relevance to present-day practices, however the misuse of these tests pre-World War 1 era, especially the Binet-Simon scale that was designed by Alfred Binet and Theodore Simon and translated into English by Henry Goddard, an American Psychologist of the early 1900 revealed concerns that are still a current debate (Foxcroft et al., 2018, p 16). Concerns emanated from the fact that non-verbal intelligence tests produced high number of mental retardations among immigrants that were entering the United States, therefore, were not appropriate to apply cross-culturally because they relied heavily on the verbal skills of the test-taker, which became a barrier to non-French, non-English, illiterate and speech and hearing impaired people (Gregory, 2015; Foxcroft et al., 2018). These concerns affected the immigrants' test results negatively since most of them were frighted, confused, and disoriented (Gregory, 2015; Foxcroft et al., 2018). Another concern was that tests were interpreted according to the original French norm (Gregory, 2015). Therefore, the behaviours that immigrants might have presented during assessment were not typically or common in France or United States of America given the bad experiences that the immigrants were exposed to (Foxcroft et al., 2018).

In 1916, Stanford professor Lewis M. Terman (1858-1965) popularize IQ testing with his revision of Binet scales which was called Stanford-Binet scale (Gregory, 2015). The scale was also suitable for people with mental retardation, children and both normal and superior adults.

For decades the Stanford-Binet scale was the standard of intelligence testing, new tests were validated in terms of their correlation with its measure (Gregory, 2015). Stanford-Binet scale went through revisions in 1937 and 1960 (Gregory, 2015). In 2003 the latest version of Stanford-Binet scale was completed. Wechsler scales (1949, 1955) began to compete with the Stanford-Binet scale. Wechsler's scales are still popular tests today and have been adapted in most countries including South Africa and has South African norms. In 1913, Pyle's group test was among the first group tests which was revised and expanded by Pinter in 2017 (Gregory, 2015). In the same year when United States entered the World War 1, group tests became popular and were used to test war recruits 'intelligence (Gregory, 2015).

Today there are many tests that have been developed to measure human intelligence. Whether they are developed for individuals or a group of people, the concerns that were raised in the past are still relevant today. Even if tests are adapted to suit multicultural and multilingual societies like South Africa, reliability and validity of the tests' instruments will always raise concerns around cultural biasness (van der Merwe et al., 2022). Contextual and demographic will always affect performance, therefore, intelligence instruments that are applicable to a culturally and contextually diverse country like South Africa should further be developed, taking into cognisance language differences.

The developments and application of intelligence tests led to a question about the nature and the structure of intelligence (Moerdyk, 2015). This question gave rise to different theories of intelligence that sought to describe the nature and structure of intelligence through their different perspectives and assumptions (Pal et al., 2004; Moerdyk, 2015). This research explored two theories of intelligence, amongst others, which are Implicit Theory of Intelligence (ITI) that was developed Carol Dweck her colleagues and Gardner's Multiple Intelligences Theory (MI) (1983). These theories are explored in chapter 2 of this study and briefly highlighted below. The current study used the term Implicit Theory of Intelligence (ITI), which is currently referred to the "Growth Mindset" (Zeka et al., 2023).

Besides the two intelligence theories that were explores in this study, it is critical to discuss the history and transition from Albert Binet and Simon Theodore's work in intelligence to Howard Gardner's Multiple Intelligences Theory (MI) and contemporary theories.

1.2. The development of theories on intelligence

1.2.1. Faculty theory

This is the oldest theory which flourished during the 18th and the 19th centuries. It is called the faculty theory because of its notion that the mind is made up of different faculties, i.e. reasoning, memory, discrimination, imagination, which are independent of each other and can be developed by vigorous training (Pal et al, 2004). The independence of faculties in the brain was criticized by experimental psychologists (Pal et al, 2004).

1.2.2. Alfred Binet's (1857-1914) and Theodore Simon's (1872-1961) one-factor theory

Unlike Faculty theory, one factor theory reduced all the different faculties to a single general intelligence or common sense, implying that all intellectual abilities are correlated (Pal et al, 2004).

1.2.3. Charles Spearman's two-factor theory (1904)

This theory was developed in 1904 by Charles Spearman, an English psychologist. He proposed that intellectual abilities comprise of a general ability (g factor), which is an inborn ability. This belief is in line with Carol Dweck's entity theory, which is one of the two mindsets within the ITI. According to this theory, the greater the general ability, the greater the individual success in life. The theory further suggests that there are several specific abilities (s factor), which are acquired from the environment. (Pal et al., 2004). Raymond B. Cattel (1960s -1970s) later maintained that Spearman's g could be further split into two distinct g factors, i.e. g*f*, which the fluid intelligence and g*c*, which the crystallized intelligence (Gregory, 2015; Moerdyk, 2015).

1.2.4. Thorndike's multifactor theory

Thorndike unlike Spearman believed that there was nothing like general ability but highlighted that each mental activity requires an aggregate of four different set of abilities that he distinguished (Pal et al., 2004). He distinguished the level of difficulty of a task to be solved, referred to the range as a number of tasks at any degree of difficulty, the area as the total number of situations at each level to which the individual is able to respond, and the rapidity with which we can respond to the items, which he called the speed (Pal et al., 2004).

1.2.5. Thurstone's theory of primary mental abilities/ Group factor theory (1930s)

Louis Thurstone, the American psychologist, argued that intelligence consisted of several overlapping but distinct abilities. Thurstone did not agree with both Thorndike's and Spearman's theories, but instead these theories and others led him to a conclusion that there is a primary factor, which is a common factor of certain mental operations (Pal et al., 2004).
He identified seven independent primary factors, i.e. verbal expression, verbal fluency, inductive reasoning, spatial visualization, number factor, memory, and perceptual speed (Pal et al., 2004).

1.2.6. John Bissell Carroll (1930-1970)

Carrol came out with a hierarchical model after a 60-year period of examining 430 data sets of 130 000 participants (Moerdyk, 2015). His model consisted of three levels or strata (i.e. stratum 1 were narrow specific abilities, such as spelling, stratum 2 were general abilities like Spearman's two-factor theory; the fluid intelligence (g*f*) and crystallized intelligence (g*c*). Stratum 3 was a level of a single general intelligence (g).

1.2.7. Phillip Vernon 1950-1970

Vernin argued that abilities are arranged in a pyramid form. He puts the general ability (g) on top, followed by two major group factors (verbal-educational ability) and (spatial-practical-mechanical ability) with verbal-educational ability further broken down into verbal and numerical, spatial-practical-mechanical ability further broken down into perceptual speed and spatial (Moerdyk, 2015).

1.2.8. Joy Paul Guilford (1950s-1980s)

Gilford proposed a three-dimensional structure of intellectual model where every intellectual task can be classified according to it's content, mental operations involved, and the product resulting from the operations. He further classified content into five categories (visual, auditory, symbolic, semantic, and behavioural. Mental operations were also classified into five (evaluation, convergent production, divergent production, memory, and cognition). Product was further classified into six categories (units, classes, relations, relations, transformations, and implications) (Moerdyk, 2015).

1.2.9. Sternberg's triarchic theory of intelligence (1980s-2000s)

Robert J. Sternberg extended his previous componential analysis of thinking by developing a triarchic theory of intelligence with three distinct and largely independent types of intelligence (Moerdyk, 2015). These intelligences are practical intelligence, creative intelligence, and analytic intelligence. Practical intelligence enables a people to adapt to the demands of their environment. Creative intelligence is defined by the ability to cope with novel situations and gain experience and the ability to quickly relate novel situations to familiar situations, be able to see the similarities and differences and ultimately be able to solve problems as a result of experiences gained (Pal et al., 2004; Moerdyk, 2015).

1.2.10. Howard Gardner's theory of multiple intelligences (1900s-2000s)

Nearly 80 years after Binet-Simon intelligent scales' development, Howard Gardner, a Harvard psychologist in the United States, challenged the narrow definition of intelligence within culture. He proposed the existence of at least seven intelligences, to which he later added an eighth and ninth (Armstrong, 2009). These nine intelligences, part of Howard Gardner's Multiple Intelligences Theory (MI) (1983), aimed to expand the understanding of human potential beyond the limitations of traditional IQ scores. They are:

- **Verbal-Linguistic:** Well-developed verbal and linguistic skills, including a good understanding of sounds, word meanings, and word rhythms.
- **Logical-Mathematical:** The ability to think abstractly and to discern, discriminate, or recognize logical and numerical patterns.
- **Visual-Spatial:** The ability to think and visualize abstractly and accurately in images.
- **Bodily-Kinesthetic**: The ability to control body movements and handle objects skillfully and competently.
- **Musical:** The skill or capacity to produce and appreciate rhythm, pitch, and quality tone in musical sound and music literacy.
- **Interpersonal:** The ability to detect, be sensitive to, and respond appropriately to other people's moods, motivations, and positive desires.
- **Intrapersonal:** The capacity for a high level of self-awareness and mindfulness of one's feelings, values, beliefs, and thought processes.
- **Naturalistic:** The ability to recognize and appreciate nature, including animals and other living and non-living organisms.
- **Existential:** Sensitivity and the capacity to contemplate profound questions about life and human existence, such as the meaning of life, death, and the origins of existence (Stanford, 2003; Armstrong, 2009).

This suggests that all human beings possess a certain degree of intelligence, regardless of any shortcomings in academic skills or abilities.

The above theories of intelligence show the transition from Alfred Binet in 1904 to current theories of intelligence, specifically Howard Gardner's theory of multiple intelligences amongst others. Building on their perspectives on the multifaceted nature of human intelligence, this current study aims to investigate how age, gender, and cultural differences relate to intelligence as perceived by teachers.

This study synthesises data extracted from various sources to address the research questions posed by the reviewer, thereby contributing to how intelligence is perceived, particularly among teachers.

1.3. Research Problem

It is argued that exploring teachers' implicit theories of intelligence—whether they lean towards fixed (entity theories) or malleable (incremental theories)—can aid in understanding their perceptions of intelligence, potentially revealing differences in their expectations regarding intellectual abilities (Sternberg, 2000). Implicit theories of intelligence were employed to explore teachers' perceptions, and these theories will be extensively discussed in Chapter 2's literature review section of this study. In conducting this exploration, the present researcher systematically reviewed international and South African literature addressing intelligence about gender, age, and cultural differences, as well as literature analysing teachers' perceptions regarding these factors.

Exploring teachers 'perceptions of learners' intelligence is considered necessary because, despite efforts by test developers to create culture-free tests devoid of culture-specific content, complete elimination of cultural influences remains challenging (Papalia & Feldman, 2011). This raises concerns about the appropriateness and relevance of European-designed tests in diverse cultural contexts such as Africa in general, and South Africa in particular.

The persistence of gender stereotypes, overestimating boys' and underestimating girls' achievements in specific disciplines academic performance and the contradicting findings from studies that investigated gender or sex differences in intelligence, justify the need for this study (McCoya et al., 2020; Piffer, 2016).

The increase and decline in intellectual functioning at different ages and between males and females when compared using intellectual scales like Raven's Standard Progressive Matrices (SPM), according to Khawar, et al., (2014) male participants demonstrated better intellectual functioning in all age groups as compared to females and intellectual functioning seem to get mature at adolescence level as there were no significant differences between adolescents and adults. Therefore, to determine whether there are gender differences, age differences and cultural influences in intelligence, various literature were explored, and relevant intelligence theories contributed to a clear understanding of intelligence.

1.4. The Research Context and Background

Some researchers agree that there are differences between males' and females' cognitive abilities, which encompass attributes such as perception, attention, memory (including short-term or working memory and long-term memory), motor skills, language processing, visual-spatial processing, executive functions, and special processing (Upadhayay & Guragain, 2014). Conversely, Halpern & LaMay (2000) contend that there are no overall sex differences in general intelligence, although variations have been reliably observed in certain cognitive ability tests. The ongoing debate regarding sex differences primarily relies on findings from contemporary Western societies, without considering the potential for systematic differences across countries with varying school systems, cultural traditions, and gender roles (Lynn & Meisenberg, 2016).

Apart from the ongoing debates on the notion of sex differences in intelligence, there is also a tendency to compare people's intelligence based on race, often overlooking their cultural, linguistic, and socio-economic circumstances (Cockraft et al., 2015). For example, a study comparing South African and British students using the Wechsler Adult Intelligence Scales Third Edition (WAIS-III) (Wechsler, 1997), revealed significant differences due to the distinct cultural, linguistic, and socio-economic backgrounds of the South African population compared to Western Europe (Cockraft et al., 2015). South Africa, with its eleven official languages, includes groups that may share some similarities with the Western world, making standardized tests developed in Europe potentially more aligned with their cultural and socio-economic contexts (Cockraft et al., 2015). Each culture shapes the conceptualization of intelligence (Shuttleworth-Edwards et al., 2003).

Chapters 2 and 4 will delve deeper into the influence of culture on intelligence and examine the perceptions of teachers regarding this issue and its impact. In contemporary industrialized

societies, intelligence is often closely linked with individual proficiency in literate, mathematical, or scientific tasks emphasised in academic curricula (Serpell, 2000).

The ongoing controversy regarding sex and age differences in intelligence and specific cognitive abilities necessitates continuous research until consensus is achieved (Halpern & Wai, 2020). These gender differences also manifest in teachers' perceptions, as they tend to rate boys higher in math abilities and girls higher in effort in reading (Upadhayay & Guragain, 2014). Investigating teachers' perceptions of gender and age differences in intelligence is crucial as it influences teachers' planning, curriculum delivery, learner motivation, support, and future educational outcomes. This study also underscores the importance of considering cultural contexts when defining or measuring intelligence (Sternberg & Grigorenko, 2004).

The discussion above suggests that there has been limited integration of the three constructs—culture, linguistic differences, and socio-economic circumstances—with the true meaning of intelligence. Wingrave (2018) highlighted in her study that age consistently correlates with improved intellectual functioning ability in children, suggesting that intellectual functioning matures with age. Chapter 2 will delve deeper into age, gender, and cultural differences in intelligence, drawing from Implicit Theories of Intelligence (ITI) (Legget, 1985) specifically examining entity and incremental theories.

1.5. Aims and Rationale of the Study

This study aimed to raise awareness among its beneficiaries and readers about how individuals typically perceive intelligence: either as a fixed and unchanging characteristic (entity theory or beliefs) or as something malleable and capable of development (incremental theory or beliefs, also known as growth mindset) (Costa & Faria, 2018). Understanding these beliefs is crucial because they shape how individuals perceive learners' abilities and their potential for academic success. The study was designed to illuminate how teachers perceive intelligence in relation to age, gender, and cultural differences, and how these perceptions influence teachers' attitudes towards learners' achievement and motivation.

There has been limited research, especially in South Africa, on gender, age, and cultural differences in teachers' perceptions of intelligence. Therefore, this study's focus is crucial as it aims to contribute to understanding teachers' and other stakeholders' beliefs about intelligence and how these beliefs manifest in their behaviour and influence students' achievement. To achieve this aim, international and South African literature was reviewed and synthesised to address the following three research objectives:

1.6. Research Objectives and Questions

The objectives of this study are:

- To investigate gender differences in intelligence.
- To explore teachers' perceptions of learners' intelligence in relation to age.
- To determine cultural influences perceived by teachers as contributing to learners' intelligence.

1.7. Research Questions

The following research questions guided the investigation of the teachers' perceptions about age, gender, and cultural differences regarding intelligence:

1. What are the observed gender differences in intelligence between boys and girls/males and females?
2. How do teachers perceive learners' intelligence in relation to age?
3. What cultural influences do teachers perceive to affect learners' intelligence?

1.8. Methodology

The systematic review research method was chosen due to the unavailability of human participants during the COVID-19 pandemic, at the time this dissertation was planned. Instead, data from relevant international and South African literature addressing the research questions were utilized. Clarke (2011) noted that systematic reviews can encompass various types of primary research. The reviewer collected both qualitative and quantitative studies, but the findings from eligible literature were qualitatively synthesised and analyzed. Detailed criteria for inclusion and exclusion of selected literature are discussed in Chapter 3, which explains the methodology followed in this research.

The systematic review process commenced with the development of a protocol following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines along with the implementation of the Population, Intervention, Comparison, Outcome (PICO) framework (Siddaway et al., 2018). PICO is a technique designed to facilitate the systematic retrieval of literature by identifying relevant keywords for conducting searches and selecting appropriate databases (Falcon et al., 2010).

1.9. Ethical considerations

There were no potential social, psychological, or economic risks that came with this review since there was no direct contact or communication with humans. Systematic reviewer, unlike primary researchers, do not collect deeply personal, sensitive, or confidential information directly from participants but they use publicly accessible documents as evidence and are seldom required to seek an institutional ethics approval before commencing a systematic review. (Harsh & Suri, 2020). Nevertheless, the researcher applied for ethical clearance to Humanities and Social Sciences Research Ethics Committee for ethical clearance and permission to conduct a research was granted by the committee. The researcher also obtained ethical clearance certificate after completing Training and Resources in Research Ethics Evaluation (TRREE). Further, to avoid ethical doubts, the reviewer went through PICO and PRISMA processes that are mentioned on the methodology process of this proposal, in Chapter 3 section 3.7, to sift all illegible literature and all qualitative and quantitative studies that were included for review had ethical considerations guaranteed.

1.10. Definition of Key Terms

Cognitive Domains: (There are six cognitive domains relevant to this study)

- **Complex Attention:** Includes sustained, divided, selective attention, and processing speed.
- **Executive Function:** Involves planning, decision-making, working memory, responding to feedback or error correction, and mental flexibility.
- **Language**: Includes expressive language and receptive language competence.
- **Learning and Memory:** Encompasses immediate, recent, and very long-term memory.
- **Perceptual Motor:** Involves perceptions and the ability to integrate perception with purposeful movement, recognition of faces and colours, and ability to imitate gestures.
- **Social Cognition:** Entails the capacity for recognizing emotions and considering another person's mental state, including thoughts, desires, intentions, and experiences (Diagnostic and Statistical Manual of Mental Disorders, 2013).

Context: According to the Cambridge Advanced Learner's Dictionary and Thesaurus (2020), "context" refers to the situation or environment in which something exists or happens. This definition is pertinent to this study as intelligence is recognized to be context-dependent (Ormrod, 2006).

Crystallized Intelligence: is the ability to utilize skills and knowledge acquired from prior learning involving recalling of pre-existing information and skills (Perera, 2020).

Culture: Culture refers to the way of life of a specific group of people at a particular time, encompassing shared beliefs, customs, attitudes, norms, and values (Moerdyk, 2015).

Fluid intelligence: refers to the capacity to think speedily and reason flexibly in order to solve new problems without relying on past experience and accumulated knowledge (Perera, 2020).

Inclusivity: Inclusivity, as applied in this research, refers to the practice of accommodating all individuals regardless of their gender, race, socioeconomic status, or disability, and treating them fairly and equally (Cambridge Advanced Learner's Dictionary and Thesaurus, 2020).

Misogynist: A misogynist refers to a person who dislikes, despises, or is strongly prejudiced against women.

Socioeconomic Status (SES): Socioeconomic status refers to an individual's social standing and class, which is typically measured as a combination of education, income, occupation, and assets that a person possesses. Additionally, socioeconomic status reflects inequalities among people and disparities in accessing resources, privileges, control, and power (American Psychological Association, 2007).

Verbal Ability: Verbal ability refers to a person's cognitive capacity to effectively use language and articulate ideas using words, expressing them in a clear and understandable manner. This ability is closely related to one of the nine intelligences identified by Howard Gardner (1983) (linguistic intelligence), which aims to expand the understanding of an individual's intellectual capabilities beyond traditional IQ scores (Armstrong, 2009).

1.11. Chapter Outline

Chapter 1 introduces the research problem, discusses the context and background, outlines the research objectives and questions, defines key concepts central to the study, and presents an overview of the chapter structure.

Chapter II focuses on reviewing relevant literature that addresses the research questions outlined in Chapter 1. It includes the theoretical framework upon which the study is based, as well as empirical literature on teachers' perceptions of intelligence about gender, age, and cultural differences.

Chapter III provides a detailed description of the methodology employed in this study. It covers the research design, sampling procedures, data collection methods, and the instrument used for data collection. Additionally, this chapter explains the thematic synthesis technique used by the reviewer to synthesize data collected from various literature sources.

Chapter IV presents the findings of the study and provides discussions on those findings.

Chapter V provides a summary and conclusions of the research findings, along with implications for theory and practice. This chapter also discusses the limitations of the research, offers recommendations, and suggests directions for future research.

1.12. Conclusion and Summary

This first chapter has provided an overview of the study's background and the context in which this review was conducted. It has defined key concepts used throughout the study and outlined the aims, objectives, and research questions. Additionally, the chapter briefly discussed the protocol and techniques used for selecting eligible literature.

Chapter 2 will delve into the literature reviewed in this study, as well as the theoretical frameworks upon which this research is based.

CHAPTER TWO

LITERATURE REVIEW

2.1. Introduction

This study explores teachers' perceptions of intelligence by reviewing literature aimed at addressing the research questions. This includes literature from Western, Asian, and African contexts, with a specific focus on South African literature. Despite the limited research on this topic conducted in South Africa, the reviewer utilised the available literature to address the research questions posed.

This chapter provides an overview of theories of intelligence, including ITI, MI, and Vygotsky's sociocultural theory. Various studies were consulted to unpack the research questions and provide insights into the concept of intelligence and its relationship to learners' gender, age, and culture. Despite limited literature on teachers' perceptions of intelligence, recommendations to address this gap are discussed in Chapter 5.

2.2. An Overview of Theories of Intelligence

2.2.1. Implicit Theories of Intelligence

Various theories of intelligence aim to elucidate and understand different types of mental abilities. Zeka et al., 2023 mentioned that there has been a long-standing debate among scientists as to whether intelligence is something innate, tangible, fixed, and relatively unchanging, or whether intelligence is not fixed and unchanging, but rather something that can be developed, dynamic, shaped, and strengthened with effort. Dweck (2017) pointed out that the view you adopt for yourself profoundly affects the way you lead your life. Carol Dweck divided the view that people adopt about themselves into two mindsets, i.e. a fixed mindset and a growth or incremental mindset (Dweck, 2017). These two mindsets are referred to as Implicit Theories of Intelligence (ITI) that Carol Dweck and her colleagues developed (Zeka et al., 2023). This study used the terms entity for fixed mindset and incremental for growth mindset mostly. In order to understand teachers' perceptions of learners' intelligence, it is critical to understand the two mindsets that teachers might hold regarding 'their beliefs about intelligence.

This study focused on ITI and their impact on how individuals in general perceive their own intelligence and that of others (García-Cepero & McCoach, 2009). Implicit theories categorize mindsets into two forms: growth/ incremental and entity beliefs as already mentioned. Some individuals view intelligence as static, fixed, immutable, and unable to grow over time (Blackwell et al., 2007), referred to as entity theory or entity belief. In contrast, others perceive intelligence and abilities as malleable traits that can be developed through effort, hard work, motivation, support, training, and learning (Martin et al., 2017; Radević et al., 2020; Mickovska-Raleva, 2010), known as incremental theory.

The ITI emphasise that individuals who view intelligence as a fixed attribute tend to believe it is innate and that the brain has limited plasticity. In contrast, those who perceive intelligence as malleable believe it can be influenced by environmental factors and believe that the brain can undergo changes throughout life (Thomas & Sarnecka, 2015). These beliefs fundamentally

shape how teachers perceive intelligence in relation to age, influencing their beliefs about whether intelligence can improve over time or not.

The entity theory of intelligence perceives failure as a hindrance and evidence of inadequate ability, whereas the incremental theory views academic setbacks as learning opportunities. According to incremental theory, the focus shifts to strategies and efforts to overcome failure (Lee, 1996; García-Cepero & McCoach, 2009). When confronted with challenges, teachers or learners who embrace the incremental theory seek to increase effort or undertake remedial actions to enhance their skills, rather than giving up or attributing failures solely to external factors (Mickovska-Raleva, 2010).

Furthermore, the incremental theory enables learners and teachers to evaluate a learner's current achievements based on their own previous accomplishments, rather than comparing them directly with others' abilities or achievements (Mickovska-Raleva, 2010). This approach emphasises the importance of observing and assessing learners as they collaborate with adults or more advanced peers to determine what they can achieve with support—within their Zone of Actual Development (ZAD) and their Zone of Proximal Development (ZPD) (Taber, 2018).

The incremental belief system enhances students' motivation, learning, and achievement by promoting the idea that effort positively influences and stimulates the development of abilities (Carr & Dweck, 2011; Mickovska-Raleva, 2010). In contrast, the entity belief perspective suggests that the more effort required for a task, the fewer abilities one possesses (Mickovska-Raleva, 2010).

The significance of implicit theories of intelligence in this study lies in understanding the diverse beliefs that teachers hold about the nature of intelligence among learners. These theories provide a theoretical framework for comprehending teachers' mindsets and how these beliefs influence their attitudes and behaviours in educational settings. This current study explores how existing literature elucidates teachers' perceptions of intelligence, shedding light on the implications of gender, age, and culture on learners' intellectual development. This research also aims to deepen insights into how these factors shape educational practices and outcomes.

This study argues that discussing teachers' perceptions of intelligence requires examining and unpacking their implicit theories or beliefs about learners' intelligence. These theories

significantly impact teachers' educational goals, practices, and student achievement (Lynott & Wolkfolk, 1994). Ready et al., (2011) further contends that teachers' subjective understandings of their students' cognitive abilities shape classroom interactions profoundly.

Understanding ITI is crucial because these beliefs influence teachers' attitudes towards their teaching methods, assessment practices, and the means of providing feedback to their students (García-Cepero & McCoach, 2009).

Strengths and weaknesses of Implicit Theories of Intelligence

People who believe that intelligence is fixed are called entity theorists, the, attribute failure to traits and tend to be less motivated, for example they might say: "I failed because I am not smart and there is nothing I can do to improve my performance" (Thomas et al., 2021). On the other hand, people who believe that intelligence can be improved are called incremental theorists, they attribute failure to behaviour, a person might say: "I failed because I did not study enough or I was not well" (Thomas et al., 2021). Incremental theorists acknowledge the importance of effort whereas entity theorists tend not to increase their level of effort. At the same breadth, teachers who believe that learners' intelligence is fixed will reserve their effort for learners whom they believe are smart enough to achieve more academically. Teachers who believe that intelligence can improve through support, will increase their effort in supporting learners and seek more knowledge on how they can offer relevant support in class.

2.2.2. Gardner's Theory of Multiple Intelligences

The MI theory was developed by psychologist Howard Gardner in the late 1970s and early 1980s. According to this theory, individuals possess eight or more relatively autonomous intelligences (Davis et al., 2011). Chapter 1 of this study outlines nine intelligences.

Gardner's (1983) theory aims to expand the conventional understanding of human potential beyond the limitations of traditional IQ scores used in intelligence tests. It does so by challenging individuals to engage in tasks that may lie outside their natural environment or cultural background (Stanford, 2003). Gardner's work has inspired teachers and parents to explore more effective teaching methods and to view children as equals regardless of their performance on intelligence tests or academic competence (Stanford, 2003; Morgan, 2021). Gardner perceives intelligence as encompassing an individual's ability to solve problems or perform tasks that hold value in one or more cultural contexts (Morgan, 2021).

The inclusion of Gardner's (1983) theory in this study serves to encourage teachers, parents, and professionals to adopt a broader range of teaching methods, materials, and techniques. By embracing the concept of multiple intelligences as a framework for assessment, educators can develop teaching and assessment strategies that better cater to diverse learning styles and a wide range of learners (Stanford, 2003; Department of Education, 2011).

Teachers who adhere to the entity theory may struggle to accommodate different learning styles, viewing intelligence as a fixed trait. In contrast, proponents of the incremental theory of intelligence, who believe that intelligence can improve or develop over time, are more likely to align with Howard Gardner's theory (Blackwell et al., 2007; Mickovska-Raleva, 2010).

The role of the teacher varies significantly between traditional and MI classrooms, particularly in how lessons are delivered. In a traditional classroom setting, the teacher typically stands at the front, lecturing and using the board or handouts for activities that often do not consider the diverse abilities and strengths of learners. In contrast, in an MI classroom, teachers employ various methods of presentation aligned with the nine multiple intelligences. They shift between these intelligences to accommodate the diverse learning styles of all students (Gardner, 1997 as cited in Stanford, 2003, p. 82).

Strengths and weaknesses of Gardner's theory of multiple intelligences

Morgan (2021) underscores Howard Gardner's theory of multiple intelligences as crucial, illuminating the various ways students learn and emphasising the importance of delivering instruction tailored to individual needs. MI has significantly contributed to this study by emphasising the importance of understanding learners' diverse learning styles in order to provide relevant support, regardless of learners' gender, age, or cultural background. The critics, on the other hand criticized the use of the term "intelligence" in MI theory instead of "talent" Morgan (2021). They also mentioned that there should a level of general intelligence that people have so that there is a connection among the intelligences that the theory suggests Morgan (2021).

Below, Vygotsky's (1978) sociocultural theory further provides strategies for support through the concepts of the Zone of Proximal Development (ZPD) and scaffolding, which will be elaborated upon in detail.

2.3. Theoretical Framework

2.3.1. Vygotsky's Sociocultural Theory of Cognitive Development

This study is underpinned by Vygotsky's sociocultural theory of cognitive development (1978), which emphasises the influence of a child's cultural context on their development (Berk, 2017). Vygotsky's theory is pivotal in understanding children's cognition as it highlights the transmission of culture across generations through meaningful dialogue (Berk, 2017). Moreover, Vygotsky stressed that for cognitive development to occur, children need guidance and support from parents, teachers, and peers through mediated learning experiences (Daneshfar & Moharami, 2018). The process of mediation will be further explained below.

The following critical concepts are important to explain and understand Vygotsky's theory and its significance in this study:

2.3.2. The Zone of Proximal Development

Vygotsky (1978) defined the ZPD as the gap between a learner's actual developmental level, determined by independent problem-solving, and the potential development level achieved through problem-solving with adult guidance or collaboration with more capable peers. Van de Pol et al. (2019) further emphasise that the ZPD represents the difference between what a learner can accomplish independently and what they can achieve with the assistance of a more knowledgeable other. This concept underscores two distinct levels of a child's mental development: what they can achieve autonomously and what they can achieve with support from teachers, parents, peers, and other professionals (Vygotsky, 1978). Two or more learners of the same chronological age may exhibit different levels of mental development due to various conditions, circumstances, and environments, which can be referred to as developmental dynamics. The difference between a child's chronological age and their mental age is what Vygotsky (1978) termed the ZPD. Therefore, it is crucial for teachers, tutors, parents, and other professionals to understand what tasks a child or learner can accomplish independently and when they require collaboration with a "more knowledgeable other" (MKO) to achieve a task (Kozulin, 2003).

The MKO refers to an individual who possesses greater knowledge and skills than the learner, often an adult such as a parent, teacher, tutor, or a more capable peer, who provides educational support within the learner's ZPD (McLeod, 2018). The MKO facilitates mediation for the learner within their ZPD until they reach their maximum level of intellectual functioning or potential.

Vygotsky (1978) emphasised that the ZPD delineates functions that are in the process of maturation but have not yet fully developed. Therefore, learners should not be confined to tasks they have already mastered; instead, interactions with more capable others should guide them towards their potential developmental level (Grogorenko, 2009 as cited in Daneshfar, 2018, p. 603). Beyond the ZPD lies the level of development that remains beyond the learner's current capabilities, where even with assistance, they cannot achieve independently (McLeod, 2018).

Vygotsky's theory serves as a bridge between the entity and incremental belief systems by emphasising the significance of recognising a learner's current cognitive development level and extending it towards their potential level through mediation within the ZPD. In the learner's ZPD, human mediators can leverage the learner's multiple intelligences to identify strategies that align with their individual learning styles.

2.3.3. Scaffolding

Scaffolding, as defined by van de Pol et al., (2010), originates from the construction field, where a scaffold is a temporary structure used to assist in building or modifying another structure. In the context of learning, scaffolding metaphorically refers to the temporary support provided to learners to help them complete tasks they might struggle with independently. This support is typically offered by an adult (such as a parent, tutor, or teacher) or a more skilled peer, and it is gradually reduced as the learner gains competence (Vygotsky, 1978; McLeod, 2018).

Rasmussen (2001), cited in Verenikina (2015, p. 6), broadly interprets scaffolding as "a form of support for the development and learning of children and young people." Different levels of scaffolding correspond to varying degrees of support tailored to the learner's level of understanding and ability to demonstrate knowledge (Donovan & Smolkin, 2002, as cited in Verenikina, 2015, p. 7).

Scaffolding involves providing learners with a series of tasks ranging from minimal or low levels of support to middle or high levels of support (Donovan & Smolkin, 2002, as cited in Verenikina, 2015, p. 7). This support allows a more knowledgeable other to assist someone who has not yet internalized specific task-related knowledge to acquire the necessary skills or knowledge (Taber, 2018). According to Taber (2018), scaffolding must be tied to a task aligned

with a specific learning goal that the learner cannot achieve independently at the current stage of development.

In any learning environment, whether in a classroom or elsewhere, it is crucial to recognise that learners do not develop intellectually at the same pace and have diverse learning needs. Therefore, teaching should accommodate all multiple intelligences and learning styles (Department of Education, 2011). Alfred Binet, the French psychologist (1857 to 1914) mentioned in Chapter 1 of this study, introduced a remedial programme for learners whose mental age significantly lagged behind their chronological age, resulting in successful increases in their intelligence (Perdew, 2001). These learners often required special education due to their academic challenges (Perdew, 2001).

Alfred Binet (1857 to 1914) recommended implementing remedial programmes in small class sizes of 15 to 20 learners, but this approach may be challenging to implement in developing and underdeveloped countries, potentially excluding less privileged learners. Therefore, this concept should be adapted within inclusive education systems, particularly in countries like South Africa, where differences among learners with special educational needs are acknowledged and respected within the same classroom or educational setting to meet the needs of all learners (Department of Education, 2011).

2.3.3.1. Characteristics of Scaffolding

It is essential for teachers to grasp the key characteristics of scaffolding to offer appropriate support and monitor how more capable peers, parents, or guardians provide support that meets the needs of learners requiring assistance. This study highlights three critical characteristics of scaffolding: contingency, fading, and transfer of responsibilities (van de Pol et al., 2010).

The first and most central characteristic of scaffolding is *contingency*. This refers to the degree of support that is adjusted, differentiated, tailored, and responsive to individual needs support that is adapted to the learner's current level of performance, ideally maintaining a challenge level that is slightly above their current capability (van de Pol et al., 2010, 2015). Contingent support takes into consideration learners' prior knowledge and is provided at the right moment when learners require assistance, facilitating their processing of new information (van de Pol, 2019). In group work settings, contingency accounts for the diverse needs and prior knowledge of multiple learners (van de Pol, 2019).

The second characteristic of scaffolding is *fading*, which involves the *gradual withdrawal* of support to promote independence (van de Pol et al., 2010). As learners achieve the expected level of competence or development, the teacher reduces the amount of support provided (van de Pol et al., 2010).

The third characteristic is the gradual *transfer of responsibility* to the learner for task performance, which is the primary goal of scaffolding (van de Pol et al., 2010). It is essential for scaffolding to facilitate a smooth and timely transition from teacher-student interaction to student-student interaction (van de Pol, 2019).

The characteristics of scaffolding mentioned above should always be kept in mind when implementing scaffolding strategies in the classroom. Scaffolding is a temporary or time-limited intervention aimed at transferring knowledge, skills, and responsibilities to the learner. Therefore, it is crucial for teachers to ensure that scaffolding strategies are contingent, involve fading of support as learners progress, and facilitate the gradual transfer of responsibility to the learner for task performance.

2.3.3.2. Scaffolding Strategies in the Classroom

In order to provide effective support and enhance learning in the classroom, teachers should begin by assessing each learner's current level of competence and prior knowledge (van de Pol, 2015). When introducing a new lesson, it is beneficial to break it down into manageable units and create tasks or assignments under each unit, clearly explaining the objectives of each assignment before learners begin (Belland et al., 2013). Additionally, it is important for learners to understand the purpose behind each task, enabling them to actively engage in the learning process and comprehend the expected outcomes (Belland et al., 2013).

Following the scaffolding procedure, teachers should establish clear learning goals and task-related objectives that are comprehensible to learners at all levels of intellectual development. This approach ensures that scaffolding strategies are implemented effectively to support diverse learners in achieving their educational goals.

Learners who struggle with working independently often require significant initial guidance from the teacher (Belland et al., 2013; Department of Education, 2011). Teachers and other knowledgeable individuals must provide a variety of opportunities that cater to learners' diverse strengths and learning styles, including multiple intelligences (Department of Education, 2011).

To enhance learners' expectations for success, motivation is crucial, especially since some learners may experience academic emotions such as frustration or disappointment due to difficulties in mastering learning goals or completing assignments (Kim & Pekrum, 2014; Pekrum, 2006 as cited in Belland et al., 2013, p. 248). Therefore, it is essential to provide encouragement for each step and achievement learners make to prevent discouragement or regression.

Scaffolding allows instructors to bridge the gap between learners' current knowledge and the content being taught. Therefore, it is crucial to activate learners' prior knowledge or functions they already possess to facilitate their mastery of new concepts or skills independently (Anwar et al., 2022; Vygotsky, 1978). This approach ensures that learners build upon their existing knowledge base to achieve deeper understanding and proficiency in new learning tasks.

2.3.3.3. Scaffolding and Enhancement of Intelligence

Empirical research has consistently demonstrated the effectiveness of scaffolding techniques in both intelligent tutoring systems (ITS) and human interventions that are specific to domains or subjects, resulting in positive changes and improvements in learners' academic competence (Mattanah, 2005; Pino-Pasternak, 2010; van de Pol, 2019; Naserpour & Zarei, 2021; Anwar et al., 2022).

For example, studies investigating the application of scaffolding techniques through Intelligent Tutoring Systems have shown significant improvements in student learning outcomes when multiple scaffolding methods are employed (Anwar et al., 2022). This highlights the importance of exploring various scaffolding techniques and strategies to identify the most appropriate ones for specific learning environments or domains, with the ultimate goal of transferring responsibility to the learner.

Similarly, the process of scaffolding, particularly the contingency of support, has been demonstrated to enhance students' learning. A study on scaffolding student understanding in small-group interactions found that students were more likely to formulate accurate answers when they utilised the teacher's support in subsequent small-group activities, rather than disregarding it (van de Pol et al., 2019). The study analysed interactions from 35 lessons conducted by 7 secondary social studies teachers across 7 small groups of students, highlighting the effectiveness of scaffolding in promoting student engagement and learning outcomes.

A study investigating the effectiveness of scaffolding strategies and task orientation on receptive and productive knowledge of lexical collocations found significant results. The study revealed that visual cues were the most effective scaffolding strategy for teaching lexical collocations and that the cooperative group technique had a notably positive impact on learning collocations compared to direct corrective feedback (Naserpour & Zarei, 2021). This research compared three scaffolding techniques: verbal scaffolding, cooperative group activities, and visual cues as instructional scaffolding methods (Naserpour & Zarei, 2021).

The studies above demonstrate that scaffolding significantly enhances learning and achievement among learners in the classroom. This approach contributes to intellectual development, leading to improved learning outcomes and the achievement of set learning goals. Moreover, it has been suggested that scaffolding may activate learners' working memory or short-term memory through the repetition of information necessary for mastery. Additionally, it is noted that general intelligence (the g-factor, which encompasses fluid and crystallized intelligences) may also be enhanced through the connection between prior knowledge and current knowledge, a key scaffolding strategy (Anwar et al., 2022).

Therefore, it is crucial for teachers to align scaffolding techniques with learners' individual learning styles and intelligences. This implies that a one-size-fits-all approach should be avoided in favour of recognising the diversity among learners. By doing so, all students can benefit intellectually from the interventions provided.

2.3.2. Mediation

Mediation refers to the process by which external stimuli are transformed into internal mental functions using artificial or non-natural stimuli (Huong, 2003). From this perspective, mediation involves utilizing tools such as computers, textbooks, and visual materials, as well as interactions with other human beings (Wertsch, 2007; Kuzolin, 2003). Beyond the use of computers as tools, there are psychological tools known as semiotic tools, such as language (Huong, 2003; Hamamorand, 2016; Daneshfar, 2018). These tools serve as sources of mediation, which can be material (e.g., a string on a finger as a reminder), systems of symbols (most notably language), or behaviours exhibited by others during social interactions (Huong, 2003). Vygotsky's sociocultural theory of cognitive development emphasises that human nature is shaped through interactions with the surrounding social and cultural environment, necessitating engagement and close relationships with both other individuals and objects (Daneshfar, 2018).

The presence of adults and "more knowledgeable others" plays a critical role in a child's cognitive development by expanding opportunities for learning beyond what the child might discover independently. It is important to emphasise the selection of appropriate tools for specific units or tasks to support knowledge construction and cognitive development. Creating an interactive environment is also essential, where teachers not only assign tasks and facilitate interactions but also cultivate a supportive and conducive learning atmosphere. In this context, teachers should maintain ongoing communication with learners to prevent confusion and monitor the progress and engagement of all students during tasks. Consequently, teachers should choose or design interactive tasks and activities that challenge students' intellectual abilities (Hamamorand, 2016). Facilitating interactions among students within the classroom, whether through peer-to-peer interactions, group work, or paired activities, is also crucial (Hamamorand, 2016).

The process of mediation, (as explained earlier), does not occur in isolation but unfolds within the scaffolding strategies, specifically within the zone of proximal development. In the following sections, the empirical literature addressing gender, age, and cultural differences in intelligence, as well as the impact of culture on intelligence, will be reviewed. This review is essential as it contributes to addressing the research questions of this study.

2.4. Intelligence and Gender Differences

Under this theme, various kinds of literature from different countries addressing the first research question, namely, understanding the factors contributing to gender differences in intelligence are reviewed. One notable study in this area is credited to Halpern (1997), which will be discussed first. Halpern (1997) highlighted that many psychologists oppose comparisons between women and men, particularly when differences are identified, due to concerns that such data could be misinterpreted and used to support misogynistic agendas. However, debates on the existence and nature of gender differences in intelligence persist and cannot be ignored (Hyde, 2014).

A significant study in this area was conducted by Lynn (2002), which revealed a male advantage in progressive matrices performance starting at the age of 15 years and continuing into adulthood. The data for this study were drawn from grade 9 classes in secondary schools in South Africa, comprising 1056 white students, 1063 Indian students, 767 coloured students, and 1093 black students. Within the study sample, male students were found to have higher mean IQ scores, equating to 2.35 IQ points higher among 15-year-olds and 4.65 IQ points higher among 16-year-olds (Lynn, 2002).

In their attempt to explain this trend, Colom & Lynn (2004) noted the developmental theory of sex differences in intelligence, which suggests that boys and girls mature at different rates. According to this theory, girls experience accelerated growth starting around the age of 9 years and maintain an advantage over boys until approximately 14-15 years of age. However, around the ages of 15-16 years, girls' growth rate decelerates relative to boys. Colom & Lynn (2004) argue that as boys continue to grow beyond this age, both in physical height and mean IQ, their scores increase relative to those of girls.

The above report is supported by existing literature indicating differences in intelligence between boys and girls, as measured by the progressive matrices' intelligence test. This conclusion aligns with findings from the developmental theory of sex differences (Lynn, 2002; Colom & Lynn, 2004; Lynn & Irwing, 2004).

Indeed, a study testing the developmental theory of sex differences in intelligence among Spanish adolescents aged 12–18 produced similar results to those found in the United States and Britain, despite the cultural differences between these countries (Colom & Lynn, 2004). The findings consistently showed that girls aged 12–13 outperformed boys, whereas girls aged 14–15 performed comparably or slightly better than boys, but this trend reversed for girls aged 16–18. This decline in girls' performance from age 14–15 onwards compared to boys of the same age further supports the developmental theory of sex differences (Colom & Lynn, 2004). Additionally, Colom & Lynn (2004) reported a 4.3 IQ point advantage for males among 18-year-olds using the Differential Aptitude Test (5th ed., or DAT-5) in their sample.

It is worth noting an intriguing longitudinal study by Lynn & Kanazawa (2011) that tracked a population in Great Britain (England, Wales, and Scotland) over more than half a century. Participants took multiple intelligence tests: at age 7, they completed tests including Copying Designs, Draw-a-Man, Southgate Group Reading, and Problem Arithmetic; at age 11, they took tests such as Verbal General Ability, Nonverbal General Ability, Reading Comprehension, Mathematics, and Copying Designs; and finally, at age 16, they took reading comprehension and mathematics comprehension tests. The longitudinal data revealed that girls who initially scored higher than boys on average at ages 7 and 11 subsequently obtained lower average IQ scores than boys by age 16 (Lynn & Kanazawa, 2011). This finding adds further complexity to the understanding of gender differences in intelligence over different developmental stages.

However, Lynn and Meisenberg (2016) have raised a cautionary note regarding the ongoing debate about sex differences in intelligence. They point out that the existing trends are largely derived from results obtained from modern Western societies. This perspective may overlook the potential for systematic differences that could exist between countries with varying school systems, cultural traditions, and gender roles. Therefore, their critique suggests that a broader, cross-cultural approach is needed to fully understand the complexities of sex differences in intelligence.

While the caution raised by Lynn and Meisenberg (2016) remains important to consider, it is noteworthy that studies exploring the impact of caste, gender, and locality on students' IQ in Purulia district, West Bengal, India, have also yielded significant findings. For instance, Paramanik (2018) conducted a study using the Cattell Culture Fair Test of Intelligence scale to measure IQ among 10th standard (14 to 16-year-old) students from six secondary schools, three urban and three rural. The study concluded that there is a notable difference between male and female students in terms of IQ, with male students showing higher average IQ scores compared to female students. Paramanik (2018) suggests that addressing this disparity may require providing additional and diverse curricular opportunities specifically tailored to enhance the IQ levels of female students. This perspective highlights the intersection of gender, education, and cognitive development within a specific cultural and regional context.

Lynn (2021) challenges the notion that males and females possess equal intelligence, arguing that while the average intelligence of young girls is higher than that of young boys, this balance shifts in school-age students, where boys and girls demonstrate approximately equal intelligence. However, Lynn (2021) asserts that in adulthood, the average intelligence of men tends to be four IQ points higher than that of women. This perspective contrasts with the findings of Lynn & Irwing (2004), whose meta-analysis of 57 studies globally, including those from South Africa, on sex differences in general population samples using standard and advanced progressive matrices found no significant differences among children aged 6–14 years. This contradicts the developmental theory of sex differences in intelligence, which suggests that girls' cognitive growth accelerates around age 9 (Colom & Lynn, 2004), but aligns with the observation that males tend to achieve higher means from age 15 onwards. Furthermore, Lynn & Irwing (2004) also reported contradictions in the IQ advantage of boys over girls aged 5–11 years compared to the developmental theory of sex differences in intelligence. Lynn (2021) argues that these discrepancies highlight the complexity of understanding sex differences in intelligence across different age groups.

Other studies, such as those by Lynn (2002), Lynn & Kanazawa (2011), and Paramanik (2018), support the developmental theory of sex differences by indicating that males generally exhibit an IQ advantage over females from age 15-16 through adulthood. These findings underscore the ongoing debate and variability in understanding how intelligence differs between genders over various stages of development.

Naderi et al. (2010) propose that the relationship between intelligence and academic achievement is intricate and multifaceted. They emphasise that gender differences in intelligence are a complex area requiring further investigation, particularly within African and South African contexts, to enhance our understanding of how intelligence relates to gender, age, and culture. In their study, Naderi et al. (2010) found that when measuring students' intelligence using intelligence tests, there was no significant difference between males and females regarding which aspect of intelligence correlated with academic achievement. Moreover, they observed that intelligence itself did not significantly predict academic achievement for either gender. These findings highlight the nuanced nature of the relationship between intelligence, gender, and academic performance, suggesting that additional research is needed to deepen our understanding in diverse cultural and regional settings.

These trends, indicating some level of inconclusiveness in the debate, suggest that if there is no significant relationship between male and female intelligence and academic achievement, both male and female learners may benefit from scaffolding as a supportive structure in their learning. Scaffolding can potentially enhance academic and intellectual development for all students, regardless of gender, by providing tailored support and guidance to facilitate learning and achievement. Thus, implementing effective scaffolding strategies in education could contribute to improving outcomes for both male and female learners.

2.5. Age differences and intelligence

Several studies examining the relationship between age and intelligence have been conducted and are discussed below.

One notable study is credited to Ackerman (2014), who discussed the evolution of traditional approaches to intelligence. These approaches have developed from Spearman’s (1904) theory of general intelligence, which posits intelligence as both general and stable. Additionally,

Binet's (1905) approach, which focuses on intelligence among children and adolescents, suggests that intelligence typically increases with age.

Khawar et al. (2013) conducted a study in Pakistan to investigate age and gender differences in emotion recognition ability and intellectual functioning. Participants included children, adolescents, adults (18-35 years), and older adults (55-77 years). The study utilised the Coloured Progressive Matrices to assess intellectual functioning in children and the Standard Progressive Matrices for older age groups. Key findings from the study indicated that intellectual functioning generally increased with age but showed a slight decline in old age. Specifically, significant differences were observed in intellectual functioning among young adults (18-35 years), middle-aged adults (35-55 years), and older adults (55-77 years). Additionally, the study identified an age-related decline in emotion recognition ability across all age groups studied.

These findings highlight the nuanced changes in cognitive abilities across the lifespan in the Pakistani context, underscoring the importance of understanding both age-related and gender-related differences in intellectual functioning and emotion recognition. According to Khawar et al. (2013), young adults demonstrated superior performance on the Standard Progressive Matrices compared to both middle-aged adults and older adults. There was also a notable difference in scores between middle-aged and older adults, with the middle-aged group outperforming the older adults. This suggests that intellectual functioning peaks during young adulthood and begins to decline as individuals enter middle and late adulthood.

Interestingly, the study found no significant differences in intellectual functioning between adolescents and adults, indicating that intellectual abilities may stabilize during adolescence and early adulthood before showing a decline in later years. This decline was particularly evident among older adults, suggesting a progressive deterioration of intellectual abilities in late adulthood.

These findings underscore the importance of age-related changes in intellectual functioning and highlight the developmental trajectory of cognitive abilities across different stages of adulthood in the Pakistani population. The findings from Khawar et al. (2013) also underscore the importance of understanding age-related differences in intellectual functioning, particularly in educational settings. Their study highlighted a decline in intellectual abilities with age, yet revealed that younger adults, aged 18-35 years, performed significantly better on intellectual assessments compared to middle-aged adults (35-55 years) and older adults (55-77 years).

Moreover, the middle-aged group also outperformed the older adults, suggesting a continuum of intellectual decline from middle to late adulthood.

These findings are crucial for addressing the second research question concerning learners' intelligence in relation to age. They emphasise that while there is a decline in intellectual functioning associated with ageing, younger individuals are not negatively affected and often perform better on cognitive tasks. This positive aspect indicates that interventions and educational strategies should focus on supporting learners across different age groups to optimize their intellectual development and academic performance. Comparative studies across different countries, such as South Africa, could provide valuable insights into how cultural and environmental factors influence age-related changes in intellectual functioning. Such studies would enhance our understanding of universal versus culturally specific aspects of cognitive aging. Furthermore, it is essential for educators to be aware of these age-related differences in intellectual abilities to avoid misconceptions, such as labelling girls as less intelligent, as suggested by Paramanik (2018). Instead of gender biases, educators should implement inclusive teaching practices and provide diversified curricula that cater to the diverse needs of all learners, thereby fostering an environment where all students can thrive intellectually and academically.

Chronological age not only correlates with visible physical growth but also involves invisible changes and growth within the brain, which significantly contribute to intellectual development. The brain is susceptible to both adverse conditions and responsive to positive environmental factors, such as interventions that promote recovery and resilience (Black, 2017). This perspective is further bolstered by research indicating that environmental improvements can lead to increases in IQ (Cocodia et al., 2003; Cocodia, 2014).

Given the presence of age-related intellectual differences, it is crucial to create a psychosocial learning environment that addresses both psychological and social factors. Such an environment plays a critical role in promoting satisfaction, health, well-being, and effective performance among learners (Department of Basic Education, 2011). When providing support, it is essential to identify environmental risks that may have either transient or long-term consequences, as our brain is continually shaped by our immediate surroundings (Fan et al., 2021). Therefore, fostering a conducive learning environment that supports intellectual growth for all learners is paramount in educational settings.

The study by Rindermann (2011), which examined the development of intelligence in childhood and youth using the German version of the Cognitive Abilities Test (CogAT) among German-speaking children, revealed interesting trends. It found that the increase in crystallized intelligence is greater than that in fluid intelligence. Specifically, children aged 6-9 years showed a larger increase compared to those aged 10-14 years, and the intelligence scores exhibited the smallest increase among 15-to 18-year-olds. These findings suggest that intellectual functioning tends to mature as individuals grow older but varies across different developmental stages. This variability underscores the importance for educators to optimize learning opportunities, particularly in primary school when children are younger. Providing rich content information and support during these formative years can enhance learners' generalized intelligence, which encompasses both crystallized and fluid intelligences (Perera, 2020).

Thus, educators can play a crucial role in nurturing cognitive development by tailoring educational strategies that capitalise on children's developmental stages and promoting comprehensive intellectual growth from an early age.

2.5.1. Components in the mental system

The mental system comprises several key components essential for cognitive functioning. According to Berk (2017), these components include the sensory register, short-term memory, working memory, central executive, automatic processes, and long-term memory. The sensory register acts as the initial receiver of information from the senses, which is then transferred to both short-term memory and working memory. This process allows individuals to process and engage with information necessary for everyday activities (Berk, 2017). Park & Reuter-Lorenz (2009) highlighted that aging is associated with declines in various cognitive functions such as speed of processing, working memory, inhibitory function, and long-term memory. Additionally, there are observed decreases in brain structure size and white matter integrity with age. These insights underscore the intricate interplay of cognitive components and their vulnerability to age-related changes, emphasising the importance of understanding these dynamics in educational and developmental contexts.

The studies by Park & Reuter-Lorenz (2009) and Khawar et al. (2013) underscore the relevance of implementing Vygotsky's theory early in the educational process to enhance intellectual development among learners. Vygotsky's theory emphasises the role of social interaction and cultural tools in cognitive development, advocating for learning experiences that stimulate both fluid and crystallized intelligence.

In the context of Park & Reuter-Lorenz's findings on ageing and cognitive decline, early implementation of Vygotsky's theory could potentially mitigate age-related declines in cognitive functions such as working memory and long-term memory. By providing a supportive learning environment that encourages social interaction and the use of cultural tools (such as educational materials and collaborative learning), educators can foster the development of fluid intelligence. This type of intelligence allows individuals to adapt and solve novel problems by using reasoning and logical thinking skills.

Additionally, Khawar et al.'s study on age and gender differences in Pakistan highlights the importance of nurturing both fluid and crystallized intelligence from a young age. Crystallized intelligence, which involves accumulated knowledge and skills, can be enhanced through structured learning experiences that build upon existing knowledge and encourage deeper understanding. Therefore, by integrating Vygotsky's theory into early education practices, educators can promote intellectual growth by providing learners with opportunities to continuously challenge and expand their cognitive abilities. This approach not only supports the development of both fluid and crystallized intelligence but also prepares learners to effectively navigate cognitive challenges throughout their lives.

The study by Hülür et al., (2011) examined children aged 2.5-7 years from kindergartens and schools across five German federal states using the SON-R 2½-7 nonverbal intelligence test. This test included six measures across six subtests: mosaics, categories, puzzles, analogies, situations, and patterns, which collectively assess reasoning abilities. The findings provided support for age differentiation within fluid abilities, indicating that cognitive domains may either strengthen (differentiate) or weaken (dedifferentiate) in their relationships as children grow older. The age differentiation hypothesis, as explored by researchers like de Mooij (2018), posits similar ideas across different cognitive domains and age groups. Studies investigating age-related changes in gray matter, white matter, and memory among adults spanning ages 18 to 88 at the Cambridge Centre for Ageing and Neuroscience have found evidence supporting this hypothesis. These studies suggest that there are discernible changes in both grey and white matter across the adult lifespan, underscoring the notion that cognitive abilities may exhibit differentiation as individuals age. While the evidence for the age differentiation hypothesis remains mixed and subject to ongoing research, these studies highlight the dynamic nature of cognitive development and the importance of understanding how cognitive abilities evolve across different stages of life. Such insights can inform

educational practices and interventions aimed at optimizing cognitive development and supporting individuals throughout their lifespan.

The studies discussed in the previous subsection highlighted significant age differences in intelligence. This subsection now focuses on specific components of the mental system, particularly those associated with general intelligence (g-factor). These components include working memory, short-term memory, long-term memory, and fluid intelligence. Support provided to learners should recognize that these components can be influenced by various factors such as environmental conditions, health issues, genetic predispositions, in addition to age and gender differences (Rindermann et al., 2016). Therefore, in some cases, interventions may need to extend beyond the classroom setting to ensure a comprehensive assessment and appropriate diagnosis of any underlying conditions. This underscores the importance of involving "more knowledgeable others," including psychologists, to identify and address individual-specific needs effectively. The studies referenced emphasise that the structure of intelligence is not fixed or static (Feraco & Cora, 2022). Rather, intelligence is dynamic and can be influenced by a range of factors over time. Understanding these dynamics is crucial for developing targeted interventions that support learners in maximizing their cognitive potential and achieving academic success.

There are several factors that can impact changes in intelligence over time. Here are some key reasons:

2.5.2. Cortical Structure and Cognitive Ability

Under this theme, an important area of exploration involves the association between cortical structure, cortical thickness, surface area, and cognitive ability, as highlighted by Estrada et al. (2019). Research indicates that both cortical thickness and surface area are linked to cognitive abilities. The cortical structure undergoes significant changes in thickness and maturation throughout childhood and adolescence, which are closely related to intellectual development.

Estrada et al. (2019) underscore the substantial relationship between cortical development and intellectual abilities, emphasising how changes in cortical structure over developmental stages play a critical role in shaping cognitive functions. This area of study contributes valuable insights into understanding the neural basis of cognitive abilities and how cortical maturation influences cognitive development from childhood through adolescence. Researchers analysing the relationship between developmental changes in general cognitive ability and cortical thickness, as well as cortical surface area, across individuals aged 6 to 21 years, found that

increases in intelligence were generally accompanied by increases in total cortical thickness and cortical surface area (Román et al., 20189. This underscores the importance of understanding how changes in brain structure, specifically cortical structure, correlate with cognitive abilities over developmental stages. It is crucial to recognise that there is no universal approach to providing support for learners; rather, it should be tailored to individual abilities and needs. This individualised approach acknowledges the uniqueness of each learner's cognitive profile and how they respond to scaffolding techniques designed specifically for them.

Moreover, individual differences in cognitive abilities are closely related to variations in brain structure, as assessed through various neuroimaging measures (Colom & Thompson, 2013 as cited in Estrada et al., 2019, p. 1339). This highlights the complex interplay between neural architecture and cognitive functions, emphasising the role of cortical structure in shaping intellectual capabilities across different stages of development. Indeed, Estrada et al. (2019), in their analysis of the developmental changes in cognitive abilities and brain structural changes from childhood to early adulthood, found a significant association between cognitive ability and cortical thickness over time. This underscores the dynamic relationship between brain structure and cognitive development across developmental stages. Identifying environmental factors that influence brain development during childhood is crucial for informing strategies aimed at promoting optimal brain development and potentially preventing cognitive challenges later in life (Lenroot et al., 2009 as cited in Richmond et al., 2020, p. 1846). This perspective highlights the importance of early interventions and supportive environments that can positively impact brain structure and cognitive abilities from early childhood through adolescence and into adulthood.

In Africa, several environmental conditions significantly impact cognitive development and knowledge acquisition. These include nutrition and health care, parasite load, educational background of parents, large classes, poor school equipment, lower educational level of teachers, school fees, insufficient or costly transportation options to schools, poverty, drugs and substance abuse, teenage pregnancy, war, violence, and crime in communities (Glewwe & Kremer, 2006 as cited in Heiner Rindermann.2012 p. 4).

These environmental challenges underscore the need for comprehensive interventions and support systems to promote optimal cognitive development and educational outcomes across Africa. These trends indicate that while intellectual ability can indeed improve with age, the environment plays a crucial role in facilitating this development. Schools, therefore, must

function as supportive environments where learners receive guidance and support to foster resilience in overcoming obstacles and achieving their potential intellectual development. To achieve this effect, continuous interventions and programmes are essential, particularly those that target and address the environmental conditions known to impair cognitive development. These initiatives should be designed to create and maintain conducive learning environments that optimize opportunities for the intellectual growth of every learner.

The impact of parenting on childhood and adolescent cortical development and its potential influence on the mental system has been highlighted in research. Whittle et al. (2014) emphasise that nurturing conditions during upbringing can significantly shape cortical development during these critical developmental stages. Moreover, research such as that conducted by Kim et al. (2022) underscores that poverty can lead to measurable differences in cortical surface area and volume in brain regions involved in various functions. These regions include those responsible for visual and auditory processing, emotion, and language processing, as well as executive functioning. Given these insights, it's clear that parenting practices can exert either positive or negative effects on a child's cognitive and brain development. Therefore, it's crucial not too hastily label learners as experiencing learning difficulties without thoroughly exploring all potential avenues of support. Adopting multilevel teaching approaches and interventions becomes essential in providing comprehensive support to learners, enabling them to enhance their academic and intellectual capabilities.

2.6. Intelligence and Cultural Influences

Understanding the relationship between intelligence and cultural influences has been the subject of numerous studies aimed at exploring how different cultural contexts shape and promote intelligence. The premise underlying these studies is the recognition that cultural environments significantly influence people's conceptions and manifestations of intelligence. Researchers such as Sternberg and Grigorenko (2004) and Sternberg (2020) have delved into this area, highlighting the diversity in implicit theories of intelligence across cultures. Implicit theories refer to the underlying beliefs and understandings that people in various cultural contexts hold about what constitutes intelligence and how it is developed and demonstrated.

The conception of intelligence varies significantly across different cultures, reflecting the unique values, beliefs, and priorities of each society. In African communities, intelligence is often viewed through a lens that emphasises social relationships and interpersonal skills. This perspective highlights the importance of maintaining harmonious social interactions, understanding cultural norms, and navigating community dynamics effectively. Scholars such

as Sternberg and Grigorenko (2004) and Cocodia (2014) have explored these cultural conceptions, noting that intelligence in African contexts encompasses social skills alongside cognitive abilities.

In contrast, Asian cultures tend to intertwine conceptions of intelligence with religious and philosophical beliefs. There is often a strong emphasis on individual self-improvement and the cultivation of cognitive skills that are seen as beneficial for personal growth and societal contribution. This perspective aligns with broader educational practices in Asian countries where academic achievement and mastery of intellectual disciplines are highly valued. Scholars like Grigorenko (2001), Sternberg and Grigorenko (2004), and Cocodia (2014) have studied these cultural nuances, illustrating how intelligence is perceived and promoted within Asian cultural frameworks.

In the United States, intelligence is often conceptualized through the lens of cognitive abilities and academic achievement, reflecting a cultural emphasis on individual achievement and intellectual prowess. This perspective underscores the importance of cognitive skills, problem-solving abilities, and academic success in defining intelligence within American society. Researchers such as Sternberg and Grigorenko (2004) have examined these cultural dynamics, highlighting the distinct ways in which intelligence is understood and valued across different cultural contexts.

One prominent aspect valued in American culture is verbal intelligence, which encompasses skills such as a rich vocabulary, verbal fluency, and effective communication. This reflects a cultural appreciation for articulate expression and the ability to convey ideas clearly through language. Scholars like Sternberg and Grigorenko (2004) have noted this emphasis, highlighting how verbal proficiency is often seen as a hallmark of intelligence within American society. Moreover, the Western notion of intelligence more broadly tends to encompass ideals of lifelong learning and self-awareness.

Cultural diversity within Western countries further contributes to varied conceptions of intelligence. Different subcultures may place varying degrees of emphasis on different aspects of intelligence, influenced by factors such as regional traditions, educational philosophies, and societal norms. Researchers like Sternberg and Grigorenko (2004) explore these cultural nuances, illustrating how intelligence is understood and valued across diverse Western contexts.

Asian countries exhibit rich linguistic diversity and cultural differences that profoundly shape their conceptions of intelligence. Unlike Western countries where verbal intelligence and lifelong learning are emphasised, and African communities where social skills and relationships are highly valued, Asian cultures often interweave intelligence with religious and philosophical beliefs. In Asian societies, intelligence is frequently viewed through the lens of moral and ethical principles, alongside religious teachings. This holistic approach to intelligence underscores the importance of cultivating not only cognitive abilities but also virtues and values that are considered essential for personal growth and societal harmony (Cocodia, 2014). Moreover, Asian cultures tend to select tasks and learning experiences that are culturally specific and deemed essential for a child's success within that particular cultural context (Berk, 2017).

Vygotsky's sociocultural theory further elucidates how a person's intellectual development is intricately intertwined with their cultural environment. According to Vygotsky (1978), children grow into the intellectual life of their culture through social interactions and constructive dialogue with knowledgeable others, such as parents, teachers, and community members. This cultural mediation plays a pivotal role in shaping cognitive processes, problem-solving strategies, and the acquisition of knowledge and skills that are valued within a specific cultural milieu.

In essence, intelligence in Asian countries is not viewed as an isolated entity but rather as deeply embedded within cultural and religious frameworks. The integration of moral values, religious teachings, and culturally specific tasks into educational practices underscores the multifaceted nature of intelligence and the importance of cultural context in fostering holistic development among children and adolescents in Asian societies.

Maharaj (2006) underscores a crucial aspect of intelligence that is often overlooked: its variability and contextual dependence across cultures. In his study on educators' perceptions of learners' intelligences, Maharaj (2006) highlights how cultural backgrounds profoundly influence the conception and evaluation of intelligence. This perspective aligns with broader theories in psychology and anthropology that emphasise the role of culture in shaping cognitive processes and behavioural norms.

According to Sternberg and Grigorenko (2004) and Cole et al. (1971) as cited in Sternberg (2007, p. 547), cultural variation significantly informs how intelligence is conceptualized and valued. What constitutes intelligent behaviour in one cultural context may not necessarily align with the criteria used in another cultural setting. For instance, skills such as verbal fluency and

assertiveness might be highly prized in Western educational systems, whereas deference to authority and group harmony could be more valued in traditional Asian cultures.

The notion that behaviours considered smart in one cultural context may be perceived as foolish or inappropriate in another, underscores the cultural relativity of intelligence. This relativity challenges the notion of a universal standard of intelligence and encourages a more nuanced understanding that respects diverse cultural perspectives.

Maharaj's (2006) findings suggest that educators and psychologists need to consider cultural diversity when assessing intelligence and designing educational interventions. Recognizing and respecting cultural variations in intelligence can lead to more effective teaching strategies that are sensitive to the unique needs and values of learners from different cultural backgrounds. Embracing cultural diversity in educational practices can enrich our understanding of intelligence and promote more inclusive and effective learning environments globally.

Maharaj (2006) underscores the dynamic nature of cultural contexts in shaping cognitive domains and the acquisition of knowledge. His perspective highlights that cultural environments not only influence how intelligence is perceived but also play a crucial role in defining and developing specific cognitive skills and knowledge domains.

Maharaj's insights suggest that traditional intelligence tests, which are often designed from a Western cultural perspective, may not adequately capture the full range of cognitive abilities valued in diverse cultural contexts. These tests may inadvertently introduce biases that favour individuals from certain cultural backgrounds while potentially disadvantaging others.

To address these challenges, Maharaj (2006) advocates for the development of culture-relevant tests. These tests would take into account the adaptive tasks and cognitive demands that are meaningful and relevant within specific cultural settings. By doing so, culture-relevant tests aim to minimize cultural biases and provide a more accurate assessment of cognitive abilities across diverse populations (Papalia & Feldman, 2011).

The classroom serves as a critical platform for transmitting a society's cultural heritage to the younger generation, enabling them to become functional members of their communities (Offorma, 2016). This educational process not only imparts knowledge and skills but also plays a pivotal role in shaping cognitive growth and intellectual development (Ormrod, 2006).

Offorma (2016) underscores the significance of culture in promoting cognitive growth within educational settings. Culture influences how individuals perceive and interpret information, shaping their cognitive processes and learning experiences. Therefore, understanding cultural differences and their influences on learning and intellectual growth is crucial for educators and policymakers.

When teachers and "more knowledgeable others" are mindful of the cultural contexts of the learners they support, they are better equipped to tailor educational practices and curriculum delivery methods to meet the specific demands and aspirations of their society (Offorma, 2016). This cultural responsiveness fosters a more inclusive and effective learning environment where students can engage meaningfully with the curriculum and educational materials. Integrating cultural perspectives into teaching practices, educators can help bridge the gap between classroom learning and real-world applications, thereby enhancing students' understanding and appreciation of their cultural heritage. This approach not only enriches the educational experience but also prepares students to navigate and contribute positively to diverse societal contexts.

Offorma (2016) and Ormrod (2006) advocate for educators to recognize and leverage the cultural dimensions of learning and intelligence. By embracing cultural diversity and tailoring educational strategies accordingly, educators can empower students to achieve their full intellectual potential while preserving and promoting their cultural identities within the educational framework.

Ormrod (2006) highlights that beyond cultural influences, students' academic performance is strongly correlated with their socio-economic status (SES). Higher-SES students typically achieve higher academic outcomes, whereas lower-SES students face greater risks such as dropping out of school prematurely. This relationship between SES and academic achievement has been underscored by various researchers, indicating that children from lower SES backgrounds or dysfunctional families tend to exhibit lower academic performance and are more prone to early school dropout (Kader & Abad, 2017; Thompson, 2018; Sinay, 2018; Yeing & Li, 2019; Vadivel et al., 2023).

In South Africa, for instance, Norje's (2017) study on the effects of poverty on education revealed high levels of poverty, with some children living in poverty unable to attend school. This socioeconomic disparity underscores the critical need for supportive environments within both schools and families to nurture academic resilience among learners. By fostering supportive school and family environments, educators and caregivers can help students

overcome multiple academic adversities associated with low SES backgrounds and maintain high levels of achievement.

Martin and Marsh (2009), along with Mampane (2023), advocate for the importance of supportive school and family environments in promoting academic resilience. These environments play a crucial role in mitigating the negative impact of socioeconomic challenges on students' educational outcomes. By providing adequate support and resources, schools and families can empower students to succeed academically, irrespective of their socioeconomic circumstances.

In summary, while cultural influences significantly shape cognitive development and learning experiences, socio-economic factors also play a pivotal role in determining students' academic trajectories. Addressing these challenges requires collaborative efforts from educators, policymakers, and communities to create inclusive and supportive environments that enable all students to thrive academically, regardless of their socioeconomic backgrounds.

The study comparing South African and British students using the Wechsler Adult Intelligence Scale, third edition (WAIS-III) (1997), highlighted significant cultural, linguistic, and socio-economic differences between these populations (Cockraft et al., 2015). These differences underscore the importance of considering familiarity with and exposure to task content, materials, vocabulary, and assessment strategies when evaluating an individual's intelligence across different cultures.

The Department of Education (2011) emphasises the importance of valuing and embracing the diversity of learners in South African schools, advocating for inclusive educational practices that accommodate students from various cultural and socioeconomic backgrounds. This approach highlights the need for educators to recognize and leverage cultural differences positively rather than focusing solely on advantaged learners. To effectively accommodate all learners, regardless of their cultural backgrounds, content, teaching and learning environment, resources and assessments should be considered.

Curriculum planners should, therefore, endeavour to integrate cultural components in the curriculum planning because the curriculum is an inevitable tool for attaining the educational goals of each nation (Offorma, 2016). This suggests that curriculum planners should be familiar with the culture of the society for which curriculum is being planned for, to successfully integrate the required knowledge, skills, and values (Offorma, 2016).

2.7. Conclusion

Based on the comprehensive review of studies on gender differences in intelligence, the findings suggest that there are nuanced trends and variations in how intelligence is perceived and develops across genders.

The developmental theory of sex differences in intelligence proposes that girls tend to demonstrate advanced intelligence compared to boys up until around the age of 14-15, after which boys tend to accelerate and exhibit higher intelligence into adulthood. This pattern is supported by several studies (Lynn, 2021; Colom & Lynn, 2004; Lynn, 2002; Lynn & Kanazawa, 2011; Paramanik, 2018). This indicates that there is a dynamic interplay between gender and age in the development of intelligence.

The literature review also reveals conflicting findings regarding gender differences in intelligence among younger children. Some studies, such as those by Lynn & Irwing (2004) and Lynn (2021), found no significant differences in intelligence between boys and girls aged 6–14 years. On the other hand, Lynn & Kanazawa (2011) reported that girls aged 7-11 years exhibited higher IQs than boys. This discrepancy suggests that the relationship between gender and intelligence is not straightforward and may vary across different studies and populations.

Despite the contradictions in younger age groups, there appears to be a more consistent finding in adolescence and adulthood. Studies cited by Lynn (2021), Lynn & Kanazawa (2011), and others indicate that gender differences in intelligence become more apparent around the age of 15 and continue into adulthood. This aligns with the developmental theory of sex differences in intelligence, where boys tend to show accelerated intelligence growth beyond adolescence. While there is evidence suggesting gender differences in intelligence emerge more prominently in adolescence and adulthood, the variability observed in younger age groups warrants further investigation. Researchers should consider longitudinal studies and robust methodologies to clarify the nature and extent of gender differences in intelligence across different stages of development.

The impact of cultural contexts and environmental factors on intelligence cannot be overlooked. Studies have shown that these factors play a significant role in shaping the intelligence levels observed in different genders within specific societal contexts (Estrada et al., 2019; Offorma, 2016).

The next chapter presents the research methodology used in implementing this study.

CHAPTER THREE

METHODOLOGY

3.1. Introduction

This chapter describes the methodology used in implementing the present study. It outlines the protocol followed for collecting and synthesising relevant data aimed at answering the research questions proposed by the researcher.

3.2. Research Design

A systematic review with a limited scope was the methodology employed in this study. A systematic review is defined as a comprehensive examination of existing literature pertaining to a specific problem and it differs from traditional academic literature reviews. The key distinction lies in conducting the review methodically, following a predetermined protocol to minimize bias, with the goal of synthesising information retrieved on the topic (Dempster, 2011). Its objective is to enhance understanding of the topic by summarising the original primary study data using a scientific methodology (Clarke, 2011; Cajal et al., 2020). Ryan et al. (2018) state that a systematic review typically identifies multiple studies addressing the same question. Further supporting this clarification, Thoma and Eaves (2016) define a systematic review as a structured method for qualitatively collecting and synthesising data to address a significant clinical question.

Following this approach, the researcher collected pertinent empirical research, focusing on addressing the study's research questions.

Systematic reviews, as described by Perry and Hammond (2002), have been extensively utilised in the medical field to generate evidence on the effectiveness of practices and treatments. Due to its significant utility in medicine, this approach has expanded to other research disciplines such as psychology, education, social psychology, and criminology (Perry & Hammond, 2002). This methodological approach is often referred to as 'secondary research' or 'research on research' (Clarke, 2011; Cajal et al., 2020).

3.3. Research Process and Data Collection

Clarke (2011) noted that systematic reviews can encompass all types of primary research. Consistent with this perspective, the researcher reviewed both qualitative and quantitative studies, synthesising and analysing the data qualitatively. The process followed eight steps for conducting a systematic review that are explained below.

3.3.1. Step 1: Complete pre-review tasks

The researcher attended sessions about the systematic review conducted by research coordinator at the University of KwaZulu-Natal and research supervisor. The researcher also got information from several sources that explained systematic review process and thereafter developed and refined research questions.

3.3.2. Step 2: Developing a protocol

The literature search method employed to identify relevant studies capable of answering the research questions was Patient, Intervention, Comparison, Outcome (PICO) framework, a technique designed to facilitate the retrieval of relevant data (Richardson, 1995). PICO framework preceded Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA), the data handling tool (Siddaway et al., 2018). PICO is explained below:

3.3.2.1. PICO Search Strategy Protocol

To initiate the review, the researcher identified appropriate search terms for conducting a comprehensive literature search across selected databases (Falcon et al., 2010). Siddaway et al. (2018) emphasised that systematic reviews entail a meticulous search process to locate all pertinent published and unpublished studies that address one or more research questions of interest. Therefore, in this systematic review, the researcher aimed to address three research questions by synthesising qualitative and quantitative studies from peer-reviewed journal articles and published books.

Teing (2007) emphasised that the PICO search protocol is a systematic strategy to comprehensively identify literature relevant to the research question. This protocol includes determining which databases will yield optimal results, selecting search terms to guide the process, and setting a timeframe for completion. Search engines that were used to retrieve information were Google Scholar, Sabinet, Academia website, and ResearchGate.

By following this process, the researcher identified the four components of PICO as represented by its acronym. The *population* component pertained to international and South African studies conducted by various researchers concerning intelligence in relation to gender, age, and cultural differences. The *intervention/interest* strategy involved analysing findings to contribute to changing perceptions regarding intelligence. Additionally, the researcher

compared findings from different studies. Kang and Ahn (2018) underscored the importance of clearly defining the PICO parameters during systematic review processes.

3.3.3. Step 3: Conduct literature searches

The search terms below were used to conduct a literature search that guided the PICO search. Boolean operator operators "AND" or "OR" were used to combine search terms as follows:

- Are there gender differences in intelligence? AND The effect of gender differences in intelligence AND Gender differences in males and female AND The perceptions of teachers on male and female learners.
- Differences in chronological age and intelligence OR Age differences in intelligence.
- The impact of culture on intelligence OR Intelligence and culture OR Cultural differences in intelligence AND Intelligence and cultural differences.

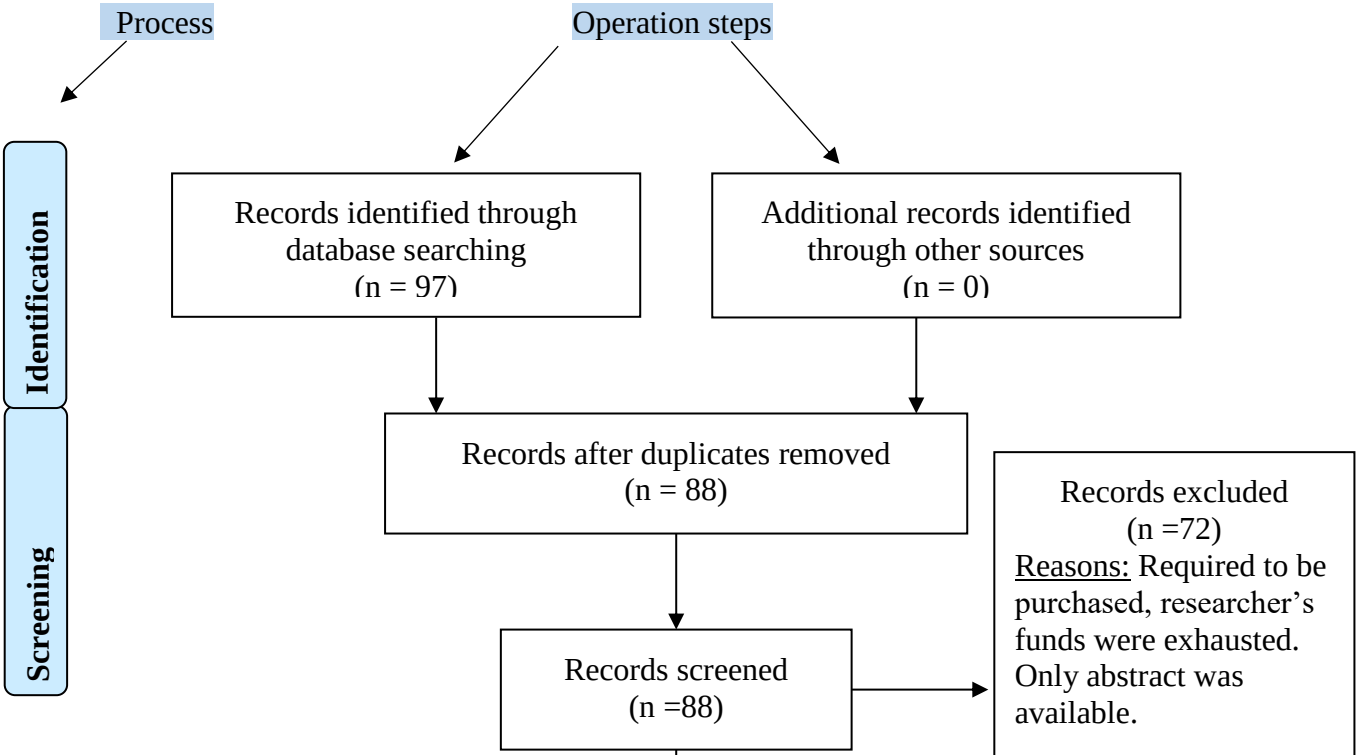
3.3.4. Step 4: Manage citations

A free American Psychological Association (APA) citation generator was used to guarantee that sources that were used are correctly cited according to the Publication manual of the American Psychological Association (7th edition). All sources that were used were acknowledged and listed on the reference list. Moreover, appendix B was used import all literature that were accessed from various sources so that duplicates are identified and removed before the screening process. Out of 97 literature that were accessed through the searching process in step 3, 9 duplicates were removed and 88 remained for screening in step 5.

3.3.5. Step 5: Screen citations

The PRISMA data handling protocol is a tool recommended by Siddaway et al. (2018) to be prepared before starting research. In this study, the PRISMA data handling protocol assisted in maintaining records of sourced data and in determining which studies should be included or excluded during the selection process, along with the reasons for such decisions. The data handling process in this study adhered to four PRISMA components (identification, screening, eligibility, and inclusion), each with specific operational steps detailing the number of studies accessed, included, and excluded. The PRISMA flow diagram in Figure 1 below outlines the

steps followed by the researcher to select relevant sources and literature using the PICO protocol (Richardson, 1995).



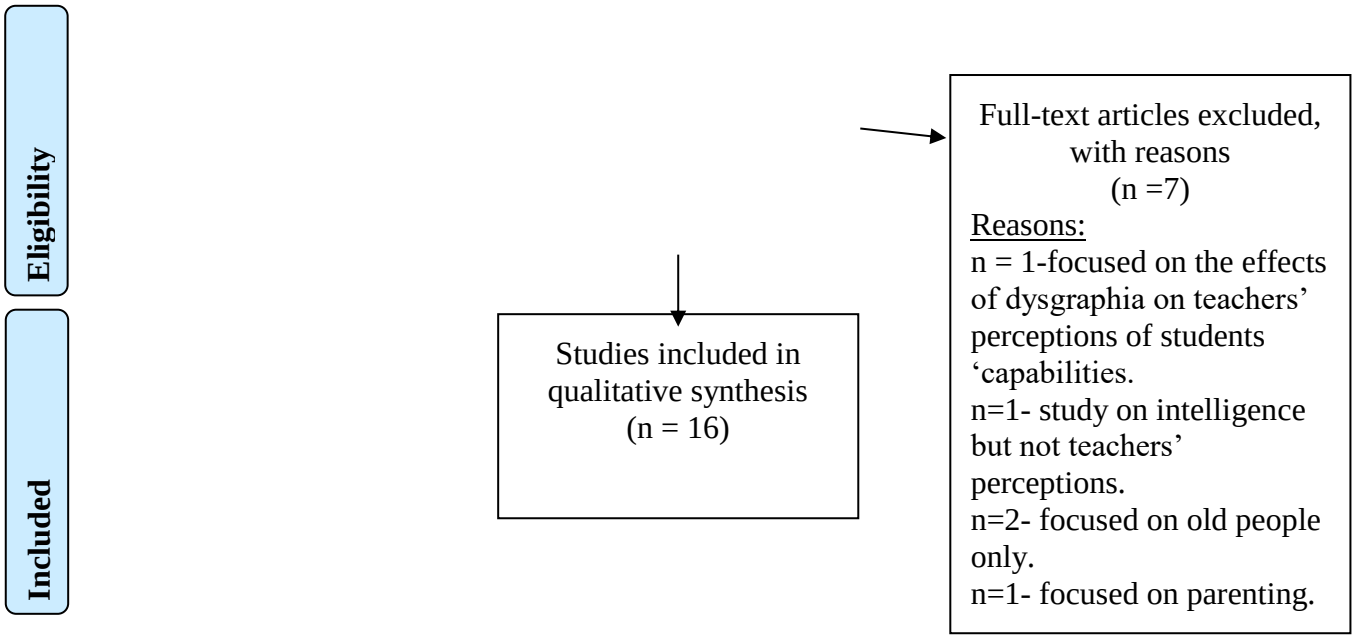


Figure 1: Adapted PRISMA Flow Diagram (Ransom & Chuard, 2020).

The researcher followed the aforementioned processes and operational steps to extract data from various search engines and other sources. These procedures are detailed to provide a clear understanding of how data were sought, identified for inclusion, and synthesised. In this study, 'data' refers to information extracted from sources such as journal articles and studies that are pertinent to the current systematic review questions. The researcher adhered to the PRISMA protocol checklist (see Appendix A). The following processes and operational steps were employed to identify sources:

Identification and Searching

In this initial stage of PRISMA, the researcher systematically searched published materials to locate all relevant literature addressing the research questions (Siddaway et al., 2018). Operational steps included identifying records through database searches using the PICO protocol (Methley et al., 2014). The number of identified studies was numerically recorded on the PRISMA flow chart and later documented in Table 1 (Summary Table of included studies with descriptive themes from thematic synthesis) and displayed in Appendix B (key findings from extracted data) (Methley et al., 2014; Warr et al., 2020). The PRISMA checklist guided the researcher in selecting eligible literature for data synthesis and reporting this study (Turk, 2021).

Screening

Following the identification of potential literature for review, the researcher conducted a screening process to identify and remove duplicates. This stage involved recording all screened literature and identifying any duplicates. Duplicated literature was subsequently discarded, and the total numbers of screened and duplicated literature were recorded numerically on the PRISMA flow chart (Monei & Pedro, 2017).

Eligibility

Following the screening process, the literature that remained underwent eligibility assessment. Full-text articles were further evaluated, and some were excluded for not meeting the inclusion criteria of this study, as outlined below. The remaining articles which were still considered potentially eligible were recording in Table 1 and Appendix B (Siddaway et al., 2018). Unlike the screening process, where only duplicated literature was excluded, at this stage, inclusion or exclusion was based on the full-text version and relevance to the current study's criteria.

Included Literature

Newman and Gough (2020) highlighted that at this stage, the researcher decides which research studies to include in the review, based on inclusion criteria. Eligible literature for inclusion refers to those that qualitatively or quantitatively address the research questions after full-text review (Methley et al., 2014). The field of eligible studies includes international and South African studies published in English from 2002 to 2022, chosen due to the limited studies focusing on the research topic. Peer-reviewed studies using qualitative and quantitative methods were included, all of which adhered to ethical considerations.

3.3.6. Step 6: Assess quality of included studies

The PICO and PRISMA protocols are designed to ensure the selection of high-quality studies. Siddaway et al., (2018) put forward that inclusion and exclusion criteria are crafted to include only relevant work in the systematic review, though the quality of included studies may vary. Annexure A illustrates the checklist that aided the researcher in meticulously planning and documenting the systematic review process (Moher et al., 2015).

Cajal et al. (2020) noted that works selected through inclusion and exclusion criteria may vary in quality. Studies included in this review focused on teachers' perceptions of learners' intelligence in relation to gender, age, and culture, including implicit beliefs about intelligence (Methley et al., 2014). This rigorous data selection and handling process aimed to ensure the quality of the literature used, thus producing reliable findings, and adequately addressing research questions. The processes and operational stages were designed to include or exclude literature without bias, thoroughly screening for appropriateness. Appendix B provides findings from 16 included studies, detailing information such as author, year of publication, participants, location, study aims, and key findings (Monei & Pedro, 2017; Cajal, et al., 2020).

3.3.6.1. Issues of Credibility, Dependability, Transferability, and Confirmability

The principles of credibility, dependability, transferability, and confirmability are essential in systematic reviews and the synthesis of qualitative research (Vergnes et al., 2010). For this study to be considered trustworthy, the researcher prioritised the following criteria of trustworthiness (Korstjens & Moser, 2018).

Credibility

In primary qualitative studies, credibility assesses how well findings reflect the perspectives of research participants. However, in qualitative synthesis, it refers to the extent to which synthesised findings accurately represent the data and results reported in primary qualitative or quantitative studies (Vergnes et al., 2016). The findings reported in this study represent information extracted from original studies and are a correct interpretation of the reviewed literature (Korstjens & Moser, 2018). The selection processes employed in this review ensured the credibility of the findings (Kumar, 2011). Table 1 and Appendix B provide evidence of the findings from the literature reviewed. Additionally, the study underwent evaluation by an expert in the field of psychology to assess its quality and suitability for publication.

Researcher Reflexivity

The researcher acknowledged and addressed any potential preconceptions about intelligence or other biases that may have influenced decisions throughout the data collection and synthesis process (Vergnes et al., 2016; Korstjens & Moser, 2018).

Definition of Data

The specific sections of the primary studies used to address the research questions were clearly defined. From these sections, data were coded, synthesised, and tabulated in Appendix B.

Thick Description

Detailed descriptions of the findings, including concepts, theories, and themes, are recorded in Appendix B. These descriptions enable readers to assess whether the results capture the depth and scope of the data from the primary studies. The theories are further explained in Chapter 2 of this study.

Dependability

To ensure the dependability of this study, the researcher engaged another knowledgeable researcher to review and analyse the study before its public release (Ross-Hellauer, 2017; Tumin & Tobias, 2019). This 'open peer review' (OPR) approach provided the technical evaluation of the study's validity in methodology, analysis, and argumentation (Ross-Hellauer, 2017). Additionally, an expert in psychology edited the study before publication to ensure quality, given the absence of participant feedback (Stahl & King, 2020; Korstjens & Moser, 2018). The details of the protocols followed are illustrated in the PRISMA data handling flow diagram (See Figure 1) and PRISMA checklist (Appendix A) to maintain consistency (Forero et al., 2018).

Transferability

Transferability refers to the extent to which the findings of qualitative research can be applied to similar contexts, settings, or other populations (Babbie & Mouton, 2005; Korstjens & Moser, 2018).

For systematic reviews, Vergnes et al. (2016) notes that transferability refers to the potential relevance and applicability of the findings—such as concepts, theories, themes, explanations, and descriptions—to other individuals, populations, contexts, and healthcare settings. The findings of this study were recorded to facilitate accessibility, allowing readers to assess the extent to which the findings can be applied to their own populations, contexts, and similar settings (Vergnes et al., 2016).

It cannot be denied that achieving transferability of an analysis of gender, age, and cultural differences in teachers' perceptions of intelligence can be challenging. Babbie and Mouton (2005) observed that qualitative researchers do not maintain or claim that knowledge gained from one context will necessarily be relevant in other contexts or time frames. The thematic synthesis process was chosen with the aim of producing findings that could be transferable, to some extent, to other contexts and cultures. Understanding other teachers' perceptions of intelligence also contributes to individuals' understanding of their own beliefs about intelligence, relative to the gender, age, and cultural backgrounds of learners (Stahl & King, 2020).

Confirmability

Babbie and Mouton (2005) defined confirmability as the degree to which the findings are the result of the focus of the inquiry rather than the biases of the researcher. The findings of the current study were derived from published literature and studies that are clearly tabulated for transparency and reliability purposes; they are not speculative interpretations (Korstjens & Moser, 2018). Vergnes et al. (2010) also agree with Babbie and Mouton (2005) in emphasizing that confirmability seeks to demonstrate that the findings are grounded in the data and not distorted or imagined by the researcher. Therefore, there was no bias in the process of selecting literature and synthesising the findings. Maintaining the researcher's neutrality was prioritised in this study (Korstjens & Moser, 2018).

Ethical Considerations

Ethical considerations are often overlooked in systematic reviews, making it crucial for reviewers to clarify how ethical issues were ensured in the review process (Vergnes et al., 2010). Unlike primary researchers, systematic reviewers do not collect deeply personal, sensitive, or confidential information directly from participants. Instead, they use publicly accessible documents as evidence and are rarely required to obtain institutional ethics approval before commencing a systematic review (Suri, 2020).

To ensure ethical integrity, the researcher rigorously applied the PICO and PRISMA frameworks to meticulously screen all eligible literature. All qualitative and quantitative studies included in the review provided clear explanations of their ethical considerations, as guaranteed by their primary researchers. Any literature lacking evidence of ethical clearance

was excluded from the review to uphold the ethical and methodological standards of this study. Throughout the inclusion and exclusion process, the researcher maintained honesty, trustworthiness, and vigilance regarding their own perspectives, pre-existing thoughts, and beliefs about intelligence (Braun & Clarke, 2006).

Independent Review

The researcher completed Training and Resources in Research Ethics Evaluation (TRREE) and obtained an ethical clearance certificate (see Appendix C). Additionally, the research proposal was submitted to, and approved by the UKZN Humanities and Social Sciences Research Ethics Committee (HSSREC).

Social Value

This study addresses a question that holds significant societal value. The intended beneficiaries include teachers, psychologists, parents, and other interested individuals. The study's findings are expected to directly or indirectly illuminate how these stakeholders perceive intelligence in relation to culture, gender, and age, and how they can provide support to learners based on the research findings and recommendations. By synthesising eligible literature and proposing intervention strategies, this study aims to contribute valuable knowledge on this topic for the benefit of society (Wassenaar & Mamotte, 2012).

Fair Selection

Fairness in the selection of eligible literature was ensured in this study through rigorous adherence to the PRISMA and PICO processes. Reasons for excluding ineligible literature were clearly and explicitly outlined in Figure 1, the PRISMA data handling flow diagram, providing evidence of the study's fair selection criteria.

Issues of Plagiarism and Copyright

All sources used in this study were appropriately cited and included in the reference list to ensure that the ideas, words, or works of other researchers were acknowledged (University of KwaZulu-Natal, 2009) (see Appendix D). The study also underwent a Turnitin process to further verify that the findings were appropriately attributed to their respective authors. The study acknowledges and adheres to the contents of the South African Copyright Act 92 of 1978, as amended, to prevent the unauthorised use of others' work (see Appendix E).

3.3.7. Step 7: Extract data from individual studies

Data for this systematic review consist of findings extracted from individual studies as primary sources (Teing, 2007). The researcher extracted data from the included primary sources to address the research questions and subsequently synthesised and compiled key findings from each source. Data extracted from various sources were synthesised and recorded in Appendix B, as previously mentioned (Evans et al., 2019).

3.3.7.1. Data Analysis and Data Synthesis

Thematic Synthesis

The included literature underwent a qualitative thematic synthesis to consolidate findings from various sources. Thematic synthesis involves systematically coding data and generating descriptive and analytical themes from primary qualitative datasets (Nicholson et al., 2016). Findings from studies included in the eligibility stage of the PRISMA protocol were synthesised; as well as, interpreted systematically, and presented in an analytic framework or summary (refer to Appendix B). This approach clarified similarities and differences among studies addressing similar research questions (Ryan et al., 2018). According to Tong et al. (2016), the synthesis process includes coding findings from primary studies, identifying themes, comparing studies, establishing relationships among them, and then synthesising themes. The steps of thematic analysis are detailed below.

Process of Thematic Synthesis:

The process of analysis followed three systematic stages of thematic synthesis, as discussed below (Nicholson et al., 2016; Thomas & Harden, 2008; Evans et al., 2019).

Coding Text

In this stage, the researcher engaged in a line-by-line coding of text, where findings from different materials were colour-coded into three analytical themes and 13 descriptive themes (Evans et al., 2019). Data was marked and colour-coded based on its meaning and relevance to the research questions and objectives of the review (Thomas & Harden, 2008). Nicholson et al. (2008) described the coding of text as the free, line-by-line coding of findings from primary studies. Figure 3 presents an example of how the data was colour-coded:

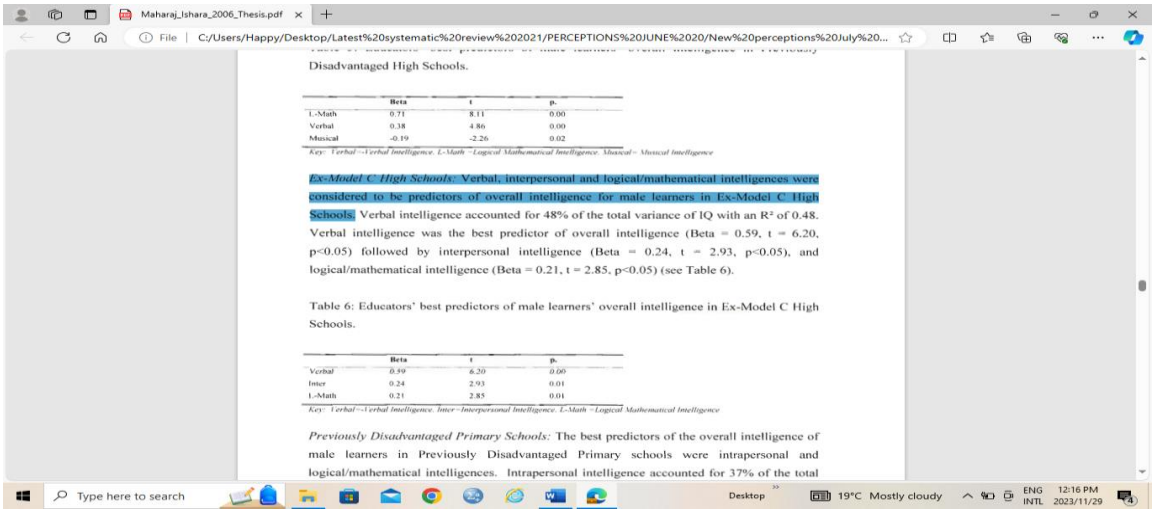


Figure 2: An example of the colour-coding used in the research

Developing Descriptive Themes

The second step involved developing descriptive themes by translating concepts from the reviewed literature and organising them into a hierarchical structure derived from the codes created in the first step (Nicholson et al., 2016; Thomas & Harden, 2008). This process included reading and re-reading the material to identify emerging themes (Price & Baker, 2012; Evans, 2019). Similar concepts were grouped based on their similarities and differences, structured according to the research questions they addressed, and summarised in Table 1 of this study.

Generating Analytic Themes

The final stage moved beyond the initial line-by-line coding of content in stage one and the grouping of codes into descriptive themes in stage two. This critical stage utilised the descriptive themes from stage two to distil key messages that directly address specific concerns or questions of this review (Thomas & Harden, 2008). The researcher integrated all themes addressing the same research question, analysed and synthesised them into meaningful findings (presented in Chapter 4). Synthesised data was organized and presented in a summary evidence table (Table 1), referred to as the 'Summary Table of Included Studies with Descriptive Themes from Thematic Synthesis' (Ryan et al., 2018).

Table 1 below presents a summary of included studies with descriptive themes derived from thematic synthesis, serving as the evidence base for the sourced data.

Table 1. Summary Table of included Studies with Descriptive Themes

Study information		Descriptive themes												
Author and year of publication	Country	Overall predictors of intelligence	Predictors of males' and females' intelligence	Teachers' perceptions of male learners' intelligence	Teachers' perceptions of female learners intelligence	Differences in males' and females' intelligence	Learners' intelligence in relation to age	Environmental improvements	Improvements and decrease in general, fluid, and crystalized intelligence	The brain plasticity	Specific academic domains	Understanding social and cultural differences	Africa, Eastern, and Western cultures	Turkish culture
Agarwal & Suraksha, 2017	India					√								
Baral & Das, 2004	India												√	
Beyazta, et al., 2017	Turkey										√			√
Budrina, 2017	Russia													
Clark, 2005	U. K.	√												
Cocodia at al. 2003	Singapore	√						√						
Cocodia, 2014	Australia							√						
Daley, et. al., 2003	Kenya							√						
Daneshfar & Moharami, 2018	Australia	√	√											
de Mooij, et al., 2018	UK								√					
Fang, 2017	USA										√			
Furnham and Budhani, 2002	U. K.	√												
Georgiou, 2008	U. K.								√					
Grarcia-Cepero & McCoach, 2008	USA											√		
Halpern & Wai, 2019	U. K.					√								
Hartshorne & Germine, 2015	USA								√					
Hessell, 2005	USA				√									
Ijeoma, 2009	Africa												√	
Jones, et al., 2012	USA									√				
Jonsson, et al., 2012	Sweden										√			√
Lynn, 2004	USA						√							

McCoy, et al., 2020	Ireland			√										
Cimpian et al., 2016, as cited in McCoy, et al., 2021	USA	√	√	√										
Maharaj, 2006	South Africa	√	√	√	√	√								
Myers, et al., 2003	Sweden										√			
Omrod, 2006	USA				√									
Pretzlik et al, 2003	U. K., Portugal	√			√									
Park & Reiter-Lorenzo, 2009	USA								√					
Downey & Pribesh, 2004	India											√		
Ready, 2011	USA							√						√
Rindermann et al., 2016	USA							√	√					
Sternberg & Grigorenko, 2004	USA											√		
Sternberg, 2007 as cited in Stangor & Walinga, 2014	Canada												√	
Thomas & Sarnecka, 2015	USA									√				
William, 2009	USA		√									√	√	
TOTAL:		7	4	3	4	1	3	5	5	2	4	4	4	3

3.3.8. Step 8: Writing the review

PRISMA checklist (appendix A) and PRISMA flow diagram or data handling tool (Figure 1) depict the flow of studies through each phase of the review process. The review report is a reflection of all included literature.

3.4. Conclusion

This chapter has detailed the methodology employed in conducting the present study. The process commenced with a systematic search for relevant literature to gather data aimed at addressing the research questions. The Patient, Intervention, Comparison, and Outcome (PICO) protocol guided the search across journal articles and books to obtain pertinent information. Additionally, the chapter outlined how the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework facilitated decisions regarding the inclusion and exclusion of literature. Clear criteria for these decisions were provided, along with an explanation of how synthesised data emerged from thematic synthesis. The chapter also addressed issues of validity and ethical considerations explicitly.

The subsequent chapter will present the findings derived from the reviewed literature and engage in a discussion thereof.

CHAPTER FOUR

FINDINGS AND DISCUSSION

4.1. Introduction

This chapter synthesises the relevant literature identified to address the three research questions of this study. Chapter 3 detailed the process of selecting eligible literature, and the key findings from the pertinent literature are tabulated in Annexure B. The review aimed to tackle the significant issue of limited studies focusing on teachers' perceptions of intelligence concerning gender, age, and culture.

The following research questions guided the investigation into teachers' perceptions of learners' intelligence in relation to gender, age, and cultural differences:

- What are the gender differences in intelligence that teachers observe between boys and girls/males and females?
- How do teachers perceive learners' intelligence in relation to age?
- What cultural influences perceived by teachers affect learners' intelligence?

The literature review uncovered themes and sub-themes that informed the findings. Figure 3 below illustrates three analytical themes and thirteen descriptive themes identified during the data synthesis process.

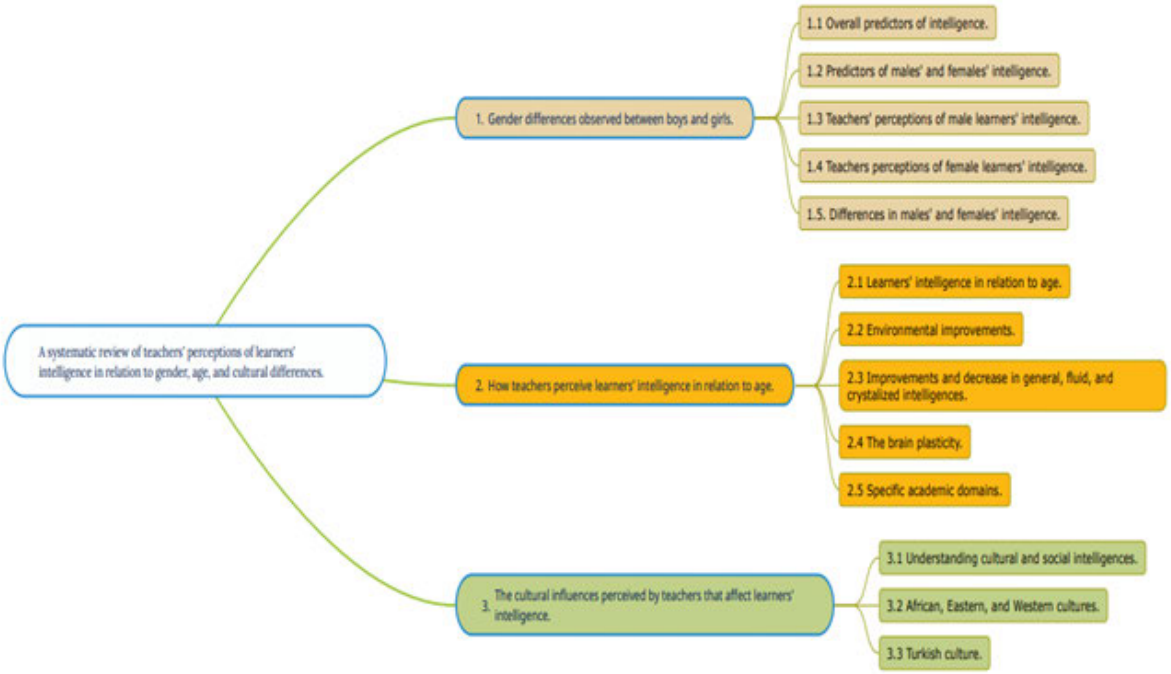


Figure 3: Diagram with descriptive and analytic themes.

4.2. Theme 1: Gender Differences Observed Between Boys and Girls

4.2.1. Overall Predictors of Intelligence

Maharaj (2006) conducted a study on educators' perceptions of learners' intelligences in ex-Model C primary schools, where verbal and logical/mathematical intelligences emerged as significant predictors of overall intelligence for both males and females. These intelligences are traditionally associated with academic achievement (Maharaj, 2006). This finding is consistent with Furnham and Budhani's (2002) investigation into sex differences in estimated general and multiple intelligences among school children, their parents, and teachers. They found that verbal and numerical abilities were closely associated with estimations of overall IQ across all three groups (children, parents, and teachers) (Furnham & Budhani, 2002).

In ex-Model C primary schools, teachers consider verbal, spatial, and interpersonal intelligences as being significant predictors of overall intelligence for female learners (Maharaj, 2006). Conversely, Pretzlik et al. (2003) discovered that children's verbal abilities are more highly esteemed than their mathematical abilities. Clark (2005) noted that teachers

may perceive verbally adept students as more intelligent compared to those who excel in visual learning styles. This perception of students' cognitive styles by teachers could profoundly influence their learning outcomes.

Maharaj (2006) also observed that educators' perceptions of female learners' intelligences vary depending on the school context. In disadvantaged high schools, teachers regarded musical intelligence as the primary predictor of overall intelligence for females. In contrast, intrapersonal and interpersonal intelligences emerged as the top predictors of overall intelligence for females in previously disadvantaged primary schools.

The findings above suggest that teachers' beliefs regarding the definition of intelligence differ between learners from advantaged and previously disadvantaged schools. Moreover, within the same school environment, differences in perceptions were noted between different grade levels (high schools and primary schools). Interpersonal intelligence was consistently identified by both ex-Model C and previously disadvantaged primary school teachers as a predictor of overall intelligence among female learners. These findings underscore the significance of recognising multiple intelligences in the classroom to accommodate gender and contextual disparities.

Hessell (2005) found that parents and teachers perceived spatial, interpersonal, and intrapersonal intelligences as significantly higher in female children compared to male children. In contrast, the MI posits that every child has the capacity to learn and possesses all nine intelligences (Gardner, 1991). Therefore, it is crucial for teachers and MKO to understand children's mental developmental levels, including their actual level of development and their potential level of development within the ZPD (Daneshfar & Moharami, 2018; Vygotsky, 1978).

According to Maharaj (2006), the following factors were identified as the best predictors of male learners' overall intelligence:

Educators in previously disadvantaged high schools estimated male learners' overall, logical/mathematical, and spatial intelligences to be lower compared to those in previously disadvantaged primary schools and ex-Model C high schools. Additionally, previously disadvantaged high schools perceived musical intelligence negatively associated with overall

intelligence for males, while considering it the primary predictor for girls' intelligence. In both previously disadvantaged and ex-Model C high schools, verbal and logical/mathematical intelligences emerged as the top predictors of male learners' overall intelligence.

In addition to verbal and logical/mathematical intelligence, teachers in ex-Model C high schools also identified interpersonal intelligence as a predictor of overall intelligence for male learners. This contrasts with Hessel (2005), who found that girls exhibit higher levels of interpersonal and intrapersonal intelligences compared to boys. In previously disadvantaged primary schools, teachers identified logical/mathematical, verbal/linguistic, intrapersonal intelligence, and musical intelligence as predictors of overall intelligence for male learners (Maharaj, 2006).

Teachers in disadvantaged primary schools uniquely highlighted intrapersonal intelligence as a predictor of overall intelligence, distinguishing their perspective from that of teachers in previously disadvantaged high schools who viewed musical intelligence as the primary predictor of overall intelligence for females (Maharaj, 2006). These findings underscore the importance of teachers and MKO communicating learners' strengths and weaknesses to tailor activities that can enhance their strengths across multiple intelligences (Hessel, 2005).

In Furnham and Budhani's study (2002), which explored sex differences in perceived general and multiple intelligences among school children, parents, and teachers, it was found that teachers' assessments of learners' intelligence did not align with cultural conceptions of male superiority, as observed in Turkish culture where males are typically viewed as dominant over females (Jonsson et al., 2012). Contrarily, in the United States, cultural stereotypes often depict girls' mathematical abilities as inferior to boys', thereby implicitly positioning males as superior to females (Cimpian et al., 2016, as cited in McCoy et al., 2021, p. 16).

Another study conducted by Budrina (2017) examined the gender characteristics of intelligence and academic achievement among younger school children in Russian primary schools using Wechsler test scores. The study found no significant differences in any of the sub-tests or indicators of verbal, non-verbal, and general intelligence (Budrina, 2017).

4.2.2. Predictors of Males' and Females' Intelligence

Studies by Maharaj (2006), Furnham and Budhani (2002), and William (2009) indicate that teachers in some ex-Model C primary schools consider verbal and logical/mathematical intelligences as the primary predictors of overall intelligence for both male and female learners. These intelligences are traditionally associated with academic achievement, particularly within Western cultures (Maharaj, 2006; Furnham & Budhani, 2002; William, 2009). Conversely, other researchers suggest empirical evidence supporting a strong correlation between general cognitive ability and academic performance (Rohde & Thompson, 2007 as cited in Naderi et al., 2010, p. 83).

The comparison of boys and girls of primary school age using the Wechsler Intelligence Scale for Children to measure general intellectual ability revealed no significant differences in all sub-tests and indicators of verbal, non-verbal, and general intelligence (Budrina, 2017). This finding contradicts implicit beliefs held by teachers in lower grades in KwaZulu-Natal, highlighting a disparity between their perceptions and the results of standardised psychological assessments administered to boys and girls in Russia. Budrina (2017) underscored that during early school age, there are no gender differences in academic achievement and intellectual development. This aligns with assertions and theories stating that boys and girls generally exhibit similar IQ levels up to the age of 15 years (Lynn, & Irwing, 2004; Lynn, 2017).

4.2.3. Teachers' Perceptions of Male learners' Intelligence

According to Maharaj (2006), logical/mathematical intelligence emerges as a prominent predictor of male learners' intelligence across different school types, including previously disadvantaged high schools, previously disadvantaged primary schools, ex-Model C high schools, and ex-Model C primary schools. This perception is also observed among teachers in the United States, who consistently rate girls' mathematical proficiency lower than boys', despite similar achievement and learning behaviour (Cimpian et al., 2016 as cited in McCoy et al., 2020, p. 16). In Ireland, there is evidence of teachers and mothers underestimating girls' performance in mathematics while overestimating boys' performance (McCoy et al., 2021).
Additionally, teachers in previously disadvantaged primary schools perceive verbal/linguistic, intrapersonal, and musical intelligences as predictors of male intelligence, in contrast to teachers in previously disadvantaged high schools who view musical intelligence negatively as a predictor of male intelligence (Maharaj, 2006).

4.2.4 Teachers' Perceptions of Female Learners' Intelligence

According to Maharaj (2006), verbal intelligence is perceived as the overall and primary predictor of intelligence for both young male and female learners in primary schools. Some researchers suggest that learners with verbal intelligence are perceived as more intelligent compared to those with visual and mathematical abilities (Pretzlik et al., 2003; Clark, 2005). Ormrod (2006) noted differences in specific cognitive abilities, with girls generally showing slightly higher verbal ability and boys exhibiting slightly higher visual-spatial ability. In addition to verbal intelligence, teachers in ex-Model C primary schools identified spatial and interpersonal intelligences as predictors of female intelligence. Similarly, teachers in previously disadvantaged primary schools found interpersonal and intrapersonal intelligences to be stronger predictors of intelligence in females (Maharaj, 2006; Hessell, 2005).

A contradiction arises between the perceptions of musical intelligence by teachers from disadvantaged high schools and disadvantaged primary schools for different genders (Maharaj, 2006). Teachers from previously disadvantaged high schools suggest that musical intelligence predicts female intelligence, aligning with African cultural beliefs in collectivism and social coherence. Musical intelligence is valued among those who embrace togetherness and unity, reflecting cultural strengths that facilitate community interaction and collaboration among teachers to support learners collectively. On the other hand, teachers from disadvantaged primary schools perceived intrapersonal and interpersonal as predictors of girls' intelligence (Maharaj, 2006).

4.2.5. Differences in Males' and Females' Intelligence

The existing reports indicate a need for further research on potential differences in intelligence between males and females until a consensus is reached regarding gender similarities and differences. Ongoing research is crucial because some studies suggest that there are no sex differences in general intelligence while acknowledging average differences in specific cognitive abilities (Halpern & Wai, 2019). Vygotsky's socio-cultural theory was explored in chapter 2, and it provides the strategies that can be used to address any existence of gender differences in specific abilities that is identified. The provision of a scaffold at any level of intellectual development to assist learners of any gender to reach the expected level of development is crucial, considering learners' learning styles in the process.

This study identified overlaps in the multiple intelligences perceived by teachers as the primary predictors of males' and females' intelligences. Logical/mathematical intelligence was predominantly seen as a predictor of male intelligence more so than female intelligence (Maharaj, 2006; Agarwal & Suraksha, 2017). Conversely, interpersonal intelligence was often perceived as a predictor of female intelligence. Research indicates notable sex differences in specific cognitive abilities, such as reading and writing skills favouring females, and certain mathematical and visuospatial abilities favouring males. These differences often exhibit cultural variations (Halpern & Wai, 2019).

According to Agarwal & Suraksha (2017), male and female students do not significantly differ in terms of their multiple intelligences. However, males tend to exhibit significantly higher levels of logical, bodily-kinaesthetic, and naturalistic intelligences, attributed to their generally stronger physical abilities compared to females. In contrast, female students demonstrate greater strengths in linguistic, spatial, musical, interpersonal, intrapersonal, and existential intelligences (Agarwal & Suraksha, 2017).

The findings above emphasise eight multiple intelligences perceived as the primary predictors of males' and females' intelligences: verbal, logical/mathematical, spatial, musical, intrapersonal, interpersonal, existential intelligences, and bodily-kinaesthetic abilities. Teachers' perceptions highlighted gender differences in intelligence, particularly focusing on these multiple intelligences. This suggests that a one-size-fits-all approach is not suitable when supporting learners in the classroom. Instead, support strategies should be tailored to accommodate gender and individual differences.

4.3. Theme 2: How Teachers Perceive Learners' Intelligence in Relation to Age

4.3.1. Learners' Intelligence in Relation to Age

Within this theme, Lynn (2017) observed that according to developmental theories of sex differences, boys and girls typically exhibit similar IQ levels up to the age of 15 years. However, from around age 16, the average IQ of males begins to rise higher than that of females, with the advantage increasing to approximately 4 IQ points in adulthood. This theory contributes to understanding intelligence in relation to both age and gender, suggesting that intelligence tends to increase with age.

In addition to the limited literature meeting the inclusion criteria of this study, the researcher also explored and reviewed teachers' implicit theories of intelligence. This investigation aimed to uncover their perspectives and beliefs regarding whether the brain can grow, develop, or change over time, or whether its potential for improvement remains fixed regardless of accumulated knowledge (Beyastaz et al., 2017; Thomas & Sarnecka, 2015).

Against the backdrop of limited available literature, which underscores the need for further research on gender, age, and cultural influences on teachers' perceptions of intelligence, several themes emerged from the accessed literature included in the review process:

4.3.2. Environmental Improvements

The literature reviewed indicates contrasting views among teachers from different environments regarding the development of intelligence. Teachers in well-developed Western countries, such as Australia, perceive that general intelligence may have reached its peak and thus do not observe significant increases over time (Cocodia et al., 2003). In contrast, teachers in developing countries like Nigeria and Asian Tiger countries such as Singapore and Korea report noticing increases in intelligence among their students (Cocodia et al., 2003; Cocodia, 2014).

This trend suggests a prevailing belief that children's intelligence has greater opportunities for growth in Western cultures and environments. In contrast, children in underdeveloped countries experience delays in intelligence development due to adverse environmental conditions (Rindermann, 2012). However, it's important to approach this conclusion cautiously, as it perpetuates the myth that children from third-world countries are intellectually underdeveloped compared to those in more developed nations. The assumption that intelligence growth is linked to modern civilisation continues to influence these perceptions.

This trend further underscores that intelligence is consistently perceived within a cultural context (Sternberg & Grigorenko, 2004). African contexts, in particular, are often perceived as less conducive to intelligence development. Daley et al. (2003), in their study on the "Flynn Effect" among rural Kenyan children, observed significant IQ gains over time in data from 20 industrialised nations, especially evident in culturally reduced tests like the Raven's Progressive Matrices (Raven, 1938).

Cocodia et al. (2003) conducted a study focusing on the impact of rising population intelligence on formal education. They found a growing consensus that increasing IQ scores partly reflect rising population intelligence. Teachers from Singapore, Korea, and Nigeria noted significant increases in general intelligence and key abilities like reading and writing skills and attributed these improvements to access to technology and multimedia. In contrast, Australian teachers believed that average general intelligence levels in their country have remained stable (Cocodia et al., 2003). According to Singaporean, Korean, and Nigerian teachers, exposure to technology and multimedia enhances students' intelligence, making them brighter, more knowledgeable, and more successful academically. In contrast, teachers from developed countries like Australia perceive slower or halted increases in general intelligence, suggesting that environmental improvements may have reached their limits (Cocodia et al., 2003).

In addition to age-related differences in intelligence, the aforementioned beliefs underscore the potential impact of environmental conditions on cognitive development in Africa, potentially contributing to international disparities in student psychometric IQ test results (Rindermann et al., 2016). This suggests that if environments can positively influence cognitive abilities, then interventions aimed at enhancing or improving environmental factors, largely influenced by human actions, could be beneficial (Rindermann, 2012).

Efforts to modernise, improve, or transform environments in less developed countries or communities aim to bridge the gap with well-developed countries. These efforts include initiatives such as improving nutrition, healthcare, and education, which are seen as effective supports across different abilities and age levels (Rindermann, 2012; Rindermann et al., 2016). This underscores the importance of adopting a collaborative sociocultural approach to support learners both within and outside the classroom, guided by teachers in conjunction with more knowledgeable others (Vygotsky, 1978). Teachers who believe that environmental changes contribute to IQ gains over time typically hold an incremental belief about intelligence. This belief highlights the connection between teacher perceptions and learners' sociodemographic backgrounds (Ready, 2011). Such teachers view intelligence as malleable and susceptible to environmental influences, suggesting that it can evolve throughout an individual's life (Thomas & Sarnecka, 2015). Therefore, it is crucial to improve the environments in which learners reside to stimulate their thinking and enhance their problem-solving skills, regardless of their sociocultural and sociodemographic backgrounds.

An important conclusion drawn from this study is that the potential for IQ growth with age is not restricted to any group or nation. Instead, it depends on the passage of time and the quality of the environment and culture in which learners are born and raised (William, 2013).

4.3.3. Improvements and Decreases in General, Fluid, and Crystallised Intelligences

This review has highlighted that certain cognitive abilities, such as processing speed and working memory, tend to fluctuate across different stages of development (Hartshorne & Germine, 2015). Daley (2003) coined the term "Flynn effect" to describe the phenomenon of significant IQ gains observed over time. This effect reflects increasing intelligence test performance in the general population across generations and countries, although its underlying causes and implications remain ambiguous (Daley, 2003). The existence of such a phenomenon underscores the critical need for further research into intelligence, its growth patterns, and its relationship to age, as revealed by this study.

Similarly, de Mooij et al. (2018) noted that changes in brain structures and cognitive functions are well-documented across the lifespan. Supporting this view, Park & Reiter-Lorenzo (2009) observed declines in abilities such as processing speed, working memory, inhibitory function, and long-term memory with advancing age. These changes are accompanied by decreases in brain structure size and white matter volume which are associated with declines in processing speed.

Similarly, Hartshone and Germine's (2015) study, which examined the trajectory of cognitive abilities throughout the lifespan, confirmed that certain abilities peak and begin to decline around high school graduation, while others plateau in early adulthood and begin declining in the 30s or peak later, such as visual working memory and verbal working memory. Their research utilized data from subtests of the Wechsler Adult Intelligence Scale-III and the Wechsler Memory Scale-III (Wechsler, 1997), to explore various mental abilities and aspects of short-term and long-term memory (Hartshone & Germine, 2015). Rohwedder and Willis (2010) further supported this trend, suggesting that the rise and decline in intelligence can be attributed to two specific types of intelligences: fluid intelligence, encompassing abilities like memory, abstract reasoning, and executive functions; and crystallised intelligence, which involves the application of learned knowledge and past experiences (Rohwedder & Willis, 2010).

Based on the findings above, it is recommended that learners should be exposed to pertinent knowledge from a young age to stimulate their cognitive development, enabling them to accumulate substantial information and progressively enhance their ability to think and reason abstractly. Jones et al. (2012) propose that an incremental view asserts individuals have some control over their intelligence and that it can be augmented through study and learning.

Overall, the studies discussed above indicate that intelligence changes over time due to factors such as alterations in brain structure size, declines in memory, and the accumulation or lack of accumulated knowledge over the years.

The studies reported below aimed to address the second research question, focusing on how teachers perceive learners' intelligence in relation to age. For example, Georgiou (2008) conducted a study comparing novice and experienced teachers' implicit theories of intelligence and their beliefs about school achievement. The findings indicated that experienced teachers were more inclined to attribute students' abilities to biological factors beyond the child's control, such as gender and genetic predisposition.

This interpretation suggests that some experienced teachers hold the belief that students' abilities are fixed. According to these teachers, a person's intelligence is seen as unaffected by positive environmental factors, reflecting disbelief in the brain's plasticity that could result from support provided by the MKO, who in this context are the teachers themselves. In contrast, novice or inexperienced teachers tend to emphasise the role teachers can play in student learning and the importance of student effort (Georgiou, 2008).

The findings above suggest that, in the context of this review, the views of inexperienced teachers in the study mentioned align with Vygotsky's sociocultural theory. This theory emphasises the crucial role of support or assistance from more knowledgeable individuals, predicting a child's future independent or intrapsychological performance based on their initial joint or aided performance (van der Veer, 2008 as cited in van Oers et al., 2008, p. 15).

Contributing to this debate, Jonsson et al. (2012) conducted a study examining Swedish teachers from urban, suburban, inner-city, and rural high schools across various disciplines to investigate their beliefs in implicit theories of intelligence. The study revealed that both older, more experienced teachers and younger, less experienced teachers tended to favour entity theories of intelligence to a greater extent.

In contrast, a study examining how pre-service and in-service teachers defined intelligence and their views on whether it was malleable or fixed revealed that many participants believed intelligence to be adaptable. This finding is significant because teachers' beliefs about the malleability of intelligence have been shown to influence students' own beliefs about intelligence, thereby impacting their motivation and achievement (Jones et al., 2012). Specifically, Jones et al. (2012) found that approximately three-quarters of pre-service and in-service teachers viewed intelligence as incremental, while about a quarter believed intelligence was fixed.

These findings highlight the differences in views among pre-service and in-service teachers, as well as between inexperienced and experienced teachers, regarding whether the brain's ability to improve through effort and persistence over time or remains fixed. Jonsson et al. (2012) emphasise that the sociocultural approach has been a significant perspective in teacher education in Sweden. Despite this influence, their study found that teachers favoured the entity theory of intelligence over the incremental theory.

The observation by Jonsson et al. (2012) suggests that Vygotsky's sociocultural theory may align with the incremental view of intelligence and the belief in brain plasticity. These issues are further discussed below.

4.3.4. The Notion of Brain Plasticity

The literature reviewed in this research indicates that teachers who endorse the concept of brain plasticity tend to support the incremental theory of intelligence. This theory emphasises that intelligence can be enhanced through effort and persistence over time. In contrast, teachers who perceive intelligence as a fixed attribute are more inclined to believe that intelligence is innate and that the brain has limited plasticity (Jones et al., 2012; Thomas & Sarnecka, 2015). The principal argument in much of the reviewed literature is that teachers need to recognise that cognitive abilities generally increase from childhood to early adulthood. This developmental process is marked by rapid growth during early childhood and a gradual deceleration during adolescence concerning the general factor of intelligence (Estrada et al., 2019). This suggests that intelligence increases as cognitive abilities develop over time.

4.3.5. Specific Academic Domains

Research indicates that teachers' beliefs about intelligence vary across different academic disciplines. The literature suggests that teachers in subjects like mathematics and science tend to lean towards an entity theory of intelligence, viewing intelligence as fixed rather than incremental (Jonsson et al., 2012). This perspective may stem from perceiving math and science as challenging subjects (Myers et al., 2003; Jonsson et al., 2012; Fang, 2017), leading them to label high-performing students in these fields as inherently smart while potentially categorising others as less intelligent (Jonsson et al., 2012; Beyaztas et al., 2017). Unfortunately, these beliefs can significantly influence students' self-esteem, confidence, motivation, and self-efficacy throughout their educational journeys (Jonsson et al., 2012), albeit in varying ways.

4.4. The Cultural Influences Perceived by Teachers to Affect Learners' Intelligence

Ingraham (2000, p. 325) defines culture as "an organized set of thoughts, beliefs, and norms for interaction and communication, all of which may influence cognitions, behaviours, and perceptions." This definition forms the basis for understanding how cultural factors impact learners' intelligence as perceived by teachers.

Earlier in this report, it was emphasised that understanding implicit theories of intelligence across different cultures and age groups provides insights into cultural differences and expectations regarding intelligence and intellectual abilities (Sternberg, 2000). This understanding is crucial because culture plays a significant role in shaping these beliefs. Rattan et al. (2012), as cited in Ringle (2014), assert that culture is a fundamental factor influencing the development of implicit theories of intelligence. Similarly, Cocodia (2014) suggests that implicit theories of intelligence can vary significantly across cultures. This variability implies that perceptions of intelligence may differ across African, Western, and Asian cultures (Sternberg & Grigorenko, 2004). Moreover, the cultural context in which a child grows up, including the family environment, profoundly impacts their learning and development (William, 2009). For instance, African and Asian cultures often emphasise collectivism, where the interests and goals of the group are prioritised over individualism (Maharaj, 2006). African cultures place significant value on competence within interdependence and social connectedness, emphasising the importance of interpersonal relationships, intelligence, and social acceptance (Mpofu, 2002). This cultural emphasis aligns with the perception that interpersonal intelligence is a crucial predictor of overall intelligence for both male and female

learners, as highlighted in the first research question (Maharaj, 2006). Interpersonal intelligence, a concept from Gardner's theory of multiple intelligences, emphasises the ability to understand and collaborate effectively with others in cooperative settings (Stanford, 2003; Morgan, 2021). This strength in interpersonal intelligence is vital for learners to work harmoniously with teachers and other knowledgeable individuals in their educational journey. It underscores the collaborative nature of learning, where interactions with teachers and peers contribute significantly to knowledge acquisition and development. In contrast, the traditional view of intelligence from a Western perspective tends to prioritise analytical and verbal intelligence (William, 2009).

Musical intelligence, perceived by educators from previously disadvantaged high schools as the primary predictor of girls' intelligence, contrasts with traditional associations of intelligence primarily with academic prowess (Maharaj, 2006). In many African cultures, however, musical intelligence holds significant value, reflecting a broader cultural appreciation for artistic expression and social harmony (Maharaj, 2006). Interestingly, cultural and social intelligences have been identified by scholars as predictors of female intelligence, highlighting the diversity of intelligences beyond traditional academic metrics (Maharaj, 2006). In contrast, mathematics, and verbal intelligence, highly esteemed in Western educational paradigms, are often emphasised as foundational for academic success, particularly for male learners' overall intelligence (Maharaj, 2006). Given these cultural and contextual variations, African teachers are encouraged to adopt differentiated instructional approaches to effectively engage and support all learners (Morgan, 2021).

4.4.1. Understanding Cultural and Social Intelligences

The findings from the reviewed studies underscore the importance of educators striving to understand their learners' sociocultural backgrounds as thoroughly as they comprehend their own. This understanding is crucial for developing a nuanced perception of intelligence and recognising how it manifests across different cultural contexts (Garcia-Cepero & McCoach, 2009). Research by Ford (2005) highlighted that cultural differences significantly contribute to the development of cultural bias in standardised IQ tests. This is pivotal because even when tests are translated into indigenous languages, the cultural context and relevance of test items may not align with the cultural experiences and knowledge of the test-takers (Sternberg & Grigorenko, 2004). This understanding underscores the critical role of culture in shaping educators' implicit beliefs about intelligence, which can influence their perceptions of learners' abilities, particularly when cultural disconnects exist (Farkas, 2003; Downey & Pribesh, 2004).

William (2009) conducted an exploratory study examining teachers' perceptions of intelligence among African male students, revealing that teachers tend to favour students whose learning styles align with the traditional view of intelligence, emphasizing analytical and verbal skills. In this study, teachers exhibited more positive attitudes towards students displaying strong verbal and analytical abilities compared to those demonstrating strong creative or motor skills (William, 2009). Verbal intelligence holds significant value in Western cultures, where educational practices emphasise explicit teaching, independence, and initiative as means to foster scholastic competence (Shapiro & Azuma, 2004 as cited in Maharaj, 2006, p. 112).

With the above indications, the findings from the literature that was reviewed yielded the following themes as far as intelligence and cultural influences are concerned:

4.4.2.1. African, Eastern, and Western Cultures

This section explores significant cultural differences that influence how intelligence is perceived across African, Eastern, and Western cultures. Understanding these variations is crucial for adapting school curricula to effectively meet the diverse needs of learners, considering their unique cultural backgrounds and experiences.

One notable finding from this review is that within African cultures, predictors of intelligence emphasise competence in interdependence and social acceptance across genders, aligning closely with Gardner's concept of interpersonal intelligence. Additionally, musical intelligence is highlighted as a predictor of intelligence specifically for girls in African cultures. This perspective underscores the significance of music in expressing language, customs, and societal values (Ijeoma, 2009).

People from Eastern cultures, akin to those in Africa, often prioritise intelligence as a reflection of wisdom and a commitment to societal improvement rather than solely individual achievement (Baral & Das, 2004; Sternberg, 2007 as cited in Stangor & Walinga, 2014, p. 432). In light of this perspective, educators from African and Eastern cultures are encouraged to prioritize interpersonal intelligence in their curriculum delivery to foster social productivity within the teaching and learning environment. Similarly, there should be a concerted emphasis on scaffolding learners through interactions with MKOs, guiding them from their current developmental level to their potential. Teachers' awareness of learners' cultural backgrounds,

alongside their own cultural perspectives and their impact on implicit beliefs about intelligence, can help bridge gaps arising from differing views on whether intelligence is fixed (entity theory) or can be developed (incremental theory).

Viewed from this perspective, the traditional Western concept of intelligence should not diminish the rich cultural heritage that Black students bring into the classroom (William, 2009). Focusing solely on analytical and verbal intelligence in academic settings risks undermining the creativity of Black children and can lead them to perceive themselves as unintelligent within the educational environment (William, 2009). Moreover, prioritizing Western or Eurocentric cultural norms and curricula should not adversely impact the academic performance and achievements of Black students, thereby contributing to their potential underachievement (William, 2009).

4.4.2.2. Turkish Culture

Turkish culture spans across parts of Western Asia and Eastern Europe geographically. The findings of this study underscore two critical aspects regarding Turkish culture and perceptions of intelligence. Firstly, Turkish teachers' beliefs regarding predictors of intelligence emphasise high performance in mathematics and science (Beyaztas, 2017). Additionally, there exists a belief among Turkish educators that males are superior to females in these domains (McCoy et al., 2020). Regrettably, these beliefs have the potential to shape students' academic trajectories, their goals, and their self-perceptions, aligning closely with cultural expectations.
Furthermore, the review of research in Turkey reveals that Turkish teachers predominantly adhere to the entity theory of intelligence, particularly evident in their approach to mathematics. In this context, academic achievement in mathematics is often perceived as reliant on innate, uncontrollable abilities more so than achievement in social sciences and other subjects (Jonsson et al., 2012).

While it is advantageous for educators to consider the cultural contexts of learners when teaching or assessing their intellectual abilities, it can also disadvantage certain students when cultural stereotypes are discriminatory based on gender, ethnicity, or race.

Several significant implications that emerged from Jonsson et al., (2012) study are highlighted below:

In Turkish culture, males often hold dominant roles, while females are frequently pressured to exceed male achievements to prove their capabilities Jonsson et al. (2012). Additionally, Beyaztas et al. (2017) noted that Turkish students are often stereotyped based on their performance in high-stakes exams, particularly in mathematics and science. Consequently, students achieving high scores in these subjects are often perceived as more intelligent compared to those scoring lower marks. The beliefs of student teachers in the Turkish context differ from those in other countries. For instance, student teachers in the United States tend to view intelligence as malleable rather than fixed (Beyaztas et al., 2017). Likewise, student teachers at a university in the United Kingdom generally align with the incremental theory, which posits that intelligence can be developed over time (Beyaztas et al., 2017). Ready (2011) highlighted that such cultural discrepancies between teachers and students can lead to inaccurate perceptions of students' cognitive abilities.

Both Jonsson et al. (2012) and Beyaztas et al. (2017) observed that in Turkish culture, students are often stereotyped based on their performance in high-stakes exams, particularly in mathematics and science. This emphasis on specific academic achievements shapes perceptions of intelligence, associating it strongly with individual excellence in these subjects. In contrast, in rural African societies, intelligence is conceptualized differently. Indigenous views prioritize social productivity and cognitive sharpness as valuable mental traits that benefit the community (Serpell, 2000). Unlike the individualistic focus on academic success in industrialized societies like Turkey, African societies emphasise intelligence that contributes positively to collective well-being.

The ZPD emphasised in Vygotsky's sociocultural theory provides the learners with the opportunity to accomplish the tasks they struggle with, in cooperation with teachers and other knowledgeable individuals (Daneshfar & Moharami, 2018). These insights underscore that perceptions of intelligence vary across cultures, as highlighted by Pretzlik et al. (2003) and Stangor and Walinga (2010), who emphasise that intelligence is defined within the cultural context in which it exists.

4.5. Conclusion and Summary

This study has highlighted a scarcity of research focusing on teachers' perceptions of learners' intelligence. Nonetheless, the present review utilized available studies to address three key research questions. The findings identified distinct predictors of intelligence for males and

females as well as common predictors across genders. For instance, verbal intelligence was consistently identified as a significant predictor by teachers from ex-Model C primary schools in KwaZulu-Natal. Additionally, logical/mathematical intelligence was perceived as particularly influential for males. Moreover, the study elucidated the developmental theory of sex differences, providing insights into how IQ differences between boys and girls vary across different chronological ages.

Chapter 5 of this research summarises the current study, offering insights into its implications for theory, practice, policy, and assessment. It will explore how different forms of assessment can effectively gauge learners' current developmental levels and provide necessary support to help them achieve their expected developmental milestones within the classroom setting. Furthermore, Chapter 5 will outline the limitations encountered during the study and propose recommendations for future research and practical applications.

CHAPTER FIVE

SUMMARY, IMPLICATIONS, AND CONCLUSION

5.1. Introduction

This chapter provides a summary of the study. It outlines the study's purpose, the methodology used to conduct it, the principal findings, and the conclusions drawn in relation to the research questions investigated. The implications of these findings for theory and practice; as well as

their relevance for policy development and assessment practices, are discussed. Furthermore, this chapter addresses the limitations encountered during the review process and offers recommendations for future research.

5.2. Summary of the Study

This study investigated teachers' perceptions of intelligence, focusing particularly on its relationship to learners' gender, age, and cultural differences. A systematic review of relevant studies published within the last twenty years (2002 to 2022) on teachers' perceptions of intelligence was conducted. The study adopted the PRISMA protocol (Siddaway et al., 2018) and utilised the PICO framework for the data search strategy. By employing these structured and systematic approaches, the study collected and qualitatively synthesised the data to address the key research questions. A qualitative thematic synthesis method was used to extract and collate findings from various relevant sources included in the review sample leading to the identification of emerging themes discussed in Chapter 4.

The study findings include:

Teachers' perceptions of learners' intelligence are influenced by age, gender, and cultural factors. Two distinct mindsets among teachers shape their perceptions of intelligence, i.e. the fixed mindset, which views intelligence as innate with limited brain plasticity, and the incremental mindset, which regards intelligence as malleable and capable of development over time. Teachers who hold a fixed mindset perceive intelligence as inherent and believe the brain has little or no capacity for change. Conversely, teachers with an incremental mindset believe intelligence can evolve over time, being influenced by environmental factors, and can undergo changes throughout an individual's life span. In addition to the predictors of intelligence associated with males and females as outlined in existing literature, cultural beliefs in Turkey and the United States firmly associate boys with intellectual superiority. Learners who excel in mathematics and science are commonly perceived as intelligent, a perception that often favours boys, who are stereotypically considered more proficient in these subjects compared to girls.

Given the above, the following conclusions clearly stand out:

Learners' intelligence is significantly influenced by age, gender, and cultural factors. Moreover, environmental factors can contribute to improvements in learners' intelligence, which is mostly evident in the developing countries. Individuals from Eastern cultures, including those from Africa, often place less emphasis on individual intelligence and are more inclined to view

intelligence as a quality associated with wisdom and a commitment to societal improvement rather than individual achievement. The debate on the comparison of intellectual abilities between males and females is ongoing among teachers and researchers regarding and still mixed and inconclusive. Some data in fields like science and mathematics suggests that males possess greater rational and analytical intelligence than females. However, evidence from interests such as music indicates that females may be more endowed with interpersonal intelligence.

What is critical is that there is a shortage of data and studies investigating teachers' perceptions of intelligence, particularly among scholars in Africa. This lack of research is regrettable and underscores the need for increased efforts by researchers in Africa to conduct studies focusing on teachers' perceptions of intelligence.

5.3. Implications for Theory and Practice

Based on the findings above, this study underscores the importance for teachers to recognise and embrace, the diverse intelligences and cultural differences among learners. This sensitivity is crucial for ensuring that teaching and learning are impactful and beneficial to all learners (Ndu et al., 2022). Furthermore, another significant implication highlighted by this study is that Vygotsky's socio-cultural theory is well-suited for implementing differentiated instruction. This theory emphasises the influence of social and cultural backgrounds on learners' cognitive development (Ndu et al., 2022).

5.4. Recommendations for Improved Policy

Based on the findings and implications outlined above, the following policy recommendations are proposed:

- There is a critical need to integrate the theories highlighted in this study into educational practices. This integration will aid teachers in recognising and addressing the diverse needs of learners, including their various learning styles and cultural backgrounds.

- It is essential for educators and other MKOs to acknowledge and appreciate the significance of Vygotsky's sociocultural theory in supporting learners in developing knowledge, skills, abilities, and values, regardless of their gender, age, or cultural background.
- Teachers should avoid relying solely on their implicit beliefs about intelligence. Instead, they should employ the scaffolding approach to enhance learners' abilities. This approach ensures that all learners feel accommodated and valued. The current study emphasises scaffolding as a supportive strategy to be used by teachers and MKOs to assist learners to achieve and maintain expected levels of development even after the support is withdrawn (Ainsa, 2007; Winstone & Millward, 2012).
- However, the scaffolding provided by teachers should not follow a 'one size fits all' model but should instead vary based on the specific support needs of each individual learner.

5.5. Recommendations for Improved Assessment Practice

This study reveals that the origins of standardised intelligence tests were intended to identify learners who needed early support, rather than as a means of discrimination. Therefore, teachers and MKOs should use assessments as tools to pinpoint learners' strengths and weaknesses in any learning environment, while accommodating multiple intelligences (Department of Basic Education, 2011). Consequently, adopting socioculturally inspired assessment practices requires a substantial shift in teachers' mindsets (Eun & Knotek, 2022).

The following sub-sections further explain what needs to be considered in a sociocultural-friendly classroom:

5.5.1. Assessment in the Classroom Setting

Various forms of assessments (baseline, diagnostic, formative, and summative) are typically employed in classroom environments. These assessments provide learners with opportunities to demonstrate the knowledge and skills they have acquired through teaching and learning, thereby facilitating their progression from their current level of intellectual progress to their potential level of intellectual development (Department of Basic Education, 2011).

Some conclusions from this study emphasise the importance of teachers conducting baseline assessments to ascertain whether learners' cognitive functions have sufficiently matured for effective learning (Vygotsky, 1978). However, traditional assessments highlighted in this study are often culturally biased, standardised, and typically involve pen-and-paper tasks administered within strict time limits (Wallace, 2013; Kim & Zabelina, 2015). Diagnostic assessments, on the other hand, aim to provide detailed insights into learners' specific challenges and offer appropriate interventions to address these difficulties hindering the learning process. This study underscores the necessity for teachers to adopt a paradigm shift in assessment practices to accommodate learners' diverse gender, age, and cultural backgrounds. It is recommended that alternative assessment methods, more culturally equitable than traditional standardised tests, be employed to effectively evaluate learners' knowledge and skills within the South African educational context (Kirikkaya & Vurkaya, 2011; Wallace, 2013; Kim & Zabelina, 2015). Below are the proposed recommended stages of support, which are aligned to the sociocultural theory:

Stage 1: Identifying learners' level of specific abilities

Identifying learners' level of specific abilities would assist teachers to recognize the skills that learners have already mastered, which will further assist the teacher to scaffold the knowledge that will walk learners from what they already know to what they should ultimately learn. Teachers should plan the lessons based on the scaffolding process that is tailor made to meet learners at their actual level of intellectual development. Kuma, et al. (2009, as cited in Zainudin, 2012) stressed that educators should be able to facilitate students' awareness of the way they learn in order to help students to be more "efficient learners". This suggests that learners also need to understand their multiple intelligences and their learning styles in the learning process so that they can feel confident with their uniqueness and level of attaining expected skills.

Stage 2: Connecting learning with previous skills

Teachers should thereafter connect what learners have mastered with new expected skills that learners must attain through the teaching and learning process. For example, when learners have already mastered basic mathematical operations, then the teacher can introduce inverse operations (Vygotsky, 1978; van de Pol et al 2018; Ndu et al. 2022). Vygotsky's sociocultural theory acknowledges that some psychological functions are in place before school instruction

begins and this supports the idea that learners do not only develop alone but they are also developed by teachers (Eun & Knotek, 2022).

Stage 3: Evaluating the effectiveness of the teaching and learning process

Evaluation in an important component of the teaching-learning process because it helps teachers and learners to improve teaching and learning (Ifeoma, 2022). It is not an event but a continuous process and according to Ifeoma (2022), there are four types of classified evaluation of students' performance, which are formative, summative, placement/ baseline, and diagnostic evaluations. These types of evaluations are in line with the four forms of assessment i.e., baseline, diagnostic, formative and summative assessments.

5.5.2. Learner evaluation

The placement/ baseline evaluation is used to evaluate students at the initial stage of learning to determine if they possess knowledge and skills needed to start a planned instruction or not. Diagnostic evaluation determines the learning difficulties and their causes that informs remedial action. Formative evaluation monitors the teaching and learning process and provide feedback to the teacher and learners regarding the success or failure of the process. Finally, summative evaluation takes place at the end of the instruction to determine if the teaching-learning goals were met (Ifeoma, 2022).

5.5.3. Teacher evaluation and feedback

Teachers are observed by their subject or phase departmental head or deputy principal or the principal to measure their performance against the expected outcomes through the Quality Management Systems (QMS), which feeds into the whole school improvement plan (Personnel Administrative Measures, 2022).

The study reveals that differences in intelligence based on gender, age, and culture necessitate teachers to recognise and accommodate these variations when designing teaching and assessment strategies for learners. (Department of Basic Education, 2011).

Teachers must also consider gender differences by identifying optimal learning approaches for both girls and boys, as well as recognising how learners from diverse cultures learn best, without any discrimination based on gender or culture (Wallace, 2013). Learners' strengths and weaknesses should thereby guide teaching, learning, assessment, and classroom support.

5.5.4. Providing Extended Support to Learners

Learners who are at risk of failure should receive remedial attention to ensure they reach the expected level of skill attainment and expand their knowledge (Armstrong, 2009). The scaffolding strategy should be extended to these learners to prevent them from disengaging from the education system.

5.6. Recommendations for Further Research

As noted earlier in Chapter 4 of this report, this study revealed a scarcity of research conducted on teachers' perceptions of learners' intelligence. Based on this finding, the following recommendations are proposed:

- More face-to-face research with teachers needs to be conducted to enhance understanding of their perceptions and implicit beliefs about intelligence.
- The population and sample of such research should be inclusive, encompassing participants from diverse cultural backgrounds, regions, races, genders, and ages.
- Qualitative research is necessary to enable teacher-participants to articulate their understanding, beliefs, and perceptions of learners' intelligence. This approach also allows researchers to engage in face-to-face interactions with participants in their actual work environments (Papalia & Feldman, 2011).

  A phenomenological research design appears suitable for this study due to its reliance on individual experiences. This design typically involves interviews or the use of cultural artifacts to elicit participants' perspectives and experiences regarding a specific phenomenon (Creswell & Poth, 2018).

5.7. Limitations of the Study

The results of this study should be interpreted in light of its limitations. Limited literature availability caused delays in sourcing relevant data for synthesis. However, studies that were included for review were from 2002 to 2022 to allow the researcher to have more literature to work with. Systematic reviews, while potentially powerful but the process is time-consuming and resource intensive. The researcher managed to utilize resources that were available and self-funded as well as the support from University of KwaZulu-Natal to access literature from the search engines. Resources can become outdated quickly, and data synthesis, both

quantitative and qualitative, presents significant challenges. Despite these, systematic reviews remain essential for evidence synthesis when conducted rigorously (Petticrew & Roberts, 2006).

5.8. Conclusion

This study has revealed the existence of gender, age, and culture-related differences in teachers' perceptions of intelligence. Vygotsky's sociocultural theory has been pivotal in emphasising the importance of creating a supportive classroom environment to enhance learners' intrinsic motivation. The findings of this study highlight the necessity for teachers and the MKOs to prioritise the development of differentiated instruction. This is crucial in light of recognising diverse multiple intelligences and varying levels of intellectual development among learners.

REFERENCES

Ackerman, P. L. (2014). Adolescent and adult intellectual development. *Current directions in psychological science*, *23*(4), 246–251. https://doi.org/10.1177/0963721414534960.

Agarwal, S., & Suraksha, P. (2017). A comparative study of multiple intelligence among male and female students in class xi. International Journal of Advanced Research in Education and Technology, 4(1), 2394-2975.

Ainsa, T. 2017. SOS: observation, intervention, and scaffolding towards successful online students. *Education*, *138*(1): 1-8.

American Psychiatric Association (APA). (2013). *Diagnostic and statistical manual of disorders.* (5th ed.). American Psychiatric Association.

American Psychological Association (APA), Task force on socioeconomic status. (2007). *Report of the APA task force on socioeconomic status.* American Psychological Association.

Antonelli-Ponti. (2019). Teachers' perceptions about the etiology of intelligence and learning difficulties. *International Journal of Educational Psychology*, *8*(2), 162-87. https://doi.org/10.17583/ijep.2019.3777.

Anwar, A., Haq, I. U., Mian, I. A. Shar, F., Alroobaea, R., Hussain, S., Ullah, S. S., & Umar, F. (2022). "Applying real-time dynamic scaffolding techniques during tutoring sessions using intelligent tutoring systems". *Mobile information systems, 2022*, 1-9. https://doi.org/10.1155/2022/6006467.

Armstrong, T. (2009). *Multiple intelligences in the classroom* (3rd ed.). Cloverdale, CA: ASCD.

Babbie, E. & Mouton, J. (2005). Qualitative studies. In E. Babie & J. Mouton (Eds.), *The practice of social research* (pp. 269-311). Oxford University Press.

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. 270–301). Cambridge University Press.

Belland, B. R., Kim, C., & Hannafin, M. J. (2013). A framework for designing scaffolds that improve motivation and cognition. *Educational Psychologist*, *48*(4), 243–270. https://doi.org/10.1080/00461520.2013.838920.

Berk, L. E. (2017). *Child development* (9th ed.). Pearson.

Beyaztas, D. I., Kapti, S. B., & Hymer, B. (2017). The relationship between student teachers' perception of intelligence and their goal orientation. *Universal journal of educational research*, *5*(9), 1519-1528. https://doi.org/10.13189/ujer.2017.050909.

Black, J. M. (2017). Adolescent brain development. In encyclopedia of social work. http://oxfordre.com/socialwork/display/10.1093/acrefore/9780199975839.013.1239.

Blackwell, L. S., Kali, H. Trzesniewski, K. H., & Dweck, C. S. (2007). Implicit theories of intelligence predict achievement across an adolescent transition: A longitudinal study and an intervention. *Society for Research in Child Development*, *78*(1), 246-263. https://doi.org/10.1111/j.1467-8624.2007.00995.x

Braun, V. & Clarke, V. (2006). Qualitative Research in Psychology. *Using Thematic Analysis in Psychology, 3,* 77- 101.

Budrina, E.G. (2017). Gender characteristics of and academic achievement of younger school children. *Procedia-social and Behavioral Sciences, 237,* 1390–1397. https://doi.org/10.1016/j.sbspro.2017.02.201.

Cajal, B., Jimenez, R., Gervilla, E., & Montano, J. J. (2020). Doing a Systematic Review in Health Sciences. *Clinica y Salud, 31*(2), 77-83. https://doi.org/10.5093/clysa2020a15

Carr, P. B., & Dweck, C. J. (2011) Intelligence and motivation. In R. J. Sternberg and S. B. Kaufman (Eds.), *The Cambridge Handbook of Intelligence (pp. 748- 770).* Cambridge University Press. http://doi.org/1017/CBO9780511977244.038.

Clark, J. M. A. (2005). The relationship between teachers' perceptions of pupils' intelligence and pupils' cognitive styles (Doctorate thesis, The University College London). Retrieved from http://discovery.ucl.ac.uk/id/eprint/1445420.

Clarke, J. (2011). What is a systematic review? *Evidence-Based Nursing, 14*(3), 64. https://doi.org/10.1136/ebn.2011.0049

Cockraft, K., Alloway, T., Copello, E. & Milligan, R. (2015). A cross-cultural comparison between South African and British students on the Wechsler adult intelligence Scales third edition (WAIS- 111). *Frontiers in psychology, 6*(297), 1-11.

Cocodia, E. A. (2014). Are kids getting smarter? Perceptions of abilities in Lagos State. *Psychology, 5*(13), 1469-1476. http://doi.org/10.4236/psych.2014.513158.26

Cocodia, E. A. (2014). Cultural perceptions of human intelligence. *Journal of Intelligence, 2*(4), 180-196. https://doi.org/:10.3390/jintelligence2040180.

Cocodia, E. A., Kim, J.S., Shin, H. S., Kim, J. W., Mary, J. E., Wee, W. S., & Howard, R. W. (2003). Evidence that rising population intelligence is impacting in formal education. *Personality and Individual Differences, 35*(4), 797-810. https://doi.org/10.1016/S0191-8869(02)00284-2.

Colom, R. & Lynn, R. (2004). Testing the developmental theory of sex differences in intelligence on 12–18 year olds, *Personality and Individual Differences, 36* (1), 75–82. https://doi.org/10.1016/S0191-8869(03)00053-9.

Costa, A. & Faria, L. (2018). Implicit theories of intelligence and academic achievement: A meta- analytic review. *Frontiers in psychology, 9*(829), 116.

Creswell, J.W. & Poth, C. N. (2018). *Qualitative enquiry and research design: Choosing among five approaches*. (4th ed.) SAGE Publications.

Daley, T. C., Shannon E., Whaley, S. E., Sigman, M. D., Espinosa, M. P., & Neumann, C. (2003). IQ on the rise: The Flynn effect in rural Kenyan children. American Psychological Society, 14(3), 215- 219.

Daneshfar S., & Moharami, M. (2018). Dynamic assessment in Vygotsky's sociocultural theory: Origin and main concepts. *Journal of Language and Teaching, 9*(3), 600. http://doi:10.17507/jltr.0903,20.

Davis, K., Christodoulou, J., Seider, S. and Gardner, H. (2011). The theory of multiple intelligences. In R. J. Sternberg &-- Kaufman (Eds.), *Cambridge Handbook of Intelligence* (pp. 485-503). Cambridge university press.

Dempster, M. (2011). *A research guide for health and clinical psychology*. Palgrave Macmillan.

de Mooij, S. M. M., Henson, R. N. A., Waldorp, L. J., & . Kievit R. A. (2018). Age differentiation within gray matter, white matter, and between memory and white matter in an adult life span cohort. *The Journal of Neuroscience, 38*(25), 5826–5836. http://doi:10.1523/JNEUROSCI.1627-17.2018.

Department of Basic Education (DBE). (2011). *Curriculum and assessment policy statement, grades R- 3, English home language*. Department of Education.

Department of Basic Education (DBE). (2011). *Guidelines for responding to learner diversity in the classroom through curriculum and assessment policy statement.* Department of Education.

Downey, D. B., & Pribesh, S. (2004). When race matters: Teachers' evaluations of students' classroom behaviour. *Sociology of Education, 77*(4), 267- 282.

Dweck, C. (2027). *Mindset.* Robinson.

Eun, B. & Knotek, S. E. (2022). Moving from association to mediation: A sociocultural approach to assessment. *Research in Education, 112*(1) 3–19, DOI: 10.1177/0034523720975430

Estrada, E., Ferrer, E., Roman, F. J., Korama, S., & Colon, R. (2019). Time-Lagged associations between cognitive and cortical development from childhood to early adulthood. *Developmental Psychology*, *55*(6), 1338- 1352. http://ddx.doi.org/10.1037/dev0000716.

Evans, C., Tweheyo, R., McGarry, J., Eldridge, J., Albert, J., & Nkoyo, V. (2019). Crossing cultural divides: A qualitative systematic review of factors influencing the provision of healthcare related to female genital mutilation from the perspective of health professionals. *Plos One, 14*(3), 1- 32. https://doi.org/10.1371/journal.pone.0211829.

Fang, F. A. (2017). Teachers' beliefs about the nature and malleability of intelligence (Doctoral thesis, The Columbia University). Retrieved from https://academic commons.columbia.edu/doi/10.7916/D85H7NMB

Falcon, l., Davidson, K. W. & Bruns, D. (2010). Evidence searching for evidence-based psychology practice. *US National Library of Medicine, 41*(8), 550-557. https://doi.org/10.1037/a0021352.

Fan, C. C., Marshall, A., Smolker, H., Gonzalez, M. R., Tapert, S. F., Barch, D. M., Sowell, E., Dowling, G. J., Cardenas-Iniguez, C., Ross, J., Thompson, W. K., Herting, M. M. (2021). Adolescent brain cognitive development (ABCD) study linked external data (LED): Protocol and practices for geocoding and assignment of environmental data. *Developmental Cognitive Neuroscience, 52*(2021), 1878-9293. https://doi.org/10.1016/ j.dcn.2021.101030.

Farkas, G. (2003). Racial disparities and discrimination in education: What do we know, how do we know it, and what do we need to know? *Teachers' College Record, 105*(6), 1119–1146. https://doi.org/10.1111/1467-9620.00279

Feraco, T., & Cona, G. (2022). Differentiation of general and specific abilities in intelligence. A bifactor study of age and gender differentiation in 8- to 19-year-olds. *Intelligence, 94*, 101669. https://doi.org/10.1016/j.intell.2022.101669.

Fiske, D. & Adkins, C. (2017). Psychological testing, *Encyclopaedia Britannica.* http://www.britannica.com/science/psychological-testing.

Ford, D. Y. (2005). Intelligence testing and cultural diversity: Pitfalls and promises (Doctoral thesis, The Vanderbilt University). Retrieved from https://nrcgt.uconn.edu/ newsletters/winter052/

Forero, R., Nahidi, S., De Costa, J., Mohsin, M., Fitzgerald, G., Gibson, N., McCarthy, S., & Aboagye-Sarfo, P. (2018). Application of four-dimension criteria to assess rigour of qualitative research in emergency medicine. *BMC Health Services Research, 18*(1), 120. https://doi.org/10.1186/s12913-018-2915-2.

Foxcroft, D, Roodt, G. & Abrahams, F. (2018). Psychological assessment: A brief retrospective overview. In Foxcroft, D & Roodt, G. (Eds.), Psychological assessment in the context of South African context (pp. 12-36).

Furnham, A., & Budhani, S. (2002). Sex differences in the estimated intelligence of school children. *European Journal of Personality, 16*(3), 201–219. https://doi.org/10.1002/per.438.

García-Cepero, M. C. & McCoach, D. B. (2009). Educators' implicit theories of intelligence and beliefs about the identification of gifted students. *Universitas Psychologica, 8*(2), 295-310.

Gardner, H. (1991). *The Unschooled Mind: How children think and how schools should teach.* Basic Books.

Georgiou, S. N. (2008). Beliefs of experienced and novice teachers about achievement. *Educational Psychology, 28*(2), 119– 131. https://doi.org/10.1080/01443410701468716.

Gregory, R. J. (2015). *Psychological testing: History, principles, and applications (Seventh edition).* Pearson Education Limited.

Grigorenko, E. L., Geissler, P. W., Prince, R., Okatcha, F., Nokes, C., Kenny, D. A., Bundy, D., & Sternberg, R. J. (2001). The organization of Luo conceptions of intelligence: A study of implicit theories in Kenyan village. *International Journal of Behavioral Development, 25*(4), 367-378. https://doi.org/10.1080/01650250042000348.

Guilford, J.P. (1968). Intelligence has three facets: There are numerous intellectual abilities, but they fall neatly into a rational system. *Science, 160*(3828), 615-620. https://doi:10, 1126/Science.160.3828.615.

Halpern, D. F. (1997). Sex differences in intelligence: Implications for education. *American Psychologist, 52*(10), 1091–1102. https://doi.org/10.1037/0003-066X.52.10.1091.

Halpern, D. (2000). *Sex differences in cognitive abilities.* New York: Psychology Press.

Halpern, D. F. & Wai, J. (2020). Sex differences in intelligence. In R. J. Sterberg (Ed.), *The Cambridge handbook of intelligence* (pp *317- 345*). Cambridge University Press.

Halpern, D. F & Wai, J. (2019). Sex differences in intelligence. In R. J. Sternberg (Ed.), *The Cambridge handbook of intelligence* (pp. 317-345). Cambridge University Press.

Hamamorad, A. M. (2016). Teacher as mediator in the EFL classroom: a role to promote students' level of interaction, activeness, and learning. *International Journal of English Language Teaching, 4*(1), 64-70. http://dx.doi .org/10.1016/j.intell.2018.02.006.

Hamilton, L. (2006). Implicit theories of ability: teacher constructs and classroom consequences. *Scottish Educational Review, 38*(2)201-212.

Hartshorne, J. K., & Germine, L. T. (2015). When does cognitive functioning peak? The asynchronous rise and fall of different cognitive abilities across the life span. *Psychol Sci.,26*(4), 433-43. https://doi.org/doi/10.1177/0956797614567339.

Hessell, S. (2005). Teacher and parent perceptions of children's multiple intelligences (Masters thesis, The Florida State University Libraries). Retrieved from Florida State University Repository.

Hülür, G., Wilhelm, O., & Robitzsch, A. (2011). Intelligence differentiation in early childhood. *Journal of individual differences, 32*(3), 170–179. https://doi.org/10.1027/1614-0001/a000049.

Huong, L. P. H. (2003). The mediational role of language teachers in sociocultural theory. *English teaching forum, 41*(3), 32-35.

Hyde, J. S. (2014). Gender similarities and differences. *Annual Review of Psychology. 65*(3),1-3.26. https://doi.org/10.11461annurev-psych-010213-115057.

Ijeoma, O. A. (2009). The socio-cultural implications of African music and dance. *Creative artist: A Journal of Theatre and Media Studies, 3*(1), 171- 185.

Ingraham, C. L. (2000). Consultation through a multicultural lens: Multicultural and cross-cultural consultation in schools. *School Psychology Review, 29*, 320-343.

Jones, B. D., Bryant, L. H., Snyder, J. D., & Malone, D. (2012). Preservice and in-service teachers' implicit theories of intelligence. *Teacher Education Quarterly*, 87- 101.

Jonsson, A., Beach, D., Korp, H., & Erlandson., P. (2012). Teachers' implicit theories of intelligence: influences from different disciplines and scientific theories. *European Journal of Teacher Education, 35*(4), 387-400. http://dx.doi.org/10.1080/ 02619768.2012.662636

Kader, N.A., & Abad, M. (2017). A study of relationship between academic resilience and protective factors among senior secondary students. *Journal of Humanities and Social Science, 22*(11), 51-55. https://doi.org/10.970/0837-2211035155.

Kang, E. & Ahn, H. (2018). Introduction to systematic review and meta-analysis. *Korean Journal of Anesthesiology, 71*(2),103 -112.

Khawar, R., Malik, F., Maqsood, S., Yasmin T., & Habib, S. (2013). Age and gender differences in emotion recognition ability and intellectual functioning. *Journal of behavioural sciences,23*(3), 54-71.

Kim, C., & Pekrun, R. (2014). Emotions and motivation in learning and performance. In J. Michael Spector, M. D. Merrill, J. Elen, & M. J. Bishop (Eds.), Handbook of research on educational communications and technology (pp. 65–75). New York, NY: Springer.

Kim, K. H. & Zabelina, D. (2015). Cultural bias in assessment: can creativity assessment help? *International Journal of Critical Pedagogy*, *6*(2), 129- 148.

Kim, H. H., McLaughlin, K. A., Chibnik, L. B.Koenen, K. C., & Tiemeier, H. (2022). Poverty, cortical structure, and psychopathologic characteristics in adolescence. *Jama Network Open*, *5*(11), 1-12. doi:10.1001/jamanetworkopen.2022.44049.

Kirikkaya, B., & Vurkaya, G. (2011). The effect of using alternative assessment activities on students' success and attitudes in science and technology course. *Educational Science: Theory & Practice*, *11*(2), 997-1004.

Korstjens, I., & Moser, A. (2018). Series: Practical guidance to qualitative research part 4: Trustworthiness and publishing. *European Journal of General Practice*, *24*(1), 120-124. https://doi.org/10.1080/13814788.2017.1375092.

Kozulin, A. (2003). Psychological tools and mediated learning. In A. Kozulin, B., Gindis, V. S., Ageyev, & S. M. Miller (Eds.), *Vygotsky's educational theory in cultural context* (pp. 15-38). Cambridge University Press.

Lee, K. (1996). A study of teacher responses based on their conceptions of intelligence. Journal of classroom interaction, 31(2), 1-12.

Liberati, A., Altman, D. G., Tetzlaff, J., Mulrow, C., Gotzsche, P. C., Ioannidis, J. P. A., Clarke, M., Devereaux, P. J., Kleijnen, J., & Moher, D. (2009). The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate healthcare interventions: explanation and elaboration. *Research Methods & Reporting*, *339*, 1-27. https://doi.org/ 10.1136/bmj.b2700.

Lynn, R. (2002). Sex differences on the progressive matrices among 15- 16-year-olds: Some data from South Africa. Personality and Individual Differences, 33(4), 669-673. https://doi.org/101016/S191-8869(01)00184-2.

Lynn, R. (2017). Sex differences in intelligence: The developmental theory. *Mankind Quarterly*, *58*(1), 9- 42. https://doi.org/1046469/mq.2017.58.1.2.

Lynn, R. (2021). Sex differences in intelligence: The developmental theory. Arktos Media Limited.

Lynn, R., & Irwing, P. (2004). Sex differences on the progressive matrices: A meta-analysis. *Intelligence*, *32*(5), 481-98. https://doi.org/10.1016/j.intell.2004.06.008

Lynn, R., & Kanazawa, S. (2011). A longitudinal study of sex differences in intelligence at ages 7, 11 and 16 years. Personality and individual differences, 51, 321–324. https://doi.org/10.1016/j.paid.2011.02.028.

Lynn, R., & Meisenberg, C. T. (2016). Sex differences in intelligence. The mankind quarterly, 57(1), 5- 8.

Lynotte, D. J., & Woolfolk, A. E. (1994). Teachers' implicit theories of intelligence and their educational goals. Journal of Research and Development in Education, 27(4), 253- 264.

Maharaj, I. (2006). Educators' perspectives of learners' intelligences (Masters thesis, The University of KwaZulu-Natal). Retrieved from researchspace. ukzn.ac.za/xmlui/ …Ligget_Maria_2020.pdf? 28

Mampane, M. R. (2023). Perceptions of academic resilience by senior phase learners and teachers from low socioeconomic schools. *Journal of Curriculum Studies Research, 5*(1), 63-81.

Mattanah, J. F., Pratt, M. W., Cowan, P. A., & Cowan, C. P. (2005). Authoritative parenting, parental scaffolding of long-division mathematics, and children's academic competence in fourth grade. *Journal of Applied Developmental Psychology, 26,* 85–106. https://doi.org/10.1016/j.appdev.2004.10.007.

Martin, A. J., & Marsh, H. W. (2009). Academic resilience and academic buoyancy: Multidimensional and hierarchical conceptual framing of causes, correlates and cognate constructs. *Oxford Review of Education, 35*(3), 353-370. https://doi.org/10.1080/ 03054980902934639.

Martin, A. J., Bostwick, K., & Tarbetsky. (2017). Implicit theories of intelligence. In V. Zeigler-Hill & T. K. Shackelford (Eds.) *Encyclopedia of Personality and Individual Differences*. Springer.

McArdle, J. J., Ferrer-Caja, E., Hamagami, F. & Woodcock, R. W. (2002). Comparative longitudinal structural analyses of the growth and decline of multiple intellectual abilities over the life span. *Developmental psychology, 38*(1), 115–42.

McCoy, S., Byrne, D., & O'Connor P. (2020). Gender stereotyping in mothers' and teachers' perceptions of boys' and girls' mathematics performance in Ireland. *Oxford Review of Education, 48*(3), 341- 363. https://doi.org/10.1080/0354985.2021.1987208.

Mcintosh, C. (2020). In *Cambridge advanced learner's dictionary* (4th edition). Cambridge University Press.

McLeod, S. A. (2018). Lev Vygotsky. *Simply psychology*. https://www.simplypsychology.org /vygotsky.html.

Methley, A., Campbell, S., Chew-Graham, C., McNally, R., & Cheraghi-Sohi, S. (2014). PICO, PICOS and SPIDER: A comparison study of specificity and sensitivity in three search tools for qualitative systematic reviews. *BMC Health Services Research, 14*(579), 1-10. https://doi.org/10.1186/s12913-014-0579-0.

Mickovska-Raleva, A. (2010). Teachers' implicit theories of pupils' intelligence and motivation: A comparative analysis between Macedonian and English teachers. *Centre for Research and Policy Making,* 1-66.

Moerdyk, A. (2015). *The principles and practice of psychological assessment* (2nd ed.). van Schaik.

Morgan, H. (2021). Howard Gardner's Multiple Intelligences Theory and his ideas on promoting creativity. In F. Reisman (Ed.), *Celebrating giants and trailblazers: A-Z of who's who in creativity research and related fields* (pp.124-141). KIE Publications.

Moher, D., Shamseer, L., Clarke, M., Ghersi, D., Liberati, A., Petticrew, M., Shekelle, P., Stewart, L. A., & PRISMA-P group. (2015). Preferred reporting items for systematic review and meta-analysis protocols (PRISMA- P) statement. *Systematic Reviews, 4*(1), 2-9.

Monei, T. & Pedro, A. (2017). A systematic review of interventions for children presenting with dyscalculia in primary schools. *Educational Psychology in Practice,* 1469-5839. https://doi.org/10.1080/02667363.2017.1289076.

Mpofu, E. (2002). Psychology in sub-Saharan Africa: Challenges, prospects and promises. *International Journal of Psychology, 37,* 179–186. http://dx.doi.org/10.1080/00207590244000061.

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 from http://www.ac.wwu.edul-culrure.

Myers, M.D., Nichols, J. D., & White, J. (2003). Teacher and student incremental and entity views of intelligence: The effects of self-regulation and persistence activities. *International Journal of Educational Reform, 12*(2), 97– 117.

Naderi, H., Abdullah, R., Aizan, H. T. &. Sharir, J. (2010). Intelligence and academic achievement: an investigation of gender differences. *Life Science Journal, 7*(1), 83- 87.

Naserpour, A., & Zarei, A. A. (2021). On the effectiveness of scaffolding strategies and task orientation on receptive and productive knowledge of lexical collocations. *Gist Education and Learning Research Journal,* (23), 107-134.

Ndu, O. G., Tshotsho, B. P., & Cekiso, M. (2022). Grade 10 teachers' perceptions of their application of socio-cultural and multiple intelligences on English second language learners. *Journal for Language Teaching, 56*(1), 1- 22, https://doi.org/10.56285/jltVol56iss1a5415.

Newman, M., & Gough, D. (2005). Ethical Considerations of Conducting Systematic Reviews in Educational Research. In O. Zawacki-Richter, M. Kerres, S. Bedenlier, M. Bond & Katja Buntins (Eds.), *Systematic reviews in educational research: Methodology, perspectives and application* (pp. 41- 54). Springer Systematic Reviews in Educational Research. https://doi.org/10.1007/978-3-658-27602-7_3**.**

Nicholson, E., Murphy, T., Larkin, P., Normand, C., & Guerin, S. (2016). Protocol for a thematic synthesis to identify key themes and messages from a palliative care research network. *BMC Research Notes*, *9*(478), 1-5. https://doi.org/10.1186/s13104-016-2282

Offorma, G. C. (2016). Integrating the components of culture in curriculum planning. *International Journal of Curriculum and Instruction, 8*(1), 1-8.

Ormrod, J. E. (2006). *Educational psychology: Developing learners* (5th ed.). Pearson Education.

Pal, H. R., Pal, A., & Tourani, P. (2004). Theories of intelligence. *Everyman's science, xxxix*(3), 181-192.

Park, D. C. and Reuter-Lorenz, P. (2009). The Adaptive Brain: Aging and Neurocognitive Scaffolding. *Annual Review of Psychology, 60,*173–196. https://doi.org/10.1146/annurev.psych.59.103006.093656.

Papalia, D. E., & Feldman, R. D. (2011). *A child's world: Infancy through adolescence.* (12th ed.). McGraw-Hill.

Paramanik, N. (2018) The impact of gender, social class and locality on students IQ in Purulia district: An empirical study. *International Journal of Research in Social Sciences, 8* (8), 256- 263.

Perdew, P. R. (2001). A developmental odyssey. In J. L. Higbee, D. B. Lundell, I. M. Durenczyk & D. Banerjee- Stevens (Eds.), *Developmental education and Alfred Binet: The original purpose of standardized testing* (pp. 71-85). National Association for Developmental Education.

Perera, A. (2020). *Fluid vs crystallized intelligence*. Simply psychology. Retrieved from: http://www.simplypsychology.org/fluid-crystallized-intelligence.html.

Perry, A. & Hammond, N. (2002). Systematic reviews: The experiences of a PhD student. *Psychology Learning and Teaching, 2*(1), 32-35.

Piffer, D. (2026). Sex differences in intelligence on American WAIS-IV. *Mankind quarterly, 57*(1), 214-225.

Pino-Pasternak, D., Whitebread, D., & Tolmie, A. (2010). A multidimensional analysis of parent-child interactions during academic tasks and their relationships with children's self-regulated learning. *Cognition and Instruction, 28,* 219–272. https://doi.org/10.1080 /07370008.2010.490494.

Pretzlik, U., Olsson, J., Nabuco, M. E., & Cruz, I. (2003). Teachers' implicit view of intelligence predict pupils' self-perception as learners. *Cognitive Development, 18*(4), 579-600.

Price, O., & Baker, J. (2012). Key components of de-escalation techniques: A thematic synthesis. *International Journal of Mental Health Nursing, 21*, 310–319. https://doi.org/10.1111/j.1447-0349.2011.00793.x.

Radević, L., Jerkovic, I., & Milovanović, I. (2020). Teachers' implicit beliefs about (mathematical) intelligence. *Nastava i vaspitanje, 69,* 151-170. https://doi.org/10.5937/ nasvas2002151r.

Rathbobe, A., Jamie, K., Bona, M., Banks, L., & Husband, A. (2017). A systematic review and thematic synthesis of patients' experience of medical adherence. *Research in Social and Administrative Pharmacy, 13*(3), 403-439. https://doi.org/10.1016/j.sqpharm.2016.06.

Rattan, A., Naidu, N. V. R., Savani, K., & Dweck, C. S. (2012). Can everyone become highly intelligent? Cultural differences in and societal consequences of beliefs about the universal potential for intelligence. *Journal of Personality & Social Psychology, 103,* 787-803.

Ready, D. D., David, D. D., & Wright, L. (2011). Accuracy and inaccuracy in teachers' perceptions of young children's cognitive abilities: The role of child background and classroom context. *American Educational Research Journal, 48*(2), 335–360.https://doi.org/10.3102/0002831210374874.

Richardson, W. S., Wilson, M. C., Nishikawa, J., & Hayward, R. S. (1995). The well-built clinical question: a key to evidence-based decisions. *ACP journal club, 123*(3), A12–A13.

Richmond, S., Bearer, R., Johnson, K. A., Allen, N. B., Seal, M. L., & Whittle, S. (2020). Towards understanding neurocognitive mechanisms of parenting: Maternal behaviors and structural brain network organization in late childhood. *Human Brain Mapping, 42,* 1845–1862. DOI: 10.1002/hbm.25334.

Rindermann, H. (2012). African cognitive ability: Research, results, divergences and recommendations. *Personality and Individual Differences, 55(*3), 229-233. http://dx.doi.org/10.1016/j.paid.2012.06.022.

Rindermann, H. (2011). Increase of Intelligence in Childhood and Youth. *Psychologie in erziehung und unterricht (PEU),* 58(3), 210-224. https://doi.org/10.2378/peu2010.art29d.

Rindermann H., Becker D. & Coyle T. R. (2016). Survey of expert opinion on intelligence: Causes of international differences in cognitive ability tests. *Front. psychol. 7*(399), 1-9. doi: 10.3389/fpsyg.2016.00399.

Ringle, S. W. (2014). *Relations between teachers' implicit theories of intelligence, standardized achievement testing, and classroom goals* (Masters thesis, The Utah State University). Retrieved from https://digitalcommons.usu.edu/gradreports/442.

Rohwedder, S. & Willis R. J. (2010). Mental retirement. *Journal of Economic Perspectives, 24(1), 119-138.* http://doi.org/10.1257/jep.24.1.119. ·

Román, F. J., Morillo, D., Estrada, E., Escorial, S., Karama, S., & Colom, R. (2018). Brain-intelligence relationships across childhood and adolescence: A latent-variable approach. *Intelligence, 68*(403), 21–29. https://doi.org/10.1016/j.intell.2018.02.006

Ross-Hellauer, T. (2017). What is open peer review? A systematic review. *F1000 research, 6*(588), 1-37. https://doi.org/10.12688/f1000research.11369.2.

Ryan, C., Hesselgreaves, H., Wu, O., Paul, J., Dixon- Hughes, J., & Moss, J. G. (2018). Protocol for a systematic review and thematic synthesis of patient experiences of central venous access devices in anti-cancer treatment. *Systematic Reviews, 7*(61), 2- 7.

Serpell, R. (2000). Intelligence and culture. In R. J. Sternberg (Ed.), *The Handbook of Intelligence* (pp. 549-577). 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.

Siddaway,A. P., Wood, A. M. & Hedges, L. V. (2018). How to do a systematic review: A best practice guide for conducting and reporting narrative reviews, meta-analyses, and meta-syntheses. *Annual review of psychology, 70*(9), 1–9.24. http://doi 10.1146/annurev-psych-010418-102803

Sinay, E. (2018). Academic resilience: Students beating the odds. *Organisational development/ research and information services, 5*(1), 394-416. https://www.researchgate.net/publication/322862555.

Stahl, N. A., & King, J. R. (2020). Understanding and using trustworthiness in qualitative research. *Expanding Approaches in Research, 44*(1), 26-28.

Stanford, P. (2003). Multiple intelligence for every classroom. *Intervention in school and clinic, 39*(2), 80–85. https://doi.org/10.1177/10534512030390020301.

Stangor, C., & Walinga, J. (2014). Introduction to psychology. Retrieved from https://opentextbc.ca/ introductiontopsychology/

Sternberg, R. J. (2000). The concept of intelligence. In R. J. Sternberg (Ed.), *Handbook of intelligence* (pp. 3-14). Cambridge University Press.

Sternberg, R. J., & Grigorenko, E. L. (2004). Intelligence and culture: how culture shapes what intelligence means, and the implications for a science of well-being. *The Royal Society, 359*, 1427–1434. http://doi:10.1098/rstb.2004.151.

Sternberg, R. J. (2000). The concept of intelligence. In R. J. Sternberg (Ed.), *Handbook of intelligence* (pp. 3-14). Cambridge University Press.

Sternberg, R. J. (2007). Intelligence and culture. In Kitayama, S. & Cohen, D. (Eds.), *Handbook of cultural psychology* (pp 547- 562). The Guilford Press.

Sternberg, R. J. (2020). Rethinking what we mean by intelligence. *Phi delta kappan, 102*(3), 36-41. https://doi.org/10.1177/0031721720970700.

Sternberg, R. J. & Davidson, J. E. (1986). Conceptions of giftedness: A map of the terrain. In R. J. Sternberg & J. E. Davidson (Eds.), *Conceptions of giftedness* (pp. 3-18). Cambridge University Press.

Sternberg, R. J., & Grigorenko, E. L. (2004). Intelligence and culture: how culture shapes what intelligence means, and the implications for a science of well-being. *The Royal Society, 359*, 1427–1434. http://doi:10.1098/rstb.2004.151.

Taber, K. S. (2018). Scaffolding learning: Principles for effective teaching and the design of classroom resources. In M. Abend (Ed.), *Effective teaching and learning: Perspectives, strategies, and implementation* (pp. 1-43). Nova Science Publishers.

Teing, L. S. (2007). Systematic made easy for nurses. *SGH Proceedings, 16*(2), 104- 110.

Thomas, A.J., & Sarnecka, B. W. (2015). Exploring the relation between people's theories of intelligence and beliefs about brain development. *Frontiers in Psychology Cognition, 6* (291), 1-12. https://doi.org/10.3389.fpsyg.2015.000921.

Thomas, A. J. & Sarnecka, B. (2015). Exploring the relation between people's theories of intelligence and beliefs about brain development. *Frontiers in psychology, 6*(921), 1-12. https://doi.org/10.3389/fpsyg.2015.00921.

Thomas, J., & Harden, A. (2008). Methods for the thematic synthesis in qualitative research in systematic reviews. *BMC Medical Research Methodology*, *8*(45),1-10.

Thompson, S. (2018). Achievement at school and socioeconomic background- an educational perspective. *NPJ Science of Learning*, *3*(5), 1-2. https://doi.org/10.1038/s41539-018-0022-0

Tong, A., Palmer, S., Craig, J. C., & Strippoli, G. F. M. (2016). A guide to reading and using systematic reviews of qualitative research. *Nephrology Dialysis Transplantation*, *31*(6), 897-903. https://doi.org/10.1093/ndt/gfu354.

Tumin, D. & Tobias, J. D. (2019). The peer review process. *Saudi Journal of Anaesthesia, 13*(1), S52- S58. https://doi.org/10.4103/sja.SJA-s44-18.

University of KwaZulu-Natal. (2009). *Plagiarism policy and procedures*. University of KwaZulu-Natal.

Upadhayay, N. & Guragain, S. (2014). Comparison of cognitive functions between male and female medical students: A pilot study. *Journal of clinical and diagnostic research, 8*(6), 12-15. http://doi10.7860/7490.4449.

Vadivel, B., Alam, S., Nikpoo, I., & Ajanil, B. (2023). The impact of low socioeconimic background on a child's educational achievements. *Educational Research International, 2023*(6565088), 1-11. https://doi.org/10.1155/2023/6565088.

van de Pol, J., Mercer, N & Volman, M. (2019). Scaffolding student understanding in small-group work: Students' uptake of teacher support in subsequent small-group interaction. *Journal of the Learning Sciences, 28*(2), 206-239. https://doi.org/ 10.1080/10508406.2018.1522258.

van de Pol, J., Volman, M. & Beishuizen, J. (2010). Scaffolding in teacher–student interaction: A decade of research. *Educational Psychology Review, 22(3),* 271-296. https://doi.org/10.1007/s10648-010-9127-6.

van de Pol, J. Volman, M., Oort, F. & Beishuizen, J. (2015). The effects of scaffolding in the classroom: support contingency and student independent working time in relation to student achievement, task effort and appreciation of support. *Instruction Science, 43,* 615–641. https://doi.org/ 10.1007/s11251-015-9351-z.

van der Veer, R. (2008). Exploring Vygotsky's legacy: The meaning of mediation. In B. van Oers, W. Wardekker, E. Elbers, & R. van der Veer (Eds.), *The transformation of learning: Advances in cultural- historical activity theory*. (pp. 15-19). Cambridge university press.

Verenikina, I., (2015). Understanding scaffolding and the ZPD in educational research. *Research online.* 1-9. https://www.researchgate.net/publication/267778614.

Vergnes, J., Marchal-Sixou, C., Nabet, C., Maret, D., & Hamel, O. (2010). Ethics in systematic reviews. *Global Medical Ethics, 36,* 771-774. https://doi:10.1136/jme.2010.039941.

Vygotsky, L. (1978). Interaction between learning and development. In M. Gauvian & M. Cole (Eds.), *Reading on the development of children.* Scientific American books (pp. 34-40). W. H. Freeman and company.

Vygotsky, L. S. (1978). *Mind in society*. MA: Harvard University Press.

Vygotsky, L. S. (1978). Interaction between learning and development. In M. Gauvian & M. Cole (Eds.), *Reading on the development of children.* Scientific American books (pp. 34-40). W. H. Freeman and Company.

Wallace, N, N. (2013). The effect of alternative assessments in natural science on attitudes towards science in grade 8 girls in South Africa (Masters thesis, The University of Cape Town). Retrieved from: https//open.uct.ac.za/11427/14004.

Wassenaar, D. R. & Mamotte, N. (2012). Ethical issues and ethics review in social science research. In M. M. Leach, M. J. Stevens, G. Lindsay, A. Ferrero & Y. Korkut (Eds.), *The Oxford handbook of international psychological ethics* (pp. 268-282). Oxford University Press.

Wertsch, J. V. (2007). Mediation. In H. Daniels, M. Cole, & J. V. Wertsch (Eds.), *The Cambridge companion to Vygotsky* (pp. 178–192). Cambridge University Press.

Whittle, S., Simmons, J. G., Dennison, M., Vijayakumar, N., Schwartz, O., Yap, M. B. H., & Allen, N. B. (2014). Positive parenting predicts the development of adolescent brain

structure: a longitudinal study. *Developmental Cognitive Neuroscience*, *8*, 7-17. https://doi.org/10.1016/ j.dcn.2013.10.006

Williams, P, A. (2009). Exploring teachers' and black male students' perceptions of intelligence. (Doctorate thesis, The University of Miami). Retrieved from https://scholarship.miami.edu

Williams R. L. (2013). Overview of the Flynn effect. *Intelligence, 41*(6), 753-764. https://doi.org/10.1016/j.intell.2013.04.010

Wingrave, M. (2018). *Perceptions of gender in early years, 30*(5), 587-606. http://doi10.1080/09540253.2016.1258457

Winstone, N., & Millward, L. (2012). The value of peers and support from scaffolding: Applying constructivist principles to the teaching of psychology. *Psychology Teaching Review, 18*(2), 59-67.

Yeung, W.J., & Li, H. (2019). Educational resilience among Asian children in challenging family environment. *Social indicators research, 153*(2), 675-685. https://doi.org/10.1007/s11205-01-02143-7.

Zeka, O., Gelisime, T., Zihin, A., Mehmet., I., Padir, M. A. A., & Vangolu, M. S. (2023). Implicit theory of intelligence: Growth mindset. *Current approach in psychiatry, 15*(3), 451-457. Doi:10.18863/pgy.1163630.

Appendix A: Research Methods & Reporting Protocols

Section/topic	Item No	Checklist item	Reported on page No
Title			
Title	1	Identify the report as a systematic review, meta-analysis, or both	i
Abstract			v
Structured summary	2	Provide a structured summary including, as applicable, background, objectives, data sources, study eligibility criteria, participants, interventions, study appraisal and synthesis methods, results, limitations, conclusions and implications of key findings, systematic review registration number	1
Introduction			4
Rationale	3	Describe the rationale for the review in the context of what is already known	
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS)	5 5
Methods			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (such as web address), and, if available, provide registration information including registration number	N/A
Eligibility criteria	6	Specify study characteristics (such as PICOS, length of follow-up) and report characteristics (such as years considered, language, publication status) used as criteria for eligibility, giving rationale	35
Information sources	7	Describe all information sources (such as databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched	40
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated	N/A
Study selection	9	State the process for selecting studies (that is, screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis)	35
Data collection process	10	Describe method of data extraction from reports (such as piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators	N/A
Data items	11	List and define all variables for which data were sought (such as PICOS, funding sources) and any assumptions and simplifications made	32
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis	34
			N/A

Summary measures	13	State the principal summary measures (such as risk ratio, difference in means).	
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (such as I2) for each meta-analysis	36
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (such as publication bias, selective reporting within studies)	
Additional analyses	16	Describe methods of additional analyses (such as sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified	N/A
Results			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram	35
Study characteristics	18	For each study, present characteristics for which data were extracted (such as study size, PICOS, follow-up period) and provide the citations	40
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome-level assessment (see item 12).	N/A
Results of individual studies	20	For all outcomes considered (benefits or harms), present for each study (a) simple summary data for each intervention group and (b) effect estimates and confidence intervals, ideally with a forest plot	
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency	47
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see item 15)	45
Additional analysis	23	Give results of additional analyses, if done (such as sensitivity or subgroup analyses, meta-regression [see item 16])	N/A
Discussion			
Summary of evidence	24	Summarise the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (such as health care providers, users, and policy makers)	64
Limitations	25	Discuss limitations at study and outcome level (such as risk of bias), and at review level (such as incomplete retrieval of identified research, reporting bias)	68
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research	69
Funding			N/A
Funding	27	Describe sources of funding for the systematic review and other support (such as supply of data) and role of funders for the systematic review	N/A

Appendix B: Findings from included studies

No.	Author, year, and title	Participants, location, design and aim of the study	Key findings		
			Intellectual intelligence and gender differences	Chronological age and intellectual intelligence	Intellectual intelligence and cultural differences
1	Maharaj, I. (2006). Educators' perspectives of learners' intelligences (Masters thesis, The University of KwaZulu-Natal). Retrieved from researchspace. ukzn.ac.za/xmlui/ …Ligget_Maria_2020.pdf?	Selected KwaZulu-Natal (South African) ex- model c primary schools' teachers, exmodel c high schools' teachers, previously disadvantaged high schools', and primary schools' teachers. Quantitative approach was used to investigate educators' implicit perceptions of intelligence.	Ex- model c primary schools' teachers considered verbal and logical/ mathematical as best predictors of intelligence for both males and females. Ex- model c high schools' teachers, and previously disadvantaged high schools' teachers considered verbal and logical/ mathematical as best predictors of intelligence for male learners. Ex-model c high schools also considered interpersonal 2 intelligence to be another predictor of overall intelligence for male learners. Ex-model c primary	–	–

			schools' teachers also regarded verbal, spatial, and interpersonal intelligences as the best predictors of overall intelligence for female learners. Previously disadvantaged high schools' teachers view musical intelligence as the best predictor of overall intelligence for females. Previously disadvantaged primary schools emerged logical/ mathematical, verbal/ linguistic, intrapersonal intelligence and musical intelligences to be predictors of overall intelligence for male learners.		
2	Furnham, A. (2000). Self- estimates of intelligence: Culture and gender differences in self and other estimates of both general(g) and multiple intelligences. Personality and individual differences, 31(2000), 1381- 1505.	There were three groups of participants: 285 (149 female, 136 male) pupils of a mixed government- run comprehensive school,	Mathematics and verbal intelligence are educators' conceptions of overall intelligence.	–	–

		between the ages of 13 and 16 years; 93 mothers and 58 fathers of the pupils; and five female and eight male teachers. largely British. Quantitative study design was used to investigate sex differences in estimated general and multiple intelligence.			
3	Hessell, S. (2005). Teacher and parent perceptions of children's multiple intelligences (Masters thesis, The Florida State University Libraries).	Sample of 3 classrooms (one first grade classroom) A, consisted of 13 females, 7 males) and 2 combined kindergarten first grade classrooms (classrooms B and C), 3 teachers, 40 students and their parents/caregivers were included in this study. By ethnic origin: 12 students were Caucasian, 4 African American, 2 East Indian, and 2 Hispanic. Classroom B and C consisted of 15 females, 5 males. By ethnic origin, 14	Parent and teacher perceived level of spatial, interpersonal, and intrapersonal intelligences were significantly higher for female than male children.	–	–

		students were Caucasian, 2 African American, 2 Asian, and 2 East Indian from Tallahassee, Florida. Children ages ranged from 6 to 7 years old. Teachers in classroom A, B, and C were Caucasian females. The study aimed at comparing parent and teacher perceptions of children's multiple intelligences, using quantitative method.			
4	Budrina, E.G. (2017). Gender characteristics of and academic achievement of younger school children. Social and Behavioral Sciences, 237 (2017), 1390 –1397. doi: 10.1016/j.sbspro.2017.02.2 01	One hundred and forty-nine primary school students participated in the investigation, 83 boys and 66 girls. The average age of the subjects was 7 years, 7 months. The study aimed to identify genderspecific characteristics of intelligence and academic achievement in early school age in Russia. Quantitative method was used.	In a Russian primary school, there were no significant differences found in all Wechsler test sub-tests on verbal, non-verbal and general intelligence that were obtained between boys and girls.	–	–

5	McCoy, S., Byrne, D., & O'Connor P. (2021). Gender stereotyping in mothers' and teachers' perceptions of boys' and girls' mathematics performance in Ireland. Oxford review of education, 48(3), 341- 363. https://doi.org/10.1080/03549 85.2021.1987208.	Participants were parents (mothers) teachers and 9-year-olds children living in Ireland. The longitudinal study of 9- year-old children and used a two stage sampling design, schools as primary and of 9-year-old children as secondary units. The paper examined how mothers and teachers rate boys' and girls' mathematics performance. The qualitative method was used.	The United States' stereotypical cultural beliefs rated girls' mathematical proficiency lower than that of boys. Both mothers and teachers underestimated girls' performance in mathematics.	–	–
6	Cocodia, E. A. (2014). Are kids getting smarter? Perceptions of abilities in Lagos State. Psychology, 5 (13), 1469-1476. http://doi.org/10.4236/psych.2014.51315 8	This paper analyzes notions of culture and human intelligence, drawing on implicit and explicit theory framework. The qualitative research was used to explore the discourses about perceptions of intelligence and culture in Asia, Africa, and Western cultures.	–	A growing consensus suggest that the rising IQ scores partly reflect rising population intelligence. More Australian teachers believed that average general intelligence has stayed the same but some primary school teachers from Asian Tiger	–

				countries perceived that general intelligence and other key abilities have increased significantly, which is linked environmental improvements. Nigerian teachers also perceived that student abilities had increased.	
7	Hartshorne, J. K., & Germine, L. T. (2015). When does cognitive functioning peak? The asynchronous rise and fall of different cognitive abilities across the life span. Psychol Sci.,26(4), 433-43. https://doi.org/doi/10.1177/ 0956797614567339.	Participants in experiment 1 consisted of 2,450 healthy, cognitivelyunimpaired Americans, aged 16–89, recruited in geographically -diverse locations. 10,394 participants in experiment 2, aged 10–69. 11,532; 10–71 years-old in experiment 3. Qualitative research was used.	_	Some abilities peak and begin to decline around high school graduation but some abilities plateau in early adulthood.	_
8	Kay, J. (2005). Crystallized intelligence versus fluid intelligence, Psychiatry, 68 (1), 9-13. www.http://doi: 10.1521/psy c.68.1.9.64189.	_	_	Crystallized intelligence increases as people age but fluid intelligence decrease with age.	_

9	Georgiou, S. N. (2008). Beliefs of experienced and novice teachers about achievement. Educational Psychology, 28(2), 119– 131. https://doi.org/10.1080 /01443410701468716.	The aim of this study was to examine the beliefs that experienced, and novice teachers hold about school achievement. 154 Greek Cypriot in Cyprus elementary school teachers and 159 teacher education students completed the Beliefs About School Achievement (BASA) scale.	_	Experienced teachers were more likely to believe that biological factors that were uncontrollable by the child were determinants of students' abilities.	_
10	Williams, P, A. (2009). Exploring teachers' and black male students' perceptions of intelligence. (Doctorate thesis, The University of Miami. Retrieved from https://scholarship.miami.e du	This study took place in a Miami -Dade County Public High School in Florida, United States. Qualitative research study, both random and purposeful sampling were used. Selected participants were black males in the 11th grade , each having as his strength one of the seven multiple intelligences along with two teachers of each student	_	_	The Western culture values analytical and verbal intelligence. Black and Asian cultures value collectivism. Teachers tend to respond more favorably to those students whose style of learning falls within the traditional view of intelligence.
11	Beyaztas, D. I., Kapti, S. B., & Hymer, B. (2017). The relationship between	There were three study groups : 1. The first	_	_	In the Turkish culture students are

	student teachers' perception of intelligence and their goal orientation. Universal journal of educational research 5(9), 1519 -1528. http://www.hrpub.org doi: 10.13189/ujer.2017.050909	group consisted of 524 students who were enrolled in the Faculty of Education department of Turkish education, primary school education and mathematics education in the 2015 -2016 term, the second group consisted of 100 university students, the third group consisted of 1409 university students who were enrolled in the Faculty of Education department of education primary school education, Social sciences education, computer education and instructional technology, physical education, science education and mathematics education in the 2015 -2016 term. This study examine d the views of student teachers in a Turkish university about intelligence (entity theory vs incremental theory) and goal			being stereotyped based on their high -stakes exam scores which mostly related on math and science.

		orientation (performance goal orientation vs learning goal orientation) and the relationship between the two. The correlational research paradigm was utilized.			
12	Ready, D. D., David, D. D., & Wright, L. (2011). Accuracy and inaccuracy in teachers' perceptions of young children's cognitive abilities: The role of child background and classroom context. American educational research journal, 48(2), 335 – 360. https://doi.org/10.3102/00028 31210374874,	Teachers of about 24 children from 1,000 public and private schools offering kindergarten programs. Quantitative design aiming at exploring the links between teacher perceptions and children's sociodemographic backgrounds.	_	_	Cultural disconnects that exist between teachers and students provide a fertile ground for possibilities of inaccurate teacher perceptions of students' cognitive abilities.
13	Jonsson, A., Beach, D., Korp, H. & Erlandson, P. (2012). Teachers' implicit theories of intelligence: influences from different disciplines and scientific theories. European journal of teacher education, i1st, 1–14, http://dx.doi.org/10.1080/02 619768.2012.662636	A sample of 226 Swedish high school teachers from various knowledge domains. Quantitative design using a 10 -point numerical scale ranging from '1 - strongly' disagree to '10 - strongly agree' with the statement. The aim was firstly to investigate if teachers within different	_	Older and more experienced teachers and younger and less experienced teachers had a stronger preference toward entity theories of intelligence.	_

		disciplines hold different beliefs about implicit theories of intelligence and secondly to provide a better understanding of the scientific theories of intelligence in relation to the implicit.			
14	Sternberg, R. J. (2007). Intelligence and culture. In Kitayama, S. & Cohen, D. (Eds.), Handbook of cultural psychology (pp 547 - 562). The Guilford Press.	This reading (handbook) focused on the perceptions of intelligence by the following: African (Zambia and Zimbabwe), United States, Asians (India and Taiwanese Chinese, Japanese, Argentina. There is no design because it is the handbook.	–	–	Rural societies of Africa's indigenous conceptualization of intelligence only values social productivity, and cognitive sharpness as mental trait when it benefits the society (Serpell, 2000, as cited in Sternberg, 2007).

Appendix C: Training and Resources in Research Ethics Evaluation (TRREE)

Appendix C

TRREE

Zertifikat

Certificat

Certificado

Certificate

Promouvoir les plus hauts standards éthiques dans la protection des participants à la recherche biomédicale
Promoting the highest ethical standards in the protection of biomedical research participants

Clinical Trials Centre
The University of Hong Kong

Certificat de formation - Training Certificate

Ce document atteste que - this document certifies that

Happy Majola

a complété avec succès - has successfully completed

South Africa

du programme de formation TRREE en évaluation éthique de la recherche
of the TRREE training programme in research ethics evaluation

[redacted]

Professeur Dominique Sprumont
Coordinateur TRREE Coordinator

Release Date: 2020/02/04

CID : 1DAeVc2GCx

FMH Continuing Education Program (5 Credits) Programme de Formation continue (5 Crédits)

Foederatio Pharmaceutica Helvetiae FPH Programmes de formation continue Continuing Education Programms Programmes de formation continue

Ce programme est soutenu par - This program is supported by :

European and Developing Countries Clinical Trials Partnership (EDCTP) (www.edctp.org) - Swiss National Science Foundation (www.snf.ch) - Canadian Institutes of Health Research (http://www.cihr-irsc.gc.ca/e/2091.html) - Swiss Academy of Medical Science (SAMS/ASSM/SAMW) (www.samw.ch) - Commission for Research Partnerships with Developing Countries (www.kfpe.ch)

[REV : 20170310]

Appendix D: Plagiarism policy

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

PLAGIARISM POLICY AND PROCEDURES

Ref:
CO/05/0412/09

REVISED

Name of Policy:	Plagiarism Policy and Procedures	
Reference Number: (supplied by the Office of the Registrar)	CO/05/0412/09	
Originator/Author: (name and position)	Prof R Vithal	
Custodian: (position/office)	DVC: Teaching and Learning	
Policy approved by:	Structure: Senate Council	Date: 04.11.2009 04.12.2009
Policy effective date:	01.01.2010; Revised 01.01.2014	
Policy review date:	22.08.2013; Revised 2017	
Implementation responsibility:	All Deans	
Implementation procedures approved by:	Structure: Senate Council	Date: 04.11.2009 04.12.2009
Policy to be monitored by:	All School Academic Leaders	

A: Policy Statement

1. Purpose Statement

This Policy employs a development and education approach to deter and prevent plagiarism. It also reinforces existing systems, policies, procedures, rules and regulations of UKZN aimed at detecting, reacting to and reducing the occurrence of plagiarism.

This Policy aims to address and provide for:

1.1 Prevention of acts of plagiarism through increased awareness and educational opportunities;

1.2 Detection and reduction of plagiarism through available and appropriate mechanisms;

1.3 Reacting to and reporting of alleged plagiarism to relevant authorities; and

1.4 Action on allegations or evidence of plagiarism.

2. Underpinning Values and Principles

2.1 The intention and spirit of this policy is to support the promotion of a culture of awareness of plagiarism and to confirm that UKZN fosters a culture of zero tolerance of plagiarism in all its manifestations.

2.2 UKZN recognizes the fact that plagiarism on the part of its staff and students seriously jeopardizes the academic integrity of the University. As such, plagiarism is viewed as a serious academic offence that is tantamount to academic fraud and theft and will be treated as such.

2.3 UKZN also recognizes that plagiarism inhibits the ability of the University to achieve its vision to the premier University of African scholarship.

2.4 Plagiarism, if left unchecked, seriously impacts on: the public perception of UKZN; the strength of relations with external stakeholders, including donors and potential employers of UKZN graduates; staff and student morale; and the reputation and image of UKZN nationally and internationally.

2.5 While plagiarism may be viewed as a developmental and education issue for students in early undergraduate years, repeated or plagiarism

committed by more senior and postgraduate students and by staff will be dealt with as a disciplinary offence.

2.6 Plagiarism is defined in the act and not necessarily in the intention. However, if it is found to be intentional or deliberate, it will be dealt with more severely.

2.7 Plagiarism is ultimately the responsibility of the author(s) of the work (student or staff), and they must ensure that they are adequately informed and act to avoid plagiarism.

3. Definition of Terms

3.1 Actions constituting ***plagiarism*** refer to, but are not limited to:

3.1.1 Presenting the ideas of another as if they are your own;

3.1.2 Representing the words or works of another as they were your own;

3.1.3 Utilisation of the ideas, words or work of another without appropriate acknowledgement;

3.1.4 Actions involving utilisation of printed text, electronic text, images, computer programmes, sound, performance or creative works without appropriate acknowledgement;

3.1.5 Work utilised in the learning process or submitted for publication or assessment without appropriate acknowledgment (work generated during formal test or examination will not require referencing); and

3.1.6 In addition, any infringement of the following will constitute plagiarism:

3.1.6.1 Where members of a group of students are each required to contribute to the creation of work, the work must correctly reflect the individual contributions made. Where a single piece of work is collectively generated, all members of the group carry responsibility for that piece of work;

3.1.6.2 Where a published work contains material previously published, even if written by the same author (which may be referred to as "self-plagiarism"), such previous publication must be properly acknowledged.

3.2 The above definition excludes copying and other forms of cheating by a student as set out in the Rules for Student Discipline.

3.3 ***Staff/Employee*** shall mean any person, excluding an independent contractor, who works for the University, who receives or is entitled to receive remuneration, and any other person who in any other manner assists the University in carrying out or conducting the business of the University.

3.4 ***Academic Managers*** refers to line managers at all levels and includes Deputy Vice-Chancellors (DVCs), College Deans of Research (CDR) and Teaching and Learning (CDTL), Deans & Heads of School (DHoS), and within Schools - Academic Leaders: Research (ALR) and Teaching & Learning (ALTL); and Academic Leaders: Cluster (responsible for a single or group of disciplines) (ALC).

3.5 ***University*** refers to the University of KwaZulu-Natal (UKZN).

4. Scope of the Policy

This policy applies to all staff and students of UKZN and its affiliates. This policy must be read in conjunction with the UKZN Policy on Research Ethics (Research Policy V); the Whistle Blowing Policy; Rules for Student Discipline and Staff Conditions of Service (Annexure A: Disciplinary Code).[1]

5. The Policy

This policy underscores the importance of prevention measures which will include a broad range aimed at creating awareness and educating the University community regarding plagiarism.

UKZN will not tolerate plagiarism and will apply appropriate prevention and detection controls. The detection controls include the utilisation of independent moderators, external examiners, plagiarism identification software and other checking mechanisms as prescribed in the systems, policies, procedures, rules and regulations of UKZN. Provision is made for reporting of any suspected or actual instances of plagiarism. Allegations of plagiarism will be investigated and, where appropriate, followed up by the application of all or any remedies available to the University.

[1] Procedures for investigation of suspected plagiarism in examined thesis/dissertations (Senate; 6 Aug 2008) and Processes for dealing with alleged plagiarism in a Masters dissertation or Doctoral thesis (Senate 5 Nov 2012) are incorporated in Part B of this revised policy.

All staff within UKZN are responsible for the prevention, detection and, if necessary, for reporting and acting on allegations of plagiarism.

5.1 *Prevention of Plagiarism: Education and Awareness*

5.1.1 It is the responsibility of all staff and the overall responsibility of the Academic Managers to ensure that all staff and students are made aware of and receive appropriate training and education with regard to this Policy.

5.1.2 It is the responsibility of all academics to provide guidance to students to avoid plagiarism and be vigilant in detecting acts of plagiarism.

5.2 *Reporting of Plagiarism*

5.2.1 It is the responsibility of all staff and students to immediately report allegations of plagiarism to the relevant Academic Managers or university authority.

5.2.2 Allegations of plagiarism may be reported anonymously by staff and students as provided for through the Whistle Blowers Policy, which is set up in terms of the Protected Disclosures Act.

5.2.3 Members of the public who suspect or have knowledge of plagiarism are encouraged to contact any of the university management or Academic Managers and/or to utilise the mechanism listed in 5.2.2 above.

5.3 *Action on Allegations of Plagiarism*

5.3.1 The action taken by UKZN will depend on the nature of the allegation of plagiarism. The matters raised may be referred to:

5.3.1.1 Any Academic Manager for action or further referrals;

5.3.1.2 Forensic investigators for detailed investigation; or

5.3.1.3 Any other relevant external authorities (e.g. professional bodies or South African Police Services)

5.3.2 Any *prima facie* case of plagiarism committed by a staff member or student of UKZN will be thoroughly pursued, including one or more of the following as appropriate:

5.3.2.1 Taking appropriate disciplinary action; and/ or

5.3.2.2 Any other appropriate remedy available (not excluding legal).

5.3.3 The Vice-Chancellor may, in accordance with due process, determine whether, in his or her discretion, the staff member should be suspended, pending any disciplinary action. The University regards plagiarism as a dismissible offence.

5.3.4 The Registrar may, in accordance with due process, determine whether a student should be suspended, pending any disciplinary action.

5.3.5 In all instances where allegations of plagiarism have been confirmed, appropriate sanctions shall be applied.

5.3.6 Any person who has reported plagiarism is entitled to an acknowledgement of receipt of the report. UKZN accepts that those, including staff and students, who report alleged plagiarism need to be informed that the matter has been properly addressed; and, subject to legal constraints, information about outcome of any investigation will be disseminated to them on a confidential basis.

5.4 *Protection of Person Reporting Plagiarism*

5.4.1 The Whistle Blowing Policy is intended to encourage staff and students to raise concerns relating to specific matters, including plagiarism, without fear of victimisation.

5.4.2 No person will suffer any penalty or retribution for reporting in good faith any suspected or actual incident of plagiarism.

5.4.3 Where false allegations, made with malicious intent, are discovered, the person who made the allegations will be subjected to disciplinary or other appropriate action.

5.5 *Confidentiality in Reporting*

5.5.1 All information relating to alleged plagiarism that is received and investigated will be treated confidentially. The progression of investigations will be handled in a confidential manner and will not be disclosed or discussed with any person(s) other than those who have a legitimate right to such information. This is important to avoid harming the reputations of suspected persons who are subsequently found innocent of wrongful conduct.

5.5.2 No person is authorised to supply any information with regard to allegations of plagiarism by an individual to the media without the express permission of the Vice-Chancellor and the knowledge of those accused.

5.6 *Publication of Sanctions*

5.6.1 Publication of sanctions in respect of students will be dealt with in accordance with the Rules of Student Discipline.

5.6.2 The Vice-Chancellor or appropriate DVC will decide, in consultation with the appropriate Academic Manager, whether any information relating to corrective actions taken or sanctions imposed regarding plagiarism should be brought to the direct attention of any person or body, or made public through any means.

5.7 *Plagiarism Reports*

5.7.1 Annual reports to Senate and Council will be made by:

5.7.1.1 The DVC and Head of College in respect of the plagiarism policy including reports on the nature, number and outcome of cases in their respective Colleges;

5.7.1.2 The Registrar on all cases of plagiarism involving students referred to the Student Discipline Court; and

5.7.1.3 The Executive Director: Human Resources on all plagiarism allegations involving staff.

5.7.2 Periodic reports to College and School structures will be made by respective Academic Managers.

B: Procedures and Guidelines for Implementation

1. Colleges and Schools have an obligation on behalf of the University to:

1.1 Publish and disseminate the University policy and procedures on plagiarism to all staff and students;

1.2 Provide opportunities for training, dissemination of information and advice to staff and students on how to avoid plagiarism;

1.3 Inform all parties of their rights and responsibilities;

1.4 Ensure that disciplinary procedures against both staff and students are implemented in a fair and consistent manner;

1.5 Use all possible methods of plagiarism identification and detection;

1.6 Support the CDR and CDTL to function as a College experts and advisers on plagiarism in their respective portfolios; to receive training and to liaise regularly with the University proctor; to have overall responsibility for managing all matters related to plagiarism in their respective Colleges; and to routinely provide consolidated reports;

1.7 Provide administrative support for undertaking procedures related to reporting and taking action on allegations of plagiarism.

2. Prevention of Plagiarism

Prevention of plagiarism requires attention to opportunities for education and awareness of plagiarism and information about this policy including mechanisms and procedures for detection.

The responsibility for prevention of plagiarism lies with all staff and students at School level, within academic disciplines and during programme delivery.

2.1 *To prevent plagiarism all staff are required to:*

2.1.1 Ensure they have a good working knowledge and understanding of what constitutes plagiarism; and be scrupulous in avoiding plagiarism in their own work, including but not limited to research, publications, teaching materials, policies, etc.*;*

2.1.2 Know and understand the University policy on plagiarism and be consistent in its application;

2.1.3 Provide all students with adequate information and refer them to resources about plagiarism;

2.1.4 Provide sufficient opportunities, with structured feedback, for students to gain the necessary knowledge and develop the necessary skills to prevent and avoid plagiarism, especially first-year students (or those new to the University);

2.1.5 Pay particular attention to the use of sources and to referencing when supervising and giving feedback to students on drafts of theses/dissertations, research articles or assignments, and alert students to any improper use of sources, or lack of acknowledgement of sources;

2.1.6 Ensure that students sign a declaration accompanying all submitted work, including research projects/dissertations/theses; this declaration must state that all work of other parties is clearly referenced and that the student has checked the work, to ensure that there are no instances of plagiarism contained within (A standard University template shall be completed and accompany all research projects/dissertations/theses submitted for examination); and

2.1.7 Sign, as supervisors, a declaration, in respect of all dissertations/theses, before submission for examination, confirming reasonable measures have been taken by the supervisor that the dissertation/thesis has been checked for plagiarism.

2.2 *To prevent plagiarism School ALTL, ALR and ALC are required to:*

2.2.1 Ensure that all curricula (disciplines, modules and programmes) address issues of plagiarism and contain opportunities for the implementation of actions as stipulated above at all levels of study;

2.2.2 Ensure that the University policy on plagiarism is communicated to all staff and students regularly;

2.2.3 Ensure that staff take up opportunities for education and training in plagiarism, are familiar with, understand and comply with the plagiarism policy and procedures;

2.2.4 Be alert to and act on any indications or allegations of plagiarism in moderation and external examination and similar reports; and

2.2.5 Deal with plagiarism matters referred to them.

2.3 *To prevent plagiarism students are required to:*

2.3.1 Read, understand and comply with the University plagiarism policy and procedures;

2.3.2 Familiarize themselves with the concept of plagiarism and observe the conventions of referencing and academic writing made available through teaching and research processes;

2.3.3 Learn and acquire the academic literacy required to prevent and avoid plagiarism;

2.3.4 Request assistance from staff for any concerns about plagiarism in their own writing;

2.3.5 Ensure that they do not submit work that can be considered plagiarised;

2.3.6 Attach the required signed declaration to each piece of work that is submitted for assessment purposes;

2.3.7 Ensure that ideas generated in group discussions are expressed in their own words;

2.3.8 Utilize plagiarism identification software programmes *prior to* submitting their work for assessment; and

2.3.9 Note that the utilisation of plagiarism software is compulsory for postgraduate students prior to submission of their research projects/dissertation/thesis for examination.

3. Detection of Plagiarism

3.1 The responsibility for detection of plagiarism lies with all staff at School level, within disciplines and programme delivery.

3.2 Plagiarism detection software programmes are made available to staff and students by the Information and Communication Services (ICS). ICS is responsible for the adequate licensing and maintenance of these, and for provision of training in the use of the software.

3.3 *For detection of plagiarism staff members are required to:*

3.3.1 Be familiar with and use the available plagiarism identification software; and encourage and enable students to use it to detect plagiarism;

3.3.2 Be alert to and document any instances of plagiarism when assessing or examining any work;

3.3.3 Ensure that allegations of plagiarism are based on sound, well-documented evidence; and

3.3.4 Follow the correct procedure as set out in this policy if plagiarism is alleged and not take any unilateral, punitive action against any student outside the approved procedures.

4. Reporting and Action on Allegations of Plagiarism

4.1 A central University database of offenders is available on the SMS system in which short reports of every incident of plagiarism shall be registered against the student's registration number.

4.2 Overall responsibility for ensuring incidents of plagiarism are entered into the system, acted on and reported is delegated to the School Academic Leader: Teaching and Learning for all coursework in undergraduate and postgraduate Honours and PG Diplomas (NQF level 6-8); and the School Academic Leader: Research for the research component of degrees, including all postgraduate Masters modules and dissertations/theses (NQF level 9-10).

The following procedures will be adopted when a staff member suspects that a student has committed plagiarism:

4.3 *For undergraduate studies at level 1 and 2 (Refer to Appendix Figure1)*

4.3.1 The lecturer, with their designated administrator, will enter the student's name onto the SMS database which will indicate whether the student has previously committed plagiarism at the University.

4.3.2 If there is no record of the student having committed this type of offence previously, that is, if it is a **first offence**, the lecturer will meet with the student to explain the offence and thereafter:

4.3.2.1 In cases <u>with minor infringement</u>, minimal or borderline plagiarism, use his/her discretion to rule that that the matter is a minor infringement and provide an educative response emphasizing the seriousness of plagiarism. In exercising his/her discretion in this way, if the lecturer has some uncertainty about the matter, s/he may consult with or refer the matter to their ALC.

4.3.2.2 In cases <u>exceeding minor infringements</u>, minimal or borderline plagiarism, the lecturer will meet with the student and shall advise the student of his/her rights, responsibilities, options and consequences of either admitting or denying the allegation. The student may then either *admit* or *deny* the allegation. If the student admits to committing the offence, the lecturer will:

4.3.2.2.1 Enter the required information on the SMS database indicating the offence that has been committed;

4.3.2.2.2 Retain the work concerned;

4.3.2.2.3 Issue a written warning to the student (this warning will be automatically generated from the SMS database once the student's details have been entered as required above); and

4.3.2.2.4 Give the student an opportunity to redo and re-submit the work after which a mark will be awarded for the new submission.

4.3.2.2.5 If the student chooses not to resubmit the work, he/she will be awarded 0% for the work.

4.3.3 If there is a record of the student having committed this type of offence previously, that is, if it is a **second offence (at UG level 1 and 2)**, or if a first offender denies the allegation of plagiarism, the lecturer will follow the procedures as set out in 4.4.3.1 onwards below.

4.4 *For undergraduate studies at level 3 and 4, and all postgraduate coursework studies* *(Refer to Appendix Figure 2)*

4.4.1 If a student is in undergraduate studies at level 3 or 4, Honours or equivalent (e.g. Postgraduate Diploma), or coursework Masters (excluding plagiarism in respect of the research component, which is dealt with in 4.5 below), the lecturer with their designated administrator will enter the student's name onto the SMS database, which will indicate whether the student has previously committed plagiarism at the University, and refer the matter to their ALC.

4.4.2 In cases of a <u>first offence with minimal or borderline plagiarism</u>, the ALC has the discretion to rule that the matter is a minor infringement and should, following consultation with the student, provide an educative response emphasizing the seriousness of plagiarism, enter the required information on the SMS database indicating the offence that has been committed, and impose an additional appropriate sanction from one or more of the actions listed in 4.3.2.2.2 to 4.3.2.2.5 above, taking the level of study into account. (In exercising his/her discretion in this way, s/he may choose to consult with other School Academic Leaders and/or the proctor).

4.4.3 Should the ALC determine that <u>a first offence exceeds</u> a minor infringement, minimal or borderline plagiarism:

4.4.3.1 The ALC will meet with the student and shall advise the student of their rights, responsibilities, options and consequences of either admitting or denying the allegation. The student may then either *admit* or *deny* the allegation.

4.4.3.2 If the student *admits* to having committed the offence, and the work concerned constitutes 25% or less of the total

assessment for the module, the ALC must ensure (with the designated administrator) that:

4.4.3.2.1 The student signs an admission of guilt under Rule 15.1 in the Rules for Student Discipline and the ALC forwards a copy of the admission of guilt to the Student Discipline Office;

4.4.3.2.2 The details of the offence are entered on the University SMS database, and on the student's academic record;

4.4.3.2.3 A mark of 0% is awarded for the work; and

4.4.3.2.4 The plagiarized work is retained.

4.4.3.3 If the student *denies* having committed the offence, and/or the work concerned constitutes more than 25% of the total assessment for the module, the ALC must refer the matter to the Student Discipline Court for prosecution under the Rules for Student Discipline.

4.4.4 Any subsequent (repeat) instances of plagiarism by the same student, irrespective of level of study, are immediately referred to the Student Discipline Court via the ALC.

4.5 *For examined research projects, dissertations and theses (Refer to Appendix Figure 3 and 4)*

In cases of alleged plagiarism in examined projects, dissertations and theses (including the research component of all postgraduate degrees) the matter is referred to the CDR and the respective SRHDC[2].

4.5.1 Research projects and Masters dissertations *(Refer to the Appendix Figure 3)*:

4.5.1.1 In the case of alleged plagiarism in a research project or dissertation (including for e.g. in Honours projects, in coursework Masters and Masters by Research), the SRHDC Chair/ALR in conjunction with the CDR must manage issues of plagiarism and conduct an internal

[2] These processes were approved by Senate (5 November 2012) and are amended and incorporated into this policy

assessment/investigation of the project/ dissertation in question, which shall include in the first instance, a check on the University SMS database for prior incidents. The process can involve an assessment of the project/dissertation using the plagiarism detection software in use at the University for this purpose and/or an investigation by an appropriate independent/internal academic in the relevant discipline.

4.5.1.2 In the event that the preliminary assessment/investigation establishes a *prima facie* case of plagiarism, consideration should be given to the appointment of an independent/external assessor qualified in that discipline for a report as to whether or not there has been plagiarism (i.e. not to re-examine). The independent assessor should be a suitable person in the appropriate discipline from another academic institution, recommended by the ALR and approved by the CDR.

4.5.1.3 The assessor should be asked to review the project/dissertation in question and come to a conclusion about the presence, nature and extent of plagiarism and to submit a written report in that regard to the CDR, including a recommendation of whether the nature and extent of plagiarism warrants a failure of the project/dissertation. (The independent reviewers/assessors must be provided with this policy and all relevant documentation.)

4.5.1.4 In cases where plagiarism is not confirmed in the internal assessment/investigation, this shall be reported to the SRHDC. In cases where the plagiarism is confirmed beyond question in the internal assessment/ investigation by the CDR and ALR and the sources have been identified, the need for an independent/external assessor may be obviated.

4.5.1.5 In the event a report is received from an independent assessor confirming the plagiarism or where the incident of plagiarism is clear-cut as mentioned above, a letter based on the reports and investigation documents must be sent by the CDR to the student requesting a written response to the allegations made and indicating the risk of failing the project/dissertation. In making the said request to the student, any questions

thought appropriate by the CDR and ALR should be put to the student for answering. A time limit of 20 working days should be stipulated for receiving a response from the student in order to ensure the administrative integrity of the process.

4.5.1.6 On receipt of the student's written response or after the expiry of the time limit stipulated, the CDR and ALR should, after carefully considering the student's response and all the reports, prepare a report together with relevant documents for submission with a recommendation for consideration by the SRHDC and the CAAB as per the Guidelines for Decision Flow of Academic Matters. If the degree is failed then the academic decision flow sets out that the recommendation comes to the SRHDC for approval and to CAAB for noting. The student's record must be appropriately endorsed.

4.5.2 Doctoral thesis *(Refer to Appendix Figure 4)*:

4.5.2.1 In the case of a doctoral thesis, the CDR should deal with the matter as set out above in 4.5.1.

4.5.2.2 In addition, it is recommended that in consultation with the DVC and Head of College, an advisory committee of at least three senior academics be constituted, chaired by the CDR, to consider the matter and advise the CDR, who will then make a recommendation to CAAB for approval as per the Guidelines for Decision Flow of Academic Matters.

4.5.3 In all cases (including the research component of all postgraduate degrees) in which allegations of plagiarism are confirmed, but the student is not failed, the matter is referred to the Student Discipline Court augmented as provided for in the Student Disciplinary Rules.

4.5.4 For both masters' dissertations and doctoral theses, in which allegations of plagiarism are confirmed, and the student is failed, the student shall not be permitted to register for any qualification in the University for a period of two years from the date the decision to fail is approved by the appropriate University structure. (This sanction shall not apply to honours level research projects.)

4.5.5 In all instances in which a project/dissertation/thesis is found to have been plagiarised (whether failed or not), the student's name

is entered into the SMS system and, if failed, the student's academic record shall be appropriately endorsed with a term decision: "Failed due to plagiarism".

4.6 *For postgraduate degrees previously awarded*[3] *(Refer to Appendix Figure 5)*

The procedure set out hereunder is followed by the University in the event that allegations arise or evidence is revealed of plagiarism by recipients of University degrees in the course of obtaining their degree. It applies to the research component of postgraduate degrees where a dissertation or thesis has been examined and passed, the qualification awarded and subsequently plagiarism is suspected.

4.6.1 In the event that a complaint, report or evidence is received or evidence revealed that plagiarism may have taken place on the part of a student in obtaining a qualification at the University, the CDR and the SRHDC responsible for that academic discipline will conduct an internal assessment of the dissertation/ thesis in question as per 4.5.1 for masters and 4.5.2 for doctoral degrees respectively. This can involve an assessment of the dissertation/thesis through the plagiarism detection software in use at the University for this purpose and/or an investigation by an appropriate academic in the relevant discipline.

4.6.2 In the event that the preliminary assessment/investigation referred to in 4.6.1 reveals a *prima facie* case of plagiarism, consideration should be given to the appointment of an independent assessor qualified in that discipline for a report as to whether or not there has been plagiarism. In cases where the plagiarism is beyond question and the sources have been identified, the need for an independent assessor may be obviated.

4.6.3 The independent assessor should be a suitable person in the appropriate discipline from another academic institution and/or country and must be recommended by the CDR and SRHDC to the Registrar for appointment. The assessor should be asked to review the dissertation/thesis in question and come to a conclusion about the presence and extent of plagiarism (i.e. not to re-examine) and to submit a written report in this regard to the Registrar.

[3] These procedures were approved by Senate (6 August 2008), which are reviewed, amended and incorporated in this revised policy

4.6.4 In the event a report is received from an independent assessor confirming the plagiarism or where the incident of plagiarism is clear-cut as mentioned in 4.6.2, the report(s) and investigation documents must be submitted by the CDR to the graduate for a written response as to why a recommendation should not be made to Senate to withdraw the degree. In making the said request to the graduate any questions deemed appropriate by the CDR and ALR /SRHDC should be put to the graduate for answering. A time limit of 20 working days should be stipulated to receive a response from the student in order to ensure the administrative integrity of the process.

4.6.5 On receipt of the graduate's written response or after the expiry of the time limit stipulated, the CDR and SRHDC should prepare a report together with relevant documents for submission to the School Board with its recommendation for consideration. Thereafter the matter should serve before the CAAB.

4.6.6 The SRHDC report and the recommendation of the School Board and C A AB is presented to Senate for a decision on whether or not to withdraw the degree.

4.6.7 In the case of a graduate who is a currently registered student, the matter is referred for disciplinary action in terms of UKZN Rules for Student Discipline.

4.6.8 In the event of the decision being that the degree be withdrawn the graduate will then be notified by the Registrar's office of the decision of Senate. If the graduate concerned is a currently registered student as well as a staff member, any decision to prosecute would be in line with the student discipline rules relating to plagiarism and University staff disciplinary code relating to misconduct.

4.6.9 The Senate's decision to withdraw a degree will serve before Council for noting only.

4.6.10 When a degree has been withdrawn as provided for above, the student's name is entered into the SMS system and the student's academic record shall be appropriately endorsed ("Failed due to plagiarism"). Such endorsement shall be considered should the student seek registration for further studies at the University as per 4.5.4 above.

4.6.11 In all cases where a student has been found to have plagiarised in a previously awarded qualification, which qualification has been revoked and the student is currently registered in the University for another qualification, then the current registration will be cancelled. Clause 4.5.4 above will apply.

4.7 *Alleged Plagiarism by UKZN Staff*

4.7.1 All staff have a responsibility to report allegations of plagiarism to their line managers, a senior manager or through available mechanisms (e.g. Whistle Blowing Policy)

4.7.2 Alleged plagiarism by any member of staff (as an employee or a student) will be investigated with a view to staff disciplinary action.

4.7.3 Staff who have supervised a thesis/dissertation, which has been found to have been plagiarised, and who have not exercised due diligence in detecting plagiarism, will be investigated with a view to staff disciplinary action.

Appendix E: UKZN Legal Framework

THE LEGAL FRAMEWORK

South Africa, as a signatory to the Berne Convention, is bound to frame its national copyright legislation within certain parameters and to abide by the provisions of Article 9(1) according to which the author has the *exclusive right to authorise reproduction of his or her work* in any manner or form.

However, recognising the need for special provisions to take account of educational needs, Article 9(2) of the Berne Convention allows member states to permit the reproduction of copyright-protected works in *certain special* cases, provided that such reproduction docs not unreasonably *prejudice the legitimate interests of the author.* Thus, while copyright law reserves to the copyright owner the *exclusive* right to undertake certain acts in regard to that work, it recognises that certain uses of copyright-protected works do lie outside the owner's control, and it consequently provides for *exceptions* to the exclusive right. While many users regard these exceptions as their rights, they are technically exemptions from liability or, in other words, defences to what would otherwise be acts of infringement.

In accordance with Article 9 of the Berne Convention, the South African Copyright Act, Act 98 of 1978 as amended, sets out, in Section 12, general exceptions from the protection of literary works. Section 12(1) states that fair dealing with a copyright-protected literary work is permissible, *inter alia,* for the purpose of research or private study or for the personal or private use of the person making the copy.

WHAT IS "FAIR DEALING"?

In a very loose way, since it is nowhere defined with any exactitude, 'fair dealing' permits the user to copy, for his or her own study or research or private use, as much of the work as is necessary to meet his or her reasonable needs without seeking permission from the copyright owner or paying compensation.

For many users this definition is insufficient.

They ask the question:

'How much may I copy under fair dealing?'

One cannot say how much, for what, is fair in each particular case will surely depend on the circumstances of that case. Contrary to widespread belief, our law does not specify that 5%, or 10% or 20% - or any percentage - is 'fair', and nor does it say that a single copy may be made as long as it does not constitute a, 'substantial amount'. If you were to copy a large portion of a book or journal, and were then charged, with copyright infringement, you would have to convince the court that your actions were fair, given your circumstances. Copyright authors agree that fair dealing is a question of fact and impression having regard to all the circumstances. In some circumstances the taking of too much of a work, or even the taking of small amounts of a work on a regular basis, would constitute negative fair dealing. So you need to be sure that you copy only as much as you really need.

Fair dealing is not quantified in any law, and since there is no bright line separating the lawful from the unlawful, voluntary guidelines have been developed in some countries.

In Norway 15% of complete work or 30 pages, whichever is the lesser, is considered fair for private use.

In Britain the Publishers' Association, the Writers' Guild and the Society of Authors accept, as within the bounds of fair dealing for research or private study, one copy of a maximum of one chapter in a book, or 5%, off a complete work. The British guidelines have no *legal force,* but might be of persuasive value as a defence in a South African court.

On the other hand, in the United States, 'fair use' is by law determined qualitatively as well as quantitatively. Section 107 of the US Copyright Act states that it depends on four factors:

1. The *purpose and character* of the use;
2. the *nature of the copyrighted work;*
3. the amount and *substantiality of the portion* used in relation to the whole; and
4. the *effect of the use on the potential market for the work.*

The American concept of 'fair use' is thus not the same as the South African 'fair dealing'. In their work, *The Modern Law of Copyright and Designs,* Laddie, Prescott and Vitoria make the following reference to this distinction: "Fair use should be distinguished from the statutory defences based on fair dealing; the latter are conceptually distinct since they pre-suppose that a substantial part has been taken."

MULTIPLE COPIES

While South African copyright law does not specify how much may be taken within the bounds of fair dealing, it is specific in that the doctrine applies only to what a person may make for his or her *own* use. Multiple copies thus fall firmly outside the bounds of fair dealing.

The essence of fair dealing is encapsulated in the so-called 'golden rule' laid down by the copyright author Joseph McDonald:

'TAKE NOT FROM OTHERS TO SUCH AN EXTENT AND IN SUCH A MANNER THAT YOU WOULD BE RESENTFUL IF THEY SO TOOK FROM YOU.'

PERMITTED REPRODUCTION IN EDUCATIONAL INSTITUTIONS

Copying is permitted under certain circumstances provided for in terms of the Copyright Act. The reproduction of a work in terms of Section 13 of the Act is permitted on the following grounds:

- Copies for personal or private use:
  - Personal copies for use by a student, a researcher and a teacher:
- a single copy of a "reasonable and necessary portion" of a work, consistent with fair dealing provisions contained in Section 12(1) of the Copyright Act, can be made without permission
- Reproduction must be done for the purpose of instructing a particular class during a specific term
- The making of multiple copies is permissible in the following circumstances:
  - not more than nine instances of such multiple copying for one course of instruction to a particular class may occur in any one term; and
  - only one copy per pupil per course may be made by or for a teacher, and then only for class-room use or discussion.

PROHIBITIONS ON COPIES FOR USE IN EDUCATIONAL INSTITUTIONS:

An educational institution, a teacher and a student may not:-

- Make a copy of a whole work.
- Make compilations commonly referred to as "course packs", "study packs", "course readers", "study guides" or "student hand-outs" in which extracts from various publications are reproduced with or without notes by the lecturer and then made available to students. Permission for such use must be obtained from the publishers of these works.
- Copying may not be repeated in respect of the same material by the same teacher from term to term, nor may it be used as a substitute for the purchase of books, publisher's reprints, or periodicals.
- No copies may be made of or from works intended to be ephemeral, including exercises, standardized tests and test booklets and answer sheets or similar ephemeral material.

WORKS SUBJECT TO COPYRIGHT

The subjects of copyright are those categories of works which have been brought into existence by a person's intellectual creation and with regard to such creation then can be classified, for e.g. into literacy, artistic, musical etc. works. Of particular interest to lecturers and students are literary works (e.g. novels, stories, poetry, handbooks, discussions, articles, dictionaries, memoranda, reports, etc.). A literary work does not have to be of a particular standard or quality to qualify as a literary work and also does not have to be in written format. What is important however is that a literary work does not come in for consideration for copyright unless the work:

- is written, or
- is recorded, or
- is converted to material form in some other manner

Copyright protection requires no formalities such as do patent and trademark applications. The author merely needs to put one of these categories of works into material form and the protection comes into existence automatically.

AUTHORS AND THE OWNERSHIP OF COPYRIGHT

In terms of the Copyright Act, the author or creator of the work is the owner of the copyright, unless the person is in employment, and the work is created in the course and scope of the employment, in which case the employer holds the copyright. It is, however, possible for the creator of the work to contractually assign, in writing, the copyright or part thereof, to a publisher or other third party either on an outright basis or for a limited purpose or period. The assignee then becomes the holder of the copyright, and is entitled to various rights and remedies.

RIGHTS OF AUTHOR AND/OR OWNER OF THE COPYRIGHT

The author or owner or his/her licensee (in some cases) can take legal action to stop infringements of his/her rights. This can include seizure of the infringing material, damages and an interdict preventing further infringement of his/her rights.

Issued by the Copyright Office: University of KwaZulu-Natal

Appendix F: UKZN Exemption from Ethics Review

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

Ms Happy Maureen Majola (217080185)
School of Applied Human Sciences
Pietermaritzburg

Dear Ms Happy Maureen Majola,

Original application number: 00005446
Project title: A systematic review of gender, age and cultural differences in teachers perceptions of intelligence.
Amended title: A systematic review of teachers perceptions of learners intelligence in relation to gender, age, and cultural differences.

Exemption from Ethics Review

In response to your **amendment** application received on 3 July 2024, your school has indicated that the amendment has been granted **EXEMPTION FROM ETHICS REVIEW.**

Any alteration/s to the exempted research protocol, e.g., Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through an amendment/modification prior to its implementation. The original exemption number must be cited.

For any changes that could result in potential risk, an ethics application including the proposed amendments must be submitted to the relevant UKZN Research Ethics Committee. The original exemption number must be cited.

In case you have further queries, please quote the above reference number.

PLEASE NOTE:
Research data should be securely stored in the discipline/department for a period of 5 years.

I take this opportunity of wishing you everything of the best with your study.

Yours sincerely,

[redacted]

Prof Lauren Eva Dyll
Academic Leader Research
School of Applied Human Sciences