ISIXHOSA AS THE LANGUAGE OF TEACHING AND LEARNING MATHEMATICS IN GRADE SIX: INVESTIGATING THE MOTHER TONGUE BASED BILINGUAL EDUCATION MATHEMATICS PILOT IN THE EASTERN CAPE PROVINCE, SOUTH AFRICA

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DECLARATION

I hereby declare that the work contained in this thesis is, to the best of my knowledge, original. This thesis has not been submitted previously, partly or wholly, for the award of a university degree in any other university.

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Naledi Ntombizanele Mbude

29th day of November   2019

DEDICATION

To: Mama Rose Nolwandle Gxabela my beautiful mother who taught all 7 of us that life is not about the privilege of the family you are born into. It is about the strides you will make that your family will be proud of. Enkosi Qwathi, Dikela, Dumba, Noni, Sdindi, Nomakhungela. You raised social-political consciousness in us from a very young age and encouraged independent thought. I salute you my great teacher!

I also thank Watana Wilford Mbude my handsome father, a father who did not spare anything that was meant to panelbeat us to a shiny product! Camagu Mndila, Nyezile, Mpondomise, Jola. You were there for us, you did your best and it is greatly appreciated.

I will not forget to dedicate this work to the whole

Mbude- Jam-jam clan, my identity is something that holds my chin up!

and last but not least to

My precious soccer club – Bathandwa Ta B, Ziyathandwa Zee, Amo Thandanani, Kalo Othandwayo, Tebello Sibanye, Tebatso Simanye and Thebe Jnr Bamanye. When the creator asked who of you wants Naledi as a mommy, all of you said me, me, me! Thank you guys

This one is for us! Niyayazi ke nina sisuke phi ze sibelapha! Ndiyanithanda nonke.

ABSTRACT

This study is an investigation on lessons learnt when the language of learners is maintained for teaching and learning mathematics beyond Grade 3 for another 3 years. It is undertaken in Cofimvaba, a rural village of the Eastern Cape in South Africa. We investigate lessons that can be learnt from the Mother Tongue based- Bilingual Education (MTbBE) strategy, that can be replicated. South Africa post-1994 has a Language-in-Education Policy (1997) that provides for the use of all official languages as Languages of Teaching and Learning (LoLT), this has remained on paper as the schooling system focusses on an early –exit model of three years of the Mother Tongue Education (MTE) for the Foundation Phase (FP) then exit to English instruction in Grade 4; this applies to African language learners only. English and Afrikaans speakers have mother tongue education from cradle to university; a benefit they have enjoyed pre- and post-apartheid. Various studies have been conducted to understand the relationship between language and mathematics learning as it is crucial to design mathematics instruction for students who are English Learners (ELs) and/or bilingual. However, in South Africa, there had not been a direct exploration of the achievement of learners in mathematics when their mother tongue is used and sustained throughout the first six years of learning mathematics, while English is a supportive resource. This is the focus of this study.

The study lends itself to the adoption of a mixed methods design (QUALT+QUANT), while also employing documents, observation and test scores of learners to obtain data. Content analysis and thematic analysis approaches were used in analyzing the qualitative-type data while a statistical approach was used in the analysis of quantitative data. The main aim of the study was to establish whether in the Cofimvaba pilot, there is any evidence to make a case for extending Mother Tongue Based-bilingual Education (MTBBE) beyond Grade 3 for black African children. Another aim, was to highlight and document the effort that was the first of its kind in South Africa, undertaken in a small rural area to develop isiXhosa as language of Mathematics and Science. The most salient of this effort was the fact that it was underpinned by deliberate theoretical and empirical foundations central to language policy and planning. The finding of this study is that the use of isiXhosa for MTbBE was effective for boosting mathematical and science skills in the mother tongue and English in Grade 6 as demonstrated in Chapter 7 and 8. Lastly, this study demonstrates the power of political will and how a decision backed by financial investment can transform the wider system despite the challenges of transformation. For the first time in the history of education; a poor department has stuck to its guns; unwearied by the negativity surrounding the development of African languages. It committed to the cause of improving the academic achievement of the poorest of the poor. Historically, in implementing a Mathematics Curriculum, the Department of Education (both officials and teachers) has never efficiently implemented the LiEP (1997) in the manner spelt out in its policy documents viz, multilingualism as the norm. The focus has been on a perspective of learners who are learning and must English, then mathematics and ways to get them to know English at all costs. This view creates inequities in the classroom because it places emphasis on what learners don't know or can't do. In contrast, this study proposes a sociocultural perspective that shifts away from deficiency models of bilingual learners and instead focuses on describing the resources bilingual students use to communicate mathematically (Moskovich, 1988). Without this shift we will have a limited view of these learners and will design instruction that neglects the competencies they bring to mathematics classrooms. If, instead, we learn to recognize the mathematical ideas these students express in spite of their accents, code-switching, or missing vocabulary, then instruction can build on students' competencies and resources (Moskovich, 1998). This study recommends a plethora of strategies that must be taken by the Department of Education to widen epistemological access to mathematics for African language learners using MTbBE as a viable strategy.

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LIST OF ABBREVIATIONS AND ACRONYMS

ACRONYMS	FULL NAME
AILs	African Indigenous Languages
ALFAL	African Languages as First Additional Languages
ALSAL	African Languages as Second Additional Language
ALAC	African Languages as Choice
AFFAL	Afrikaans as First Additional Language
AFSAL	Afrikaans as Second Additional Language
ANA	Annual National Assessment
BICS	Basic Interpersonal Communication Skills
CALP	Cognitive Academic Language Proficiency
CES	Chief Education Specialist
DBE	Department of Basic Education
DCES	Deputy Education Specialist
DHET	Department of Higher Education and Training
DEM	Delayed Exit Model
EDO	Education Development Officer
EEM	Early Exit Model
EL	English Learners
EFAL	English as First Additional Language
EMIS	Education Management Information Systems
FAL	First Additional Language
FAT	Formal Assessment Task
HL	Home Language
IAL	Introduction of African Languages
IELs	Indo European Languages

IIAL	Incremental Introduction of African Languages
LAR	Language as a Resource
LAP	Language as a Problem
LiEP (1977)	Language in Education Policy
LIEPU	Language in Education Policy Unit
LOA	Language of Assessment
LOI	Language of Instruction
LOL	Language of Learning
LOLT	Language of Learning and Teaching
LTSM	Learner Teacher Support Material
NPPR	National Promotion and Progression
PanSALB	Pan South African Language Board
PPN	Post Provisioning Norm
PERLC	Provincial Education Labour Relations Council
PIRLS	Progress in International Reading Literacy Study
PRAESA	Project for Alternative Education in South Africa
SACMEQ	Southern Africa Consortium for Monitoring Educational Quality
SAL	Second Additional Language
SASA	South African Schools Act
SASL	South African Sign Language
SASAMS	South African School Administration Management Systems
SLP	School Language Policy
SMS	Static Maintenance Syndrome
SNOALS	Schools that Do Not Offer an African Language
SOALS	Schools that Offer African Languages
SYPP	Six Year Primary Project

GLOSSARY OF TERMS

Mother tongue: Refers to the language that a learner has acquired in his/her early years and which has normally become his/her natural instrument of thought and communication.

Home language: Refers to the language that is spoken most frequently at home by a learner.

Language of learning and teaching (LOLT): Refers to the language medium in which learning and teaching, including assessment, takes place.

Bilingualism: Refers to the ability to communicate effectively in two languages, with more or less the same degree of proficiency in both languages.

Multilingualism: Refers to the ability to speak more than two languages; or to be proficient in many languages.

Code switching: Refers to switching from one language of instruction to another language of instruction during teaching and learning.

Dual medium instruction: Refers to the use of two media (languages) of instruction by a teacher in a lesson, switching from one medium (language) to the other, on a 50:50 ratio.

Language learning areas: Refers to any of the 11 official languages, other languages approved by the Pan South African Language Board (PANSALB), Braille and South African Sign Language, approved by UMALUSI.

Language level: Refers to the level of proficiency at which language learning areas are offered at school (e.g. home language, first additional language, second additional language).

Language proficiency: Refers to the level of competence at which an individual is able to use a language for both basic communication tasks and academic purposes.

African language: In the context of this research, the term refers to South Africa's nine official indigenous languages namely: isiNdebele, isiXhosa, isiZulu, Sepedi, Sesotho, Setswana, Siswati, Tshivenda and Xitsonga.

Single medium instruction: Refers to the use of one medium (language) of instruction by a teacher in a class.
Single medium school: Refers to a school that uses one medium of instruction (language) for all learners in all grades.

Parallel medium instruction: Refers to teaching that takes place in two or more languages of instruction in separate classes in the same grade.
Parallel medium school: Refers to a school that practices parallel medium instruction in all grades.

Preferred language of instruction: Refers to the (preferred) language of instruction indicated by a learner at the time of registration.

First language: Refers to languages learnt first at home.

First additional language: Refers to a compulsory language subject that learners have to study at that level.

Second additional language: Refers to a non-compulsory language subject that may be studied (by choice) by learners at that level.

Interdependence: Two languages depending on one another.

Language acquisition: Picking and using a language in natural contexts.

Language learning: Picking a language and using it in school-type contexts.

Language planning: Processes that allocate languages roles.

Linguistically homogeneous: (A place) with people who speak a common language.

Linguistically heterogeneous: (A place) with people with different languages.

Literacy: The ability to read, understand, and answer questions.

Monolingual: Facility in one language.

Mother tongue: The language a person learns first.

Mother tongue instruction: The teaching of mother tongue subject and using it as a medium of instruction

Multilingualism: Ability to use many languages fairly well

Pedagogical: To do with teaching/learning.

Bilingual: Ability to use two language

Quadrilingual: Able to use four languages.

Second language: A language a person learns after the mother tongue.

Third language: A language a person acquires/learns after the first two.

Translanguaging: Multicompetence of bi/multilingual speakers who possess the ability to switch between languages while integrating them within a single linguistic system.

Key Words:

Bilingual Education, Mother Tongue-based Bilingual Education, Translanguaging, Language of Teaching and Learning, Language of Assessment, Mathematics and the prestige factor

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CHAPTER ONE

INTRODUCTION AND BACKGROUND OF THE STUDY

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1. Introduction:

My interest in this area of work has been moulded and shaped by three issues in the order they appear: (a) being a black African language speaking female born into a poor home (b) the advantages and disadvantages of attending a Catholic missionary school (c) teaching Science in a public township school. The first issue raises a context for me that almost forces me to never forget where I come from and to continue to engage in work that will make material difference to the lives of all South African despite their colour, language and sexual orientation. The study is an investigation on lessons South Africa can learn when the language of the children is maintained for teaching and learning mathematics beyond Grade 3 for another 3 years in Cofimvaba, a rural village of the Eastern Cape in South Africa. The Mother Tongue based- Bilingual Education (MTBBE) pilot project started in 2012 with a random sample of a cohort of 72 Grade 4 schools. The majority of black African language learners in South Africa, offer their Grades 1 to 3 in the Home Language; they then change the Language of Teaching and Learning (LOLT) in Grade 4 to English mainly, despite all the progressive legal provisions found in the Constitution (1996) that allow individuals to choose their LoLT. This study concerns itself with the teaching and learning of mathematics and science through isiXhosa mainly in a Late Exit-Transitional Bilingual Education model (Ramirez et.al., 1991).

1.1.Background to the Study

It is a commonly held view that the teaching and learning of mathematics occurs in contexts of linguistic, cultural and socioeconomic diversity; in South Africa we do not seem to know how to work with, and work within, this diversity to enhance the learning and teaching of mathematics. The disparity in access to meaningful education is tied to race, language, socio-economic status, and location in the province and country. Post-apartheid, the schooling system in South Africa has been expanded to include all children, regardless of race, language and

social origin. The children of the elite still manage to succeed at higher rates in mathematics than their less advantaged peers who happen to be in the main black, rural, poor and are African language speaking. The focus of this study is, how can the education system of South Africa promote mathematical learning for the majority within these complexities?

1.2 The significance of Language Diversity and Multilingualism

Research within the field of education, language in education and of mathematics education uses a variety of words to characterise language diversity, including, but not limited to, 'multilingual', 'bilingual', 'second language', 'additional language' or 'minority language'. Multilingualism is defined as the ability of an individual speaker or a community of speakers to communicate effectively in more than one language. A person who can speak multiple languages is known as a *polyglot* or a *multilingual* (Nordquist, 2018). Current research begins by emphasizing the quantitative distinction between multilingualism and bilingualism and the greater complexity and diversity of the factors involved in acquisition and use where more than two languages are involved (Cenoz 2000; Hoffmann 2001a; Herdina and Jessner 2002). Thus, it is pointed out that not only do multilinguals have larger overall linguistic repertoires, but the range of the language situations in which multilinguals can participate, making appropriate language choices, is more extensive. Herdina & Jessner (2000) refer to this capacity as the multilingual art of balancing communicative requirements with language resources. This wider ability associated with the acquisition of more than two languages has also been argued to distinguish multilinguals in qualitative terms. One qualitative distinction seems to lie in the area of strategies of learning home and additional languages by multilinguals. This study is conducted within the context of multilingualism; it is a context where the home language of learners and that of the teachers is isiXhosa. The hegemony of English though, renders schooling in English elevating it above their home language. Languages may be associated with particular activities, institutions or contexts on a language-by-language basis, so that one language may be seen as for school, while another language is seen as for home. Multilingualism therefore is a contested concept, with different theoretical lenses offering particular ways of seeing how multiple language resources interact in any context of practice (Study 21, 2009). One of the most important goals of mathematics education is to facilitate successful mathematical learning. This learning occurs in complex linguistic environments; complexity derives from the multiple language backgrounds, mathematical languages and semiotic systems that are always present. In the Cofimvaba MTbBE case, because of the language homogeneity amongst learners and teachers they feel at home in their mathematics

learning environment as they share similar language backgrounds. In the non-MTbBE mathematics classrooms; learners and teachers face language barriers. The reality though is that despite the barriers they face each day, they must find ways to discuss and learn mathematics. This study will, therefore, also seek to examine how constructs about language, discourse and multilingualism that have their origins in language studies are pertinent to mathematics education (Study 21, 2009).

1.3 Mother Tongue Based Bilingual/Multilingual Education

There are various definitions of the concept of Mother tongue-based Bi- or Multilingual Education and they are context dependent. Malone (2007) in discussing the concept in Asia, argues that discussions relating to MT-Based MLE in Asia tend to use the term in one of two ways. In some contexts, MT-based MLE refers to the use of students' mother tongue and two or more additional languages as Languages of Instruction (LoI) in school. In other contexts, the term is used to describe bilingual education across multiple language communities each community using their own mother tongue plus the official school language for instruction. In the non-dominant language communities of South Asia, multilingual education usually follows the first definition: learning and using multiple languages in school (Malone, 2007).

Heugh and Skutnabb-Kangas (2010) define Mother Tongue-based Multilingual Education as a system based on strong development of the mother tongue or language of the immediate community best known by the child, with the addition of at least one other language (maybe two or even three). All will be used for teaching some subjects, in a carefully considered sequence, to achieve high levels of multilingualism and multi-literacy. L1 is used as the primary medium of instruction during all of primary school. Then, L2 is introduced as a subject of study to prepare children for eventual transition to using L2 as the medium of learning in some academic classes. In the case of Cofimvaba, the focus of the Mother Tongue-based Bilingual Education (MTbBE) pilot was on the use of isiXhosa mainly for teaching, learning and assessing mathematics and science starting in Grade 4 and continuing incrementally; while English could be used as a resource language whenever teachers or learners felt there was need. The focus was on the development of isiXhosa and not having equal bilingualism with English. This was done taking into consideration the argument by Alidou (2004) that the multilingual context with African languages is where most are in the process of acquiring official orthographies. She further argues that the lack of literate environments in the national languages constitutes a serious barrier, preventing African children from developing adequate

literacy skills in the national languages. She proposes that in such contexts the focus first should be on the development of the child's mother tongue. Only when a particular threshold has been reached in the mother tongue will we see the kind of transfer Cummins (1979, 1981) talks about to a dominant language like English or French (Alidou, 2004). The threshold she refers to applies both to the development of the mother tongue as well as to the child's development in the mother tongue. In our case, the level of development of isiXhosa compared to English or Afrikaans warrants that our MTbBE strategy focusses on developing isiXhosa as a language of teaching mathematics and science to contribute towards its intellectualisation (Sibayan, 1992).

1.4. Rationale

Students whose mother tongue language is different than the [language of instruction] are often at a considerable disadvantage in the education system. This is especially true for children living in remote areas [like Cofimvaba in our case]. The farther away a child lives from urban areas the less English he or she uses or hears (Malone, 2007). MTbBE is based on the assumption that learning in school grows out of the general learning that children have already done. Children don't start learning the minute they enter the classroom; they start learning from the moment they're born. When you're born you're learning with your parents, your siblings, the other people involved in your life. And so you're basically at the focus point of a large community of people who informally are your teachers. So you're learning your social life, your conceptual development, your place in the world. And how to control other people's behavior towards you by mastering language, because language is the tool we use for all of those things. In educational circles, we think of language mainly as a cognitive tool. But language is much more than that. Yes it is a cognitive tool – the most extensive and complex one that we possess. It is also the tool we use to make our presence felt in the world, to get our desires expressed and met. And children, as they acquire that, are doing it in their mother tongue. We can't expect that when they go to school there will be this instantaneous transition over to another medium of exchange for all of this really important information they encounter at school. And children, as they acquire that, are doing it in their mother tongue A large body of evidence from different countries as well as advances in the field of cognitive neuroscience show that children who have access to Mother Tongue-based Multilingual Education (MTB MLE) develop better language skills in their mother tongues as well as national languages. When knowledge of a second language (L2) is added to a rich knowledge of a first language (L1), a child forms complex knowledge networks (Joseph lo Bianco, 2014). Giving children

proficiency in the language spoken in their homes (L1) as well as the language spoken by the community outside of theirs (L2, L3, L4, etc.) can benefit individuals and society by increasing cognitive skills, humanistic understanding, achievement, economic benefits, linguistic ability, social skills and political cooperation between groups (Crystal, 2011). MTbBE allows learners to use their language for learning, and use English as well for different functions in the mathematics and science classroom particularly during assessment. The data analysis sections, Chapter 6 and 7 will demonstrate how learners switched languages for various functions.

1.5. Language and Education

Language is a powerful symbol of identity, a wisdom neatly encapsulated in proverb. According to the Welsh, Heib iaith, heb cenedl' (No language, no nation). The Maori express a similar sentiment: 'Ka ngaro te reo, ka ngaro taua, pera I te ngaro o te moa' (if the language is lost, we are lost, we will become extinct as has the Moa) (cited in Edwards, 2004) as she looks back into the past voicing concern about the use of language as a tool for the subjugation and assimilation of other peoples. She states that there is an unnerving similarity between the call of the US peace commissioners to blot out the 'barbarous dialect' of the Indians as they attempted to bring the frontier wars to a halt and the Australian entreaty to Aboriginals to 'build huts, wear clothes and be useful … love God … love white men … learn to speak English' (Edwards, 2004). She couldn't be further than the truth as in Africa we know too well how the project to 'leave your barbaric ways, stop slaughtering cows, love God and God saves and he speaks English' has changed the complexion of the continent.

What is language, besides it being a tool of the powerful? Language is used by people, who grow up with it "at their mother's knee", who use it to express their deepest feelings – to pray, swear, make love – and to communicate with others (Edwards, 2003). It is the repository and means of articulation of values, beliefs, prejudices, traditions past and present achievements. It is the distinguishing characteristic of the human being, it is at the heart of the culture of the people; it is what makes people see themselves as different; and is related to issues of identity, position and power. When it is linked to colour prejudice or class privilege, for example, language becomes a highly emotional and political issue, capable of being mobilised as a powerful social instrument. Because of all these considerations, 'language policies for education are highly charged political issues and seldom, if ever, decided on educational grounds alone (Hawes 1979).

Like in Europe and the US, in South Africa, the issue of language in education has been used as a basis for classifying and dividing people, and as the cornerstone of segregationist education policies (Mda, 2005). Hartshorne concurs with Mda that language policy decisions in South Africa have had to do with issues of political dominance, the protection of power structures, the preservation of privilege and the distribution of economic resources. Therefore, language in the school has been an instrument of social and political control (Hartshorne, 1995).

The role of language in education is crucial because it is the main means through which knowledge is conveyed and learning acquired (Mda, 2000). She goes on to further posit that languages in South Africa have not enjoyed equal status. During the colonial and apartheid eras, Afrikaans and English were defined as 'languages', while indigenous African languages were viewed as 'tongues' or 'vernaculars'. The term 'language carried esteem, rights, recognition and privilege, the reverse was true for tongue and vernacular. African languages were marginalised as languages of [teaching and] learning and were not usually used as such beyond the primary school (Mda, 2000). This anomaly has been reported in various studies when it pertains to African language learners when they have to learn mathematics; their poor proficiency in English has literally shut out the door for epistemological access to mathematics learning (Howie, 2003; Systemic evaluation, 2005; ANA Report, 2014). Research on Mother-Tongue Education and scholastic achievement points to a correlation between the two (Myburgh, Poggenpoel and Van Rensburg, 2004; Burkett, Clegg, Landon, Reilly and Verster, 2001; Kaphesi, 2000). It has been found that bilingual children perform better in school when the school teaches the children's home language and, where appropriate, develops literacy in that language (Cummins, 2001). Desai (1999) argues that there is a world of difference between those who are learning an additional language voluntarily to expand their linguistic repertoire, and those who are forced to learn an additional language in order to gain access to education and to participate in wider society. Learners in Cofimvaba fall into the second category with dire education consequences for them. Myburgh et al. (2004) posit that where learners do not speak the language of instruction, authentic teaching and learning cannot take place. It is purported that such a situation largely accounts for low academic achievement in Africa. It becomes important to encourage the use of home language (HL) as the Language of Learning and Teaching (LoLT), especially in the earlier years of schooling (DBE, 2010).

1.6. Language and Mathematics learning

A person's education is closely linked to their life chances, income, and wellbeing (Battle and Lewis 2002). Therefore, it is important to have a clear understanding of what benefits or hinders one's educational attainment (Barry, 2005). Access as it pertains to educational opportunity, continues to enter into current debates over the role of language in learning. Battles lines have been drawn over political issues that are fuelled by a plethora of legislation aimed at the access question. The relationship between language skills and academic performance is not a perfect one: some academic areas are more affected more than others, some language skills appear to be more directly responsible for school success than others, some language -minority groups are more adversely affected than others by the presence of more than one language in their environments. One academic area of current interest that appears to have a large language-related component is mathematics. The relationship between language skills and mathematics is not well understood, even though the same low math achievement statistics among certain groups of learners are reported year after year. (Cocking and Mestre, 1988: 4). In South Africa, there are poor mathematics skills among the African language speaking black majority, significance attached to mathematical literacy is demonstrated by the number of both governmental and non-governmental organisations that dedicate millions yearly to fund development efforts; and the conferences held regularly by local and international organisations to address the systemic failure in this area of learning. For the purposes of this study, two subjects were chosen for the MTBBE pilot viz. Mathematics and Natural Science and Technology. The preoccupation with these two subjects in South Africa is undoubtedly linked to the fact that mathematics and science continue to elude the majority of people; who happen to be black and African language native speakers. The two subjects always receive a major capital injection while the return on investment is relatively small (Heugh, 2000). This thesis is not dealing solely with mathematics learning or solely with language issues, it rather deals with cognitive processes of learning, comprehension, and symbolic thinking.

Some argue that mathematics itself is a language and therefore language learning issues are important in thinking about the various strands of achievement in mathematics. Both mathematics and language are symbol systems, and therefore symbolic thinking is a relevant cross over area to consider for this kind of research (Cocking and Mestre, 1998). The nature of mathematics knowledge is cumulative; it works much like a stack of building blocks. You

have to gain understanding in the area before you can effectively build upon another area (Flemming, 2014). Our first mathematical building blocks are established in infancy, when babies throw away near empty milk bottles as opposed to latching onto full ones – these are the beginnings of understanding volume and capacity. This Basic Interpersonal Communication Skill (BICS) from life experiences is later initiated into register specific mathematics, termed Cognitive Academic Language Proficiency (CALP) by Cummins (1979). BICS can be learnt at home from the environment; friends, siblings and mainly from play and other informal activities. CALP is what schools offer; the school completes the informal journey by initiating learners to speaking mathematically using BICS as a basis. Mathematics and Science are two subjects in primary schooling that heavily rely on CALP. Low academic achievement in literacy and mathematics cuts across all levels of schooling in South Africa. The poor performance of South African schools compared to those in developed countries has been discussed at primary level in mathematics and reading (Moloi and Strauss, 2005) and at secondary level in mathematics and science (Reddy 2006). Regional comparisons such as the Southern and East African Consortium for Monitoring Educational Quality (SACMEQ II and SACMEQ III, 2007) similarly showed poor results in literacy and numeracy performance (Spaull, 2013). The survey indicated that out of fourteen education systems, South African Grade 6 learners ranked 8th for mathematics with learners participating in the study lacking basic numeracy skills (Shabalala, 2005).

The Department of Basic Education (DBE) Annual National Assessment (ANA) results from 2011 to 2014 confirm this poor performance in literacy and numeracy. Different reasons are given for learners' underachievement, including language of instruction, poorly resourced schools, lack of reading material and poor teaching methods (Barbarin & Richter, 2001; Fleisch, 2008; Boylan, 2010). At most the description is dire as posited by Taylor et al, (2007), that the South African [education] sector can be characterised as a high cost, high participation and low quality system. For me, a factor that is most important is what Taylor describes as both the poor comparative performance and the within-country inequities which are, of course, traceable back to a history of 350 years of colonial selective development, exacerbated by the policies of systematic discrimination and isolation pursued between 1948 and 1994 (Taylor, 2007). A major factor that is usually left out or referred to as a side or confounding issue (Spaull, 2014) is the issue of language of instruction. I agree that language is not everything that leads to failure in education; but language is the only tool of communication that everyone must use at school to communicate everything else (Wolf, 2002).

Currently, teachers are encouraged at every turn by the department to make each content subject a language subject (Language Across the Curriculum (LAC) taking time away from the actual subject learning. All these are efforts aimed at enhancing the English vocabulary that learners 'need' to access mathematics. Acquiring vocabulary in lists of technical words and phrases characterises a typical mathematics classroom in South Africa. Moskovich (1998) warns that the notion of register should not be interpreted as getting learners to memorise a list of technical words and phrases. This interpretation reduces the concept of mathematical register to vocabulary and disregards the role of meaning in learning to communicate mathematically. A critique of the typical mathematics learning environs for bilingual learners must not be premised on what is the 'right' or 'wrong' way of teaching mathematics to English learners. Learner performance (and by implication, mathematical achievement) is determined by a complex set of inter-related factors (Clarkson, 1991). The poor performance of ESL learners in mathematics cannot be attributed to the learners' limited language proficiencies in isolation from the wider social, cultural and political factors that infuse schooling (Setati et al. 2008). Unlike for the Afrikaans and English L1 child whose concentration is on cognitive development in mathematics; for the African language speaker cognitive matters cannot be separated from socio-political issues relating to language and power when exploring the teaching of mathematics in classrooms where learners do not have adequate facility in the target language. Getting black children to understand English before learning Maths has not worked.

What has become obvious in the South African assessment data is that when we compare the achievement of children who learn and are assessed in their HL (English and Afrikaans) with those who learn and are assessed in a second language (usually English for the 78% of students who use an African language), there is a significant gap in achievement of between 32% for African language speakers and 69% for speakers of English and Afrikaans. This means that the majority of African students are so far behind by Grade 6 that it is unlikely they will catch up with speakers of English and Afrikaans. They are the most vulnerable in terms of future employment, health and poverty (Heugh, 2015). Despite this state of affairs a myriad of factors, the underdevelopment of African languages and the global nature of English, are the reasons advanced against the use of mother-tongues as media of instruction (Alexander & Busch, 2007). Despite UNESCO declaring in 2003 that learning in one's own language holds various advantages for the learner, including increased access, improved learning outcomes, reduced chances of repetition and drop-out rates, and socio-cultural benefits (UNESCO, 2003) we are still stuck in whether or not mother tongue education will work for African language learners.

Nobody asks why mother tongue education works in South Africa for English and Afrikaans native language speakers. The minute one raises a similar debate asking for the same for African language speakers to equalize education opportunities; then academics are the first to say show us research that will prove this will work. Africa has been thrown into a perpetual cycle of research work to prove that MTE will work for African language learners as well as it has been proved that it works already for English and Afrikaans Home Language speaking groups in the same country. One can only hope that this study will at least convince sceptics.

1.6.1. The racial history of Mathematics education in South Africa and its effect on achievement in it, by black people

The education policy of any country reflects "its political options, its traditions and values, and its conceptions of the future" (Faure, 1972) and exists in the context of a particular social, economic and political order. The point made by Faure is clearly demonstrated in the following speech by Dr HF Verwoerd, then Minister of Native Affairs advocating for passing of the Bantu Education Bill in 1953 to an Act in 1954:

> *When I have control over native education The researcher will reform it so that natives will be taught from childhood to realise that equality with Europeans is not for them ... People who believe in equality are not desirable teachers for Natives ... what is the use of teaching the Bantu mathematics when he cannot use it in practice? The idea is absurd (House of Assembly debates Volume 78. August – September 1953: 3585).*

By this speech, Verwoerd explicitly named and politicized mathematics in the early framing towards apartheid and Bantu Education. As a direct consequence, black people were denied epistemological access to mathematics education. This speech plunged mathematics into a perpetual sea of unassailability for the poor, black majority. Moloi (2005) brings a historical account by positing that historically, the apparently unceasing shortage in both intake and success in school mathematics in South Africa has been largely blameable on a curriculum that was patently skewed in favour of a small minority of learners who would proceed to university training in areas such as engineering, manufacturing, medicine and other so-called 'hard skills'. It provided little to no opportunity to learners who only needed to apply mathematical skills in ordinary life situations. The curriculum was heavily content-laden, encouraged rote learning of mathematical techniques and algorithms and lent itself to very little application in everyday experiences of learners. He goes on further to say that besides

the universally known cognitive challenges that learners have to contend with in learning mathematics, in South Africa the then apartheid regime made access to this learning area particularly difficult on three fronts.

- Firstly, discriminatory provision for education on the basis of race limited severely the availability of adequate and appropriate resources for Black learners who constitute the absolute majority of the learner population in the country.
- Secondly, whatever learning support materials (LSM), particularly textbooks, that were available were based on western philosophies and were found not adaptable to local indigenous knowledge systems (IKS). The locus of the underlying pedagogy was on teaching rather than learning. Consequently, the curriculum was packaged into time-bound subject syllabi which required highly contrived and theoretical contexts in order to be accessed cognitively.
- Thirdly, the use of imposed foreign languages for instruction affected the acceptability of the curriculum, made learning in general very difficult and learning of mathematics in particular virtually impossible.

This study will look closely on the effects of poor achievement of African language learners against this background and try to ascertain whether the MTBBE strategy could widen epistemological access to mathematics, therefore reversing the debilitating effects of history. Dr Verwoerd became Prime Minister of South Africa from 1958 to 1966 when he was assassinated; he had sufficient time to entrench and implement his grand plan. South Africa is now left to contend with the products of his grand implementation plan affecting millions of black learners' years later. I find myself on several occasions having to defend my analyses of how the politicisation of mathematics education affected black people then and now. I have encountered colleagues and academics who ascribe to a colour-blind philosophy. They ignore race or pretend its personal, social, and historical effects don't exist. This approach ignores the incredibly salient experience of being stigmatized by society and represents an empathetic failure on the part of the black learner who has been characterised as unable to learn mathematics for reasons presented by colour-blindness. I intentionally make the analyses of achievement in terms of race as it has had material difference to the achievement or non-achievement of blacks in South Africa. Underperformance in mathematics has a colour and that colour is black, African and has a socio-economic status of Lower Bound Poverty (LBP).

Education is never neutral but is directed towards achievement of certain purposes, behind which rest fundamental issues such as philosophies of life, religious beliefs, ideas about the

state and society, language policies for education come into being: they too, do not exist in a vacuum (Hartshorne, 1995: 306). It is a pity that South Africans are reluctant to examine issues of pedagogy and power, they are trying very hard to reflect reconciliation (Mda, 2005) to a point whereby those who dare touch the issue risk heavy criticism. Qunta (1998) registers a concern about South African reluctance to discuss issues of race:

> *The issue of race is very difficult in our society. Yet there is a queasiness to deal with it in a frank manner. There appears to be an underlying assumption that to raise the issue would in fact provoke it and, conversely, that if we ignore it, we would be all living happily as one nation united by a common South Africanness ... (Qunta, 1998)*

Squelch (1993) purports that to gloss over the racial differences and the material difference they make in the lives of people does not change reality. The reality that cannot be disputed in South Africa as framed by Verwoerd is that through the duration of apartheid two education systems co-existed – one predicated on the goals of a First-World Education and primarily meant for whites, the other intended to produce a pool of labour, unfortunately blacks were recipients. Those inequalities deliberately engineered by colonial and neo-colonial policies deepened to a point where former President Mbeki characterised South Africa consisting of 'two nations, one rich and white, the other poor and black. When there's inequity in learning, it's usually baked into life (Fryer in Ireland, 2016). The odds escaping a poverty-ridden lifestyle, despite innate intelligence and drive, are a long short for Africans. This research should contribute towards changing the narrative for black children to triumph over baked-in societal inequality through education. If inequality starts anywhere, many scholars agree, it's with unequal education. Conversely, a strong quality education can act as the bejewelled key that opens gates through every other aspect of inequality, whether political, economic, racial, judicial, gender or health-based (Deval in Ireland, 2016). This study preoccupies itself with how MTbBE can be used as a viable strategy to widen epistemological access to mathematics to the black African language speaking majority.

1.6.2. The effect of poverty on mathematics achievement

The Centre for Development and Enterprise (CDE) has been conducting ongoing research into mathematics and science achievement in South Africa since 2004. In their research report they highlight how both mathematics and science are key gateway subjects that open up most higher education opportunities as they are critical competencies for the development of sorely-needed high-level skills. These in turn are vital for job creation,

economic growth and the full development of national capacities (CDE, 2014). The low achievement of black learners in mathematics plunges them further into a perpetual cycle of poverty. Of all the factors in South Africa that impact on mathematics and science achievement, socio-economic ones, especially poverty, may be the most important (Crouch & Mabogoane, 2001; Spaull, 2013). Contextual constraints affecting learner performance in mathematics are complex, intertwined and often structural. In South Africa these include a lack of facilities and resources at many schools, large class sizes, inadequate teacher education, poor learner commitment and discipline, inadequate parental involvement, to name but a few. Most of these derive from the country's apartheid history; the following is a list of significant research reports that examine a variety of factors impacting on learner performance in mathematics that have been published (DBE, 2010; Moloi & Chetty, 2011; Carnoy, Chisholm,& Chilisa, 2012; HSRC, 2013; NEEDU, 2013; Spaull & Venkatakrishnan, 2014; N. Taylor, Van der Berg & Mabogoane, 2013) as well as some other smaller studies (for example, Adler & Venkatakrishnan, 2014; Bohlmann & Pretorius, 2008). Of the variety of interpretations and explanations for the low academic mathematics achievement found among language minority students these four variables are key: poverty, language, culture and cognitive abilities patterns. Poverty is an important factor that cannot be subsumed under the notion of resources. Even controlling for resources, poor children, or schools in poverty-stricken areas, tend to perform much worse than others: *schools in very poor areas tend to have matriculation pass scores some 20 points lower than schools in richer areas,* even if one statistically makes resources equal. It is thus wise to be increasingly modest about how much one single sector such as education can achieve, until the worst aspects of poverty are dealt with via economic growth, redistribution, targeted anti-poverty programmes, and programmes aimed at increasing social capital. In the same vein, the education sector can control for language use in mathematics education thereby altering the status quo for millions of children who otherwise wouldn't have achieved.

1.7. Language: a source of tension in Africa post-independence

The main reasons for failure in education that exacerbates our problems leading to a downward spiral is the fact that African indigenous languages were left out of the education system as languages of teaching mathematics and science pre-independence. The status quo remains post-liberation, why is that? Alexandre showed in 1971 how in post-colonial Africa, one's degree of proficiency in the ex-colonial language had become a determinant

of class location and even of class position (Alexandre, 1972). Like in Europe and the US, in South Africa, the issue of language in education has been used as a basis for classifying and dividing people, and as the cornerstone of segregationist education policies (Mda, 2005). Hartshorne concurs with Mda that language policy decisions in South Africa have had to do with issues of political dominance, the protection of power structures, the preservation of privilege and the distribution of economic resources. Therefore, language in the school has been an instrument of social and political control (Hartshorne, 1995).

He identified two broad tendencies which conflict with one another in the development of language policies in (1) civil and political society on one hand, and (2) in the schooling system on the other. Since the 1960s post-independence in Africa, he posits that along with independence came a strong desire to free the newly liberated peoples from the languages which were part and parcel of the earlier imperialist political systems. There has been a resurgence of interest in the indigenous languages of Africa, numerous high-level conferences at which African academics and writers have pleaded for their greater use in the schooling systems of the continent, and attempts have been made within these systems to strengthen the position of regional and national languages. Yet at the same time these countries have had other language needs, and in the ex-British colonies these, in the main, have been met by English (Hartshorne, 1995). He goes on to quote Strevens (1966):

> *First English is often the only feasible language of internal political unity ... a language free from local partisanship ... In the second place, African states throughout the continent need a means of collaborating with each other ... and in the third place, Africa as a whole seeks a window on world civilisation ... in other words, the function of English is no longer a direct product of the political and social systems of Great Britain, it has purposes which are far more immediate and localised, independently of Britain. (Strevens 1966, cited in Hartshorne 1995)*

This tension between these tendencies leaves Africans frustrated as on one hand they recognise its practical usefulness, while on the other hand the fact that Africans had little choice because of the subjugation to a Western metropolitan culture which froze the development of their own languages. Spencer (1985) explains that the introduction of the colonial languages into African societies and their media of education and as communication instruments for the modernising process, froze the opportunities for functional development of almost all the African languages. It also froze linguistic competition between access to

new domains, and to some extent the European languages retarded the extension of existing African vernacular languages. An example of the impact of freezing of these African languages can be demonstrated by looking at the difference in status today between Afrikaans and indigenous African languages. Ndebele (1987) offers a plausible explanation when asking how can we fail to note that the supposed decision-makers were, structurally speaking, captive native functionaries of the colonial imperial powers? In reality, the functionaries merely responded to the call of necessity at a given point in time: the necessity of limited choices. Are we still tied with limited choices despite an array of impressive legal provisions post-colonialism and post-liberation? This study will attempt to critique the reasons behind an apologist attitude towards the intellectualisation project of developing African languages to higher status functions, post-independence. Alexander (2003) argues that African elites who inherited the colonial kingdom from the ostensibly departing colonial overlords, have made no more than nominal gestures towards equipping the indigenous languages of the continent with the wherewithal for use in powerful and high-status contexts. It is therefore important to highlight what many want to shy away from as an important reason for the underperformance of the majority, who are black and poor viz. language use in education. Mazruis (1998) lament this post-colonial tension by positing that an important source of intellectual dependence in Africa is the language in which African graduates are taught; intellectual and scientific dependence in Africa may be inseparable from linguistic dependence. This study will demonstrate intellectualisation efforts embarked on as an effort to reduce the post-colonial tensions gripping development.

1.8. Translanguaging a strategy used in multilingual classrooms in South Africa

The concept of translanguaging is essentially based on various notions of language use and bi/multilingualism (García and Wei 2014). Baker (2011: 39), who first translated the word into English, defines it as 'the process of making meaning, shaping experiences, gaining understanding and knowledge through the use of two languages'. García (2009a:41), however, has developed the term further, and what began as a pedagogical theory she now conceptualises as the 'multiple discursive practices used as a "norm" in which bi/multilinguals engage in order to communicate effectively and make sense of their bilingual worlds'. Looking back at my own experience as a bilingual mathematics learner, I concur with García and Wei (2014) when they define the concept of translanguaging as the multi-competence of bi/multilingual speakers who possess the ability to switch between

languages while integrating them within a single linguistic system (García and Wei 2014). I think back as we chatted away in catechism, during play and at church telling each other stories we read in comics or magazines moving between the two languages, either when isiXhosa equivalents escaped us or when we changed languages for effect. This was done outside of the classroom and in school. This phenomena is explained in several studies that have identified the use of translanguaging by bi/ multilingual speakers for effective communication outside the classroom (Wei 2005; García 2009a; Baker 2011). Angela Creese and Blacklegde posit that a growing trend reflects how educationalists are now eager to explore how bi/multilingual competencies can be employed within the mainstream classroom in order to enhance learning (Creese and Blackledge 2010). This study explored the potential advantages of using translanguaging as classroom pedagogy for assessment as learners used it extensively in the Natural Sciences and Technology June examination test. The basis of a successful translanguaging strategy is for learners to know that it is ok to use their language or the target language as need arises in their learning. In classroom observations of both mathematics and science lessons in MTbBE schools; there was extensive use as of translanguaging which was interesting for a homogeneous language setting like in Cofimvaba. The analysis in Chapter 8, will also reflect on how effectively students used translanguaging in aspects of their learning, particularly in the June examinations for both mathematics and Natural Sciences and Technology.

Creese and Blackledge (2010) assert that the concept of bilingualism was historically frowned upon in the Western context by monolinguals in the field of education who considered multilingualism and the notion of switching between languages as an academic deficiency (Creese and Blackledge 2010). Hence, the approach to bilingual education was until the mid-20th Century conflated with negative connotations (Saer 1923; Jones 1959). This was predicated on the assumption that by keeping languages separate, the teacher avoids cross-contamination of the languages (Jacobson and Faltis 1990), thus making the acquisition of a new linguistic system easier (Creese and Blackledge 2010). This is what our Irish school principal tried to do with all her good intentions. I thought she was right and did the same thing when I became a teacher, years later. Those ideas were a deficit model in bilingual learning held in the past (Saer 1923; Jones 1959; Setati et al. 2002; Shin 2005). The term translanguaging was developed by the Welsh educationalist Cen Williams (1994 cited in Baker 2011) – it was originally coined as a Welsh word (trawysieithu), referring to a pedagogical practice which deliberately switched the language mode of input and output

in bi/multilingual classrooms (Lewis et al. 2012). Since its original development, the term has been extended and developed by numerous researchers and scholars to refer to the various language practices of bilinguals as well as the pedagogical approaches that use those practices (García 2009a, b, 2012; Creese and Blackledge 2010; Baker 2011; Canagarajah 2011; García and Sylvan 2011; Wei 2011; Hornberger and Link 2012; Lewis et al. 2012; Sayer 2013; García and Wei 2014). This study will report on translanguaging in Cofimvaba.

1.9 Statement of the problem

Like in the rest of South Africa; African language learners make use of their home language as a language of teaching and learning (LoLT) in the first three years of education. In Grade 4, they then switch to an English instruction system until they finish Grade 12 and if lucky move to higher education, where English is the language of instruction. The schooling journey in Grade 4 for learners in Cofimvaba cannot be compared to English and Afrikaans speaking learners studying the same grade as it would be like comparing apples to bananas. The findings of the paper titled *Starting behind and staying behind in South Africa,* by Spaull and Kotze (2015) confirmed that the learning gap between the poorest 60% of students and the wealthiest 20% of students is approximately three Grade-levels in Grade 3, growing to four Grade-levels by Grade 9. It further posits that in South Africa, only the top 16% of Grade 3 students are achieving at Grade 3 level (Spaull and Kotze, 2015). If the vast majority of South African learners are not meeting the Mathematics curriculum requirements as early as Grade 3 when they are learning in their home language; the question is why? Academics choose simplistic answers that want to point out that other things than language have impact on this situation. A not so simplistic answer is the fact that when the system is designed to favour education in English and Afrikaans from cradle to university the snowball effect will reflect in the lower grades and become worse as learners progress with schooling. Szanton (2003) observes the fact that after forty years of political independence, the languages of the former colonial powers monopolise virtually all academic and intellectual discourse at African universities. Unlike the situation in most Asian countries, in Africa the local languages have not been adapted for use in academic debate, research or scholarly publications (Szanton, 2003). What one would assume as obvious is that if not a single Higher Education Institution (HEI) in South Africa offers Foundation Phase courses for educators in the Home languages they are supposed to teach in after graduation, why is there a question about the quality of Foundation Phase Mathematics in African languages. If HEIs find it is necessary to train teachers who will teach

mathematics in English and Afrikaans at Pre-Service and in-Service; why has it not been raised as an issue that black educators who graduate in all our HEIs to teach mathematics in the Foundation Phase in either isiXhosa, Sesotho or any of the indigenous official languages are all trained through English and Afrikaans. They are left on their own to navigate teaching in the Home Language in their classrooms with no training in it? Therefore the poor performance of HL speakers in mathematics cannot be attributed to [teachers or] learners' limited language proficiencies in isolation from the wider social, cultural and political factors that infuse schooling (Setati et al., 2008). Unlike for the Afrikaans and English L1 child whose concentration is on cognitive development in mathematics; for the African language speaker cognitive matters cannot be separated from socio-political issues relating to language and power when exploring the teaching of mathematics in classrooms where learners do not have adequate facility in the target language. What has become obvious in the South African assessment data is that when we compare the achievement of children who learn and are assessed in their HL (English and Afrikaans) with those who learn and are assessed in a second language (usually English for the 78% of students who use an African language), there is a significant gap in achievement of between 32% for African language speakers and 69% for speakers of English and Afrikaans. This means that the majority of African students are so far behind by Grade 6 that it is unlikely they will catch up with speakers of English and Afrikaans. They are the most vulnerable in terms of future employment, health and poverty (Heugh, 2015).

1.10.Research questions asked:

1. The main concern of this study revolves around lessons that can be learnt from the Mother Tongue-based Bilingual Education (MTbBE) pilot in Cofimvaba, and whether these lessons support the case for extending MTbBE for African language learners beyond Grade 3?

From these lessons,

2. What is the performance of MTbBE learners in the mathematics test in their 6th year of exposure to learning mathematics in isiXhosa compared to that of learners who are not part of the program? Does this say anything about the role of language in mathematics learning, in the Cofimvaba case study?

3. The language of tests: what elements could present comprehensibility challenges in how mathematics examination scripts are set, whether in isiXhosa or English or bilingually?

4. What strategies do learners use to mitigate language barriers when faced with tests?

5. Do the Natural Science and Technology test results; demonstrate that MTbBE learners were able to understand questions in English and respond as required? What does this tell us about their development of proficiency in English? Does this disprove the oft cited concern that English proficiency will suffer as a result of instruction in the Mother Tongue?

1.11. Significance of the study

Research projects as early as the 1930s and later on, have described what happens in multilingual mathematics classrooms where English is the LoLT of ESL learners (Adler, 2014; Moloi, 2005; Setati, 2005). They have described the challenges experience by learners who learn through an underdeveloped second language. This study is not about describing the tension between teaching the African language majority mathematics through either English or the mother-tongue. It is a study exploring lessons that can be learnt to improve mathematics learning when a Mother Tongue based-Bilingual Education (MTbBE) strategy is extended beyond Grade 3 for teaching and learning mathematics (and science) in Grade 6. In Africa, there has been one significant study that focussed on what happens when the language of instruction is extended beyond the Foundation Phase; it is the Nigerian Six-Year Ife Primary Project (SYPP) that was piloted from 1970 initiated by Professor Fafunwa. The SYPP was an experiment implemented on a small scale in the Ife Province in Southern Nigeria. Afolayan (1976) describes the context in which the project was conceptualised as the following:

> *The average Primary Six pupil leaves school without the ability to recognize the Nigerian flag, any awareness of the nature of his country politically, economically or socially, tools for continuous self-education through permanent literacy, or hope for any bright future in the community. He is completely alienated from his agricultural background and generally can only see himself as a failure ... (1976)*

The project was primarily concerned with the question of the most appropriate language policy for efficient primary education, to address the deficiencies described by Afolayan (1976) above. The main objective was enhancing the quality of learning achievement and bilingual language competence at the primary level, by (i) laying a solid foundation in both English and Yoruba (ii) Teaching in, with, and from the first language all through the primary education cycle (Obanya, 2004). The five experimental groups involved in the study included both rural and urban students. They were taught all content subjects in Yoruba, while English was taught by specially trained teachers. The major findings of the study were

that learners achieved significantly higher scores in all subjects including in both Yoruba and English. They also adapted easily to English medium requirements at the secondary level (Obanya, 2004).

Despite all the discussion and research papers presented on the issue of language and learning mathematics; there is no documented evidence on the kind of study that extends the mother tongue for learning mathematics and science in South Africa beyond Grade 3 hence the study in Cofimvaba. The pilot LTP Project in the Western Cape was an attempt to try out the MTbBE strategy (WCED, 2006); it was aborted prematurely. The Eastern Cape attempted the Home Language-based Bilingual Education (HLbBE) to experiment on Additive Bilingualism, there is no documented report on the results of this pilot; there are theories of why this project failed. This study will attempt to provide empirical data as to Mother Tongue based-Bilingual Education as a viable strategy beyond the Foundation Phase. The difference in my study with the Nigerian six year Project is that while the Ife Study experimented with all the content subjects in the primary school; the Cofimvaba study is concerned with only two subjects, Mathematics and Natural Sciences and Technology. The reasons mainly are the poor results in both subjects despite a high investment from government, funding agencies, NGOs and other social partners. Mathematics and Science in South Africa are top of the agenda with a big injection of funding but with very little returns on investment, particularly for African language learners. More discussions on this matter are expounded on in Chapter 2 chapter of this study. The results of this study will provide government and policy makers with classroom data to help support the Language in Education Policy Implementation (1997). Despite its good intent and forward thinking on multilingualism as the norm, the policy has remained a paper policy with no funded implementation plan. English and Afrikaans have maintained their prominence and primal status quo in education and public life at the expense of the languages spoken by the majority. Benson (2008) argues that the effects of colonisation on people's language attitudes and practices, and by implication their cultural beliefs, identity and self-esteem, cannot be underestimated. While the various colonial powers differed in their explicit policies and practices (assimilationist or separate-and-unequal development), length of time present in the region, and type of involvement (cultural, political, economic and so on), they strongly influenced the linguistic habitus and linguistic market of the colonised, who could simultaneously be considered both victims and co-conspirators. The complacency and complying neither passively nor critically with the symbolic domination of the colonial

language and values, is described by Pierre Bourdieu as a result of "dispositions which are impalpably inculcated, through a long and slow process of acquisition, by the sanctions of the linguistic market", given the chances of material and symbolic profit for holders of a given linguistic capital (Bourdieu 1991 in Goke-Pariola 1993). Whether the "linguistic capital" was English, Portuguese, Spanish, French or another language such as German, Dutch or Italian, the major effect of the colonial change in habitus and market was to push people's own languages and cultures into the background, if they were to exist at all (Goke-Pariola, 1993). This study aims to move away from ideologising and rhetoric that has produced no real fruits of implementation, as it sets out a real case study that has made real difference to the lives of children in the Eastern Cape. It has already prompted other provinces to visit the Eastern Cape to find out how to implement MTbBE. It has definitely assisted government to move towards real implementation; a move away from statements of intent that Language Policies in Africa have become. Its real significance would be to provide South Africans with evidence that MTbBE can work (see Chapter 6).

1.12 Contextualising the study

The Eastern Cape (iMpuma Kapa in isiXhosa) is one of the nine provinces of South Africa. Formed in 1994 out of the Bantustan homelands viz. Transkei and Ciskei together with the eastern portion of the Cape Province. This study is located in Cofimvaba, a rural area in the Chris Hani District Municipality. Bisho is the capital town where the seat of government through the legislature resides. It is led by a Premier and his EXCO, who are Members of the Executive Committee (MEC). Port Elizabeth and East London are the two largest cities. The area is situated in a landscape of a total of 168, 966 km ² with a population of about 6, 522, 700 (2018 estimate). There are two metropolutain municipalities and six district municipalities in total namely: Nelson Mandela Metropolutain Bay, Buffalo City Metropolutain Municipality , Sarah Baartman, Amathole, Chris Hani, Joe Gqabi, OR Tambo and Alfred Nzo. The density 39/km (100/sq ml) and it ranks 6th in South Africa in terms of density. The population makeup according to the 2011 Census was 98.3% Black African, 0.5% Coloured, 0.3% White, 0.3% Indian and 0.5% other foreign nationals. The recent trend has shifted with a decrease in population numbers to 86.3% for Black African, 8.3% Coloured, 4.7% White, Indian or Asian 0.4%. The languages spoken are isiXhosa 78.8%, Afrikaans 10.6%, English 5.6%, Sesotho 2.5%. English is spoken by 2.6% while the other 4.3% is a mix of other languages (2018, www.ecprov.gov.za). In the Cofimvaba village, isiXhosa is spoken by 93.1% of the villagers,

English is spoken by 2.6% while the other 4.3% uses a mix of other languages (Census, 2011). The research takes place about 79 km east of the nearest town Queenstown. In Cofimvaba, like in the rest of South Africa; African language learners make use of their home language as a language of teaching and learning (LoLT) in the first three years of education. In Grade 4, they then switch to an English LoLT system until they finish Grade 12 and higher education. Their schooling journey from Grade 4 cannot be compared to English and Afrikaans speaking learners as we would be comparing apples to bananas. The focus of this study is investigating what we can learn from delaying exit in Grade 3 to Grade 6 when teaching and learning mathematics using a Mother Tongue-based Bilingual Education strategy? In this monolingual rural setting of Cofimvaba, isiXhosa is the home language of the majority of children and educators; it was used as the main LoLT until Grade 7. In 2011, 72 schools that underperformed in the ANA in mathematics were selected to partake in this pilot study where mathematics and science would be taught using the Mother Tongue-based Bilingual Education strategy (MTbBE). Underperformance was the criteria of inclusion in the sample.

Cummins (2009) distinguishes between three different aspects of proficiency in a language (a) conversational fluency, (b) discrete language skills and (c) academic language proficiency. The English language proficiency of Grade 6 learners in Cofimvaba can be placed on the first level of proficiency as described by Cummins (2009). Given the Census data (2011) of homogeneity in Cofimvaba, chances that Grade 4 learners in Cofimvaba will achieve conversational fluency in English well enough to learn through it are virtually zero. Hence the MTbBE pilot.

Prah (2009) critiques the notion of an additive multilingualism policy in an African context by stating that Africans are among the most multilingual people in the world. However, he qualifies this multilingualism by saying that this richness in command over languages is mainly oral, with little basis in literacy. He continues by stating that this weakness means that the foundations of multilingualism in Africa are tenuous. It is a multilingualism which suffers from the debilities of orality as opposed to literacy (Prah, 2009). Initiation into English of these learners is purely Transitional Bilingual Education (TBE); the move to use English as a Language of Instruction (LoLT) despite these low levels of proficiency, is based on the educational rationale of perceived priorities that children must function in the so-called 'international language' (Baker, 1991). Having gone through Mother Tongue -based Bilingual Education from Grade 4, these learners have been exposed to their home language as LoLT for mathematics and Science; with English LoLT in the other 4 learning areas in Grade 6. I am aware of the differences between the labels "bilingual" and "English Learners", for the sake of

this study, the researcher will use "bilingual mathematics learners" to refer to the Grade 6 learners. They have acceptable levels of discrete language skills in English; the analysis of their science results should evidence this. The Cofimvaba community is homogenously monolingual; learners hear academic English mainly at school (Alidou, 2004) from teachers, and mainly television at home if they are lucky to own a set.

In the Eastern Cape, change is driven by a complex mix of political, economic, legislative, environmental and social forces that act on a local, regional, national and even international level. Years of democracy and consistent economic growth since the end of Apartheid have helped the province prosper in some parts, while other areas have stagnated in poverty and underdevelopment. Cofimvaba is one of those small villages that prosperity has forgotten. Large scale growth and development plans like the Wild Coast SDI in Umtata and the Coega IDZ in Port Elizabeth, together with luxury coastal resorts and a flourishing ecotourism industry are juxtaposed with rural areas without sanitation and electricity. Land degradation, droughts and the downturn in livestock farming reinforce human migration patterns to overflowing urban centres and a dependence of rural communities on grants and remittances. Various people ascribe these challenges to conflicting interests of government; conflicting interests of traditional leaders and conflicting interests of the poor, further impede progress. It is truly a land of diversity, steeped in history, with all the challenges and opportunities that come with such heritage (Hamann and Tuinder, 2012). The education system has suffered in the province as a result of Apartheid, Bantustanism and lately political factionalism. It is recent that we have seen a steady increase in the pass rates and a dedicated executive to changing the lives of the majority of children in the province. The province is vast, homogenously black African and rural. Whatever will work in the Eastern Cape can work for the majority of the rural provinces who have similar features like us viz. KwaZulu Natal and Limpopo.

1.13 Research Methodology

Cohen et al (2000) ask a pertinent question in the opening chapter on case studies that how can knowledge of the ways in which children learn and the means by which schools achieve their goals be verified, built upon and extended? They say that this is central for educational research. There are three broad approaches outlined in their book on educational research namely (1) the first is based on the 'scientific paradigm, and rests on the creation of theoretical frameworks that can be tested by experimentation, replication and refinement. The second approach seeks to understand and interpret the world in terms of its actors and consequently

may be described as interpretive and subjective. A third, emerging approach that takes account of the political and ideological contexts of much educational research is that of critical educational research (Cohen et al, 2000). For the purposes of this study The researcher will utilise a case study approach tracking the performance of the MTbBE Grade 6 cohort within a specific context of Cofimvaba. Of the three paradigms presented by Cohen et al; the paradigm most suited to case study research is the second one, with its emphasis on the interpretive and subjective dimensions.

A case study is described as a specific instance that is frequently designed to illustrate a more general principle (Nisbet and Watt, 1984). Adelman et al (1980) describe it as the study of an instance in action. They further posit that the single instance is of a bounded system for example a child, a clique, a class, a school, a community. It provides a unique example of real people in real situations, enabling readers to understand ideas more clearly than simply by presenting them with abstract theories or principles. They go further by stating that indeed a case study can enable readers to understand how ideas and abstract principles can fit together (Aldeman et al., 1980). This case study draws on the case studies presented by Holm and Holm (1990); Ramirez et al (1991) and the Nigerian Six Year Primary Project (Bamgbose, 2000). The cohort under study has been followed for a three year period since they exited Grade 3. Instead of changing LoLT in Grade 4 this cohort maintained their HL (isiXhosa) for mathematics, Natural Sciences and Technology (NS Tech) right through to Grade 6 thus employing a late exit model (Ramirez & Merino, 1990). The bounded system of a case study to be presented is the Grade 6 MTbBE cohort in Cofimvaba; providing a unique example of these learners in their specific context. It will employ a mixed method design which is both qualitative and quantitative in nature. The qualitative part has to do with the narrative descriptions of the pilot study (Koshy, 2010) whereas the quantitative analysis will be of the 2018 June mathematics and NS Technology results for both the MTBbE cohort and the non-MTBbE cohorts.

1. 14 My personal journey:

In my opening statement in this chapter I state that one of the influences in pursuing this area of work was my education in a missionary school for my primary schooling. Looking back at my history, I thought of my education at a Catholic school as a privilege, having opened vistas for me and having exposed me and my entire family to a multilingual and multicultural environment. I never understood why our neighbour's children who attended government schools could not perform at our level, particularly in English. I never understood why we were

considered in a negative light by attending this exclusive school. It only dawned on me much later when I attended a government high school; why our life in the missionary school was removed from the reality of the rest of our people; and why in the process we were deliberately removed from the rest of our community.Moloantoa (2016) in his article about recording and documenting the establishment, growth and development of ten missionary schools of excellence makes a statement that Mission education schools were established to evangelize and educate entire communities. I want to highlight that it was select communities; one had to either be baptised into the mother church or convert and accept the religion. It was sometimes awkward for some children as their parents refused to leave their churches of origin with the result of only the offspring being Catholic in search of a better education. Moloantoa (2016) goes on to further say that the intentions of missionary education were both deliberate and not. Their founders clearly deviated away from colonial intention of total subjugation of indigenous groups by espousing the educability and advancement of the black population. He says, these pockets of excellence in missionary schools offered black students the same kind of education comparable to that which white students received; it was this polished and quality education which offered black students like black leaders from these schools (Rev John Tengu Jabavu, Rev Tiyo Soga and Rev Charles Pamla early African religious leaders) and South African Political leadership (of the likes of Nelson Mandela, Robert Sobukwe, Oliver Tambo, Govan Mbeki, Charlotte Maxeke, ZK Matthews) and others with the courage to fight human injustice. It was missionary education which predisposed these leaders and the likes of Thabo Mbeki, Steve Biko and many others to be empowered to take a stand against racial prejudice and to be at the forefront of the struggle for freedom in South Africa (Moloantoa, 2016). I partly agree with him on the first part; and wholeheartedly agree with the last statement that the beliefs of missionaries however, were a long way from liberation theology (Moloantoa, 2016). I have always appreciated the multicultural environment we were exposed to; it is something that I hold dear and has made me to escape the '*wit gevaar*' syndrome that seems to grip people in work environments. When a white person has spoken, no matter how foolish or meaningless their contribution is; people find it hard to engage or disagree with them in fear of disrespect. Thanks to being exposed from a very early age to all racial groups in my primary school I don't have that. The benefits of this multiculturalism and multilingualism are explained by Elphick (2012) that mission schools had amongst their admissions children of the white teachers, missionaries and colonial authorities placing black students in a multilingual setting. He further says, the entire enterprise of mission schools stood at an ambiguous, and conflicted crossroads; it was partisan to the colonial project, but yet educated students who were opposed to

colonialism. We were also very fortunate to have been introduced to a plethora of ideas with some educators nurturing strategies of critical thinking in various ways.

Mda (2005) in her article about integrated schools posits that teachers have a significant influence on young learners, she further says it can be assumed that they transfer, intentionally or otherwise, their beliefs, aspirations, values and interests. Language as the transfer of culture, values and belief systems, becomes important in that transfer (Mda, 2005). This affected us in both negative and positive ways. Learners in our school were African language speaking; the principal was an Irish nun. All English teachers were white nuns; their language, belief system and culture was promoted in the middle of a township in the 1980s. I concur with Christie (1990) that since the move to open Catholic schools was not prompted by any dissatisfaction with them, these schools "appeared educationally sound, and thus escaped closer scrutiny".

The value system of our school brewed in us a feeling of being the 'cream of the crop' as our school was privileged with funds; creating a chasm between us and learners from poor public schools. The false sense of status elevation that came with English proficiency became a marker of class. We swooped all competitions whether it was sports (we had full sports equipment); music competitions (we had a professional music teacher who played the piano during school mass and taught music theory). During readathons we recited poems and novels with an Irish twang practised well before competitions. We sometimes understood very little of the meaning of the poems recited and books read with eloquence. This set us apart from our neighbours, friends and relatives. We were not like 'them'; nor were we like the women who spent time on making us better blacks. Great effort was spent correcting spelling and pronunciation on our weekly coaching for Bible reading and responsorial psalms, in proper English. I appreciate how it contributed to my own literacy development; making me very aware of my own literacy practises. I however do not appreciate, how this was done informed by a false metaphor underlying missionary belief of creating from us a layer/ strata of literates to move us away from our cultural roots as we had to strive to spell and sound like the English teacher. The metaphors as defined by Scribner (1988) as literacy as adaptation and literacy as state of grace, aptly define my education. In our school, literacy was confused with English literacy. It was held that literacy was the key to social and economic access and would provide a solution to functional English problems of individuals. Literacy in the home language isiXhosa did not count. On Fridays a white priest offered school Mass and 6 white nuns; the entire school and other teachers were African language speaking; the whole service would be run in English. We were meticulously taught the responses in English; it was much later that

Bible readings would be done in isiXhosa. A Sesotho minority group demanded the same be done for Sesotho in our Sunday Mass led by a Sesotho educator creating multilingual services. On the positive side; the beginnings of consciousness were implanted in me by isiXhosa educators; they found a way to use literacy to empower us particularly through writing.

Writing became an empowering tool where it broke the culture of silence (Edelsky, 1991) characterising our school. At the time, none of us understood why our teachers pushed the agenda of literacy as power; we weren't aware that a silent struggle was happening within the school. These educators used the only means they had viz. literacy, as an instrument for praxis to promote a more just environment (Walsh, 1991); they showed us how to read the situation between the lines. They encouraged us to critique the status quo through writing without saying much. Lastly; the notion of literacy as grace represented literacy as a kind of salvation in which *the literati* were considered to have special virtues. The belief that there was an intellectual divide between literates and non-literates was rife and created tensions and rifts. It was compositions and orals that we were given to critically discuss and debate all these issues that has stuck with me. It forced me to think outside of the box and begin to see the other side of the story; it made me angry for a while when I attended a government high school and realised that there were none of the opportunities we received at our missionary primary school. Nothing prepared me for the misery at high school as I began the slow process of integration to a life experienced by the majority of black learners who attended public schools at the time. Shortage of budget for black schools, too few classrooms, overcrowded classrooms, underqualified teachers (Christie, 1988); no libraries; no sports field; excessive corporal punishment by frustrated educators, no teaching aids and loads and loads of frustrated and discontent students whose life had turned them into bitter, violent and fearless youngsters. I knew at that moment that there was something wrong with a privileged life in a missionary school across the road in the same area for a select few; and a miserable environment in a public school in close proximity for the majority. These were the beginnings of my commitment to contribute to social justice activism, no matter how small that contribution would be. I began to appreciate the privilege of attending the missionary school, and appreciated even more the heightened awareness nurtured forcefully in my public high school which propelled as sense of intolerance for injustice.

Kaschula (2013) in his adaptation of Konner (1993) describes the political moment of the time as requiring urgency. His apt words define what I feel that it is time to choose, and to choose now, either for or against the further evolution of the human and linguistic spirit. It is for us,

in 2013 [2019] to apply whatever knowledge we have, in all humility but with due speed and to try and learn more as quickly as possible. He goes further to posit that it is for us, much more than any previous generation, to become serious about the human future, linguistically, environmentally and otherwise, and to make choices that will be weighed not in a decade or a century but in the balances of geological time. It is for us, with all our stumbling, and in the midst of our dreadful confusion, to try and disengage the tangled wing. This study might be riddled with what some may view as academically invalid or not making academic sense; I am not trying to be an academic I am trying to present and highlight best practices that have been achieved by the Eastern Cape in widening access to meaningful mathematics learning for the children of Cofimvaba; and investigate what lessons can be learnt that can be replicated to widen epistemological access. The use of autoethnography as a reporting style is deliberate to validate the author's experiences, that have led her to conduct this kind of research.

1.15 Structure of the thesis

This thesis is written in nine chapters in the order below and has a separate CD for appendices.

Chapter 1 introduces the research by outlining the current status of the performance of South African learners in mathematics particularly African language learners. There is an extensive discussion on language as an issue in the education sector. I bring a personal angle into the discussion by explicating my personal journey and what shaped my interest in this area of work. The statement of the problem follows, a discussion on translanguaging is also included, context of the research, research questions, and significance of this study. The structure of the thesis and chapter summary conclude Chapter 1.

Chapter Two presents a timeline of the history of Language Policy implementation in South Africa from pre-colonial education to the current language-in-education policy provisions.

Chapter Three looks at the theoretical framework informing Mother Tongue-based Bilingual Education (MTBbE) /Home Language Education. It reports on some case studies significant for Mother Tongue Education undertaken in various parts of the world. In addition this chapter will report on the Cofimvaba MTBBE project from its inception in 2011 up to its present form. It reports on the phases of implementation including: advocacy, sampling, teacher training, resource development for learning and teaching viz. terminology development; translation and versioning and the use of Translanguaging as a strategy.

Chapter Four reports on the Mother Tongue-based Bilingual Education (MTbBE) project: Cofimvaba (2011 – 2016)

Chapter Five is a chapter on research methodology and a discussion on the methodologies employed in this study viz. research paradigms and approaches; mixed methods (qualitative for reporting on the pilot and quantitative for data analysis of test scores).

Chapter Six presents the data, and an in-depth analysis of the June Mathematics Test results of both the control (non-MTbBE) and experimental (MTbBE) group.

Chapter Seven presents the data, and an in-depth analysis of the June Natural Science and Technology test results of both MTbBE and non-MTbBE groups.

Chapter Eight discussion the findings both from the learner data set in relation to the teacher data set (demographics including age, qualifications and experience).

Chapter Nine discussion on recommendations, suggestions, summary and conclusion of the study.

1.16 Chapter Summary

This Chapter provides an insight into the study by discussing language an issue in Africa and also engaging on the centrality of language for mathematics learning. It highlights the tensions that exists post-independence in African countries and how this contributes to the further freezing of the development of African languages. The statement of the problem was discussed; research questions outlined; and the significance of the study. The context of Cofimvaba was highlighted; my personal journey outlined and the structure explicated. Chapter 2 will engage robustly with the history of language policy and planning in South Africa employing a time line demonstrating significant years for Language in Education Policy and Planning.

CHAPTER TWO

THE HISTORY AND DEVELOPMENT OF LANGUAGE POLICIES IN SOUTH AFRICA

2.1. Introduction

In multilingual countries, international and national studies indicate that issues around languages of instruction are challenging because of complex social, political and economic factors associated with language usage (Van Laren and Goba, 2013). This point is echoed by November (1991) that education cannot be examined in isolation from the political and socio-economic imperatives that operate within society (November, 1991). This chapter will outline the historical language policy environment of the previous South Africa with its exclusionary scenario that had no intention of language planning to cater for the social, economic and educational needs of the indigenous people in South Africa. Hartshorne (1992) supports this view by arguing that in South Africa, the history of the use of language in African schooling has revolved around the relative positions and status of English, Afrikaans and [then] the African languages, and been determined by the political and economic power of those using the dominant languages. The decisions were taken 'for' and not 'by' those most closely involved, they served to divide African communities and limited social mobility and access to higher education. The interests and wishes of the users (pupils, teachers and parents) were subordinated to the political and economic purposes and ideologies of the two white groupings. The conflicts between these groupings also spilt over into black schooling, and in particular found expression in the language policies laid down from time to time (Hartshorne, 1992). He argues further that language policy decisions were never taken by those who use African languages in their everyday life, and ironically, when decisions were taken in favor of those languages they were taken without reference to their users, and for purposes far removed from any that had broad community support or any educational value to Africans. It is in this context that the sentiment by Hawes (1979) is most fitting that language policies for education are highly charged political issues and are seldom if ever decided on educational grounds alone (Hawes, 1979). In this chapter, The researcher will demonstrate how the artful implementation of hegemonic historical language policies of the past; makes it virtually impossible for the new Constitution (1996) and the Language in Education Policy (1997); to make any material difference to the lives of the majority of citizens who are black and poor. It tries to outline the alignment of language and power characterizing the apartheid era and how the current language

policies still reflect the relative positions of English and Afrikaans, despite being transformative in nature.

2.2. The historical role of language use as an instrument of power

Social theorists such as Pierre Bordiue, Jurgen Habermas, Michel Foucalt, Norman Fairclough and others; recognise that it is not just that language has become perhaps the primary medium of social control and power; language has grown dramatically in terms of the uses it is required to serve. To try to explain the historical role language has played in maintaining the ideologies of both colonialism and apartheid in South Africa, one cannot agree more with Fairclough (1989) that ideologies are linked to language, because using language is the commonest form of social behaviour where we rely most on 'common-sense' assumptions. The historical bilingual policy of the past reflected only the linguistic diversity of white South Africa; it is sad how post-1994, the models of the 1909 Official bilingualism are superimposed on current reality. The issue of educational access since democracy, in South Africa is no longer about institutional access; since the advent of democracy, all educational institutions were forced to go through a process of opening their doors to all. Institutions that were reserved for certain racial groups or language groups were to incorporate non-racialism and multilingualism as defined by Section 29 of the Constitution (1996). The issue now is where there is institutional access for all racial groups, there is no guarantee that epistemological access (meaningful access to the curriculum, will take place), language being at the centre of access or failure. Therefore, language in the school remains an instrument of social and political control. Like in Europe, the United States and in other developed countries, in South Africa the issue of language in education has been used as a basis for classifying and dividing people, and as the cornerstone of segregationist education policies.

Language policy decisions in South Africa have had to do with issues of political dominance, the protection of power structures, the preservation of privilege and the distribution of economic resources. The apartheid government had a penchant for structural and organisational uniformity; this ensured that all systems are aligned to serve the white population. This chapter identifies some of the issues that have emerged historically in language in education policy in South Africa; signified by important political eras and the subsequent elevation of both English and Afrikaans which South Africa has to contend with post-colonialisation and apartheid. For the purposes of this chapter, I distinguish the periods that changed the language policy landscape significantly in order of appearance. The most important factor being that when the

Dutch colonists came to establish a freshwater station in the Cape, the Khoi and San were there speaking their languages; the amaXhosa were also there speaking isiXhosa. Language policies had no role before the arrival of the whites in the Cape; as there was no formal schooling.

2.2.1. The arrival of whites in South Africa and the birth of Afrikaans

When Dutch colonists arrived at the Cape in 1652, the Khoi, the San and the Cape Nguni spoke their distinct languages with the structure of one language influenced by the other. The languages were not written down; but were well established and rich orally, in poetry and music. In 1658, the first school opened at the Cape with Dutch as Medium of Instruction. The origins of Afrikaans as a language are a contested issue. Creolists have argued that Afrikaans is a 'semi-creole' or 'creoloid'. They have put strong emphasis on the possible influence of the indigenous Khoikhoi. According to this theory, they picked up the primitive Dutch and English trade jargons prior to the founding in 1652 of a Dutch settlement. It served as the basis for the development of a pidgin language among the Khoikhoi in the second half of the seventeenth century. What some call 'Khoikhoi Dutch' soon became well entrenched at the Cape. Slaves began arriving in considerable numbers in the final decades of the seventeenth century. Since they came from different places and therefore there was a strong need for a lingua franca. The theory argues that the already existing Khoikhoi Dutch greatly influenced the slaves in the development of their own Dutch pidgin. Afrikaans developed out of a Dutch stem into a distinct language as a result of the interaction of imported slaves, indigenous Khoikhoi and European colonists at the Cape of Good Hope founded as a refreshment station. Afrikaans developed in South Africa out of a Dutch stem as a result of interaction between European colonists, who arrived there in 1652, slaves imported from Africa and Asia, and indigenous Khoisan people (Gilliomee, 2003).

The struggle to gain recognition for Afrikaans as a written language was directed and carried out from the town of Paarl. The Guild of True Afrikaners (Genootskap van regte Afrikaners) had its inaugural meeting in 1875 with the aim to establish the new language of Afrikaans in a written form. The Afrikaans language Monument was erected in 1975 in Paarl to honour the Afrikaans language.

By the 1930s there were fewer than two million people who spoke Afrikaans as a first language. English, which became the official language in 1806 in the Cape Colony, threatened both Dutch, the official language between 1652 and 1795, and Afrikaans. The dispersal of the Dutch or Afrikaner colonists across South Africa, the rise of Afrikaner nationalism triggered by the

South African War (1899–1902) and widespread Afrikaner poverty in the early decades of the twentieth century created the conditions for the rapid growth of Afrikaans as public language. Under the Dutch East India Company, which governed the Cape Colony between 1652 and 1795, Dutch was the language of administration and of the Dutch Reformed Church. Britain conquered the Cape in 1795 and after a short interlude again in 1806. More than 90 percent of the Europeans in this new British colony were people called Dutchmen or Afrikaners who spoke no English. The British rulers nevertheless in 1828, made English the language of administration and the courts (Gilliomee, 2003). Between the mid-1830s and mid-1840s some 15 000 Dutch or Afrikaner colonists, also called Boers, moved out of the colony and by the 1850s had established republics in the Orange Free State (OFS) and Transvaal whose official language was Dutch. Due to a serious lack of schools only a thin layer of well-educated Afrikaner colonists in the Cape Colony and in the two Boer republics could speak or write Dutch correctly; the others spoke the vernacular known as Afrikaans.

2.2.2. The Anglo-Boer War/South African War 1899

As the language evolved, the white Afrikaans speakers distanced themselves from the predominantly English-speaking community. Believing themselves to be the true white owners of the land and rejecting any claims by natives (Anglicization Policy of Lord Milner, 1902).

2.2.3. The Language Accord (1909- and the formation of the Union 1910

F.V. Englenburgh, editor of the pro-Botha Volksstem and Botha's biographer, remarked that It should not be forgotten that whereas the fathers of the Constitution accepted the absolute equality of both languages in all good faith, English-speaking South Africa never took the matter seriously (Englenburgh, 2003). He goes on to say that Bilingualism was regarded as nothing more than a polite gesture towards the other section – neither more nor less. The average English-speaking South African was inclined to regard every political recognition of the Dutch language as a menace to the interests of his own race. The flashpoint was the civil service, which continued to be dominated by English-speakers in the higher ranks until the Second World War. When the first Union cabinet met in 1910 it resolved that no civil servant employed at the time of Union who was fluent in only one of the official languages would be forced to learn the other official language (In practice this related only to English-speakers). New appointees had to be bilingual to be considered for promotion. Under pressure from the staunchly pro-Empire Unionist Party, Smuts watered down this requirement. Equally important in this decision was the fact that the Afrikaners were far behind English-speakers in terms of education. The Afrikaner community produced far fewer suitable candidates for the civil

service than the English community. In 1915 only 15 percent of Afrikaner children had advanced beyond the seventh school year (Standard 5), and only 4 percent had progressed far enough to become proficient in English. As a result, progress in bringing Afrikaners into the civil service was very slow. Afrikaners made up only a quarter of those newly appointed in the first five years of Union.

Language had become embroiled in the political and status struggles of the two white communities. At the heart of the Afrikaners' nationalist struggle was the attempt to imagine a new political community with an own name and a language enjoying parity of esteem with English in the public sphere. Only then would their sense of being marginalized be overcome. They wanted Dutch to be heard in Parliament, the civil service, schools, colleges and universities, and in the world of business and finance; it had to be the medium of newspapers, novels, and poems, giving expression to what was truly South African. Instead of English-speakers portraying Afrikaners in reports, novels or histories as everything they were not: unrefined, semi-literate, racist, dogmatic, and unprogressive, the Afrikaners had to define and present themselves to the world as the true (white) South Africans. For Afrikaner nationalists this cultural revolution had to culminate in the establishment of Afrikaner political dominance and economic advancement. Ultimately the Union of South Africa had to make way for a republic that was independent of Britain (Giliomee, 2010).

The Language Accord in Article 187 of 1909 put Dutch and English equally. In the 1909 Language Accord officials were required to be bilingual in both Dutch and English. When the Union was established in 1910, Official bilingualism was enshrined in Article 137 of the 1910 Union Constitution. It affirmed that both the English and Dutch languages shall be official languages of the Union, and shall be treated on a footing of equality and possess and enjoy equal freedom, rights and privileges (Hartshorne, 1992). This decision was to have far-reaching implications for black education in the long term. In the meantime, for the next thirty years or so, the role of the two official languages in white education was to be the dominating issue. There was a growing emphasis on exclusive Afrikaans mother tongue instruction in separate schools, as opposed to a dual medium policy favored by leaders such as Jan Smuts. The desire was for the creation of a powerful Afrikaner identity which would provide the emotional drive for the acquisition of political and economic power (Hartshorne, 1992). Dirven (1987) refers to the official bilingualism of the time as 'parallel bilingualism' which, according to him, meant that two or more official languages have equal official status and that anybody can at any time and in any place use either, at least in principle' (1987).

At the time of the Union of South Africa, English was firmly entrenched as the dominant language in black schooling. Dutch/Afrikaans had not become an issue, while in the Transvaal and Natal there was a growing lobby in favor of a greater use of the 'vernacular' languages, as African languages were then called. This position continued until the 1930s. In 1915 literacy levels among the Afrikaners were very low and they felt the debilitating effects of the South African war. In 1935, the Interdepartmental Committee on Native Education the Welsh Committee, began its investigation on the issue of the language policy for natives (Desai, 2012). As far as medium of instruction was concerned, the pupil's mother tongue was to be used for the first six years in Natal, for the first four years in the Cape and Free State, and for the first two years in the Transvaal. Thereafter, in practice, English was always used as medium. Apart from the extension of mother tongue instruction until the end of the fourth year in the Transvaal in response to a recommendation made by the Welsh Commission in 1935, this policy remained in effect until the implementation of Bantu Education which extended mother tongue instruction until the end of primary school, so that African pupils now had eight years of mother tongue instruction. The Welsh Committee of 1935-6, interestingly, was also in favor of extending mother tongue instruction beyond the fourth year of school, but recommended that certain factors had to be in place before this could be realized. These included the development of fixed terminologies in each language, suitable textbooks and a greater availability of literature in these languages. It recommended, long before the balkanization of parts of South Africa into separate 'homelands' and its brand of linguistic apartheid, the organisation of schools in multilingual 'Native' areas on a language basis, or grouping languages such as Xhosa-Zulu and Sotho-Tswana (Desai, 2012). Only where this was not practicable, was an official language (either English or Afrikaans) was to be used as a medium of instruction earlier than after four years of schooling. It did not recommend the compulsory study of Afrikaans as a subject at primary school level.

2.2.4. The Formation of the ANC 1912

Preliminary drafts of the Union governments' Native Land Act were debated in 1911 and the Mines and Works Act was passed in 1911. These laws and the formation of the Union were important factors leading to the formation of the South African Native National Congress on 8 January 1912, in Bloemfontein; renamed the African National Congress in 1923. Land dispossession lied at the heart of South Africa's history and heritage of inequity. The new ANC was created against the backdrop of massive deprivation of Africans' right to own land. After actively petitioning the National Convention and being ignored during 1910 and 1911,

delegates to the South African Native Convention (SANC) decided to call a meeting in Bloemfontein on 8 January 1912 to consider the formation of a dynamic and unified movement that would challenge the White government. The outcome was the formation of SANNC. The inaugural conference was organised by Seme, Alfred Mangena, Richard Msimang and George Montsioa (all lawyers educated abroad). Seme wrote an article in October of 1911 called 'Native Union'. In it he proposed an agenda for the inaugural conference as set out below. Sources are unclear as to whether this exact agenda was used at the conference:

First Section

- To formally establish the South African Native Congress as a National Society or Union for all the Natives of South Africa.
- To consider, amend, and adopt, the Constitution and Rules for the Society, Union or Congress.
- To elect Officers for the ensuing year.

Second Section

- The installation of Officers.
- To take a Vote of Confidence on: General the Right Honourable Louis Botha, P.C; The Honourable the Minister for Native Affairs and The Honourable the Native Senators.

General discussions

- Native customs and union.
- Native Marriages and Divorce.
- Native beer, is it a national beverage?
- Native schools and churches.
- The Black Peril and White Peril.
- Native Lands and Reserves.
- Native Courts, civil and criminal.
- Native labour (Karis, T & Carter G. M., 1972)

This proposed agenda makes reference to Native schools and churches, it doesn't make any particular mention of the issue of language. The struggle for the ANC was against discrimination on the basis of colour and also was driven by the issue of land. There is no record of any challenge to the hegemony of English; Afrikaans later had its share in 1976. This might explain why the hegemony of English has gone unchallenged as Blacks view it as a language of liberation, a language of the economy and a marker of status and quality education.

2.2.5. Afrikaans accorded Official Status 1925

The National Party (NP) was founded under the leadership of General Hertzog in 1914-15. All its machinery was used to spearhead the Afrikaans language movement. During the entire twentieth century, activists for Afrikaans used the NP as their vehicle. These language activists, however, never squarely confronted a key issue: Did the Afrikaner community form a racial community whose language struggle was subordinate to the entrenchment of white supremacy? Or did Afrikaans-speakers form a language community whose social identity was shaped by the struggle for the acceptance of Afrikaans as a public language co-equal with English? If the latter was the case, the salience of race had to diminish and the creed 'Die taal is gans die volk' (the language constitutes the entire people), which activists often cited, had to be made a reality across racial boundaries; this did not happen (Giliomee, 2010). Afrikaner nationalists realised that except for their own history only language set themselves apart from the English-speaking community. Yet they displayed little enthusiasm for Dutch, which was almost a foreign language to the great majority of Afrikaners. At the same time there was virtually no literature in Afrikaans and it carried the stigma of a lower class language. The man who did most to win the argument that Afrikaans should replace Dutch as an official language and should be used for all purposes was Cornelis Jacob Langenhoven.

During the first four decades of the twentieth century many Afrikaners experienced acute poverty. The causes were complex: the collapse of subsistence farming after the closing of the frontier, the devastation of farms as a result of the scorched earth policies of the British forces in the South African War of 1899–1902, the shortage of schools and the Afrikaners' lack of skills for industrial jobs. The swelling numbers of Afrikaner poor added urgency to demand that the schools switch from Dutch to Afrikaans as medium of instruction. In 1919 the Transvaal Dutch Reformed Church concluded that the fundamental cause of the Afrikaners' poverty lay in their children's struggle to master Dutch and English in school. The Afrikaans poet N.P. van Wyk Louw later said that to make Afrikaans a language of instruction in this period was a broodsaak. ('a bread-and-butter necessity'). Activists drove a message that without Afrikaans, the Afrikaner people were powerless, of no consequence, doomed to poverty and disadvantage. To them, only Afrikaans as a public language could save many Afrikaners from the fate of becoming a 'people with no language' (Giliomee, 2010). The noise of the white Afrikaner activist, determined the extent to which their struggle would be won. One doesn't get any record of such activism from blacks in South Africa for the mother tongue; is it because white settlers came from Holland a country with a system of Mother Tongue

Education (MTE)? Blacks have no other reference point; education to them was always brought to them packaged in English. This what they know.

In 1925, D.F. Malan, Minister for the Interior in the Hertzog-led Pact Alliance, introduced a bill that added Afrikaans to Dutch and English as an official language. Malan describes the elevation of Afrikaans to the status of an official language as for the first time the Afrikaners felt that they were fully free and at home in their own country. Afrikaans almost immediately replaced Dutch as medium of instruction, and as the language in which laws and documents were published. In 1938, when a new curriculum was introduced in the Transvaal, Afrikaans became a compulsory subject in African schools and had to be introduced in the fourth year. Hartshorne (1992) explains that from the mid-1930s the purified Nationals of Dr Malan, together with the Afrikaner Broederbond; began to make of Afrikaans a symbol of exclusiveness and separateness, and the struggle for Afrikaans became part of the mission to control and rule over South Africa. In the education field this was expressed in the separation of schools, and in a rigid mother-tongue education policy. As Nationalist theorists and ideologues turned their attention to African schooling, a clear pattern began to emerge of strict educational separation, a Christian National Education (CNE) ideology, enforcement and extension of the mother tongue medium, and thereafter the use of Afrikaans with a concomitant decline in the influence of English (Hartshorne, 1992). The stage was set for the introduction of Bantu Education, compulsory mother tongue instruction and the elevation of Afrikaans in African schooling. The battle between English and Afrikaans, 'die taaltwis' as it has come to be known, played a big part in policy measures of the time; at the centre was language.

2.2.6. The National Party wins 1948

The National Party came into power in 1948, the foundations of its apartheid philosophy were laid. The doctrine of Christian National Education was introduced, Article 15 dealt with African education. The mother tongue must be the basis of native education and teaching but the two official languages must be taught as subjects because they are official languages and the keys to the cultural loans that are necessary to his own cultural progress (cited in Hartshorne 1992). Malan and subsequent National Party Governments were encouraged by recommendations of the Sauer Commission (1948) which stated that the education for Africans had to be on a firm Christian-National basis, and must take account of the needs and level of development of the mass of natives. This education was supposed to build his character and anchor the native to his national characteristics. The African would ultimately have to be responsible for the expenditure on and control of his own education under white supervision.

He would also be guided to establish his own social, health and welfare services in the reserves (Troup, 1976). To the Nationalist, blacks were subjects that needed white supervision.

2.2.7. The Eiselen Commission 1949-51

When the National Party came into power in 1948 it developed apartheid education through a series of commissions of enquiry; of all the commissions, the Eiselen Commission was the most significant as it had significant implications then up to today. The Nationalist Government appointed Dr. W.W.M. Eiselen to chair a commission of inquiry that would look into the education for Natives. The Membership of the Commission consisted of Dr. W.W.M. Eiselen (Chairman- Secretary for Native Affairs from 1949-1958), Prof. A H. Murray (Member of Senate - University of Cape Town), P.A.W. Cook (Professional Advisor- Bantu Education Department), G.B. Gerdener (Member of Council and Senate- University of Natal), J. de Wet Keyter (Member of Council and Senate- University of the Orange Free State), M.D. C. De Wet Nel (Member of Native Affairs Commission -MP), and Messrs W.A Hofmeyer and J. Macleod. The striking feature about the membership of the Commission is that no Black people were appointed on it. There was also no consultation with the Blacks, at least on who they thought might represent their interests. Therefore, the criteria for choosing these Commissioners remains suspect (Molete, 2007). These were the terms of reference:

(a) The formulation of principles and aims of education for Natives as an independent race, in which their past, present, and their inherent racial qualities, their distinctive characteristics and aptitude and their needs under ever-changing social conditions are taken into consideration.

(b) The extent to which the existing primary, secondary and vocational educational system for Natives and the training of Native teachers should be modified, in order to conform to the proposed principles and aims, and to prepare Natives more effectively for their future occupations.

(c) The organisation and administration of the various branches of Native education.

(d) The basis on which such education should be financed and

(e) Such other aspects of Native education as may be related to the preceding (Report: U.G. 53/1951: Par. 1).

The main recommendations of the Eiselen Commission on language policy matters were the following:

1. All education should be through the medium of the mother tongue for the first four years, and this principle should be progressively extended year by year to all eight years of the primary school.

2. Mother-tongue medium should be used in teacher training colleges for school organisation and method, child psychology, and subjects taught through mother-tongue in the primary school.

3. The first official language (the language which is most generally used in the neighbourhood of the school) should be introduced in the second year of schooling as a subject, and the second official language not later than the fourth year.

4. One of the official languages should be a compulsory subject in the secondary school (with the same requirements as those applied to the second language for white pupils), and where the second official language is taken as an optional

5. Terminology committees should be set up to produce manuals for the teachers, after which mother-tongue instruction should be introduced gradually in the secondary school.

The Eiselen Commission was charged with the duty of formulating principles of education based on racial qualities and distinctive characteristics and aptitude. This certainly seems to justify prejudice against man. People developed constraints, which later became transformed into forms of oppression, like racism. They justified their actions with the idea of biological determinism. There was a need for each social system to deliberately develop various strategies of maintaining the inferior members in absolute trust, obedience and subservience. In South Africa this was achieved through education (Molete, 2007). Having said that there is agreement that people are not abstract entities, they are members of a determinate race. Besides race, there are other differences between people of history, culture and identity. These were valid differences. To deny these differences would be denying reality. The problem lies not with these differences, but with the way the ruling class manipulated those differences into disadvantageous positions in order to oppress other races (Molete, 2007). This criticism of the commission and its work, concurs with that of Eisenberg (1957) when he writes that in its formulation of educational principles, the commission shows a greater concern for the social purpose of education than for the development of individual intelligence and talent. Contrary to honoured pedagogical opinion the education of the individual is subordinated to that of the community (Eisenberg, 1957). It therefore came as no surprise when H. F. Verwoerd, the then Minister of Native Affairs, stated in Parliament in 1954 that:

lt is the policy of my department that education should have its roots entirely in the Native environment and native community. There Bantu education must be able to give itself complete expression and there it will have to perform its real service. The Bantu must be guided to serve his own community in all respects. There is no place for him in the European community above the level of certain forms of labour. Within his own community, however, all doors are open ... (Hansard, 1954).

The Nationalists really believed that education should follow the social order blindly, it was then expected that these modifications would be of such a nature that they should align themselves with the laws that had already been passed; like the Group Areas Act (41 /1950) the Population Registration Act (30/1950) and other apartheid laws. The climate created in the country at that time, did not leave any occasion for an integrated system of education. Therefore, modifications might also be interpreted as meaning segregation (Eisenberg, 1957).

2.2.8. The Bantu Education Act 47/1953

The legislation such as the Bantu Education Act of 1953 came as part of recommendations from the Eiselen Commission. In terms of this Act, African education now fell under the direct control of the state, as opposed to the missionary institutions which were largely responsible for it before then (Soudien, 2002). The commission report formed the basis of the Bantu Education Act, No. 47 of 1953, which transferred control of Bantu Education from the provinces to the Department of Native Affairs of the central government. The first Minister of Native Affairs was Dr H.F. Verwoerd. By centralising African education, the government ended the pivotal role played by missionaries. Grants paid to mission-run primary and secondary schools were phased out progressively until 1957, when all financial assistance to missions ceased. Subsidies paid to teacher-training institutions run by religious bodies ended in 1955 when the Bantu Education Act became law. Those churches that wished to continue their roles in education could do so, on an un-subsidised basis, but they had to apply for registration of such establishments. The Bantu Education Act was later renamed the Black Education Act of 1953; it legalised several aspects of the apartheid system. Its major provision was enforcing racially separated educational facilities. Even universities were made "tribal", and all but three missionary schools chose to close down when the government no longer would help support their schools. Very few authorities continued using their own finances to support education for native Africans. In 1959, this type of education was extended to "non-white" universities and colleges with the Extension of University Education Act, and the internationally prestigious University College of Fort Hare was taken over by the government

and degraded to being part of the Bantu Education system. It is often argued that the policy of Bantu (African) Education was aimed to direct black or non-white youth to the unskilled labour market. Hendrik Verwoerd, at the time Minister of Native Affairs; claimed that the aim was to solve South Africa's "ethnic problems" by creating complimentary economic and political units for different ethnic groups; it was designed to further subjugate or oppress the black majority. The Minister of Native Affairs at the time, called the "Architect of Apartheid" Hendrik Verwoerd, stated that:

> *"There is no place for [the Bantu] in the European community above the level of certain forms of labour. What is the use of teaching the Bantu child mathematics when it cannot use it in practice?" (Hansard, 1954).*

The introduction of Bantu Education led to a substantial increase of government funding to the learning institutions of black Africans, but it did not keep up with population increase. The law forced institutions under the direct control of the state. The National Party had the power to employ and train teachers as they saw fit. Black teachers' salaries in 1953 were extremely low and resulted in a dramatic drop of trainee teachers. Only one third of black teachers were qualified.

In 1956, the Minister of Native Affairs issued a regulation that required all African children to be educated through the mother tongue from year 1 until year 8, the last year of the primary school at the time (Horrell, 1968). The regulation stated that, until 1958, pupils could use a Bantu language or an official language when writing the school-leaving examination at the end of year 8. After 1958, however, the Bantu languages only could be used. The extension of the mother tongue saw the phasing out of 'vernacular' schools where all linguistic groups in schools now became segregated along linguistic lines. Up to this day, we still have that.

As far as languages as subjects were concerned, from 1956 the official language predominantly spoken in an area was introduced as a subject in the first year of school, and the second official language introduced in the second year. This meant that within the space of two years after starting school, African children were learning three languages, their own and the two official languages.

At secondary school, Physical Education, Music and the 'vernacular' were to be taught through the mother tongue. The remaining secondary school subjects were to be taught half in English and half in Afrikaans. Schools could, however, apply for special exemption not to use Afrikaans as the medium of instruction. The period 1968 to 1975 saw an intensification of

methods employed to accelerate the process of promoting Afrikaans throughout the school system. Hartshorne (1992) summarises these changes as follows

- Mother tongue instruction now ended at the end of year 6 (Standard 4).
- In 1972, year 8 moved to the high schools and year 7 became the last primary school year, in line with white schools.
- Both official languages had to be used as media of instruction in year 7 (Standard 5).
- In other words, the 50-50 rule involving the use of both English and Afrikaans as media of instruction was to be enforced earlier, from year 7.
- By 1974, steps had been taken to correct the unequal use of the official languages in secondary schools, and so to increase the use of Afrikaans.
- General Science and practical subjects were to be taught through the English medium while Maths/Arithmetic and Social Studies were to be taught through Afrikaans — what became known as the 50-50 approach as 50% of the key subjects had to be taught in English and 50% in Afrikaans (Hartshorne, 1992).

Many teachers resigned from their jobs while others were forced to resign by the officers of the Department. Malherbe (1977) suggests that the Act resulted in the deterioration of the quality of education, especially with the use of unqualified teachers. Protest action against the Education for Blacks resulted. The Cape African Teachers Association (CATA) wanted to hold a conference to discuss Education for Blacks; they were threatened by Government. However, the African National Congress and its associated organisations organised the Resist Apartheid Campaign which aimed at resisting the Bantu Education Act, the Native Resettlement Act, the pass laws, the Group Areas Act, the Suppression of Communism Act and anti-trade unions measures (Hirson, 1979). On 12 April 1954 there was a demonstration, organised by the Youth and Women's Sections of the ANC to resist Bantu Education. The pupils were given an ultimatum by the Government to return to school or face expulsion. This weakened the campaign, though many children still chose not to go back to school, but attended schools at Cultural Clubs whose leaders were detained in the State of Emergency that was proclaimed after the Sharpsville Massacre of 1960. Many schools, mainly under missionary control, were closed down. Most children abandoned their education in the gross re-organisation of schools, some either sat at home or were determined to defy the authorities. Rebellion became endemic in schools and colleges (Hirson, 1979).

2.2.9 The Introduction of Afrikaans as Medium in Universities 1960 – 1970s

While the education for blacks was taking a downward spiral, nothing stopped the Afrikaner from accelerating the development of Afrikaans. In 1960 Afrikaans was used as Medium of Instruction (MOI) in Higher Education Institutions. White Afrikaans schools and universities played a vital role in the rise of Afrikaans and the Afrikaner nationalist movement. During the 1950s the government introduced a policy of compulsory mother-tongue education. At the university level, where there was no compulsion to attend a mother-tongue institution, Afrikaans universities drew almost all the Afrikaner students, and also were better able to attract students from the 'other' white group than their English counterparts were in attracting Afrikaans students. Afrikaans was introduced as MOI in the Humanities. In 1970 Afrikaans was extended to the Sciences as MOI in HEIs. In the early 1930s Afrikaans began making its mark as a language of advanced research in the Arts and Humanities; by the 1970s it had been extended to the natural sciences and medicine. In the 1980s it was the language 32nd most frequently used in the articles indexed by Chemical Abstracts (more than Hindi, Armenian and Arabic). It was 25th in Index Medicus. With the state pursuing a firm policy of bilingualism, a large proportion of Afrikaners found secure jobs in the civil service. By 1968 there were twice as many Afrikaners in the civil service than in 1948. More than a third of the Afrikaner labour force was employed in the public sector, and Afrikaners now dominated the top positions. By 1974 Afrikaners accounted for 80 percent of the senior staff in government departments (Giliomee, 2010). After the apartheid system was established in 1948, the epistemic violence and racism at universities were taken to another level. All of these worked for the white Afrikaner; there was a vast majority of people out there who the system designed to conveniently forget. During apartheid, higher education was 'designed to entrench the power and privilege of the ruling white minority' (Bunting, 2004). The 'conception of race and the politics of race' shaped the higher education policy. This included designation of institutions for the exclusive use of particular racial groups (Bunting, 2004). Bunting writes that the councils and administrators at the historically white Afrikaans-medium universities gave full support to the apartheid regime and the white supremacy project. He adds that these 'instrumentalist institutions' were governed in a top-down and authoritarian manner (Bunting, 2004). The historically white English-medium universities on the other side, considered themselves as 'liberal' institutions that had 'highly ambiguous relationships with the government during the apartheid years'. They received funding from the government but argued that they were not the 'servants of the state'. These institutions were governed in a fashion that was a 'mix of the collegial and the authoritarian' (Bunting, 2004). Although the

English-medium universities saw themselves as the opponents of apartheid and agents for change, in reality they were islands of white privilege that benefited from apartheid's policies even if not openly supporting the government. Gibbon and Kabaki (2004) indicate that the entire higher education system 'served to construct and maintain the social, political and economic features of the apartheid order'. One of the ways it did this was by contributing 'to the systematic under-qualification of the majority black population'. While the Afrikaans-medium universities worked closely with the government on this, the English-medium universities also played a role in maintaining the segregation and oppression. Mamdani (1998) argues that 'the South African academy, even when it was opposed to apartheid politically, was deeply affected by it epistemologically'. Sehoole (2006) adds that during apartheid, most of the English- and Afrikaans-speaking academia 'shared whiteness – a belief in white hegemony in South Africa'. Higher Educations institutions up to this day have done very little to move away from this scenario; with the issue of language still being used to select those who can study at universities. Even though doors of learning were opened post-apartheid; that space is still reserved for those fluent in English and Afrikaans. Throughput rates per race, research interests and what research gets funded, by whom, acceptance of papers in which academic/ international journals, subsidies universities get, who funds what programmes and which students, in what courses and the representation in those courses are all research subjects for another study.

2.2.9. The Soweto Uprising 1975

After the NP unexpectedly won power in 1948 it rigidly applied the Language Accord of 1909 and required civil servants to be bilingual before they could be promoted. By the end of the 1950s there was general satisfaction in nationalist ranks with the position of Afrikaans. Van Wyk Louw called the language the 'socialism of the poor Afrikaner.' Once the state enforced Afrikaans as an official language, the 'small man' knew that his language would help him to get work. In his view the language movement had triumphed; it had secured more rights than other 'small' languages, like Irish or Welsh, and had built up a respected literature. To Afrikaners, Afrikaans provided a sense of personal worth, as well as jobs and other economic advantages. But Louw warned against complacency; the language could still perish unless it served as vehicle for the real and vital needs of large groups of people. Afrikaans (and the legitimacy of white rule) would have been greatly strengthened at this point if the NP government had embraced the coloured community who numbered 1,5 million in 1960 against 1,8 million Afrikaners. But it did the very opposite by removing all coloureds from the voters'

roll, banning all sex across racial lines and segregating coloureds residentially. Without consulting them the government introduced a pronounced shift in the policy towards the medium of instruction in coloured schools. In 1936 some 42,000 coloured children were taught in Afrikaans; 16 500 in English and 20 000 in both languages more or less equally.

By the 1970s almost all were taught in Afrikaans only; very little instruction was in English and virtually none in both languages. There were dangers in the developments sketched above. Afrikaans and the Afrikaner policy of apartheid and the Afrikaner-controlled state had become locked in a tight and suffocating embrace. Afrikaans had become the language of the oppressor – the medium used when white policemen arrested black pass offenders or when white civil servants ordered blacks or coloured people out of their houses in racially mixed slum areas. In 1976 Jakes Gerwel, a black professor of Afrikaans at a coloured university, cited a statement by the novelist Alan Paton that 'only a fool or a philologist' would discuss Afrikaans without thinking immediately of Afrikaner nationalism and its close association with apartheid. He added that Afrikaans had become the defining characteristic [of the state] which the greatest part of the population knows, particularly by its image of arrogance and cruelty (Gerwel, 1976). Afrikaners always had grave fears that Afrikaans, the very symbol of their roots in Africa, would not survive. By the early 1970s a census revealed that the proportion of people who spoke Afrikaans as their mother tongue would steadily decline. It was still 18 percent of the population in 1970, but was projected to decline to 15 percent by year 2000. English as the language of commerce and industry was steadily becoming dominant among blacks in the polyglot Witwatersrand (Johannesburg, Pretoria and other major towns in the vicinity). A 1972 survey of young Sowetans found that 98 percent of them did not wish to be taught in Afrikaans. Half of those polled considered Afrikaners 'the most cruel and least sympathetic people in South Africa'. In the so-called homelands, where close to half the blacks lived, Afrikaans was also on the retreat. One after the other the African 'homelands' created by the apartheid policy, chose English and a Bantu language as the official languages, this for the Afrikaner signalled being snubbed and being left out in the cold (Giliommee, 2010).

In the first half of the 1970s the survival fears prompted some Afrikaners to engage in a disastrous overreach of power. Among right-wing civil servants and politicians the idea began to take root that Afrikaans could only hold its own against English if the language clause of the 1909 Constitution was applied to black schools as well. In 1975 a conference of white Afrikaans cultural organisations accepted a motion calling on the government to promote Afrikaans in all possible ways to achieve its 'rightful position' in schools for blacks and Asians.

Andries Treurnicht, leader of the NP's right-wing and deputy minister of Bantu Administration and Development, held the view that the government had the right to decide the medium of instruction in black schools because white taxpayers subsidized the schools.

The Department of Bantu Administration and Development resolved to enforce the 50-50 rule for Afrikaans and English as languages of instruction in black schools, which had been in their plans for quite some time (Hegh, 2005). Inspectors in Soweto and other schools in the southern Transvaal area instructed black schools that mathematics and arithmetic had to be taught in Afrikaans alone, despite the fact that most teachers and pupils probably had only a weak command of Afrikaans. Teacher organisations and black parents on school boards in the townships protested strongly, but the government ignored these protests and also the dire warnings by the official opposition that a volatile situation was building up in Soweto. In 1976, the *Afrikaans Medium Decree* of 1974, which forced all black schools to use both Afrikaans and English as languages of instruction beginning with the last year of primary school, led to the Soweto Uprising in which more than 575 people died, at least 134 of them under the age of eighteen (Desai, 2012). Mandela in his book Long Walk to Freedom narrates that it was on June 16 1976, when fifteen thousand schoolchildren gathered in Soweto to protest the government's ruling that half of all classes in secondary schools must be taught in Afrikaans. Students did not want to learn and teachers did not want to teach in the language of the oppressor. Pleadings and petitions by parents and teachers had fallen on deaf ears. A detachment of police confronted this army of schoolchildren and without warning opened fire, killing the famous thirteen-year-old Hector Peterson and many others (Mandela, 1994). This is a story of a group of people who would sacrifice anything to accelerate Afrikaans as a language on par with English. African language activists do not desire any repeat of this atrocity; all they desire is that government adheres to the constitutional mandate of Section 29 that the situation that left these languages undeveloped and lacking must be redressed (Constitution, 1996).

2.2.10. 1979 The Education Training Act 1979

The Bantu Education Act was repealed in 1979 by the Education and Training Act, 1979, which continued the system of racially segregated education, while also eliminating both discrimination in tuition fees and the segregated Department of Bantu Education (DET). There were language adjustments in MTE; from 6 years it was reduced to 4 years allowing both use of the mother tongue up to the fourth grade and limited attendance at private schools as well. Segregation became unconstitutional after the introduction of the Interim Constitution in 1994, and most sections of the Education and Training Act were repealed by the South African

Schools Act, 1996. The main features of this Act (Department of Education and Training, 1979) in relation to language policy were the following:

Compulsory mother tongue education would now be till the end of year 4.

Thereafter parents could choose the medium of instruction.

The most significant departure from the 1953 Act was the admission that parental choice would be respected, as well as the freedom to choose the medium of instruction (Hartshorne 1992; NEPI 1992). There wasn't much to that choice either because the Act wasn't coupled with a plan to develop African languages to be sufficient as Languages of Learning and Teaching (LoLTS); it wasn't a choice after all.

2.2.11. The Turbulent 1990s

Political pressure from the international community through the boycotts that were staged by developed countries, and local pressure of ordinary and civil movements forced former President de Klerk on 2 February 1990 to unban the leading political parties viz. ANC, SACP, PAC and other organisations. The release of Nelson Mandela was historic, the hope that filled South Africans was a culmination of the feelings that of a nation that had been in waiting for a very long time. Initiatives were launched aimed at exploring possibilities for the 'new South Africa'. The domain of education received prominent attention (Desai, 2012). Two initiatives that would be a focus in this section are the government's Education Renewal Strategy (ERS) with its associated document, A curriculum model for education in South Africa (CUMSA). The National Education Co-ordinating Committee's (NECC's) established the National Education Policy Investigation (NEPI) research project to investigate policy options for restructuring education in South Africa. This section will report on the government's Education Renewal Strategy (ERS) with its associated document, A curriculum model for education in South Africa (CUMSA). It will also report on the National Education Co-ordinating Committee's (NECC's) report of the National Education Policy Investigation (NEPI, 1992). As it became obvious by the end of the 1980s that the state of education was in crises; particularly that of Africans; the National Party Government responded with a policy document titled A strategy and programme for education renewal. The Education Renewal Strategy (ERS), as it came to be known, was released by the Minister of National Education in June 1990. The role of the different languages in education was not specifically addressed by the ERS. It was discussed in an associated document, A Curriculum Model for Education in South Africa

(CUMSA), released for discussion in 1991 (Harthorne, 1992). He goes on to further argue that there were two government voices:

- one represented by the November 1991 Curriculum Model for Education in South Africa (CUMSA). This for the most part represented white education interests and it avoided the issue of medium of instruction; it concentrated on languages as subjects.
- the other voice was that of the Department of Education and Training (DET) that was responsible for the education of Africans in South Africa. The DET did focus on the medium of instruction (DET, 1995, p. 314).

2.2.12. The 1991 amended language medium policy

Between the publication of the ERS and the CUMSA documents; the Department of Education and Training (DET) amended the Education and Training Act No. 90 of 1979 as follows:

> *the language or languages to be used as the medium of instruction at a school and the extent and duration of such use shall be determined by the Minister after consultation with the parents of pupils enrolled at that school, which consultation shall take place in the manner prescribed (Education and Training Amendment Act 100 of 1991).*

It is not clear what led to this change of heart, this effectively meant that mother tongue instruction was no longer enforceable by statute and that the choice of medium of instruction could, in effect, be determined independently by each school in consultation with the community and the Department of Education and Training (DET). Consultation was never a virtue in the execution of any plans of the apartheid education department concerned with the education of Africans. This was a desperate attempt to transform its hardline approach to appeal to the masses that were no vocal about the state of African education.

The following year (1992) an information brochure was sent to schools to help them decide on the appropriate medium of instruction by the DET. There were only three choices contained in this information brochure called the ERS (Education Renewal Strategy):

l. Straight for the long-term medium

2. Sudden transfer from the mother tongue to a second language medium

3. Graduated transfer from the mother tongue to a second language medium.

In the document titled amended language medium policy, the DET (1992) explains what is meant by each of these options.

Option 1: English, Afrikaans or an African language will be the only medium of instruction as from the beginning of Sub Standard A (1992:. 7).

Option 2: The mother-tongue instruction up to the end of any standard followed by a switch-over to English or Afrikaans in all subjects except the vernacular (1992, p. 8).

Option 3: Phasing in English or Afrikaans as medium of instruction subject by subject over a period of perhaps two or three years (1992:9).

More than half the schools chose the 'graduated transfer to a second language medium'. Heugh (1993) indicates that 67% of the DET's 7368 schools returned voting records. Their choices were recorded as 54% choosing a graduated transfer to English (option 3).

This is in line with the results of the survey commissioned by the Pan South African Language Board (PanSALB) in 2000 through MarkData. Contrary to popular perceptions, most respondents (42%) wanted pupils to learn in both their mother tongue and English. 7.6% wanted English only as their first choice, whilst 12% opted for English only as their second or further choice (PanSALB, 2000). The MarkData survey has been criticized for various reasons ranging from claims that the categories used in the survey were misleading. Some said the categories were not properly constructed and some overlapped with each other, so that the data was not very reliable. My position is very clear on this one; the often stated refrain that African language parents do now want their children to learn an African language has been chorused over and over again. No empirical data proves this opinion; it is always volarized by those who feel that they know what African language parents want and think. This raises a definite need for a large survey that points to African language parents rejecting their language outright. I think what Fairclough calls face value common sense facts must be dealt with once and for all. The facts are that the unassailability of English makes leaves no choice for parents as they understand the market value of English; it is a socio-political arrangement. If tomorrow isiXhosa would be accorded the same value; parents would change immediately.

2.2.13. A Curriculum Model for Southern Africa (CUMSA)

In the CUMSA document, government proposed a language curriculum contained on pages 5 and 6 of the executive summary. There is no explicit mention of the medium of instruction issue, except indirectly. In the document, the meaning of the three levels is given as follows:

 Basic Level: intended for learners who lack competence in the particular language. The acquisition of oral communications skills is emphasised.

Ordinary Level: intended for learners with adequate language ability/those who use the particular language as medium of instruction. Emphasis is placed on more complex language structures and on an appreciation for the language, the culture it represents and its literature.

Advanced Level: intended for learners who are proficient in the particular language/s; a sophisticated literature component is therefore included (National Education Department, 1991:5-7).

In short, while the CUMSA recommendations involve the compulsory study of three languages from year 5 to year 7, the learners' home language is not a compulsory subject. There is also no assumption that the learners' home language will be the medium of instruction. The recommendations are in fact glaringly silent on the medium of instruction issue. The document raises more questions than answers with the most curious being whether MTE was watered down as political footwork after the 1976 bloodshed.

In light of the ERS and CUMSA rccommendations above, I find it proper to examine the ANC's 1992 recommendations and compare them with the government recommendations.

2.3. The Policy Guidelines of the ANC's

The Ready to Govern policy guidelines document was published by the ANC in May 1992 in preparation for a transition to a democratic South Africa. Paragraph J4 deals with language in education policy; a full overview of the section is presented below:

J4.l We recognize the multilingual nature of South Africa and believe that all individuals must have **access** through their mother tongue and a language of wider communication to all avenues of social, political, economic, and educational life.

J4.2 We are committed to providing **access** to a minimum of two languages — a regional lingua franca and English. In cases where, firstly, there is more than one regional lingua franca, access will be provided to each except where not possible because of practical constraints; and secondly, where the home language of the pupil differs from the regional lingua franca, access to the mother tongue will be provided except where impractical.

Discussion: As the NEPI report (1992:40) indicates, it is not clear what was being referred to by the use of the word **access.** Did it refer to access to a particular language as subject or as medium of instruction? The differences between the then government's recommendations and the ANC's were two-fold:

- the CUMSA document recommended that three languages be studied during years 2-4,
- the ANC guidelines mentioned a maximum of two languages. Unlike the CUMSA which recommended that both English and Afrikaans be compulsory subjects, the ANC document made no mention of Afrikaans, only of English.

The early 1990s saw a proliferation of policy recommendations as political parties positioned themselves for the first democratic elections that were now inevitable. It was in this context that the NEPI Committee made public its examination of policy options.

2.4. NEPI and its report on language

In the words of the chairperson of the NEPI Executive Committee, Jakes Gerwel,

The National Education Policy Investigation (NEPI) was a project of the National Education Co-ordinating Committee (NECC) conducted between December 1990 and August 1992. The object of this investigation was to interrogate policy options in all areas of education within a value framework derived from the ideals of the broad democratic movement.

These reports do not constitute a model for a new education system, nor even a set of recommendations for a more equitable dispensation: the twelve sectoral reports are an analysis of feasible options for the short-to medium-tem future (1992:4).

Altogether, there were 12 such reports, each covering a major educational field. Language was one of them. Some of the other fields were Teacher Education, Adult Education, Curriculum Studies and Early Childhood Education. In accordance with its mandate, the NEPI group on language presented a range of options for language in education in its report. For each model the report looks at, amongst other things:

The necessary conditions for the policy to work well;

The extent to which these conditions were met in South Africa in 1992;

The extent to which they could be met in the near or distant future.

The Report acknowledges that, broadly speaking, there are two types of policy:

- The child's home language is used for the teaching of all subjects (except languages) throughout schooling;

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- A language that is not the child's home language is used as medium of instruction for all or part of the child's schooling. There are several variations on the second type of policy (NEPI 1992:74).

The report proceeds to look at the following options:

l. Mother tongue or home language throughout formal schooling;

2.   Second language throughout;

3.   Initial literacy and numeracy in first language (Ll) followed by education in second language (L2). Three ways in which the transition can happen are then looked at. These are:

- Delayed immersion into L2 from the beginning of a predetermined school year, which would be the same throughout the country;

- A gradual transition to L2 after initial literacy and numeracy have been established in L1;

- Initial bilingualism followed by transition to L2 when pupils are ready for L2 instruction. The options are based on Bilingual education throughout schooling (NEP1 1992:74-88).

Further details of each option are documented in the NEPI (1992) report. Desai (2012) makes an interesting admission that as a person who was one of the key participants in the NEPI process, she thinks in retrospect they may have erred by presenting the options in a neutral way without sufficient guidance as to which policy/policies made better sense in particular contexts. She further admits that concrete suggestions in this regard may have been more useful, even though they were specifically tasked not to give guidance; according to her every option had its problems (Desai, 2012). She defends the warning that they gave as correct that the particular context in which a school(s) finds itself would strongly influence the success or otherwise of a policy. Many language programme typologies of schools exist, and several have been put forward in the past two decades. Alternatives to the state's classification of schools were developed by language activists as part of the struggle for national liberation in the latter years of apartheid. The pioneering work of the National Language Project from the mid-1980s and its offshoots looked beyond the exclusionary Afrikaans/English pairing toward a democratic society in which African languages would come into their own, multilingualism would empower people (Alexander 1995), English would be the initial linking language (see Alexander 1989), and education would be based on the mother tongue (Alexander, 2006). The work done by the National Language Project, Neville Alexander and Kathleen Heugh on typologies paved the way for the NEPI (1992) project and later models to be developed.

The NEPI schema is comprehensive in that it covers all categories, not only those regarded as additive bilingual; distinction is made between those in which the main language of teaching is a non-indigenous language(s), viz. immersion, delayed immersion, and submersion; models in which the main LoT is an indigenous language, viz. learners' home language or a lingua franca; and models that use both an indigenous and a non-indigenous language, such as gradual transition models, and more flexible multilingual models (NEPI, 1992:47–58). The NEPI Report warned that community participation should not be a token gesture: allowing choice in educational matters is not sufficient for the exercise of democracy: people must have the necessary information if they are to make responsible choices' (1992:16). This point is supported by King and van den Berg (1992) by stating that placing the decision on parents who might not know what is feasible, what must they choose and why; is very difficult for ordinary parents who are not educationists. In absence of an implementation plan to advocate to parents the various models and which ones are most salient and most beneficial to learners there issue of choice is not choice at all. There is no system in the education sector, tied to admissions that allows parents to take up the powers vested in them to determine the language policy of a school their child attends. Besides the important work done by producing the various language policy options and models; the de facto position, as it existed before 1994, remains in place, with the exception of a change in the CAPS introducing English as FAL, in Grade 1 as a passing subject. One would be forgiven for thinking like NEPI (1992) that Provincial governments are in a better position than schools to recommend particular medium of instruction options as they have the full provincial picture to draw on. NEPI recommended that if a democratic regional government were to be given the responsibility of establishing what the region's needs and resources were, and if it were able to tailor expenditure to serve these needs, this might be a very suitable body to make medium of instruction decisions. It would be able to consult more widely than an individual school community would, and in greater depth than the central government would, about the needs on the ground. It would also have a wide enough picture of needs and resources to be able to deploy the resources to the greatest advantage of all the people in the region (1992). It is sad that provincial departments are not capacitated to do this.

2.4.1. Report of the CEPD Working Group on Language Policy in Education

The Centre for Education Policy Development (CEPD) was established to conduct research on education policy to advise the ANC. The working group on language policy in education was tasked to draft recommendations on language in education policy. The working group submitted its report to the Director, Dr Trevor Coombes, in June 1993.

The report consists of two parts; Part I gives an overview of the ANC Policy Guidelines on Language, focusing on those principles which relate to language in education. It drew attention to issues of principle and implementation which remained to be resolved [at the time of writing the report]. Part 2 proposed a policy position for language in education which deals with specific issues in more detail than Part 1. Where different interpretations of ANC policy principles are possible (for example, on the principle of choice), Part 2 offers specific recommendations. (1993, Preface).

The main thrust of Part I was to alert policy makers to the inconsistencies in the May 1992 Policy Guidelines between Paragraph N, which dealt with ANC language policy generally and Paragraph J4 which focused on language policy for education. Part 1 suggested that the policy guidelines captured in Paragraph N were 'structured by a dynamic interaction between three main principles which were

- Choice of languages
- The right of educational access to the development of necessary linguistic skills
- Affirmative action for languages whose status was reduced under apartheid (1993a,)

Unlike the general guidelines which did not mention any specific language, or categories of language, Paragraph J4 mentioned English specifically. It also used categories such as language of wider communication and regional lingua franca. The recommendation of the Working Group therefore was that these clauses needed to be revisited. The Working Group was mindful of the fact that technical experts such as themselves could make recommendations, but that the policy decisions had to be taken by the political actors (Desai, 2012). Part 1 therefore ended with a list of issues around the three core principles that the Working Group thought needed to be resolved by the political actors. Part 2 (1993) dealt with the actual recommendations. Below are the twelve key recommendations for implementation:

- All South African children will learn not fewer than two South African languages, and preferably three, from the first grade and throughout the period of compulsory school attendance.
- Learning institutions will be required to declare at least three languages spoken by the institutional community as institutional languages, and ensure that these languages are used in all operational aspects of its work.

- Democratic community structures in consultation with the Ministry of Education will select which language or languages will be used as languages of learning and taught as subjects.
- The learning of additional South African languages will be strongly encouraged.
- Languages other than those traditionally recognized as South African may be taught either as subjects or used as languages of learning where appropriate, provided that two South African languages and preferably three are also learnt.
- Language varieties will be recognized and accepted.
- No child may be refused admission to any school during the early years of the period of compulsory school attendance on the grounds that she/he is not proficient in the languages taught at that school.
- The State will provide and allocate resources in such a way as to redress past and present imbalances and to make bilingual competence a reality.
- The State will foster the ideal of multilingualism through the active promotion of all South African languages.
- The language examination system will be overhauled to promote the creative and innovative teaching and learning of languages.
- In the long-term, pupils will be examined in any South African language of their choice.
- A language in education unit will be set up within the Ministry with wide-ranging powers and responsibilities to implement a new language in education policy for South Africa (CEPD 1993:4).

Although many of these recommendations appear in one or other form in the Language in Education policy document of 1997, the problems pupils experience when learning through a second language remain. The Report of the CEPD's Working Group on Language in education was an important document as its influence on the ANC's 1994 Policy Framework for Education and Training indicates. However, it was ultimately the product of a political process. Although members of the Working Group had thought deeply about the issues, the recommendations were captured in rhetorical terms in the ANC's Policy Framework, as is the practice in many such policy documents. There was not a sufficient focus on implementation (Desai, 2012).

2.4.2. The ANC's Policy Framework for Education and Training

As part of its preparations for the first democratic elections in South Africa in April 1994, the Education Department of the African National Congress (ANC) produced a discussion

document, A Policy Framework for Education and Training, in January 1994. This document, or the Yellow Book as it was subsequently called, set out proposals for ANC policy on education and training, building on the guidelines adopted by the ANC Policy Conference in May 1992 and contained in the document Ready to Govern, discussed above. It was widely circulated for comment. For the purposes of this study the discussion will be confined to the section on language in education policy, which constituted part of the section titled "Resources for learning". As far as the history of language in education policy was concerned, the document highlighted what the ANC considered as important lessons to be learnt from the past:

- The legacy of past language struggles cannot be ignored by the future democratically-elected government. It is of the utmost importance that the correct lessons are learnt and that the cycle of language oppression and resistance be broken, in the interests of building peace in our schools and communities and a common South African nationhood. Four such lessons seem to have priority.

- Language policy in education should be the subject of a nation-wide consultative process, to ensure that proposed changes in policy have the broad consent of the language communities which will be directly affected by them.

- No person or language community should be compelled to receive education through a language of learning they do not want.

- No language community should have reason to fear that the education system will be used to suppress its mother tongue.

- Language restrictions should not be used to exclude citizens from educational opportunities (ANC 1994:62).

It is interesting to examine these caveats in retrospect. With regard to the first lesson about broad consultation, the post-1994 government remains as concerned about consulting 'stakeholders', a term used to describe a range of people likely to be affected by developments in any given area, in this case, language policy. But in the process of consultation, often the very people who need to be consulted are not." Allow me to concretize this point. The Department of Education's 1997 language in education policy devolves a school's language in education policy decision onto school governing bodies and pupils/parents. However, by the end of 2011, very few parents and pupils had actually been consulted about language policy issues. In fact, very few schools have actually developed language in education policies since July 1997 (Heugh 2002; Probyn 2008; Probyn et al 2002). As a result, the situation remains largely unchanged from what it was before 1994. Presently, the only difference is that English

is introduced as a medium of instruction a year earlier, at the start of year 4, to coincide with the start of the intermediate phase in the General Education Training Band. The second lesson is a reminder of one of the catalysts of the Soweto Uprising (discussed earlier in this chapter), the compulsory introduction of Afrikaans as a medium of instruction alongside English. Yet, it can also be seen in retrospect as a justification for not making the mother tongue the medium of instruction for pupils who are speakers of African languages. Incidentally, the mother tongue is the medium of instruction for most pupils who are speakers of Afrikaans and English. The third and fourth lessons are directed more at speakers of Afrikaans. The third one is an attempt to dispel any fears on the part of Afrikaans speakers that their children might not be able to study through the medium of Afrikaans, whilst the fourth lesson we know, from hindsight, refers to African children being excluded from Afrikaans-medium schools if they were not proficient in Afrikaans.

There is a clear link between these lessons and the principles guiding the proposals in the 1994 Policy Framework. The principles are:

- The right of the individual to choose which language or languages to study and to use as a language of learning (medium of instruction).
- The right of the individual to develop the linguistic skills, in the language or languages of his or her choice, which are necessary for full participation in national, provincial, and local life.
- The necessity to promote and develop South African languages that were previously disadvantaged and neglected (1994:63).

The principles are based largely on the general language clauses of the 1992 Policy Guidelines and Part I of the CEPD Working Group Report. The third principle could be seen to be in conflict with the other two. For if pupils, or their parents, choose either English and/or Afrikaans to study, why would it be necessary to promote and develop the 'previously disadvantaged' languages? Such development and promotion would have made more sense if African languages had been compulsory as subjects, as was recommended by earlier. Given such principles, it is no surprise that the actual policy recommendations did not say much and the choice was left open. The choice of language or languages of learning was based on one of three options:

- A language of wider communication, such as English, to which the school community subscribes, irrespective of whether this is the home language of the pupils. If the

language chosen is not the home language of the pupils, then it should be introduced gradually. The gradual introduction of the language of wider communication as a language of learning is based on the research evidence which strongly suggests that the conceptual development of children is facilitated by initial learning in their home language.

- The home language of the majority of pupils in a particular school, as long as this does not discriminate against pupils whose home language is different. Where the choice of a single language of learning would discriminate against significant numbers of pupils, schools should, where possible, adopt more than one language of learning. In such cases, parallel classes could be run for different sets of pupils.

- The use of different languages as languages of learning, for example to teach different subjects (1994:64).

The three options above capture the recommendations made in the NEPI Report, Language (1992), but without the nuanced description of necessary and sufficient conditions to implement any of the options. As far as languages as subjects were concerned, the 1994 document recommended that:

All South African children should be given access to, and be expected to learn, at least two South African languages throughout the period of compulsory schooling, as subject and/or as language of learning. The learning of more than two languages will be strongly encouraged.

Schools will be strongly encouraged to offer, if necessary through appropriate incentives, at least one African language In particular, the learning of an African language by non-African children will be actively promoted, as a contribution to raising the status of these languages, aiding understanding and communication across cultures, and thus building a non-racial society based on common citizenship (ANC 1994:65).

Despite the above proposals, very few 'non-African' children learn an African language. Phrases such as 'strongly encouraged' remained empty promises. It is interesting to note that the proposal to make an African language compulsory to all children was rejected at the April 1994 conference. It was again made as part of the Values in Education Working Team, but it still remains a proposal, despite the Report (DOE 2000b) being accepted by the then Minister of Education, Professor Kader Asmal. Significant progress towards ensuring that non-African language learners learn an African language might be made currently if government becomes serious in implementing the Incremental Introduction of African Languages (IIAL) of the

Department of Basic Education (2016). The disappointment in 2016 was that the Department of Basic Education started with this plausible initiative as a policy; then it was watered down to being a strategy after a lot of noise from the non-African language sections of our society made it known that it shall not happen. The IIAL requires all schools through an incremental phasing-in approach to offer an African language either at HL, FAL or SAL (DBE, 2016) from Grade 1 incrementally. Hopefully, this strategy will shift monolinguals towards multilingualism .

In tracing the development of language in education policy in South Africa since 1991, I have deliberately made detailed references to the original documents to indicate to the reader that the trend on the part of first the ANC, and now government, to take definitive policy decisions on language in education that favours Africans continues to hold South Africa at ransom. This trend has continued with the 1997 Language in Education Policy document referred to later.

2.4.3. Post-Apartheid South Africa and new legislation (1994-
This section examines closely two key documents on present day language in education policy. There has not been much movement with regard to language in education policy since the 1997 Language in education policy document. The researcher will therefore first discuss these two documents before providing a brief update since 1997. The two documents are:

- Language in Education Policy published in terms of Section 3(4)(m) of the National Education Policy Act, 1996 (Act 27 of 1996), and the
- Norms and Standards regarding Language Policy published in terms of Section 6(1) of the South African Schools Act, 1996. The document which publicly announced these two policies on the 14 July 1997 indicated that, although the two policies have different objectives, they complement each other and should at all times be read together. (Department of Education 1997a:1).

    In the preamble to the Language in education policy, Paragraph 4.1.5, which looks at locally viable approaches to multilingual education, suggests that:
- Whichever route is followed, the underlying principle is to maintain home language(s) while providing access to and the effective acquisition of additional language(s). Hence the Department's position that an additive approach to bilingualism is to be seen as the normal orientation (my emphasis) of our language-in-education policy (1997a:3).

Despite such strong sentiments in favour of home language maintenance, the next Paragraph (4. I .6) can be seen to undermine these sentiments by bestowing the right to choose the language of learning and teaching onto the individual learner or parent. The only qualification for exercising such a choice is that it has to be 'exercised within the overall framework of the obligation on the education system to promote multilingualism' (1997a:3). No mention is made of home language maintenance. How does one reconcile the right of the individual parent/learner to choose the language of instruction with a rhetorical accommodation of mother tongue instruction or home language maintenance?

A similar tension between the promotion of multilingualism and home language maintenance arises in the aims outlined in the language in education policy (Department of Education, 1997a). Paragraph 4.3.5 takes for granted that there will be mismatches between home languages and languages of learning and teaching by talking about countering such disadvantages. In fact the one aim that refers to pupils' conceptual growth makes no mention of home language. It might be useful to examine this aim in more detail. Paragraph 4.3.2 sets out the intention:

> [T]o pursue the language policy most supportive of general conceptual growth amongst pupils, and hence to establish additive multilingualism as an approach to language in education (1997a:4).

The connection between the two phrases of this paragraph is not evident. How will the conceptual growth of pupils be established through a policy of additive multilingualism? Incidentally, the phrase additive multilingualism is peculiarly South African. Additive bilingualism is a well-known construct in second language acquisition studies, but no mention is made of additive multilingualism in international literature on the subject. It is a phase actually coined by the Department of Education in South Africa.

Historically, language in education policy in South Africa has two components: namely language as medium of instruction and language as subject. It is noteworthy that there is only one clause in the language in education policy stipulations that refers to medium of instruction or Language of Learning and Teaching (LoLT), as it is known in South Africa. Paragraph, 4.5, reads as follows, 'The language(s) of learning and teaching in a public school must be (an) official language(s)' (1997a:6). This is curious as it opens up space to continue with the status quo of the past. The desperation to appease minority fears and a blind loyalty to English seems

to have strongly influenced the watering down of the initial drafts. Individual choice is circumscribed by the condition that the LoLT has to be one of the eleven official languages. Again, no mention is made that it should (preferably) be a language learners are proficient in. We see therefore that there are a number of implicit tensions in the language in education policy. These revolve around three issues, namely, choice, access and multilingualism. If the state were to play a more interventionist role by limiting the choice to languages learners are familiar with and reasonably proficient in, it would go a long way to promoting and developing African languages, which is one of the aims of the policy. Instead, all kinds of restrictions are imposed to prevent African languages from being used as media of instruction. These are highlighted in the second part of the language policy announcement, the Norms and Standards document, mentioned above. In particular, Paragraphs 5.2.4 and 5.3.2:

5.2.4 Where no school in a school district offers the desired language as a medium of learning and teaching, the learner may request the provincial education department to make provision for instruction in the chosen language, and section 5.3.2 must apply. The provincial education department must make copies of the request available to all schools in the relevant district.

5.3.2. Where there are less (sic) than 40 requests in Grades I to 6, or less (sic) than 35 requests in Grades 7 to 12 for instruction in a language in a given grade not already offered by a school in a particular school district, the head of the provincial department of education will determine how the needs of those pupils will be met (Department of Education 1997:8-9).

If we accept that currently most pupils beyond year 3 are taught either in English or Afrikaans, it is clear that these regulations mainly affect African languages, and not only in schools formerly set aside for those classified white, colored or Indian. It is the learner, or her parent/guardian in the case of a minor, who chooses the language of learning upon application for admission to a particular school. These figures are informed by the Department's learner-teacher ratios and what it considers cost-effective use of education funds.

2.4.4. Issue of access

Under apartheid, pupils were segregated along so-called racial lines and difference meant inequality. So it is understandable that a post-apartheid government would want to be seen to be breaking down racial enclaves of privilege. In these circumstances, African pupils gaining admission or access to schools formerly set aside for whites would be seen as a victory against apartheid. It does not necessarily mean that African pupils have meaningful access to the curriculum. The main reason for this is that such pupils are usually not very proficient in the

language of learning at the former white schools. And usually, there are no teachers who can speak the relevant African language, even though there is learning support for such pupils. In the words of the language in education policy, there is, in such cases, a 'mismatch between the home language and the language of learning' (Department of Education 1997a:4). Although most African schools too use a second language as a medium from the fourth year, the difference between them and the former white schools is that almost all teachers at such schools are able to mediate language difficulties for their pupils as they often share a common language.

2.4.5. Issue of multilingualism

A close reading of both the Language in Education Policy document (Department of Education 1997a) and the Norms and Standards document (Department of Education 1996) indicate that the Department has placed greater emphasis on promoting multilingualism than on facilitating learning. Additive multilingualism is the goal. But how is it to be arrived at? If one looks at the language in education policy both in terms of language as medium and language as subject, it is not clear that additive multilingualism will necessarily be achieved through this policy, although that is supposedly an overriding aim. The constraints with regard to choose of medium of instruction have already been mentioned. In addition, if one looks at the clauses on languages as subjects, there is no guarantee that a learner will choose his or her home language.

2.4.6. Summary and conclusion

The issue of parental choice is a refrain that runs throughout the history of language in education policy in South Africa since the Bantu Education Act of 1953. I would like to repeat the concluding words of the NEPI Report (1992), Language, which captures the caution that needs to be exercised around choice:

Language policy for education needs to be flexible without being so laissez faire as to allow the perpetuation of present discriminatory practices or ill-informed choices of alternatives to them (1992:93).

A second issue that recurs in the language in education policy debates is the question of whether a particular policy leads to segregation or, as stated earlier, 'ghettoizes' pupils. The issue of segregation is a non-starter in present-day South Africa. For, to put it cynically, there are not enough whites around in South Africa for integration to be significant. The demographics of South Africa are vastly different from those in a country like the United States of America where integration is a real demand. What is more important for such pupils is that

the education they are exposed to does not exclude them from participating in the economy of the country, and more globally. I discuss this issue further in the section below.

A third area of concern is more serious and that is whether a particular language in education policy, mother tongue education to be precise, will lead to educational closure for particular sections of the population. African languages have historically been used by the apartheid state as a means of educational closure, so it is no surprise that parents view mother tongue instruction with suspicion. Myers-Scotton (1990) posits that in a society like South Africa, language becomes a key feature of social closure, with the dominant languages playing an important role in the stratification of the society. This is accomplished either by bureaucratic decree or by a cultural hegemony which the dominant languages sustain through their educational role and their frequent use in print and the media, its dominance (i.e. English) as the language of reading and writing in South Africa is considerable (1990:29).

The only way to address this fear is to ensure that pupils who use an African language as their language of learning are given access to a language of wider communication, English. It is not sufficient that such pupils are taught English. They need to be taught English by teachers who are proficient in the language and with the necessary resources.

For a language to be regarded as official it needs to function in 'some or all' of the following capacities listed by Fasold (1984) and cited in du Plessis and Pretorius:

- The spoken language of government officials in the exercise of official duties at the national level;
- The language of written communication between and within government agencies at the national level;
- The language in which government records are kept at the national level;
- The language in which laws and regulations governing the nation as a whole are originally written;
- The language in which forms, such as tax forms and various applications related to the national government, are published (1999:5).

Whilst our Constitution (RSA 1996) has adopted eleven languages as official, it is mainly English, and to a lesser extent Afrikaans, that functions in the above capacities. This has obvious implications for language in education policy. Whilst I agree with Harlech-Jones' view

(1995) that there is no necessary correlation between declaring a language official and its role in education, I would nevertheless argue that African languages will seem more attractive as media of instruction if they have greater currency in the day to day running of society.

2.5. Post- 1994 Language Typologies

Heugh (1995) used the NEPI schema to develop a typology of bi-/multilingual educational models linking social policy, language-in-education policy, and educational outcomes, and distinguishes between additive and subtractive/transitional bilingual models within three orientations to language: language as a problem, as a right, and as a resource (Ruiz, 1984), respectively. It is a highly developed and theoretically coherent classification system.

She later worked with Alidou et al 2006 & Heugh 2006 on a typology identifying only 'additive bilingual' or 'strong bilingual models', namely (1) 'home-language [mother-tongue education] throughout' schooling, with good second-language teaching (2) 'additive bilingual education', meaning MTE with good second-language teaching to Grade 6 or 8, followed by dual-medium education, and (3) 'very late-exit transition to L2', meaning MTE with good second-language teaching to Grade 8, followed by second-language teaching from Grade 9. Additive bilingual' is used to refer to both the overarching category as well as to one of the three sub-categories within it. All the three additive bilingual models discussed above, assume MTE (single medium) for the duration of primary schooling, with the additional language learnt as a subject; the difference in programme models takes effect only in secondary school. According to Pluddemann (2010), the Alidou et.al, & Heugh (2006) classification forms a useful point of departure for his proposed typology. The Pluddemann (2010) typology describes the LoLT arrangement of the school viewed longitudinally across grades without a reference to the home language of learners. The following is a summary of his proposed typology:

- A single-stream school has only one language model, i.e. all learners who progress through the school from the entry year to the exit year would have experienced the same LoLT arrangement.

- A parallel-stream school has two or more language models, for at least one grade of the school.

A parallel cohort embarking on a new language model, typically from Grade 1 upwards, also defines a stream, even where the cohort has not yet reached the school's exit year. Since a learner can experience single-medium and dual-medium education but cannot experience

parallel media of instruction, the traditional term parallel-medium (education) becomes oxymoronic and is replaced by parallel-stream (school).

- A language model represents the overlay of a school's (stream's) LoLT arrangement and the language approach experienced by a cohort, i.e. the combination of LoLT and learner HL. It makes a distinction between home-language based and non-home language based models.

The school's language approach is its ideological commitment to the learner's home language, measured by the duration of the use of the home language as a LoLT.

- A home-language based (HLb) approach is an orientation that values the HL as the main vehicle for teaching and learning, either singly or (as the formative LoLT) alongside the FAL-LoLT.

He goes on further to say that given the multilinguality of school populations, it is necessary to stipulate a cut-off point, in terms of learner proportions, for what qualifies as home language-based. Only schools in which at least 75% of learners in both the Foundation Phase and the Intermediate Phase are educated in their home language, and in which the HL-LoLT is used for at least 50% of curriculum time in Grades 1–6, qualify as home-language based.

- As a corollary, a non-HLb school is one that does not value the HL as the main vehicle for teaching and learning. A non-HLb school is one in which fewer than 75% of learners are educated in a home language in the FP or the IP, and/or where the proportion of curriculum time allocated to the HL-LoLT drops to below 50% at any point in Grades 1 –6.

- In bi-LoLT models, the HL-LoLT is contrasted with the FAL LoLT, which refers to the use of the first additional language (FAL) for teaching and learning, including assessment. In bi-LoLT models the FAL-LoLT is usually supportive of the formative HL-LoLT. The researcher will end this section with the definition of home-language-based bilingual education (HLbBE) has a goals component and a forms component. HLbBE has the socio-cultural goal of consolidating the core of the child's identity; the linguistic goal of developing competence in a home language and at least one additional official language, both orally (bilingualism) and in writing (biliteracy), as well as conversational fluency in a third; the educational goal of laying the foundation for all other learning by developing competence to use two languages for learning; the civic goal of promoting a multilingual citizenship in all learners, thereby contributing to the struggle against racism, ethnocentrism and xenophobia; the political goal of

cultivating marginalised official languages, and thereby empowering their HL speakers; and the economic goal of achieving greater efficiency in the education system, in cost-benefit terms, and in enabling participation in, and the transformation of, linguistic markets.

Pluddemann (2010) then focusses on the forms of HLbBE rather than on its goals, as he argues that the latter are encoded in the Constitution and other pieces of legislation, notably the Language-in-Education Policy (DoE, 1997). He makes mention of factors to be considered in designing a viable HLb model. According to him, a good HLb model will emerge from the socio-educational context in which the school community finds itself, and cannot be decided in a vacuum. Factors that will influence the school's language policy include, amongst others the linguistic market and the politics of language learners' home language(s) and language biographies teachers' language repertoires and subject competence availability of textbooks and teachers' guides in the relevant languages, departmental support, curriculum documents, circulars, record-keeping documents, workshops and courses, etc. in the relevant languages, parents' language attitudes, extent of the school leadership's language preference (Pluddemann, 2010). Lastly, I am interested in his three ways of allocating LoLTs: LoLT by separation, LoLT by integration, and LoLt by a combination of the two, i.e. a mixed approach. LoLT separation is when different LoLTs are used for different subjects (or themes within the same subject), or by different teachers, or at different times within the same grade. The two LoLTs are not used in the same lesson; codeswitching is therefore avoided. In LoLT integration the two LoLTs are used in the same lesson, although not necessarily in equal proportions or for the same functions. Codeswitching and codemixing are permitted, provided that both languages are used systematically for teaching, learning and assessment and undue repetition is avoided. This implies that both LoLTs are used orally and in writing in LoLT-integrated subjects. Two important practices in LoLT integration are (i) that all forms of assessment (in content subjects) are made available bilingually, and (ii) that assessment tasks can be answered in either LoLT, and/or using codemixing and codeswitching. Accordingly, LoLT separation & integration combined represents a mixed LoLT allocation approach in bi-LoLT models that recognises the complexity of many bi/multilingual contexts and the existence of code-mixed varieties. The model suggests that some subjects are best taught monolingually and others bilingually, while yet others may undergo a LoLT change over time as learners become more proficient in the FAL-LoLT (Pluddemann, 2010). Classifying models is one thing; policy realisation is another. The proposed typologies indicate, via the learner HL-LoLT match, which schools are in line with the additive bi/multilingual spirit of the LiEP (1997). These should

assist the education authorities to identify appropriate interventions needed in order to help schools towards policy-aligned directions. School language policy reviews and development still needs to happen, teacher provisioning and development, provision of language appropriate textbooks and LTSMs in relevant languages must go hand in hand with a good language model.

2.5.1. The Legacy of the Past and its Current implications

The discussion above demonstrates that the nature of language policies lend them in a position whereby they cannot be divorced from the socio-political issues of the day (Hawes, 1979; November, 1991). Graeme Bloch (2016), a former board member of Equal Education, a movement of pupils, parents, teachers and community members working for quality and equality in South African education said 22 years after democracy, black and coloured schools in South Africa are still left under-resourced. In 1953, finances for black and white schools were separated, and black children were given significantly less than white children. In 1975/76, the state spent R644 annually on each white pupil, R189 per Indian pupil, R139 on a coloured pupil, and only R42 on an African pupil. There was also a lack of black teachers, and many of those who did teach were underqualified. In 1961, only 10% of black teachers held a matriculation certificate. This perpetuated an inferior schooling system for the country's majority (Bloch in Villette, 2016). "Former white and Model C schools had more money and resources to a build a solid foundation for children, whereas schools in townships did not. He goes on to say that the poor will always get a poorer education unless there is more investment and teachers are trained. It is estimated that at least 250 000 people in Soweto were actively involved in the resistance of the Bantu Education Act, which was designed to provide black people with skills to work in manual labour jobs under white control; they never completed school. That legislation deprived and disadvantaged millions for decades, and its devastating personal, political and economic effects continue to be felt today. The Coloured Persons Education Act of 1963 put control of "coloured" education under the Department of Coloured Affairs. The 1965 Indian Education Act was passed to separate and control Indian education, which was placed under the Department of Indian Affairs. No new high schools were built in Soweto between 1962 and 1971, and pupils were meant to move to their relevant homeland to attend the newly built schools there (Bloch, 2016). How do we wake up and fix that? We now find ourselves at a point where language policy changes were aligned to the strategic overall grand plan of colonialism and apartheid.

In South Africa, it is noticeable that each time government attempts to address the issue of language for black learners; it is always interesting who deflects the attention of government

from that; it is usually academics. There is an interesting observation that in the recent history of vocal group academics who claim to know what is wrong with the system and how to fix it and offer very little in terms of the injustice of language deprivation. To them language is just one factor of disadvantage it will not solve our problems in education. There is an element of truth in that statement; that changing language policies is not a panacea for the challenges in the system. But because language is the single vehicle in schools that is a common denominator for teaching, learning assessment and communication; there will be no learning without it (Wolf, 2006). All government efforts post democracy are tilted towards opinions and learned advice from research papers and articles of academics; government listens to academics. They sit on panels of advice to the Minister of both Basic and Higher Education and are part of education Lekgotla each year; I hear very little advice to the Minister on equalizing education in terms of the medium of instruction. In the Eastern Cape instead, we have been criticized for being a poor province that should concentrate its resources, on other things than language projects.

2.5.2. Dismantling colonial and apartheid mentality in Higher Education Institutions

Direct colonial rule may have disappeared; but colonialism, in its many disguises as cultural, economic, political and knowledge-based oppression, lives on' (Sardar, 2008). If one adds the term 'apartheid' after 'colonialism' in the above quote, we get a true picture of post-apartheid South Africa, where colonial and apartheid marginalisation, racism and exploitation live on in many spheres of life and work, including basic and higher education. It was academics who sat in the Walsh, Eiselen and various other Commissions that advised previous government on the best way to break down the dignity and future of the black majority. It is academics who now determine research agendas on what is acceptable and not acceptable and which way government should go; many of them hide behind academic freedom to throw water at effort done to change the system that was designed to benefit a few white citizens. The government did intervene on behalf of the Afrikaner and changed their status and life trajectory by investing in the development of Afrikaans, at the expense of African languages. In terms of the Constitution (1996) it is the responsibility of government to redress injustices of the past and elevate the previously disadvantaged languages. Language was used as a vehicle to empower one group and disadvantage other groups. We need universities and academics who want to genuinely contribute to socio-economic transformation in the country and on the African continent, to assist government in ways of placing language at the center of redress. They have to profoundly change what they teach, research topics and how they are conducted. The current

Eurocentric curriculum – coupled with epistemic violence – does not contribute to a much-needed reimagining of the past and shaping of the present and future on the African continent. This can only be achieved through a curriculum that 'reconstructs' Africa from the historical, civilizational, political economy and political standpoint perspectives (Mamdani, 1998). However, this will not happen until the Eurocentric institutional cultures and staff demographics at universities fundamentally change (Department of Education 2008). Maserumule (2015) argues that fundamental change requires academics and administrators 'with a decoloniality posture' when dealing with the issue of decolonizing universities. The challenge in South Africa is that academics and administrators with a decoloniality posture are a minority at universities. Many come from the old system that worked hard to maintain apartheid and white domination; some have enjoyed the white privilege while claiming to be against apartheid or, in the case of many black academics and administrators, were indoctrinated during apartheid. Thus, the struggle to decolonize higher education will be a long one, possibly requiring new generations of academics and administrators – who were not part of the old system and who are representative of the country's demographics – to reach senior positions at universities. The opposition to change is entrenched within the university structures and will not easily allow the breaking down of the grip on power, privilege, influence and decision-making. This group will do everything in its power to contest, resist and water down the change, as 'any intellectual challenges to the orthodoxy that underpins' any field of study will 'provoke the ire of those who benefit most from the status quo' (Lagardien, 2014). Thus, the debates about decolonisation make many at universities uncomfortable. This is important and necessary, as change will not happen if people are comfortable with the status quo. Decolonisation requires a large mass of people demanding change on the campuses and in society. They will have to confront the 'official orthodoxy' (Mudimbe 1985:209) and 'consciously disrupt the status quo' (Nwadeyi 2016). Social and structural change seldom happens anywhere in the world without activism, advocacy, dissent, disruption and protest. The powerful and influential don't simply give in because it is the right thing to do; they only act when they are compelled to do so by social movements and masses. Progressive academics and lecturers must take the lead and not wait until the institutional cultures and environments transform. They need to decolonise their own curriculum and democratize the learning space in which they operate. In particular, they have an opportunity to involve students in the process of transformation of the curriculum, teaching and learning. Academics and lecturers can do this by creating an 'anti-hierarchical' space in their classrooms where everyone learns, engages, debates and critically reflects together placing African languages at the core of these

discussions (Rouhani 2012:1731). Freire (1970:69) sees this as an educational space where lecturers and students jointly work on 'unveiling the reality', understanding it critically and recreating the knowledge in the process. This is in line with Motta's (2013:88) notion that 'the process of constructing knowledge needs to be reclaimed and remade as a critical act of opening possibility through developing pedagogies (as method and content) with students'. Radical departures from the status quo are never easy. They are always simultaneously symbolic and visceral. But they open up new possibilities for questioning what was once unquestioned and unquestionable' (Msimang, 2015). This is exactly what the South African education system needs today, a radical departure from the status quo and questioning the colonial and apartheid knowledge systems that until now have not been questioned sufficiently, if at all. The movement to transform and decolonize education and the language policy landscape includes a coalition of students, conscientious teachers, progressive academics, university staff and a concerned public. The public must find ways to hold institutions accountable and maintain the non-violent, intellectual, evidence-based, emotional and popular struggle until Eurocentrism and epistemic violence at universities are dismantled. The system cannot self-correct language planning atrocities through other means; language planning needs to address language disadvantage and balance out that scale first comparing oranges to oranges. The false myth that you can correct language barriers in the education sector by training teachers in more English is a myth created by those who continue to benefit from an English mainly system. Universities cannot be complacent with having courses that teach our Pre-Service and In-service educators mathematics and science courses only in English when they know those teachers will teach in the primary school, particularly in the Foundation Phase. Transformation starts there; decolonizing education starts there, not in any statement of intent and jargonized commitment to multilingualism and equal opportunities for all. It will not happen overnight; but we are waiting to see real commitment otherwise we accept that the collusion that happened in the past to denigrate the poor majority is the plan post-apartheid. The fact that universities produces educators; then criticizes them for being unable to teach mathematics and science having gone through their programs is cause for concern. I might sound very harsh in criticism of HEIs and some academics; my experience as a civil servant is that academics are quick to profess to know what is wrong with the system and how to fix it; they should hasten to do so.

2.6. Dismantling Bilingual Education from its history in South Africa

Historically, the term bilingual education arose in response to the struggle for political control and economic power between Afrikaans and English more than a century ago. During the Union period (1910–1948), the dominant understanding of bilingual education was dual-medium education, in which Afrikaans- and English-speaking white pupils were schooled in the same classes in order to promote not only bilingualism, but political reconciliation and social and cultural integration after the bitter Anglo-Boer (South African) wars. The bilingual school and pedagogic terms, fell foul of the hegemonic aspirations of Afrikaans-speaking whites over their English-speaking compatriots. Well before 1948 the conservative Afrikaner class were able to give expression to their anti-English sentiment by phasing out dual-medium education in favour of parallel-stream (known as parallel-medium) and single-medium schools, a process that was accelerated under apartheid. Thus bilingual education defined in terms of the *means* through which educational goals were to be achieved – two media of instruction – increasingly made way for bilingual education understood in relation to the *goal*, namely of promoting bilingual competence amongst pupils. In effect, single-medium schools in which the second language was taught as a compulsory subject all the way through fell within the ambit of bilingual education. While this is arguably a *weaker* form of bilingual education than dual-medium, most Afrikaans-speakers nevertheless learnt English to a fairly high level in this way, i.e. through the *subject* route (Pluddemann, 2010). For bilingual education to take on its rightful meaning within a context of multilingualism; it must be moved away from this history.

2.7. Chapter Summary

South Africa opted for a pluralistic alternative instead of the structural and organizational uniformity that characterized the apartheid government era for a long time. The advantage of such a pluralistic alternative is that it allows and protects the cultural, religious and linguistic diversity of the present day South Africa. A disadvantage might be that such toleration might be easily turn out to be a way of protecting, and continuing the provision of fundamentally unequal education racial lines as seen in the recent stories in the media with former Model C schools using language as a reason for separating learners. In allowing pluralism our Constitution (1996) tolerates the protection of minority interests at the expense of children. Brian Bullivant (1981) argues that while a pluralist alternative in principle has many appealing features, it also brings with it the pluralist dilemma. Even in the most enlightened and tolerant societies pluralistic options can potentially function as ideal methods of controlling knowledge

and power, while appealing through symbolic political language to be acting solely from the best of motives in the interests of ethnic groups themselves. The flavor of the Constitution (1996) being pluralist allows maintenance of the status quo despite it purporting being transformative. We seem to be running in circles between maintaining what was for the sake of peace and pluralism; when in fact we cannot move towards material change for the other.

As long as language planning and language policy formulation is seen as a top-down activity, removed from those whose lives it affects most closely, and is perceived as an activity only for those with specialized expertise, it will most probably continue to be generally ineffective. What is needed, instead, is language policies devised in consultation with, and with the support and involvement of, those they intended to serve. This in turn requires that ethnic, cultural and linguistic rights, whether conceived in individual or group terms, will of necessity have to be protected, as will the political, social, educational and economic rights of all South Africans (Reagan, 2014).

CHAPTER THREE
MOTHER TONGUE EDUCATION (MTE), CASE STUDIES AND THEORETICAL UNDERPINNINGS

3.1. Introduction

In attempting to devise an approach for this chapter, I tried to search frantically for literature that moves backwards and forwards on the value of mother tongue education for the majority populations for developed countries; no matter how big or small they are; mother tongue education is taken as the norm. There is no reason to make a case for MTE for children in these countries; it is given. The issue is always about how to ensure multilingualism for those countries and discussing possibilities for the education of minorities and immigrants. In these contexts, it is taken for granted that pupils from the majority populations will learn best through their mother tongues. Desai (2014) asks a pertinent question why is this practice then so problematic that it cannot be extended to the majority of pupils in African countries, some Asian and Latin American countries and to a minority of immigrant populations in Western countries? I add another question that deliberately brings another element to this question of why the discussion on mother tongue education for whites, Asians and the so-called coloured is taken as a given for these racial groups and not as a given for African language speakers in the same country? It should not be a surprise then, that Africans are suspect of any discourse by advantaged racial groups that tries to reason out why MTE is not doable for Africans despite being beneficiaries themselves. Is it a case of Africans cannot have what these racial groups have? If that is the case; then that must be overtly stated. The domain in which discussions on MTE for African language learners in South Africa, takes on different discourses depending on who says what, for what reason and the intention behind their words. In this chapter the researcher will touch on how the discussions on MTE for Africans, have formed a common ground discourse of its own. The researcher will also present the theoretical framework underpinning MTE and also present case studies on MTE that were significant; including a summary of the MTbBE pilot in Cofimvaba. The importance of this MTbBE pilot is that it provides the latest effort by government and the community to once more prove the same point for isiXhosa that has been proven so many times in developed countries, and for both English and Afrikaans in South Africa that MTE works. The pain of having to prove MTE as important, to beneficiaries of MTE, opens one's eyes to the depth of the disadvantage of being African. The hegemony of English and Afrikaans informs the structural arrangement of power in high

status domains like academia that Africans must prove a point to; that African languages are worth being used as LoLTs.

3.2. Discussions on MTE as Discourse forming

The UNESCO meeting of specialists on the use of vernacular languages in education in 1951 (UNESCO, 1951), whose report was published in 1953, is easily and understandably cited as an incipient point in the discourse on MTE. Since then, a lot of research has been done on MTE and literature on the subject abounds. Reviews of this literature can be found in a sizeable percentage of works that tackle the subject of MTE. Mwaniki (2014) provides an overview to outline the dominant themes in the discourse on MTE; she attempts to propose a taxonomy that captures the width and breadth of the discourse on MTE as embedded in the literature. It is important to unpack the concept of discourse and what it is. Discourse is the way in which language is used socially to convey broad historical meanings. It is language identified by the social conditions of its use, by who is using it and under what conditions. Language can never be 'neutral' because it bridges our personal and social worlds (Henry and Tator, 2002). John Benjamins (2004) posits that discourse is more than a message between sender and receiver. In fact sender and receiver are metaphors that obfuscate what is really going on in communication. Specific illocutions have to be linked to the message depending on the situation in which discourse takes place (Benjamin, 2004). Psychologist Herbert Clark compares language in use with a business transaction, paddling together in a canoe, playing cards or performing music in an orchestra. A central notion in Clark's study is common ground. The joint activity is undertaken to accumulate the common ground of the participants. With common ground is meant the sum of the joint and mutual knowledge, beliefs and suppositions of the participants. South Africa tends to discuss the issue of MTE for Africans differently from MTE for other racial groups. Some of these discourses assist the debate and bring us closer to mother tongue realisation for the education of the majority. Some of these discussions, postured as advice or caution impede implementation as they are often written by those who society listens to; either as professors or informed educationists. A careful study of their reports, papers, articles and verbal statements creates discomfort in those who have a responsibility of education provision. In social sciences, discourse is mainly used to describe verbal reports of individuals. In particular, discourse is analyzed by those who are interested in language, talk and what people do with their speech. Discourse is also used to refer to meanings at the more macro level, where language is used to describe aspects of the world (Ogden, 2002). This chapter will give examples of micro level discourse ideas, suggestions and sheer opinion in the

public space that is posed as knowledge that the public must consume, without critically analysing what the intentions of that discourse are. The researcher will also critically analyse this discourse.

3.2.1. Types of Discourse dominating discussions on MTE for Africans

Mwaniki (2014) identifies the dominant discourses in MTE as the historiographical/comparative discourse; the pedagogics/didactics discourse; the policy discourse; the human rights/social justice discourse; and the development discourse (Mwaniki, 2014). The first discussion is on one of the dominant discourses in MTE that can be characterised as the historiographical/comparative discourse. From the perspective of historiographical discourse, MTE carries the burden of history and is cognisant of this. The historiographical discourse seeks to locate MTE within historical space. In doing so, it depicts MTE as always being alive to the historical circumstances in which it has evolved; and as being a contributor to the historical circumstances in different polities. This discourse underlines the linking of MTE with state formation, where the entrenchment of MTE in a country's education system is conceptualised as one of the key mechanisms of consolidating the nation state. This view has been especially dominant in the Western conceptualisation of the inextricable relationships between language and the nation state and the role of education in socialisation, usually within a 'unilingual' state. The emergence of multiculturalism has tended to challenge this perspective, but not to replace it. In the West, multiculturalism is strongly associated with a growing realisation of the unintended social and cultural consequences of large-scale immigration. It is a term associated in principle with the values of equality, tolerance, and inclusiveness toward migrants of ethnically different backgrounds. From this perspective, multiculturalism is a social doctrine that distinguishes itself as a positive alternative for policies of assimilation, connoting recognition of the citizenship rights and cultural identities of ethnic minority groups and, more generally, an affirmation of the value of cultural diversity (Kymlycka, 1995).

In our part of the world, multiculturalism is a defining feature, like in most former colonised countries. In this part of the world, multiculturalism is a way of life and not an unintended social and cultural consequence of large-scale immigration. This point is supported by Prah (2009) when he states that Africans are among the most multilingual people in the world. He then qualifies this multilingualism by saying that this richness in command over languages is mainly oral, with little basis in literacy. He continues by stating that this weakness means that the foundations of multilingualism in Africa are tenuous. It is a multilingualism which suffers

from the debilities of orality as opposed to literacy (Prah, 2009). The fact that the colonial language are the ones in the minority in former colonies creates tension in this discourse. This discourse on MTE in the former colonised world takes cognisance of the disruptive nature of colonialism and colonial languages to the education systems of former colonial polities, with polities defined as autonomous nation-states with specific and entrenched forms of government. It uses the disruptive logic of colonialism and colonial languages as a basis to argue for the recognition and promotion of indigenous languages in education in these polities. In advancing the case for MTE in these former colonial polities, the historiographical discourse traces the historical circumstances attendant to the creation of different nation states and the impact of these historical circumstances on MTE; while acknowledging the pervasive multiculturalism and accompanying multilingualism in these polities and the primacy of diversity in creating viable nation states (Mwaniki, 2014). She goes on to further argue that closely related to the historiographical discourse in MTE is the *comparative discourse*.

3.2.2 The comparative discourse

This discourse seeks to compare MTE regimes in different polities; and in the process identifies the challenges attendant to actualising MTE as well as identifying success stories. In this comparative endeavour, this discourse is alive to the dialectics of history and MTE in different polities. This discourse is anchored on a need to identify and consolidate an inventory of what works and what does not work in MTE, while remaining cognisant of the peculiar circumstances in different polities. This discourse seeks to use both what works and what does not work for MTE as signposts for the actualisation of MTE across polities (Mwaniki, 2014).

3.2.3. The pedagogic-didactic discourse

This discourse underlines much of MTE philosophising. In more general terms, the study of education is called pedagogics. However, specifically, pedagogics entails "a study of the phenomena of pedagogy, where pedagogy means the education of a child by a responsible adult person" (Harmse, 1982). As a part-discipline of pedagogics, "didactics is scientific reflection centring on educative teaching-learning acts in the school and the related aspects such as didactic principles (teaching principles), teaching and learning materials (knowledge) development and teaching methods" (Duminy and Sohnge, 1982). Among general didactic principles, which include totality, individualisation, interest and motivation, perception, environmental teaching, and selection, mother-tongue teaching features prominently. For children, language provides the power to start, in a much more efficient and differentiated way, a dialogue with their world, and also with the people in their world. Through mother tongue, a

child gains a whole cultural heritage, which will, to a large extent, determine his further thinking, feelings, desires and attitudes. The pedagogic-didactic discourse argues for the primacy of mother tongue in teaching and learning. However, the link between the role of mother tongue in teaching and learning is not a simple and straightforward one. At the beginning of a school career, a child still has a relatively limited knowledge of mother tongue. A child may know enough of the language for his/her own needs at that stage, but ahead lies a great deal of hard work, not only in his/her mother tongue, but also on his mother tongue as a subject. It is only through purposeful and systematic teaching that the linguistic efficiency and skill brought from home can be heightened and extended. The logic of the primacy of mother tongue in teaching and learning is premised on the understanding that mother tongue is the most effective vehicle or carrier of all other things that the child is expected to learn from school. Further, mother tongue is also the basis upon which all other learning is anchored (Mwaniki, 2014). This point is supported by Joseph Lo Bianco (2014), he posits that we need to see that literacy grows out of the general learning that children have already done. He argues that children don't start learning the minute they enter the classroom; they start learning from the moment they're born. When you're born you're learning with your parents, your siblings, the other people involved in your life. And so you're basically at the focus point of a large community of people who informally are your teachers. So you're learning your social life, your conceptual development, your place in the world. And how to control other people's behavior towards you by mastering language, because language is the tool we use for all of those things (Lo Bianco, 2014). In educational circles, we think of language mainly as a cognitive tool, but language is much more than that. It is a cognitive tool, the most extensive and complex one we have. It is also the tool we use to make our presence felt in the world, to get our desires expressed and met. Children, as they acquire that, are doing it in their mother tongue. We can't expect that when they go to school there will be this instantaneous transition over to another medium of exchange for all of this really important information they encounter at school. A large body of evidence from different countries as well as advances in the field of cognitive neuroscience show that children who have access to Mother Tongue-based Multilingual Education (MTB MLE) develop better language skills in their mother tongues as well as national languages (Lo Bianco, 2014). Duminy and Sohnge (1982) observe that:

> When language formation is not up to standard, one cannot expect much from the teaching-learning setting. First, the necessary foundation of language formation must be present, and this foundation can never be better laid than within the sphere of the

mother tongue. Training in the mother tongue enables the socio-emotional life of the child to unfold smoothly, and at the same time helps the child towards independent and logical thinking (Duminy and Sohnge, 1982).

There are many proponents of MTE whose work is based on a comparative, pedagogi-didactive discourse amongst them, Alexander, Heugh, Alidou, Skutnabb- Kangas, Prah, Mazruis, Baker, Cummins, Prah, Bambogse and many others.

3.2.4. The Policy discourse

Mwaniki (2014) posits that policy, especially public policy, underlies much of the research and writing around MTE. Public policy is defined as a long series of more or less related choices, including decisions not to act, made by governmental bodies and officials (Dunn, 1981). According to Van Der Waldt (2002), policy is larger than a decision. A policy usually involves a series of more specific decisions, sometimes in a rational sequence. Even when the sequence is more erratic, a policy is typically generated by interactions among many, more or less consciously related, decisions. The study of a policy usually involves tracing multiple interactions among many individuals, many groups, and many institutions. Policy also involves action as well as inaction. In other words, policy makers may fail to act and/or take deliberate decisions not to act. Policy as inaction is, however, more difficult to pin down and analyse than policy as action, since it involves perceived behaviour and intent. Policy can be seen as the overarching concept, whilst legislation or acts, regulations, and instructions can be seen as purpose- and process-specific derivatives of public policy (Mwaniki, 2014). Underpinned by policy discourse, much of MTE research and literature has preoccupied itself with the following:

1. A description of policies, often language-in-education policies, which inform MTE in many a polity.
2. A description of the factors that underlie MTE policies in different polities.
3. A prescriptive rendition of what should be the best MTE policy for different polities.
4. A bemoaning of the lack of appropriate MTE policies in different polities.

A singular failure of MTE research and literature which is premised on the policy discourse has been the lack of recognition of the political nature of public policy. In many polities, the political infrastructure is controlled by the elites. Unless it further serves the entrenchment of their power, elites do not implement policies that seek to undercut their power. In as much as the foregoing is the rule of the thump everywhere, it is more apparent in the developing world.

In these polities, elites (who are often a creation of an educational, economic and political system premised on Western values) see the value of the mother tongue for political mobilisation, but revert back to other languages, especially Western languages, for the business of governance. In exceptional cases where elites agitate for MTE, as is the case with the Afrikaner elite in South Africa, it is because the educational, political and economic fortunes of these elites are inextricably tied to their mother tongue. Regrettably, to many developing world elite, mother tongue does not feature in the project of modernising their countries. The masses in the developing world also view mother tongue with suspicion, as a way of confining them to the lower echelons of educational, political and economic achievement. This is a sad but true. To reverse this trend in the developing world, there is need for MTE research that understands the intricacies of public policy processes that underpin MTE with the view of illustrating that MTE does not necessarily undermine the power of the elites, but rather serves the greater good of preparing citizens in a modernising democratic state (Mwaniki, 2014).

3.2.5 The Human rights/social justice discourse

The idea of human rights is one of the most powerful in contemporary social and political discourse. It seeks to overcome divisiveness and sectarianism and to unite people of different cultural and religious traditions in a single movement asserting human values and the universality of humanity, at a time when such values are seen to be under threat from the forces of economic globalisation and religious fanaticism. The idea of human rights, by its very appeal to universally applicable ideas of the values of humanity, seems to resonate across cultures and traditions and represents an important rallying cry for those seeking to bring about a more just, peaceful and sustainable world (Ife, 2001). MTE is claimed as being necessary for a person or a group (especially the minorities and the marginalised) to be able to achieve their full humanity, in common with others. MTE is also seen as applying to all humanity and it is desired for all people anywhere and everywhere. Further, the human rights discourse in MTE holds the view that MTE is essential for people from the minorities and the marginalised to achieve full human potential. Proponents of the human rights discourse in MTE have been able to mobilise support to the extent that there is substantial universal consensus on the legitimacy of MTE as a human right. They further argue that with proper institutional support, especially from governments, it is possible for MTE as a human right to be realised for all legitimate claimants, especially at the foundational years of education; and that the right to MTE does not contradict other rights (Mwaniki, 2014).

3.2.6. Human Rights Discourse

Closely related to the human rights discourse in MTE is the social justice discourse. Essentially, social justice relates to the principle that every effort should be made to ensure that all individuals and groups enjoy fair access to rewards. It is about creating a more equitable, respectful and just society for everyone. However, social justice is not necessarily about equality. It can be about providing equal opportunities to access an unequal reward structure. In a society committed to the ideals of social justice, it is recognised that fair treatment and equal opportunities for everyone can only be brought about by imposing restrictions on the behaviour of some individuals or groups (Furlong and Cartmel, 2009). From a social justice discourse perspective, MTE is a way of ensuring individuals and groups enjoy fair access to education in a manner that is equitable, respectful and just for everyone.

3.3. The Development discourse

The development discourse in MTE is compelling, both in its traditional nuance that conceptualised development as 'modernisation' and the contemporary nuance of development as 'human development' (Mwaniki, 2014). Modernisation posited that all societies' progress in a linear fashion from a traditional state to modernity, with models of development based on historical processes that had taken place in the industrialised world. Historically, modernisation is the process of change towards those types of social, economic and political systems that have developed in Western and North America from the seventeenth century to the nineteenth and have spread to other European countries and in the nineteenth and twentieth centuries to the South American, Asian and African continents. To the newly independent nations of the Third World, it held out the promise of a guided transition to the state of developed industrial society. This perspective embodies a simplistic dichotomy between the traditional and the modern, with modernisation depicted as the process of moving from the former to the latter (Haines, 2009). Development for the people implies that the benefits of growth must be translated into the lives of people, and development by the people emphasises that people must be able to participate actively in the processes that shape their lives. The traditional nuance of development as 'modernisation' explains why in many polities in the developing world MTE is only for the first few years of schooling before transition to education in other languages, usually western languages. In South Africa, MTE is used for the Foundation Phase (Grades 1-3) then there is a switch to English. Within this framework, MTE is conceptualised as being a simplistic but necessary precursor of education in western languages. This orientation to development which informs many an education system in the developing world accounts for the crises of MTE in

developing world polities. Human development on its part accounts for the renewed interest in MTE in many polities in the developing world. MTE is conceptualised as an integral part of enlarging people's choices within and outside the education system (Mwaniki, 2014). The issue of choice is discussed in this study where the point is made that there is no choice if the whole system is designed to favor English.

The discourse scenarios discussed above, are found in the MTE literature worldwide, and also in South Africa in particular. There is one common thread that runs through all of them that in virtually all African countries, the hegemony of the colonial language English in education has remained an enduring legacy of colonialism. In the apartheid era, Afrikaners wanted to achieve the same hold with the 50-50 rule of 1976 to a dismal end. The above MTE scenario is a result of cumulative policy omissions and commissions through time as mentioned in Chapter 2; that have swayed MTE discussions in different directions but have made very little difference to change the linguistic landscape for African language speakers. In the next chapter the researcher will dedicate a section to a discourse not mentioned above, whose character has bits of each of the other discourses in its makeup but has a common ground narrative which has a phenomenal drawback effect on the implementation of any program favoring MTE for Africans. Giving a specific name to it is not important, but disclosing its effects is crucial to me and to this study. I term it MTE Common Ground Refutation Discourse (CGRD) and it will be dealt with extensively in Chapter 4.

Criticism often level on case studies is that the results cannot be generalized to a larger population precisely because they are case studies. Be that as it may, case studies offer us a window through which language operates in different contexts. The researcher will report on three significant studies which illustrate the important role that pupils' first languages play in accessing knowledge as well as facilitating the access of a second language. In a global era where it is important to communicate widely, the importance of additional languages cannot be overstressed. It will be noted that all the case studies mentioned were concerned both with learner's cognitive development through extending the use of their mother tongue, and with learners' acquisition of an additional language. The approach adopted was not a choice of either mother tongue or additional language. It gave due weight to both mother tongue and additional language. The researchers in these cases are all advocates of MTE who are fully cognizant of the dangers of ghettoizing learners by not exposing them to additional languages. At the same time, they are aware that in most contexts local languages are ignored at great cost to learner's cognitive development, as well as to their future effective participation in the wider society

(Desai, 2014). The three significant studies were done outside of the country and were done quite some time ago. The researcher will also present work that has been done on the continent and in South Africa lately and the Cofimvaba MTbBE project of 2012-2016 as a unique case of interest. All the work show similar results of the centrality of the Home Language of learners.

3.4. The Navajo Project at Rock Point

The Navajo project is as evidenced by the report by Holm and Holm (1990) retrospectively, important for South Africa as it is a very good example of the benefit of co-operating with local communities. It is about a Navajo community and school that went back to parental involvement and community control. They went back to the native language and to the community and Reservation [for] more effective education for their children (Holm & Holm 1990). In the 1960s, English was essentially a foreign language in the Rock Point community. English was not needed or used by children, except for direct communication with the handful of non-Navajos in the community, as very few moved out of the community. Despite this background, educators did not seem to have really tried to teach children to read and write in Navajo. A formal bilingual education programme was started at Rock Point Navajo Community School from kindergarten to 12 in the early 1970s. Husband and wife Agnes Holm and Wayne Holm were the co-founders of this programme. Desai (2014) reports that the curriculum took the following form:

Kindergarten: Two-thirds of the class time was in Navajo, one third in English.

Grades 1-2:   Half the class time was in Navajo, half in English.

Initial literacy was in Navajo, followed by English literacy in Grade 2.

Grades 3-6:   One third of the class time which included literature, science and social studies was in Navajo. Math was taught in both languages, but concepts were always introduced first in Navajo, then in English.

Junior High School: One fifth of the class time, which included Science, was in Navajo. Senior High School: Just over a tenth of the class time was in Navajo. This included Social Studies. The latter consisted of Navajo history, economic development and government (Holm and Holm 1990).

The programme drew on research from well-implemented bilingual-bicultural programmes across the world. McCarty states that the design of the programme was called 'coordinate

bilingual instruction', with separate but complementary time devoted to learning in each language. Navajo-language teachers (NLTs) taught and interacted entirely in Navajo, and English-language teachers (ELTs) taught and interacted only in English. Students learned to read first in Navajo, then English (McCarty, 2010).

In developing their programme, the Rock Point community were mindful of many factors. First was the importance of maintaining Navajo as a language both for cultural purposes as well as pedagogical ones. Second was the need for Navajo children to be exposed to and acquire English as a language. The community was cognizant of the important role that English played in the wider society and hence did not want to deprive their children of this opportunity. Third was to inculcate a pride in 'Navajo-ness' and 'to see themselves as capable of succeeding because of, not despite, that Navajo-ness' (Holm and Holm, 1990). In this regard, both NLTs and ELTs were to plan, instruct and evaluate as teachers so that the equality of the two languages and the teachers was ensured. Fourth, the Rock Point data showed, 'contrary to the conventional wisdom, that being rural and speaking Navajo need not lead to doing poorly in school' (Holm and Holm, 1990).

McCarty posits that the longitudinal data from Rock Point show that students not only outperformed comparable Navajo students in English-only programmes, they surpassed their own previous annual growth rates and those of comparison-group students in BIA schools and they did so by a greater margin each year' (2010:90, drawing on Holm and Holm 1990). Navajo students also had the benefit of becoming bilingual and biliterate in both Navajo and English.

However, it needs to be borne in mind that the programme described above evolved over more than twenty-five years. It was only in the early 1980s that the first twelfth grade class graduated from the school. A sobering thought indeed, especially for those who seek instant solutions to complex problems. It must also be remembered that this programme provided at least two teachers per class, one Navajo speaking and the other English speaking, in the early grades so that pupils had quality input in both languages. For one of the goals of the programme was to ensure the equality of the two languages and the teachers (Holm & Holm 1990). It is also worth noting that the amount of input in the pupils' primary language, Navajo, decreased in correlation with their proficiency in that language and their readiness to be exposed to more material in English. This is in keeping with the tenets of the threshold hypothesis which states that learners in contexts such as the Rock Point one, need to have a sufficient level of proficiency in the mother tongue before being able to benefit from exposure to a second

language and the developmental interdependence hypothesis which maintains that acquisition of L2 is linked to and influenced by the level of proficiency in the Ll (Cummins 1979 in Desai, 2014)). A further feature of the Navajo programme that bears mentioning is the important role played by the parents and the community in providing support for its implementation. Parents who were drawn into the programme had positive attitudes towards maintaining their children's home language in their school career. This programme succeeded because it approached the medium of instruction issue from a holistic and systemic perspective, in other words it acknowledged that 'buy-in' had to be gained from all sectors of the community: the teachers, the students, the parents and the Board (an equivalent today of a school governing body).

The following section is dedicated at an experimental project conducted in the Ife Province in Nigeria in the 1970s which extended the use of Yoruba as a medium of instruction to six years as opposed to the usual three years (Desai, 1994).

3.4.1. The Six Year Primary Project (SYPP)

Prior to the 1970s, most Nigerian children did not go beyond primary school. Despite it being compulsory, primary schooling left much to be desired. Afolayan describes the situation at the time as quite dismal:

> *The average Primary School pupil leaves school without the ability to recognize the Nigerian flag, any awareness of the nature of his country politically, economically or socially, tools for continuous self-education through permanent literacy, or hope for any bright future in the community. He is completely alienated from his agricultural background and generally can only see himself as a failure (Afolayan, 1976).*

It is in such a context that the Six-year Primary Project (SYPP) was conceptualized. The SYPP was an experiment implemented on a small scale in the Ife Province in Southern Nigeria starting in 1970. The project was primarily concerned with the question of the most appropriate language policy for efficient primary education, to address the deficiencies described by Afolayan above. There were five groups involved in the study. These included both urban and rural pupils. Two groups were taught in Yoruba, their Ll, for six years, before changing to English as the medium of instruction in secondary school. One of these two groups had a specialist English teacher for English as a subject. The other three groups followed the usual Nigerian model and had Ll medium of instruction until the end of their third year after which they switched to English as a medium of instruction. English was taught to all the groups as a subject, as was Yoruba (NEPI, 1992). The SYPP curriculum consisted of English,

Mathematics, Science, Social Studies, and Yoruba. The main differences between the Old Experimental (OE) and the Old Control (OC) classes were in the medium of instruction in the last three years of primary education as well as in the use of a specialist teacher of English for one of the experimental classes. As the project was extended to ten more schools, additional variables were brought in, such as the abandonment of specialist teachers of English for the new experimental (NE) classes, the introduction of a new curriculum for both NE and New Control (NC) groups, and the introduction of new materials for ELT (Bamgbose, 2000). He outlines the achievements of the experimental classes as follows:

Between 1976 and 1978, the SYPP was subjected to detailed systematic evaluation covering the various subject areas, and intelligence tests as well as psychological/sociometric tests of affective outcomes were also administered. The results show consistently that the best group in all subjects is the Original Experimental (OE) Group followed closely by the New Experimental (NE) Group. The worst group in all cases is the Traditional Control (TC) Group. Hence the difference in medium of instruction is shown to be significant. Longitudinal follow-up studies also reveal that most of the products of the experimental classes had no difficulty in gaining admission into secondary schools. In the planning of the Project, it was envisaged that children in the experimental classes would need an extra year of an enrichment course in English in which concepts learnt in Yoruba would be converted into English; but such was the performance of the children in English that the idea of a conversion course was abandoned long before the children reached the end of the primary school programme. One of the factors responsible for the children's good mastery of English is the use of a specialist teacher of the language, it is a pity that this aspect of the experiment was later abandoned (Bamgbose, 2000).

As was to be expected, the use of Yoruba as the medium of primary education led to the development of the language, particularly at the lexical level. According to Afolayan (1976), there are usually three methods employed by any language to expand its lexical inventory. These are: the creation of new items through the exploitation of the language's morphemic and phonemic resources (as in the creation of the word "iropo" for addition as a mathematical procedure); a change in the totality of the referential coverage of an existing item (as in the use of "idi" to refer to place or position); and the borrowing of items from other languages (such as coining the word "matimatiki" for mathematics). The development of the Yoruba language also involved work on Yoruba orthography and technical or scientific terminology, driven by the needs of this project.

During the life of the project new materials had to be developed in Yoruba, particularly in Mathematics and Science. These also had to be produced in English so that both the control and the experimental groups had equivalent materials. Teachers had to be trained to teach through the medium of Yoruba because up until the 1970s they had been trained in English to teach in English. In fact the teachers were often better qualified to teach in English than in Yoruba, particularly when it came to methodological issues. Inevitably, such activities as materials development and teacher development led to curriculum development. The main objective of the project was to improve the effectiveness of primary education, which was terminal for the majority of pupils. The SYPP was an important project in the history of applied linguistics in Africa as it showed the benefits of extending the use of an African language systematically beyond the initial three years (Desai, 2014).

3.4.2. Ramirez, Yuen and Ramey Longitudinal Study

The third study, a longitudinal study sponsored by the Department of Education in the United States of America was an 8-year project that began in 1983-4 and ended in 1990-1. It is reported in Ramirez et al (1991). The main objective of the study was to compare the effectiveness of three programmes in facilitating the acquisition of English language skills in primary school pupils from a language minority background (or as they are often referred to, limited-English-proficient [LEP] pupils) so that they could succeed in an English-only mainstream class. The three programmes were structured English immersion, early-exit, and late-exit transitional bilingual education programmes for 'language-minority children. The main difference between these three programmes was the amount of English used for instruction and the length of time pupils participated in each programme. Drawing on Ramirez et al (1991), the main features and findings of the longitudinal study are discussed below:

a) Description of longitudinal study

- **Structured immersion strategy programme**

All instruction was in English. The teachers had specialized training in meeting the needs of LEP pupils in the form of a bilingual education credential or English as a second language (ESL) credential. In addition, they had strong receptive skills in Spanish, the pupils' primary language. English was taught through the content areas. However, there was a strong language development component in each such content lesson. The use of the child's primary language was limited primarily to clarify English instruction. Beginning in the kindergarten, a LEP pupil would be expected to be mainstreamed within two to three years.

- **Early-exit programme**

There was some initial instruction in the child's primary language, about thirty to sixty minutes per day. This was usually limited to the introduction of initial reading skills. All other instruction was in English, with the child's primary language used only as a support, for clarification. However, instruction in the primary language was quickly phased out over the next two years so that by grade two, virtually all instruction was in English. Pupils in this programme were expected to be mainstreamed by the end of the first or second grade, similar to the structured immersion programme. The teachers in this programme too had a bilingual education credential. This type of programme was the kind typically funded through the Bilingual Education Act.

- **Late-exit programme**

In contrast, pupils in this programme received a minimum of forty percent of their total instructional time in Spanish (Spanish language arts, reading, and other content areas such as mathematics, social studies, and/or science). Pupils remained in this programme through the sixth grade, regardless of whether they were considered 'fluent-English-proficient FEP') or not. Again, the teachers had a bilingual education credential. In addition, teachers working in this programme tended largely to come from a similar background as their pupils and were sufficiently fluent in Spanish to teach in it.

b) Findings of the longitudinal study

Two phases were involved in the data analysis of this study. The first addressed issues on research design such as comparability of background characteristics across the three programmes. The second phase addressed issues of programme effectiveness. With minor exceptions, schools in the three programmes were comparable as far as background characteristics were concerned (Ramirez et al, 1991).

As far as programme effectiveness was concerned, after four years in their respective programmes, LEP pupils in immersion strategy and early-exit programmes demonstrated comparable skills in mathematics, language, and reading when tested in English. As the school districts that chose to implement the late-exit programmes did not provide either an immersion strategy or an early-exit programme, the three late exit programmes are compared with one another as two of them (Site D & E) used approximately forty per cent of Spanish during grades five and six, whilst the one district (Site G) used more than ninety per cent English in the last

two grades. By the end of the sixth grade, sites D and E had significantly higher mathematics skills than pupils in site G who were abruptly transitioned into English instruction. As far as English language reading skills were concerned, pupils at site D who also had the highest skills in English language and reading in the first grade, completed the sixth grade with the highest scores. In the two areas of English language and reading, Sites E and G ended the sixth grade with the same skills, despite Site E exposing learners to less English. Interestingly, pupils in all types of programmes increased their skills in English language and reading from kindergarten to third grade as fast, or faster, than the norming population. The same, however, did not apply to mathematics in which case pupils in these alternative programmes experienced a growth rate slower than the norming population. The picture changes, however, when one takes a longer look, particularly at sites D and E in the late-exit group, at the picture from Grades 1 to 6. Such a picture shows that both sites developed either as fast, if not faster, than the norming population in their English language and reading skills, as well as their mathematics skills.

In conclusion, as the executive summary of the longitudinal study states that these findings suggest that providing LEP pupils with substantial amounts of instruction in their primary language does not impede their acquisition of English language skills, but that it is as effective as being provided with large amounts of English. Of equal importance is the finding that pupils who are provided with substantial amounts of primary language instruction are also able to learn and improve their skills in other content areas as fast as or faster than the norming population, in contrast to pupils who are transitioned quickly into English-only instruction (Ramirez 1991).

Two notable features of the late-exit programme were that, firstly, teachers in such a programme assigned and corrected more homework than was done in either of the other two programmes. Secondly, there was greater parental involvement in the late exit programme. Ramirez et al (1991) posit that the higher proportion of late-exit parents monitoring and ensuring that their children complete their homework might be facilitated by the provision of homework in Spanish and/or the encouragement of use of Spanish for instruction by school personnel. A similar observation was made in the SYPP. This is an important argument in favor of mother tongue education and is often overlooked when discussing the merits or demerits of mother tongue education. It's easy to dismiss marginalized language group parents as lazy.

The three case studies reported on above all involved extending the use of the learners' mother tongues (Navajo, Yoruba and Spanish) systematically as media of instruction, in conjunction with English. These case studies are important for South Africa for various reasons. Firstly, the tension between promoting a language of wider communication like English and local languages like isiXhosa is a tension present in all the studies reviewed above. The case studies provide clear evidence of learners' competence in English not suffering as a result of extending the use of local languages as media of instruction. Secondly, the importance of involving local communities in supporting their children's education is a crucial factor in many of the case studies, as it is in South Africa. Such parental and community support is more possible if local languages are used in education. Thirdly, the case studies emphasise the importance of teacher training in realising the use of local languages as media of instruction. Fourthly, in some of the case studies (Navajo study and SYPP), the development of terminology in local languages was necessary, a feature that is present in the South African scenario as well (Nomlomo 2008; Mbekwa 2008). Fifthly, materials had to be developed in local languages for these languages to be used as academic languages. And finally, negative attitudes towards local languages as media of instruction had to be consciously counteracted, as it is the case in South Africa (Desai, 2014). It is quite disappointing that research to prove the same thing is still required.

The following takes a brief stock taking of recent ongoing developments in what has been referred to as mother tongue-based (bi)multilingual education to indicate that the same principles and hypotheses are equally applicable today.

3.5 Taking stock of recent developments in the field of mother tongue education

Despite the critiques of mother tongue and mother tongue education raised, communities all over the world continue to experiment with the use of the mother tongue in education. 'Experiment' may be the operative word though, as very seldom are these 'experiments' scaled up to serve the greater population. There are of course exceptions, such as the work done in Ethiopia to promote local languages, although, even in this case, moves to reverse or halt the policy are beginning to emerge (see Benson et al 2010; Heugh et al 2007; and Heugh et al 2010 for more detail on Ethiopia). It must be noted that the discourse which I have referred to as common ground discourses, is ever present and ever loud each time government makes concerted efforts to extend MTE for Africans. These discourses present a narrative of language as a problem that unfortunately, officials listen to because of who says it. This tension is ever present and has created the freeze in the development of African languages as LoLTs.

Key texts that this section is drawn from are (Alidou et al 2006; Brock-Utne and Skattum 2009; Brock-Utne at al 2003, 2004, 2005, 2006, 2010; Desai et al 2010; Dutcher 2004; Heugh et al, 2007; Heugh and Skutnabb-Kangas 201 0a; Nomlomo 2009; Qorro et al 2009; Skutnabb-Kangas et al 2009; Thomas and Collier 2002; Tollefson and Tsui 2004) which describe and examine the use of the mother tongue in education in various contexts across the globe. Despite the challenges referred to above, the communities discussed in these texts continue to extend the use of the mother tongue or familiar local language as a medium of education. In the section that follows I draw mainly on developments in sub-Saharan Africa, but also refer to other multilingual contexts such as the United States of America where there are many 'minority' language communities. The first section focuses on the stock-taking exercise on mother tongue and bilingual education commissioned by the Association for the Development of Education in Africa (ADEA).

3.5.1. The Association for the Development of Education in Africa (ADEA) stocktaking exercise on mother tongue and bilingual education in sub-Saharan Africa

In 2005 ADEA commissioned a stock-taking research exercise on the 'state-of-the-art on mother tongue and bilingual education in formal and non-formal education in sub-Saharan Africa' (Alidou et al 2006). The UNESCO Institute for Education (UIE) and the Deutsche Gesellschaft fur Technische Zusammenarbeit (GTZ) were requested to organise and coordinate the study with ADEA. As stated in the Executive Summary of the Report, the research had three objectives. These were:

1. To document and analyze research and experiences of African countries with regard to the use of African languages as the medium of instruction and the adaptation of curricula to local context and culture;

2. To explore the state of the art of mother tongue and bilingual education with emphasis on its situation in Africa South of the Sahara;

3. To facilitate policy dialogue on the issues of the use of African languages and bilingual education (Alidou et al 2006).

The six researchers tasked with this exercise had to give priority to studies which were supported by sound theoretical and empirical evidence and which were, preferably, evaluated independently. Learner achievement was a special focus of attention. Altogether programmes in 25 countries were considered (Alidou et al 2006). The researchers argue that:

Using African languages as media of instruction for at least six years and implementing multilingual language models in schools will not only increase considerably the social returns of investments in education, but will additionally boost the social and economic development of African nations and contribute to the improvement of the continent to knowledge creation and scientific development (Alidou et al, 2006).

In his chapter, Wolff argues that to achieve the above, three major obstacles have to be overcome. These are:

1. The uninformed attitude towards language in education by key stakeholders in Africa;
2. Western experts' negative attitudes regarding African languages; and
3. The fact that African universities are not fulfilling the leadership role they should have in promoting and developing mother tongue education (2006).

The last obstacle in particular is one which can be addressed, as is evident from translation of learner support materials in Science, Mathematics and Biology into isiXhosa and Kiswahili as part of the LOITASA Project.

In her chapter on Language Education Models, Heugh (2006) looks at different language education models and the extent to which they use African languages as media of instruction. Her conclusion is that despite the considerable efforts to develop and support the use of local languages in Africa, they do not go far enough. Most of the models tend to exit too early to the ex-colonial language. Drawing on international and African research such as Thomas and Collier (2002) and Bamgbose (2000), she argues that for the benefits of mother tongue education to be lasting, mother tongues should be used as media for a minimum of six years, but preferably longer. Alidou and Brock-Utne (2006) in their first chapter draw attention to the inadequacy of the existing teacher training programmes which do not equip teachers to teach through the mother tongue or to teach bilingually. They also refer to the lack of appropriate educational materials in both mother tongues as well as second languages.

Find the Executive Summary of the ADEA Report concludes as follows:

The Executive Summary of the ADEA report concludes that there are numerous mother tongue literacy programs, transcription of oral languages, community-based and non-government based organizations, donor and development agencies and specialised university departments. Each of these initiatives needs to be encouraged in their respective settings and supported further. However their potential cannot be realised if they are subsumed into education systems

which discourage the use of African languages after the initial years of early literacy or short-term mother tongue programs. Every effort should be directed towards building on these existing resources (Alidou et al, 2006).

This conclusion captures the problem in many multilingual contexts; how to get governments to make a long-term investment in local indigenous languages so that pupils can access knowledge in familiar languages and be enabled to acquire additional languages which provide wider access, such as English.

In the next section I look at one African country's attempts to use local languages as media of instruction in primary school (see Benson et al, 2010; Heugh et al 2007; Heugh et al 2010 for more detail on the Ethiopian model).

3.6. Study on medium of instruction in primary schools in Ethiopia

Heugh et. al. (2007) reports that in 1994, Ethiopia adopted a national Education and Training Policy whose focus was on extending the use of the mother tongue, particularly as a medium of instruction, for the full eight years of primary schooling. The policy also included the teaching of Amharic, the working language of government as well as a national language, as a subject to speakers of other languages (Heugh et al., 2010). From Grade 1, English was taught as a subject before it became the medium of instruction for secondary and higher education (Benson et al 2010; Heugh et al 2007; Heugh et al 2010). As part of a bigger review of its education policy, the Ministry of Education commissioned a study on the medium of instruction in primary education in Ethiopia. The consultants appointed were two international researchers, Dr Kathleen Heugh (Team leader) and Dr Carol Benson and two national researchers, Dr Berhanu Bogale and Mr Mekonnen Alemu Gebre Yohannes (Heugh et al 2007).The brief of the commissioned team, was to explore the existing models and practices of language acquisition and learning in Ethiopia since adoption of the mother tongue medium (MTM) policy. It was also to determine which practices were the most effective, so that these best practices could be part of evidence-based recommendations for language education policy and practice in Ethopia (Benson et al, 2010).

Of the nine regions, fieldwork was conducted in eight regions along with the city administration of Addis Ababa collecting a range of data. The team indicate that the decentralised nature of educational decision-making in Ethiopia has made it possible for the semi-autonomous regional states to choose appropriate languages and develop the materials needed to implement

national policy, although to varying degrees and with greater challenges in more linguistically diverse regions. This fact of uneven implementation makes Ethiopia something of a microcosm of the different models of bi-and multilingual education currently on offer throughout the world. This study provides some clear evidence that particular learning outcomes are associated with the degree to which mother tongues are developed (Benson et al 2010). Heugh et al highlight that, despite many challenges: the implementation of a bilingual education policy for Amharic speakers, and trilingual policy for most school pupils in Ethiopia, could be seen as an exceptional success over the ten to twelve year period between 1994-2005/6. It has been possible, in fact, to develop MTM education in 23 Ethiopian languages and engage in language development work in at least 34 languages within a decade, partially enabled by language development activities decentralised to the level of each regional administration (Heugh et al 2010). Given this remarkable progress over such a short period of time, what does this policy reveal in terms of student performance in system-wide assessment? Although the weighted mean achievement scores of the MTE experimental group were significantly higher than those of the control; they were generally low across the curriculum. Heugh (2010) cautions that this unfortunately is not an unusual phenomenon in African countries and can be attributed to poverty, poor educational resources, often content-heavy and inappropriate curriculum. The scores are within the range of other system-wide studies in Africa, even those found in wealthier countries in Africa such as South Africa (Heugh et al., 2010).

As indicated earlier, mother tongue (medium) education is a necessary but not sufficient condition to improve the quality of education in poor contexts such as the ones in Ethiopia. As can be seen from the above table, no region achieved an average of 50% which would be a minimal pass rate. The closest regions in Ethiopia came to 50% were those which taught in MTM in Grade 8 — 45.85%. Nevertheless, as Heugh et al (2010) indicate, those taught in their mother tongue (or a national language such as Amharic) achieved higher scores in all subjects except English. Even in the latter case, the difference between the two scores was not very high (see Heugh et al 2007 and Heugh et al 2010 for more detail with regard to the systemic scores).

The research team (Heugh et al 2007, 2010) highlight the aspirations for English and the negative 'washback effect' it has on the other languages, both in terms of resources allocated to English and the earlier introduction of English as a medium. Benson et al state that in response to pressure for high levels of English language proficiency in school leaving examinations and teacher under-preparedness for conducting English lessons, the Ministry of Education undertook a number of extraordinary and expensive projects since 2004. One of these, the

English Language Improvement Programme (ELIP) in collaboration with the British Council, trained a core group at the teacher training colleges in 2005 and established English Language Improvement Centres at colleges and universities. At the time of this study in 2006, 42% of the national teacher education budget was routed towards this programme. A second strategy to improve English language provision and teaching had been the installation in 2004 of (plasma generation) television monitors in all secondary classrooms of the country (Benson, 2010).

In response, the research team (Heugh et al 2007, 2010) recommended that more of the resources be diverted to MTM and the development of local languages and reading materials in them. They suggest that the introduction of English as a subject be delayed till teachers who are proficient in the language are available: 'The mere presence of English as a subject from Grade 1 is meaningless if teachers are not proficient' (Heugh et al., 2010). The team concludes that despite the current reversal of policy, the system-wide implementation of multilingual education across a large poor country was achieved with remarkable efficiency within a short period of time and it has much experience to offer other countries by way of large-scale data (Heugh et al., 2010).

Perhaps it is precisely this 'short period of time' that is the problem if one looks at the 25 years that it took a much smaller project such as the Rock Point one to successfully implement MTM education (Holm and Holm, 1990). The careful planning that went into the SYPP (Bamgbose, 2000) is another example, as is the longitudinal study conducted by Ramirez et al in 1991. Ethiopia needs to give its regions time to develop the MTM models and time to develop an effective model for the acquisition of English. As the educationist Stoddart says, "Perhaps one slogan might be 'Later English means better English!' Another might equally be 'Later English means better science, mathematics, geography (Stoddart, 1986 cited in Benson et al., 2010).

The next section looks at a small- scale experimental project extending the use of the mother tongue in education, the Language of Instruction in Tanzania and South Africa project, also referred to as LOITASA.

3.6.2. The Language of Instruction in Tanzania and South Africa (LOITASA) Project

The Language of Instruction in Tanzania and South Africa (LOITASA) Project, funded by the Norwegian Programme for Research, Development and Education (NUFU), is modelled on the SYPP of Nigeria (Desai, 2014). The LOITASA Project is known in donor circles as a 'South-South-North' cooperation project. The first phase of the project began in January 2002 and

ended in December 2006, whilst the second phase started in 2007 and will continue till the end of 2011. It is funded by The Norwegian Programme for Research, Development and Education (NUFU). The project involves both a research part and a staff development or capacity building part. The research part of the LOITASA project consisted of two elements: one descriptive and analytical and the other an empirical, intervention project. The descriptive/analytical part involved an analysis of the current language in education situation in Tanzania and South Africa and was the focus of our first edited collection (Brock-Utne et al, 2003). What follows is a description of the South African side of the project.

3.6.2.1. Project description and rationale

The study in both phases was a longitudinal one spreading over three years (Grades 4-6) and involved two primary schools in urban townships in the Western Cape. At each school one class constituted the experimental group and the other a control group. The experimental group was taught Science and Geography (Mathematics replaced Geography in the second phase) in isiXhosa while the control group was taught these subjects in English. The same pupils were part of the project from Grades 4-6 in each phase. The project monitored the progress of pupils in the two subjects, Science and Geography (Mathematics). In addition, qualitative data was collected through classroom observations and interviews with teachers, pupils and parents. Existing learner support materials in English in the three subject areas were translated into Xhosa. These materials were provided free of charge to both the experimental and control groups. There was also a teacher-training component to the project.

By conducting a study where the mother tongue of the pupils (isiXhosa) was used as a medium of instruction in two key subject areas in Grades 4-6, we wanted to explore whether pupils would learn better through the use of this medium as opposed to an unfamiliar language (English). The questions we focused on were the following: Would this switch to the mother tongue be in the best interests of the pupils for the acquisition of knowledge in Science and Geography (later Mathematics)? Would it facilitate the acquisition of English? Would it be in the interest of national development? We hoped to throw some light on the question of the consequences of continuing with English as a medium of instruction, as opposed to using a medium which was more familiar to the pupils.

3.6.2.2. Some findings of the LOITASA Project

Vuyokazi Nomlomo (2008) shares some of the findings that emerged from the first phase of the LOITASA Project in South Africa in the Science classrooms taught in isiXhosa as that

learners developed high self-esteem and better confidence as they participated in classroom activities in their own language. They were spontaneous in responding to teachers' questions and they could express themselves clearly in their mother tongue (isiXhosa). Their written work made more sense than their counterparts who were taught through the medium of English. They could elaborate on issues, making use of complex sentences which showed originality and better understanding of Science concepts (Nomlomo, 2008).

See Nomlomo (2008 and 2009) for details of actual examples from pupils' scripts. Nomlomo also points to a positive correlation between the use of Xhosa as a medium of instruction and pupils' understanding and academic performance in Science. For example, the pass rate in Science in Grade 5 for the Xhosa class ranged from 70 to 86%. Pupils in the isiXhosa-medium class consistently outperformed their counterparts who were taught in English.

Similarly, Langenhoven states that when pupils use their mother tongue to read and talk about a topic, they construct meaning, making sense of their world and thus generating a better understanding of scientific concepts instead of memorizing scientific facts' (2010). Langenhoven illustrates the complexities involved in assessing learners in a language that is not their first language. In other words, how do you know whether the concept in Science is misunderstood or whether a learner is simply not able to express himself in English. It is for this reason that Langenhoven asked learners to sketch their understanding of certain concepts. He argues that '(d)rawings are revealing and although mere suppositions, can generate meaningful insights into how pupils' conceptual understanding develops' (Langenhoven, 2010).

The important gains made by the project, are captured in the LOITASA edited volumes (Brock-Utne et al 2003, 2004, 2005, 2006, 2010; Qorro et al 2008; Desai et al 2010). There were also many challenges as well; concern was expressed by the research team after classroom observations that, despite a new curriculum which emphasized a learner-centred approach, teaching in both the experimental and control groups was characterized by a predominantly teacher-centred approach. Children spent most of their time listening to the teachers talking, with occasional choral responses from the students. Where questions were asked of pupils, they were largely of an information-seeking kind. The higher-order thinking that did take place in the four classrooms of these two schools was linked to assessment tasks in the learner support materials provided by the project (Desai, 2010). This drove researchers in the project to conclude that Mother tongue education is a necessary but not a sufficient condition to remedy such teacher centred approaches in the classroom, particularly in subjects such as Natural

Science where it is expected that pupils' natural curiosity and higher-order thinking are to be encouraged. An intimacy with subject knowledge on the part of the teachers is needed to develop a confidence and boldness in teachers which, in turn, could lead to greater pupil involvement in learning (Desai 2010). Cummins (2009) makes the same point that 'bilingual education is not by itself a panacea for underachievement'; I would say that the fact that there has been no modelling in the training of educators to teach content subjects in the home language leaves the teacher on their own to sink or swim. In absence of Teacher Education models at all HEIs that are delivered in African languages teachers will simply draw on models that they themselves were taught through. Desai (2014) qualifies her statement by saying that however, this does not mean that efforts to promote mother tongue education are futile. One needs to bear in mind that the one variable that remains constant in educational research is the correlation between socio-economic status (SES) and academic achievement. Language of instruction remains an important factor but it is not sufficient in turning around poor academic achievement in resource-constrained poor areas. As Wolff so powerfully said, 'Language is not everything in education, but without language everything is nothing in education' (Wolff, 2006).

The final study in this brief stock-taking exercise is the longitudinal study conducted by Thomas and Collier in the United States. International studies have something to offer Africa; although the context in which they are conducted in is different. They give us a sense of the importance of appreciating the universality and diversity of children wherever they are and that we need to rigorously integrate research specifically investigations of educating poor children.

3.7. The Thomas and Collier longitudinal study

The study entitled 'A national study of school effectiveness for language minority students' long-term academic achievement carried out by Wayne Thomas and Virginia Collier (2002) is one of the largest investigations of educational effectiveness ever conducted (Cummins 2000). Thomas and Collier describe their research in the Executive Summary as that their research from 1985 to 2001 focused on analysing the great variety of education services provided for language minority (LM) students in U.S. public schools and the resulting long-term academic achievement of these students. This five-year research study (1996-2001) was their most recent overview of the types of U.S. school programs provided for the linguistically and culturally diverse students, focusing on English language learners' (ELLs/LEPs) long-term academic achievement in Grades K-12. Their study included qualitative and quantitative research

findings from five urban and rural research sites in the northeast, northwest, south-central, and South-East U.S. The research provides whole school district views of policy decision-making that is data-driven regarding designing, implementing, evaluating, and reforming the education of LM students (Thomas & Collier, 2002).

They examined various models of school 'bilingual' education which included full immersion programmes in a minority language, dual-medium or two-way programmes where both minority and majority languages (usually Spanish and English) were used as media of instruction, transitional bilingual education programmes, ESL programmes and English-only programmes (May 2008; Thomas and Collier 2002). As with the Ramirez study, one of Thomas and Collier's findings was that the most effective programmes resulted in achievement gains for bilingual students that were above the level of their monolingual peers in mainstream classes. These gains were most evident in programmes where the Ll was used as a medium of instruction for an extended period of time. Desai (2014) describes key findings of their research as; it was found that One-way and two-way developmental bilingual education programs were the only programs then that assisted students to fully reach the 50th percentile in both Ll and L2 in all subjects and to maintain that level of high achievement, or reach even higher levels through the end of schooling. The fewest dropouts come from these programs. Students with no proficiency in English should NOT be placed in short-term programs of only 1-3 years. The minimum length of time it takes to reach grade-level performance in second language (L2) is 4 years. Furthermore, only ELLs with at least 4 years of primary language schooling reach grade-level performance in L2 in 4 years. Students with no primary language schooling (either in home country or host country) are not able to reach grade-level performance in L2. The strongest predictor of L2 student achievement is amount of formal Ll schooling. The more Ll grade-level schooling, the higher L2 achievement (Thomas & Collier, 2002). In both the Ramirez (1991) and the Thomas and Collier study (2002), length of Ll -medium education was more influential than any other factor in predicting the educational success of bilingual students, including socio-economic status (Desai, 2014). This demonstrates that three years of MTE for African learners is not adequate. If children in a well -resourced country like the USA need more time in the L1 to do well in English; imagine what this means for our learners, who have limited opportunities to hear English outside of the classroom (Alidou, 2006).

The last case study is a summary report of the Eastern Cape MTbBE project that began in 2012 to 2016. It adds a voice to the voices that will not stop seeking answers from where English and Afrikaans sought answers viz. mother tongue education for their children (Mbude, 2016).

3.8. Explaining Mother Tongue-based Bilingual Education (MTbBE)

The term Mother Tongue-based Bilingual Education and its later variations of Mother Tongue-based Multilingual Education have come to mean similar, but different things to different contexts in various parts of the world; the basic similarity in all these definitions is the primacy and valuing of the mother tongue of the child. The term was originally identified mainly with the Project for Alternative Education in South Africa (PRAESA), whose strategic pedagogical objective since 2001/2 was the establishment of a mother-tongue-based bilingual education system (Pluddemann, 2010). In this conception English, rather than any other important language, is taken to be the constant element in the equation' (Alexander, 2003). The central concern is that the education system should be based on learners' mother tongues while providing access to English, the global lingua franca. In such a system, the MT features as the formative medium of education, preferably throughout schooling and even into tertiary education (Alexander, 2003). Carol Benson (2005) defines Mother Tongue-based Bilingual Education (MTbBE) as a form of schooling that uses the first language (L1) for teaching beginning literacy (reading and writing) and content area instruction (such as mathematics), while teaching the L2 as a second language. Her further explanation on the MTbBE model is that using the mother tongue as a medium of instruction implies that teachers plan and teach lessons in that language, use reading and writing in that language, and have textbooks and/or support materials in that language (Benson, 2005).

The international charity Save the Children has adopted MTbBE as its language-in-education approach, it explains Mother Tongue-based Bilingual Education to mean starting with the learner's knowledge and experiences; providing the child with a foundation in their first language and building a second language on this. Oral, reading, writing and thinking skills are developed in the first language, while teaching the second language as a subject. Exposure to the second language gradually increases, without sacrificing children's literacy and cognition in the first language. Additional languages can be added in this way (termed Mother Tongue-based Multilingual Education). (Save the Children (UK), 2007).

3.8.1. Historical meaning of Bilingual Education in South Africa

South Africa cannot divorce itself from its past as it moves forward post-colonialism and post-apartheid. Anyone who dares to venture into work associated with bilingualism and MTE must take consideration of this fact as it seems very difficult to shed the history associated with language policies of the past, this has implications for implementing any successful bilingual

program. Pluddemann (2010) posts that historically, the term bilingual education arose in response to the struggle for political control and economic power between Afrikaans and English more than a century ago. During the Union period (1910–1948), the dominant understanding of bilingual education was dual-medium education, in which Afrikaans- and English-speaking white pupils were schooled in the same classes in order to promote not only bilingualism, but political reconciliation and social and cultural integration after the bitter Anglo-Boer (South African) wars. The bilingual school and pedagogic terms, but fell foul of the hegemonic aspirations of Afrikaans-speaking whites over their English-speaking compatriots. Well before 1948 the conservative Afrikaner class were able to give expression to their anti-English sentiment by phasing out dual-medium education in favour of parallel-stream (known as parallel-medium) and single-medium schools, a process that was accelerated under apartheid. Thus bilingual education defined in terms of the *means* through which educational goals were to be achieved, two media of instruction – increasingly made way for bilingual education understood in relation to the *goal*, namely of promoting bilingual competence amongst pupils. In effect, single-medium schools in which the second language was taught as a compulsory subject all the way through fell within the ambit of bilingual education. While this is arguably a *weaker* form of bilingual education than dual-medium, most Afrikaans-speakers nevertheless learnt English to a fairly high level in this way, i.e. through the *subject* route (Pluddemann, 2010).

The historical bilingualism for Africans has no desired educational outcomes like in the case of whites. The results of the three year MTE bilingual program for blacks are characterized by low proficiency levels in the HL for blacks, low proficiency levels in English; poor achievement in MST and all things that education for whites is not. Both historical groups had cultural capital on their side; black people might have the symbolic voting majority to keep a black government in power; but cultural capital is not theirs, the linguistic market has been defined and actors in that market are the children of English and Afrikaans speakers and the few elites of the emerging black middle class. The poor majority suffer the effects of poor achievement in both mathematics and science; underachievement has a colour in South Africa (it is black and African Language speaking) and it has a defining surname (previously disadvantaged and continually disadvantaged); this ensures that poverty will always have a home amongst blacks as they do not possess the language/s that deliver social goods (Setati et.al, 2008). The words of Paulo Freire (1970) and Goke-Pariola (1993) unsettle us when they say that the phenomenon in which people comply with and even promote attitudes and practices

that unfairly discriminate against them as internalizing the consciousness of the oppressor, where becoming like the oppressor becomes a subconscious life's goal. According to Freire, for people to overcome oppression they "must first critically recognise its causes, so that through transforming action they can create a new situation, one which makes possible the pursuit of a fuller humanity" (Freire, 1996). The implication is that for change to occur, people must become aware of aspects of both their linguistic habitus and the linguistic market in which they interact. They can then become agents of change, and may be able to influence others beyond their own perceived decision-making.

3.8.2. The Cofimvaba MTbBE Project (2011 - 2016) of the Eastern Cape

- **OBJECTIVE**

  - To develop isiXhosa as a language so as to widen epistemological access to subjects other than the mother tongue so as cope with MTE To enhance Enhancing the quality of learning achievement and bilingual language competence at the primary level, by teaching in, with, and from the first language throughout the primary education cycle
  - To extend the use of isiXhosa as a medium of instruction and assessment for mathematics and science from Grades 4 incrementally to Grade 7
  - To engage in language intellectualisation through language planning activities (status planning, corpus planning and acquisition planning would be undertaken).
  - To provide teacher capacitation and support; and ensure teacher provisioning through the PPN process (Post Provisioning Norms).
  - To develop a long term advocacy plan to heighten public awareness of the language-in-education legislative framework and get buy in from all levels of the community.
  - To motivate Subject Specialists as action researchers by encouraging them to analyse the results of MTbBE learners each year against those of the non-Implementing cohort
  - To learn from the project best practices and or areas of weakness that will guide the system on MTbE implementation.

- **DESIGN**

  - Experimental groups of learners taught two subjects Mathematics and Natural Science and Technology through isiXhosa mainly from Grades 4-7. With isiXhosa as a subject the design lends itself to being a 50-50 model; three subjects in isiXhosa and another 3 subjects in English. 70 underperforming schools were part of the initial pilot.

- Controlled groups of comparative levels, and in comparable situations taught the orthodox methods where English is Language of learning and teaching in all subjects and isiXhosa is taught as a subject

- **RELATED ACTIVITIES**

- Advocacy Strategy
- Teacher preparation
- Review of existing isiXhosa technical/scientific terminology and
- Increasing metalanguage by panels of mathematics and science experts including language experts
- Development of Learner Teacher Materials (LTSM) in isiXhosa and later Sesotho.
- Introducing the concept of Bilingual Exams nationally and locally.

- **MAJOR FINDINGS**

- Significantly higher academic performance in Mathematics by Grade 6 MTbBE learners in bilingual examinations.
- Significantly higher academic performance in Natural Science and Technology by Grade 6 MTbBE levels in English only tests.
- Significantly higher academic performance of Grade 6 MTbBE learners in the 2014 ANA for FAL and mathematics..
- ICT will be an equaliser if all children have access to it. Investing in Bilingual ICT Programs is the way to go.
- The central role of the educator is highlighted as learners begin to be confident in expressing themselves
- Increased chances of opportunities to talk about maths and science amongst girl children, and their natural competitiveness comes up in translanguaging
- Increased adult and community participation increases gains for people to help
- Peers have an instrumental role to play as ways of talking maths and engaging on maths and from maths are squared out with fear of saying the wrong English sentence.

- **UNINTENDED POSITIVE OUTCOMES**

- Teacher reskilling contributed positively to teacher in-service education
- Heightened awareness of the importance of MTE for successful learning outcomes in MST amongst the community of the Eastern Cape through sustained roadshows.

- Upward trajectory of the development of isiXhosa as a language of mathematics and science has begun.

- The use of ICT to develop isiXhosa will pay off more dividends than buying textbooks.

- Ordinary parents welcome the program, officials have a negative or positive influence.

- The centrality of peer education has been highlighted by this program.

- Spotlight is thrown on the centrality of the teacher and the need to capacitate him/her in managing the education of rural and poor children.

- Learner confidence in general improved

- Learners and teacher talk contains items beyond question and answer. The blurred distinction between fear vs respect often characterizing traditional African classrooms reduced as learners get used to communicating for a purposes. It reduced the incidents of corporal punishment that teachers meted out suspecting ill-discipline when learners do not cooperate.

- The national Department of Education, considers to pilot MTE in a six year period, because the Eastern Cape, the province that is always number last in academic results (except in 2018) has shown that it can be done. Provinces will be required to use 2019/20 as a readiness year to implement their pilots. This is great news, given that this proposal was accepted by Minister Pandor in 2006.

- **LIMITATIONS OF THE PROGRAM**

- As a case study; the limitation is already in the generalizability of this study to bigger populations. Implementation of the MTbBE program needs a scientific study which will show statistical evidence as to the causal impact of language to mathematics and science learning. A very difficult hypothesis to prove post Grade 3.
  Mitigation: The current group of learners can be tagged in Grade 3, 6 and also in Grade 9 once the program moves to high school in later years.

- Individual and school SES affect how much prior knowledge learners possess and how much this sets them apart from others. Schools do not allow cellphones for obvious reasons; but the amount of information that we downloaded for offline use for vocabulary dictionaries from publishers made such a huge difference.
  Mitigation: The use of basic cellphones, radio, CDs, and videos are an alternative to technology that do not depend on having data in order to work. If each school or library had a radio and television set; so many National Geographic Videos and

offline content can be shown to make up for the previous knowledge that low SES children do not have.

- Cofimvaba schools have limited numbers of learners. These schools lose educator posts in the PPN process due to lack of learner numbers. Trained MTbBE learners were lost to other non-implementing schools in and outside of the district. Educator stability is a big lever changer.

  Mitigation: We were able to secure protection for MTbBE educators not to move from their schools even if they were identified in excess so that the program in the school didn't lose moment or suffer.

- The distances teachers travel to and from school makes it impossible for teacher training after school. Their contract transport/taxis wait to pick them in groups from school to school. It makes it difficult to have individual conversations with regard to MTbBE teaching and one loses momentum after lesson observations.

- Teachers who have no means of transport cannot offer extra classes. The taxis drop them at school at a particular time and fetch them at a fixed time.

- Lack of research staff at Head Office and District offices misses opportunities that only an ethnographic researcher can pick up as they are resident most times.

- The 2019 service delivery model of the department doesn't; afford to employ LiEP officials at the District/Circuit offices. The same design of identifying Circuit Managers and Subject Advisors will still pose a challenge as they are overloaded.

- The funds for the project are sourced from government, procurement takes time affecting LTSM deliveries, therefore demoralisng schools and educators.

- The negative attitudes of some officials towards the project almost derailed the project. It is not true that parents don't want MTE, the middle class have issues with MTE.

The overall finding on this project point us to best practice and more work to be done, the central question of whether there are lessons to be learnt is a definite yes. All the case studies mentioned above employed the use of learners' mother tongues or first languages, let us look again at the theoretical and conceptual framework which has guided this study.

3.9. Theoretical and conceptual framework

The case studies in the previous sections have one thread in common, they used the home language of learners as central to their learning. The central question of this study is whether any lessons can be learnt from the Cofimvaba MTbBE project that can present a case for extending the use of the mother tongue mainly as a medium of instruction with English playing a supportive role, throughout the primary school.

Tsui and Tollefson indicate that the interpretation of medium of instruction policies 'must be situated in their socio-political contexts, which are inseparable from their historical contexts' (2004). They argue that many earlier studies on medium of instruction (in the 1970s and 1980s) were motivated by educational concerns and tended to ignore the socio-political contexts in which they were implemented. Whilst acknowledge that decisions around medium of instruction policies are usually taken on political grounds, I consider it important in this study to foreground the educational concerns. King and Benson (2004) argue that the adoption of a medium of instruction that students comprehend is also effective pedagogy, independent of language-planning goals. This perspective rests on a number of widely cited principles including the efficacy of first-language literacy instruction (Skutnabb-Kangas, 2000); the transferability of skills from the first language to the second (Cummins 2001; Krashen 1996); and the interdependence of first-and second-language competence (Ramirez, Yuen, & Ramey 1991; Thomas & Collier 2002; King and Benson 2004).

The theoretical and conceptual framework guiding this study (and which has been outlined in this chapter) therefore draws essentially on the link between the development of a pupil's mother tongue (home language) and the acquisition of academic language proficiency in both the mother tongue and a second language in multilingual contexts. In such contexts, the second language is usually a prestigious language like English whilst the first language is a minority language often used only in a local context.

The framework incorporates theories on mother tongue education, bilingual education, multilingual education, second language acquisition and academic language development drawing on the work of linguists, sociolinguists and applied linguists such as Jim Cummins; Tove Skutnabb-Kangas; Neville Alexander; Kathleen Heugh, Alidou (2003, 2004); Alidou et al (2006); Baker (1993); Benson (2009); Cummins (2000, 2009); Heugh (1995, 2000, 2002, 2006, 2009); King & Benson (2004); Prah (2009); Skutnabb-Kangas (1981, 2000, 2009); among others. The constructs focussed on in this chapter were largely developed by Cummins

(1976, 1979, 1980, 1984b, 1986, 2000, 2009) and can be seen as a cluster (Desai, 2014). The constructs are: additive/subtractive bilingualism, the threshold hypothesis, semilingualism , the developmental interdependence hypothesis, basic interpersonal communication skills (BICS) and cognitive academic language proficiency (CALP).

In conclusion, Cummins corroborates the point made by Tsui and Tollefson (2004) above, when he reminds us that the 'use of a language as a medium of instruction in state-funded school systems confers recognition and status on that language and its speakers' (2009). However, he reiterates his earlier hypothesis on the relationship between first language development and second language acquisition:

Significant positive relationships exist between the development of academic skills in first (Ll) and second (L2) languages. This is true even for languages that are dissimilar (e.g. Spanish and Basque; English and Chinese; Dutch and Turkish). The most successful bilingual programs are those that aim to develop bilingualism and biliteracy. Short-term transitional programs are less successful in developing both L2 and Ll literacy than programs such as dual language programs that continue to promote both Ll and L2 literacy throughout elementary school (Cummins, 2009).

3.10. Refutations against the implementation of MTE in the African setting

The discussions within this chapter raise controversies around MTE and around the terms mother tongue and mother tongue education themselves. What do we mean by a mother tongue? There is a claim that term mother tongue has an emotional load. I am not sure why emotional load must mean something negative; emotions mean there is active energy present. Whether that emotion creates a load (something not flowing, building up) or whether it is negative is neither here nor there. Working on the emotion that they feel something about is what will matter. We cannot theorize on what emotions are loaded and whether that load is a negative or positive. Most loads exist in the form of a potential load and certain phenomena would activate or trigger emotions, we want emotions to be triggered so that they can be dealt with. Logical discussions or judgements on terminology will not steer emotions; the term mother tongue therefore whether it has emotional load or not, will still be used. We must then deal with the emotions it triggers or may not trigger at all. Pennycook suggests that underlying the notion of mother tongue may be 'a strategically essentialist argument (which) is useful for mobilisation and legislation, but it may also reproduce those fixed categories of identity that many wish simultaneously to avoid' (Pennycook, 2002). The term may also obscure the

element of choice as happened during the period of apartheid when mother tongues were assigned to particular ethnic groups such as Zulus or Xhosas as part of the grand apartheid plan. In a multilingual society, a family's common language may often not be the mother's, and in some cases not the father's either. Choices are made, for better or for worse. The terminology is not an issue for isiXhosa as mother tongue means 'literally ulwimi lwebele (the language of the breast); and later people prefer to say ulwimi lwasekhaya (language of the family or home). Therefore I do not want us to get bogged down to a discussion that relates to the English language. Desai (2010) writes that there are also arguments related specifically to languages committed to writing under colonial circumstances. Makoni (2003) makes the point that African languages in their written forms, and therefore the forms used in formal education, are colonial or missionary inventions, differing both in linguistic range and political and in political significance from the linguistic practices they were supposedly committing in writing. He suggests that they may need to be 'disinvented' to recover their potential. A related point concerns an element of contemporary practice: the disjuncture between the standard variety used in education and the varieties used by speakers of that language. This is a very widespread phenomenon, both in South Africa and internationally (example, Delpit 1988; Nomlomo 2003; Rampton 1995; Smitherman 1994 and Webb 2010 in this regard). In this case of African languages, Makoni sees the difference between standard and current forms as potentially disabling and posits that the magnitude of the disjuncture is so great that there are potentially adverse effects for mother tongue education. Standard African languages are rarely used as primary languages in the homes and playgrounds in African communities, particularly in urban areas (2003). I agree with Makoni that there is a disjuncture between standard and current forms with African languages like in all other languages; however for him to claim that this disjuncture is so great that there are potentially adverse effects for MTE begs for substantiation. I have a problem with the generalisation that he makes he should rather consider limiting his claim to his language and provide examples. If his statement opaquely suggest that English should rather be used to teach African language learners because of the disjuncture between the standard variety and the current variety then he needs a wakeup call, as standard English is still refereed to and spoken by British people who have a very high, perhaps even the highest, social status and therefore are the most influential, educated, prestigious and wealthiest people in the United kingdom. They are the minority of British population as only a small percentage have upper or upper-middle class backgrounds (Bhana, 2015). He continues to caution that Standard English is in no form superior to any spoken dialect and that linguistically, no dialect has a lower status than English. Trudgill (1990) states that Standard English is not even

legitimate to claim that it is more acceptable than other dialects, unless we specify who it is acceptable to (Trudgill, 1990). The tone of the discussion so far has been that the first language is the ideal tool for laying a solid foundation for quality education. We are, however, not unmindful of strong counter arguments from well-meaning academics. This section will summarize these counter arguments and place them side by side with refutations.

Counter-Argument 1:

There are just too many languages struggling for attention in any given African country, so the choice of the first language (s) to use in education is almost impossible.

Refutation 1: The choice is perhaps difficult, but it is certainly not impossible. The demographic and socio-linguistic strength of specific languages can in fact be determined with some accuracy. This has been used in a number of countries to determine 'zonal' languages for use in education (Guinea: 6 languages; Zambia: 6 languages; DR Congo: 4 languages; Namibia: 4 languages, e.t.c).

Counter-Argument 2: Large cities pose a peculiar problem, as the population will contain substantial numbers of persons of diverse linguistic origins.

Refutation 2: In most of the large cities of Africa there is usually a dominant language, the language of the market place, of the roadside workshop, of the play field, etc. Yoruba in Lagos, Wolof in Dakar, Soussou in Conakry, Ewe in Lomé, Lingala in Kinshasa, Kiswahili in Nairobi, Hausa in Kano, Igbo in Onitsha, etc. Such a language is usually learnt informally by a majority of citizens and it is usually the best-mastered language of second and older generations of immigrants. Learning in, with, and from it is therefore possible.

Counter-Argument 3: There are too many African languages without a written form, and this makes their use in education impossible.

Refutation 3: First language learning need not begin with reading and writing, as the natural sequence for language acquisition is oracy before literacy. Moreover, the scientific capacity for developing orthographies is readily available in Africa. Africa already has an appreciably large number of written languages. There are even cases of common orthographies' (applicable to several closely related languages) developed by African linguists for highly multilingual countries like Cameroon.

Counter-Argument 4: The cost of training teachers and producing materials in a multiplicity of first languages would be prohibitive, especially in a situation of severe poor funding of education.

Refutation 4: Materials are not necessarily books, as there are societal resources (artifacts, dance, music, drama, festivals) that are more effective materials than books. Teachers would no doubt need to be trained, especially in creativity, to be able to harness the learning potential of societal resources. Moreover, the emphasis in Africa must shift to investing in education (seeing the benefits of education in their long term, multi-impact perspectives) rather than merely spending on education. Addressing quality issues in education involves some sustained investment.

Counter-Argument 5: An overemphasis on learning in the first language would be detrimental to student mastery of the official languages that hold the key to higher education and social mobility.

Refutation 5: A solid foundation in the first language does in fact facilitate the learning of the official language, since bilingualism in a solid manner does aid further language learning. Furthermore, the psycho-educational benefits of initial learning in the first language cannot be matched by the prevailing patchwork approach that makes the learner a master of no language at all.

Counter-Argument 6: African languages do not possess the scientific and technical terms needed for understanding today's complex world. It would therefore be a handicap for learners to concentrate too heavily on their first language.

Refutation 6: All human languages are capable of coping with their immediate realities and can easily expand their repertoire to absorb new experiences. African languages have proved over the years that they can do this and have done so through digging deep into their internal linguistic resources, by borrowing and adapting from other languages, and by coinages. English did not wake up one day to find a terminology base bestowed on it. That is a function of corpus planning, hence you will find the word sheep suitable for reference to the animal; it has Germanic roots in its origin. The word mutton refers to the meat, and is of French origins. The same is true for Afrikaans in South Africa, a used language can accumulate as much terminology as it wants depending on the status and corpus planning activities it embarks upon to intellectualise its language. Intellectualised languages can be used for educating a person in any field of knowledge from kindergarten to the university and beyond' (Sibayan 1999).

3.10. Chapter Summary:

Using a language in education is one way of ensuring its technical development. As orthography is developed to meet the needs of literacy, appropriate terms emerge to cope with teaching-learning needs in a variety of formal disciplines. Literacy (well developed) can lead to the emergence of literature in a particular language. With a large corps of users (created by the educational system) societal use of the language can be further enhanced. That certain concepts can be too abstract to be expressed in African languages is not supported by empirical evidence. The Christian concept of the Holy Trinity, for, example, came into over a hundred African languages over a century ago (with the Bible translated into numerous languages) and through the work of missionaries. For African groups that have always had their strong religious beliefs and cosmology, the 'transfer' to Christian beliefs did not prove impossible. Problems related to the level of technical development of individual languages will have to be addressed in a creative manner, through borrowing, adaptations, and harnessing of the cultural resources and deeper syntactico-lexical wealth of each language" (Obanya, 2004). It can also be countered that what we all need is proficiency in English, as this is the language of modern day business, science, and Information and Communications Technology. But, is the current trend towards diminishing bilingualism likely to produce proficient users of English from our midst? Are employers not already complaining of the standard of English among the graduates of our higher institutions? It will be pertinent to recall, in response to possible counter-messages, that the Japanese language (the medium of education in Japan) is spoken only in Japan, that China has as yet no overseas territories, that India conducts basic and secondary education in its numerous first languages. What these countries have in common is that they have become nations to be reckoned with in today's technological and industrial world. Their technological leapfrogging is supported largely by their national educational systems. These systems have successfully used incremental bilingualism to promote mass education, to produce the creative brainpower to support industrial and technological growth, and to produce a corps of highly educated citizens who can do business in English with the western world, in addition to being deeply rooted in their national cultures. Finally, to return to where we started, we are advocating education with the first language (that is, learning it). This should go along with learning in the first language (that is, using it to explore the social and physical world around us), as well as learning from it. This is the first step in lifelong learning. It is the foundation for the incremental bilingualism that would ensure our pride in being Africans, in addition to making us competitive citizens of a wider world (Obanya, 2004).

CHAPTER FOUR
REPORT ON THE MOTHER TONGUE BASED BILINGUAL EDUCATION (MTBBE) PROJECT: COFIMVABA (2011 – 2016)

4.1 INTRODUCTION:

This Chapter describes in detail the various phases of the Cofimvaba MTBBE Project focusing on the key elements of the project. In this project, learners in the project schools went through a Late Transitional Model where mother tongue education was extended beyond Grade 3 for another 4 years for Mathematics and Natural Science and Technology (NS Tech); the rest of the subjects were taught in English mainly viz. Life Orientation and Social Sciences. This subject allocation gives an equal split between the two languages of three learning areas each. IsiXhosa is offered to (i) teach it as a subject at Home Language level (ii) to teach mathematics through it and to (iii) teach NS Technology through it. English is offered to (i) teach it as First Additional Language, to (ii) teach Life Orientation through it; and to (iii) teach Social Sciences though it. This chapter serves as an account of how the MTBBE project was conceptualized, advocated and its implementation over five years. It is divided into nine sections in the following order:

- **4.2** presents the debate around mother tongue education in South Africa and the discourses formed around it.
- **4.3** defines the concept of MTbBE for the Cofimvaba Project and describes rationale and objectives of the project.
- **4.4.** discusses the areas targeted for intervention namely: advocacy, identification of schools for the pilot; materials development and terminology development for teaching and learning mathematics and NS Technology for Grades 4-7.
- **4.5.**   Language Policy and Planning: What is language planning .
- **4.6.** discusses assessment strategies for MTbBE and presents the 2014 Annual National Assessment results of the MTbBE learners in English FAL and Mathematics.
- **4.7.** outlines challenges encountered during the implementation of the project and strategies used to mitigate those challenges.
- **4.8.** Outline the common ground discourses that highlight Language as a problem

4.2. The Language in Education Debate

From 2003 to 2006, the Association for the development of Education in Africa (ADEA) and the UNESCO Institute of Life Long Learning (UIL) examined a range of Mother Tongue and Bilingual Education models in SubSaharan Africa (Abiyo, 2017). The research report for ADEA and UNESCO concluded in 2006 (Alidou et al., 2006) concluded that the most effective way of guaranteeing African children quality education and of achieving sustainable development was to provide strong models of bilingual education. Language plays two different roles in education, it constitutes an instructional area, a subject to be learnt, but unlike the other components, it can also be the medium of instruction. This means that behind any learning process whatever, (except in a few marginal cases) language is always involved (Fafunwa et.al., 1989). He argues further that this becomes more complex when the learning involves not monolingual but bilingual or even multilingual situations, which typifies the Nigerian classroom. Under such circumstances, the question arises as to which language will play which role. Is the child's mother-tongue going to play either of both roles of subject and medium throughout? Alternatively, is the English Language to play either or both roles throughout? (Fafunwa et.al., 1989). Fortunately in the Cofimvaba scenario, the area is of language homogeneity where the majority of learners and their teachers speak isiXhosa. The debate that is unceasing in areas like Cofimvaba and the rest of South Africa, is whether African languages like isiXhosa can be used as a language of teaching and learning beyond Grade 3; it is a discussion grounded in the oft rhetoric habitus that English is the deliverer of social goods.

Desai (1999), posits that there is a world of difference between those who are learning an additional language voluntarily to expand their linguistic repertoire, and those who are forced to learn an additional language in order to gain access to education and to participate in the wider society. Children in Cofimvaba, like in the rest of South Africa bear the burden of linguistic marginalization as they not only learn English voluntarily to expand their linguistic repertoire; they are forced to learn English and learn through it , after an initial 3 years of MT education. This is despite impressive transformative laws in South Africa post-1994; that should ensure that this violation ends. Instead, Grade 4 becomes the execution year for children as their hopes of becoming anything they dreamt of are dashed as schooling becomes more difficult with high dropout rates and poor academic outcomes. The Cofimvaba project was designed to investigate lessons that could be learnt from implementing a Mother Tongue-based Bilingual Education program; not just for the sake of changing the LoLT and the language of textbooks; but to facilitate their meaningful learning of mathematics and science.

4.2.1. Rationale for MTbBE vs Bilingual Education or Mother Tongue Education (MTE)

A large body of international research has demonstrated the importance of instruction in the Mother Tongue (MT) in the early years of a child's schooling, particularly for language and cognitive development (Benson, 2000, 2002; Hornberger, 2002; Hovens, 2002; Krashen, 1999; UNESCO, 1953). The period of Bantu Education tainted Mother Tongue Education in South Africa, to a point where black people are suspicious every time the discussion about the benefits of mother tongue education are raised. Mother-Tongue Education (MTE) and bilingual education in South Africa bear the weight of history (De Klerk, 2002). Unlike MTE, bilingual education is a contested term that has at least two meanings, the term originally meant the use of two languages as mediums of instruction. It included, but was not restricted, to the learning of two languages as subjects. Therefore it usually means: the L1 plus an L2 as mediums of instruction (Pluddemann, 2010). In South Africa bilingual education is understood as mother tongue instruction (L1 medium) throughout school plus a second language taught as a subject to a high level of proficiency. (Alidou et al 2006)**.** The view of the De Klerk and Alidou related to the two meanings of bilingual education in South Africa is similar to that of Cummins (2003). He argues that bilingual education is generally defined in terms of the *means* through which particular educational goals are achieved. Two or more languages are used for instructional purposes in order to promote certain kinds of educational outcomes. He goes to further posit that however, the term bilingual education is sometimes defined in relation to *goals,* to refer to educational programmes that are designed to promote bilingual proficiency among students. When used in this broader sense, bilingual education may entail instruction primarily through only one language. (Cummins, 2003). Taken together, the two quotes capture the two traditions of bilingual education in South Africa.

For the Cofimvaba pilot, it was important to frame the pilot on a strong bilingual education model with the means spelt out that the mother tongue isiXhosa would be used mainly, while English is a supportive LoLT. Mwakini (2014) makes a very point that is it very rare and in exceptional cases where elites agitate for MTE, as is the case with the Afrikaner elite in South Africa, it is because the educational, political and economic fortunes of these elites are inextricably tied to their mother tongue. Regrettably, to many developing world elite, mother tongue does not feature in the project of modernising their countries. The masses in the developing world also view mother tongue with suspicion, as a way of confining them to the lower echelons of educational, political and economic achievement precisely because there is

no cultural capital associated with the local mother tongues; therefore any attempt to introduce MTE must take this into consideration. In the South African case, the first phase of Bantu Education (1955–1975) tainted the concept of MTE. African-language speakers were given the poisoned chalice of MTE, followed by a particularly disabling form of dual-medium education. Ironically, the prescription of MTE for all eight years of primary schooling may have benefited a whole generation of learners more than was intended by the architects of apartheid (Heugh, 1995), and certainly more than succeeding generations who laboured under early-exit transitional (or early-transit) programmes. Nothing underlines more clearly the fact that apartheid-era language struggles between Afrikaans and English were fought at the expense of Bantu-language speakers than the oppressive 50/50 ruling, in terms of which half the subjects at secondary school had to be in Afrikaans, and the other half in English. The fact that the 50/50 ruling was not widely applied in black schools (NEPI, 1992) does nothing to contradict the fact that it was a corruption of the dual-medium principle, since neither of the two languages was a home language for learners. In purely technical terms the period of eight years' MTE might qualify today as mother-tongue based bilingual (or multilingual) education under the broader *goals* definition. Under Bantu Education Phase II (1976–1994), the three years following the 1976 Soweto revolt were marked by the termination of the use of Afrikaans as MoI amongst African-language speakers, the reduction of MTE to the first four grades, and the status-enhancement of English to the point where it became the sole (on paper) MoI from Std 2/Grade 4. The fact that students were (consecutively) exposed to two MoI technically makes this early-exit transitional model a candidate for the *means* definition of bilingual education, albeit a weak variant of it. The mantel would be ill-fitting, however, as the officially bilingual apartheid state understood bilingual education to refer to the Afrikaans/English combination only. For African-language speakers all three languages remained compulsory as subjects practically all the way through schooling. Despite this design feature, the linguistic goal was not to promote advanced competence in two or more languages or to empower African-language speakers; on the contrary. Apartheid-capitalism's segregationist project required a pool of cheap (black) labour with only a limited competence in the languages of power (Afrikaans and English); and African languages had no cultural capital in any case. Thus while appearing to qualify as bilingual education on both the means and goals definitions, the Bantu Education Phase turns out to be compatible with neither. The example is interesting because it suggests that language regimes and the power hierarchy of languages in society determine the parameters within which the technical aspects of language acquisition planning should be understood (Pluddemann, 2010). This rationale of this project was to use MTE in a bilingual paradigm to benefit learners.

Several studies and experiments show that there is enough evidence that bilingual schooling can improve basic education in developing countries. Pedagogical advantages of bilingual education are clearly demonstrated in a number of works (Baker, 2006; Benson, 2002; Cummins, 2000; Dutcher, 2001; Lin, 1997; Youssef, 2002). Using L1 to learn helps teachers and students to interact more naturally and negotiate meanings together (Benson, 2004). Bringing the culture and language of the home into the school is important for identity and for personal as well as for group empowerment (Cummins, 2000). Bilingual programmes address educational quality issues by promoting successful literacy acquisition (Benson, 2002) and biliteracy (Hornberger, 2002) and affective factors such as improved motivation and self-esteem (Dutcher, 1995). The majority of MT programs are designed to function in rural, linguistically homogeneous communities where the need is greatest, and where large numbers of learners can be served with a single L1 (Benson, 2002).

Ouane and Glanz (2011) posit that in low-income countries, use of the L1 in education is associated with improved access, quality and equity for marginalized groups. The same observation was supported by UNESCO (2010 and 2012), that L1 education provided maximum benefits for these learners. There is no conceivable reason why countries like South Africa, with large rural areas like Cofimvaba; should not consider testing the veracity of these claims by initiating mother tongue based education programs. Particularly when this view is supported by an element that is highly lacking in educating the poor, the issue of parental involvement. Ball (2010) argues that L1 education also leads to greater parent involvement. The familiarity of the language of the curriculum places them in a position whereby they can at least interact with what their child learns at school and can therefore assist with homework and projects. Overall, use of the L1 at any level of education builds not only cognitive skills but also positive affect, self-confidence, self-esteem and strong identity, all of which contribute to successful learning (Cummins, 2009). This was the rationale of the project; to document any benefits of mother tongue education beyond Grade 3 if there are any and point us to where more focus is needed. Years of the bilingual education programme implemented in South Africa for the black majority, is a weak form in all respects. Moving from MT to English in Grade 4 is abrupt and happens at a time when children are just beginning to reap the benefits of learning in their L1. If three years of MTE is sufficient for literacy and numeracy, why do Afrikaans and English speakers continue with MTE from cradle to university? Is there empirical evidence that MTE is suitable for some racial groups? Unfortunately, the debate on MTE for Africans is located within the racial politics of superiority in South Africa.

4.2.2 Objectives of the MTbBE project

The objectives of this study are couched in Professor Pai Obanya's (2004) Annual Lecture of the Fafunwa Educational Foundation, delivered at Ile-Ife, Nigeria on 23 September 2004 when he delivered his lecture on the Ife Project of Nigeria. He made the following distinctions in three related areas of the educational use of language: learning *in*, learning *with*, and learning *from*. He argues that ***Learning with*** refers to using the language as subject of instruction. That is, we are learning the language (Dholuo, Kiswahili, isiZulu, Igbo, Lingala, Yoruba, Mandika, Kikongo, XiTsonga, Oshivambo, Hausa, Ewe, etc.), possibly in the language itself (Obanya, 2004). The **first objective** of the MTbBE project was to develop isiXhosa as a language so as to widen epistemological access to subjects other than the mother tongue so as cope with MTE.

According to Obanya*, **Learning in*** refers to situations in which a language is used as medium of instruction [MoI], either in a restricted sense (that, is limited to selected subjects) or to a given sub-sector or level of education. Most of the countries of Africa have (for example) language-in-education policies that advocate the use of the first language for instruction in the early stages of formal education (Obanya, 2004). The **second objective** was to extend the use of isiXhosa as a medium of instruction to teach mathematics and science from Grades 4 incrementally to the end of the primary school Grade 7. Initially 70 pilot schools would be involved as the experimental group, with all other schools using the orthodox method of initial MTE for 3 years as the control (Non-MTbBE). In realising this end, a **third objective** of language development planning activities of status planning, corpus planning and acquisition planning would be undertaken. He posits that ***Learning from*** can be seen from two main angles: the linguistic and the cultural/educational. In the strictly linguistic sense, it means learning/ acquiring the skills of a particular language for the purpose of use in communication. From the broad educational angle, it means learning from the cultural repertoire of a language. This is a realm that transcends the linguistic wealth of a language to the realms of culture in all its ramifications and practical and creative manifestations. An important educational and pedagogical point that is beginning to emerge from this discussion is that language is a powerful element of quality in education. A logical extension of this point is that the quality potentials of language-in-education cannot be fully harnessed if learning is not carried on with, in, and from language. Above everything else, this is more effectively and efficiently done (in educational terms) in the learner's first language. In the African situation, that first language is, in almost all cases, an indigenous one (Obanya, 2004). **A fourth objective**, was to develop a long-term advocacy plan to heighten public awareness on the legislative framework.

4.3. Mother Tongue-Based Bilingual Education (MTbBE) for the Cofivamba Pilot

The Mother Tongue-based Bilingual Education project that was to be in the Western Cape (WCED, 2006) was stopped midway into implementation with the usual reasons given of cost and the difficulty of not seeing immediate results. There is no record of the Home Language-based Bilingual Project of the Eastern Cape (ECDoE, 2010), the only article I could find was written by Elize Koch sharing the bilingual education practices used in the Additive Bilingual Education Project that was implemented in the Eastern Cape (Koch, 2015). I want to be cautious and not claim that the Cofimvaba MTbBE project is the first of its kind in the Eastern Cape as that serves no significant purpose; The researcher will explain though the project was born out of desire to extend MTE beyond the initial three year phase, while providing learners' access to English. The term MTbBE has come to accumulate meanings that are context dependent but they all have one thing in common; it is the primacy and valuing of the mother tongue of the child. The term was originally identified mainly with the Project for Alternative Education in South Africa (PRAESA), whose strategic pedagogical objective since 2001/2 was the establishment of a mother-tongue-based bilingual education system (Pluddemann, 2010). The central concern is that the education system should be based on learners' mother tongues while providing access to English, the global lingua franca. In such a system, the MT features as the formative medium of education, preferably throughout schooling and even into tertiary education (Alexander, 2003). Whether it is Benson (2005) with the definition of Mother Tongue-based Bilingual Education (MTbBE) as a form of schooling that uses the first language (L1) for teaching beginning literacy (reading and writing) and content area instruction (such as mathematics), while teaching the L2 as a second language. Or, the international charity Save the Children that has adopted MTbBE as its language-in-education approach, it explains Mother Tongue-based Bilingual Education to mean starting with the learner's knowledge and experiences; providing the child with a foundation in their first language and building a second language on this. Oral, reading, writing and thinking skills are developed in the first language, while teaching the second language as a subject. Exposure to the second language gradually increases, without sacrificing children's literacy and cognition in the first language. Additional languages can be added in this way (termed mother tongue based multilingual education). (Save the Children (UK), 2007). Find below another definition of Mother Tongue-based Bilingual Education as proposed in the Lo Bionco model for Bilingual Education:

Mother Tongue-Based Instruction	The learning programme is delivered entirely in children's **L1**
Bilingual Education	Two languages are used as the media of instruction. This type of instruction is also known as 'dual language instruction' in which children who speak both the minority and majority language are taught in both majority and minority languages.
Mother Tongue-Based Bilingual Education	L1 is used as the primary medium of instruction during all of primary school. Then, L2 is introduced as a subject of study to prepare children for eventual transition to using L2 as the medium of learning in some academic classes.
Multilingual Education	Formal use of more than two languages in the curriculum**.**
Transitional Bi/Multilingual Education, or 'Bridging'	This type of instruction is aimed at planning a transition for children to move from learning in L1 to learning in L2. Such transition can be done abruptly after a few years or after a longer period during which the child has become fully fluent academically in his/her L1.
Maintenance Bi/Multilingual Education	Even after L2 has been introduced, children are instructed in L1 and L2. L1 continues, often as a subject of study, to ensure ongoing support for children to become academically proficient in L1. This is also called 'additive bilingual education' because one or more languages are added but do not displace L1.
Immersion or Foreign Language Instruction	The entire education programme is provided in a language that is new to the child.
Submersion	Speakers of non-dominant languages have no choice but to receive education in a language they do not understand. The approach promotes subtractive bilingualism, i.e., learning L2 at the expense of L1.

Table **4.**1: Model for Bilingual Education

4.3.1. Project Design

The Cofimvaba MTbBE project was designed in two stages (2011–2015) and was later extended into all districts of the Eastern Cape (2016–2020). It was initially, as a late-exit transitional program, where from Grades 1 to 7 the learner's language was used mainly for offering isiXhosa as a subject; teaching, learning and assessing mathematics and science alongside English as supportive LoLT (50% MTE). English is used as a subject for 50% of subjects (English as a subject, Life Orientation and Social Studies). In 2016 MTbBE was extended to all districts in the province with a new Grade 4 cohort doing phased implementation each year. According to the implementation plan, in 2020, there will be an adequate MTbBE representation across the Primary school grades (Grade 4-7) for an extensive evaluation.

In 2011, an Advocacy strategy was designed targeting traditional leaders, community leaders and members; schools; parents; SGBs and officials. Officials have a potential of sabotaging any project if they don't buy into the idea.

4.3.2.Sampling

Sampling was done based on underperformance in the 2011 ANA in mathematics. The then district director in 2011, said all schools that had done below 30% in the ANAs of 2011 must be part of the MTbBE project. If the strategy worked; it must work to improve the results of these low performing schools. There were initially 72 schools, 2 dropped out in the first year of implementation citing that they were part of a project for improving English. A lot of advocacy work had to be done with the school community involved particularly teachers who felt that they were being punished for underperformance. After 4 sessions of advocacy and engagement all was well. Today these teachers are MTbBE champions; in all workshops they are the lead teachers for terminology development and methodology demonstrations. Once we had won them, winning parents was easier. Parents and learners bought into the proposal.

4.3.3 The MTbBE strategy of the Eastern Cape Education Department (2012 – 2015)

The Mother-Tongue-based Bilingual Education Plan of the Eastern Cape (ECDoE, 2016) refers to Mother-Tongue-based Bilingual Education in terms of the goals and the means of education as set out below:

  a) Primary School: extending the use of the mother-tongue/ home language or L1 of the learner as a *formative LoLT* in Grade 4 up to Grade 7; district must ensure that MTbBE learners participate in Science and mathematics Olympiads offered in both languages as a means to test whether they are reaching bilingual proficiency.

b) Ensuring good teaching of the Home Language as a subject so that the learner can have a good foundation in it. The quality of FATS, Tests and tasks set in the HL for the subject as a language or for MSTE, must demonstrate high levels of HL proficiency.

c) Ensuring good teaching of the first additional language (FAL) as a subject so that the learning can function in both the home language and FAL with ease. MTbBE learners must participate in local spelling bees in HL and English, Quizzes and Olympiads,

d) Throughout implementation, ensure that using L1 + FAL as *complimentary LoLTs* at a 50:50 level by the end of Grade 7 has been catered for in terms of LTSM, teacher training and teacher provisioning.

e) Conduct research studies into various aspects of MTbBE to inform the system.

f) High School: Advocacy would start in Grade 7 to target feeder schools for possibility of implementing a parallel medium class in Grade 8 to accept learners who wish to continue with MTbBE post-primary school to the high school. This process must be well managed in 2019 so that 2020 becomes an MTbBE readiness year for high schools that wish to continue with MTbBE.

g) All districts to appoint Circuit Managers as MTbBE coordinators and Subject Advisors as support personnel. Duties are to assist the SGB and school community on school language policy formulation and review; filling in the School Language Choice Form (SLCF); ensure LTSM requisition data is completed each year according to each grade; ensure correct quantities of delivery of language appropriate material to MTbBE schools; ensure bilingual exams scripts are translated and delivered to schools on time; report on progress, challenges, support and monitoring on district accountability sessions; analyse performance of MTbBE schools for mathematics and Science annually. This information to be used for targeted intervention.

h) Districts to ensure all Language in Education implementing schools have access to the circulars/memos protecting the movement of MTbBE educators, each year.

i) The Language in Education Policy Unit (LiEPU) must to inform the Executive and HoD of progress, challenges and plans going forward in quarterly reports and report on the set targets in the Annual Performance Plan. Presentations to be made on the MTbBE project at Top Management meetings as required.

j) Implementation activities will cover system wide Advocacy, Materials Development. Terminology Development, Teacher Training and Provisioning, Provincial Item banks of bilingual Question Papers for mathematics and NS Technology (Grades 4 to 7).

The favoured means for language distribution in this plan are two languages; isiXhosa (MT) is used mainly as a language of learning, teaching and assessment for Mathematics and Natural Science and Technology. Although the MTbBE Plan was approved for implementation; it is still open for comments, no language plan is ever perfect; the review period for effectiveness was set at three years, but some aspects posing challenges could be reviewed annually.

4.4. Advocacy Strategy

The Long-term MTbBE advocacy strategy had four target levels, targeted line function units within the department that had intersecting points with the project at Head Office. It had a district level target for District Management Teams, Subject Advisors, Circuit Managers and principals of schools. It also had a school community level targeting project schools; SGBs of the pilot schools, parents, traditional leaders, councillors, and Unions. Partnerships were developed with the 2 major teacher unions SADTU and NAPTOSA in Cofimvaba.

ACTIVITIES	RESPONSIBILITY	COLLABORATION WITH
International Mother Tongue Day celebrations. 21 February annually.	Language in Education Policy and Planning Unit (LiEPU). The Unit rotates these celebrations in different districts each year. District officials identify host	Curriculum, School Governance, Offices MEC, SG, Unions, SGBs, PanSALB, Unions, Deaf Associations.
Language our Heritage: 24 September annually	LiEPU. These include seminars, conferences where everyone invited talks on impact of LiEP implementation in EC.	Curriculum, Offices MEC and SG Education, DSRAC, Steve Biko Centre, PanSALB, Unions, HEIs.
On-going Roadshows	District coordinators, LiEPU,	District Education Forums, Schools, Unions, PanSALB

Table 4.2: Overview of implementation

4.4.1. MTbBE Implementation

To successfully implement a language model; there needs to be an implementation plan integrating identified activities in an all-embracing process (Obanya, 2004). He argues that there is usually a coordinated chain of actions at the political and technical levels.

Language Policy Process (Obanya, 2004)	State Compliance	Status
First, language rights are recognized as a fundamental human right in the country's constitution;	Chapter 6 of the Constitution (1996) recognizes these rights.	DONE- Escape clauses need review.
Second, a national language policy is developed to espouse in greater detail the language rights provisions of the nation's constitution.	The Bill of Rights in the Constitution deal with language rights.	DONE+
Third, appropriate mechanisms are set up (and empowered) for systematic language planning and development	PanSALB, NLUs, PLCs, Hansard, NLS and now Language Units	DONE- Dysfunctional entities
Fourth, the national education policy takes a cue from the constitution and the language policy and makes adequate provisions for language education in the broader context of incremental bilingualism	The LiEP (1997) is aligned to Constitutional Provisions.	DONE+ Open ended provisions create confusion.
Fifth, the educational service delivery mechanisms take care of teacher education, materials development, research and evaluation and social mobilization to ensure smooth implementation	Language Unit was established in the EC in 2010. Duties: Advocacy, Status, Corpus and Acquisition planning, Teacher Capacitation. Research and support.	DONE – Lack of personnel to be addressed by 2019 Service Delivery Model (SDM)
Above all, like all development programmes, incremental bilingualism through the educational system must be adequately budgeted for.	Despite being a poor province; the EC funds LiEP activities within the	DONE+ MTbBE extensions

		confines of a limited budget.	funded with budget.

Table 4.3: Process table Proposed by Obanya (2004)

4.4.2. Language Policy and Planning and MTbBE Implementation

Unlike other African countries in Africa, South Africa has the most progressive constitutional provisions; which have not been implemented to the benefits of all citizens of the country. Webb (2006) argued that the incremental increase in the use of English and a non-implementation of the policy is partly responsible for inequalities in the country; unequal economic and educational development, unequal social opportunities, the inadequate development of democracy and the restriction of cultural liberty. He postulates that the powerful position of English is a threat to linguistic and cultural diversity, is a powerful factor in discrimination, exclusion and would lead to a continuation of the unacceptable gap in the distribution of wealth in the country, disadvantaging an extremely large group of people in South Africa. He indicates that the reasons for this lack of implementation are political and bureaucratic; economic and sociolinguistic; and theoretical and cultural (Webb, 2006). MTbBE is a plan to reduce non-implementation.

4. 4.3 Language Orientations (Richard Ruiz, 1984)

The implementation of the MTbBE required a coordinated model to deal with issues of language policy and planning that would otherwise impede implementation if not understood in a particular context. The researcher will utilize Ruíz's (1984) model on three language orientations to explain the processes MTbBE went through, the challenges and mitigation strategies that were utilised during implementation. No implementation is perfect; what was constant was the desire of implementers, political will and funding of activities.

4.4.3.1 Language as a problem

From the perspective of historiographical discourse, MTE carries the burden of history and we were cognisant of this. The historiographical discourse seeks to locate MTE within the historical space and in doing so, depicts MTE as always being alive to the historical circumstances in which it has evolved; and as being a contributor to the historical circumstances of MT speakers (Mwaniki, 2014). Historical Language policy and planning in South Africa created a negative space for us to implement MTE as both the colonial era administrators and the National Party used language as a vehicle of power. Language

planning underlain by this orientation is constructed in a manner to solve a problem; and that problem is language(s). It is the orientation that sees multilingual situations as riddled with problems that need solving and hasten to work towards monolingualism as an ideal (Mose, 2014). The following are identified as language problems, code selection, standardization, literacy, orthography, and language stratification (Neustupný, 1970). This orientation is characterised by liberalist ideas of just giving MTE for a short period then get everybody to switch to English' as soon as you can; then all will be well. This everybody doesn't include any other racial group in South Africa, it is always black African language speakers. The motivation behind this orientation seems to range from a need to save resources that could be 'wasted' on training personnel, LTSM and ultimately, save from the perceived problems caused by multilingualism for example national disunity among others (Mose, 2014). Interests of this group of people are varied and are sometimes never opaque, this made it difficult for MTbBE implementation as each time non-issues would be made issues. The commonality around these people is that language is a problem and no consensus is ever reached because the aim is not to find solutions. It is to problematize; it doesn't matter how different their positions are; they unite in a common cause of problematizing language and multilingualism. The advocacy strategy concentrated on collaboration within the various sections of the department; with stakeholders, and traditional leadership. It is mistake to think that the language as a problem orientation will go away on its own, or you need just one or two pep talk sessions. The advocacy plan makes the 21 February (IMLD) an annual event to highlight multilingualism and the South African Heritage Day on 24 September, a Language our Heritage Day for a provincial activity aimed at uniting people around the idea that diversity and multilingualism are the norm. Its aim is to create a platform for social dialogue interrogating peoples' views.

4.4.3.2. Language as a right

In the Eastern Cape we have the Basotho people, a minority group of marginalised language speakers whose language needs were never met by previous governments of the province who simply understood that the province is homogeneously isiXhosa. This model perceives language as a right of individuals; especially heritage or mother tongue or first languages in whatever part of the province they are spoken. Language is viewed as a means to participate in the affairs of the state including access to court services in own languages, education in own languages, accessing voter education, health services information, and all important

information in own languages (Mose, 2014). The official linguistic landscape of the Eastern Cape is dominantly English in written discourse; and then isiXhosa in oral discourses. Williams (1981, quoted in Ruíz, 1984) states that before detailed language policies are formulated, it behoves us to question the relationship between language planning and language rights and to suggest the manner in which planning can realize the fulfilment of individual and group based rights. The department publishes various materials in all provincial languages to cater for the quadrilinguality of the province viz. IsiXhosa, Afrikaans, English and Sesotho. Multilingualism and associated approaches that favour all languages, especially minority speakers, is a welcome addition. Crusaders of this approach view deprivation in matters of language as not only affecting language, but also multiple other aspects of life as pointed out in Williams' observation. It didn't make sense to develop isiXhosa, while ignoring Sesotho, an indigenous minority language in the province. In the process, we became aware that Afrikaans speakers feel that the elevation of isiXhosa along English was discriminatory and therefore demand equal recognition. Engaging this community and making understand that isiXhosa and Sesotho need the spotlight we are putting on them as a redress tool is key, as language barriers have all too often worked to frustrate and stifle the full development of latent capabilities. When people are deprived of enlightenment and skill, their capabilities for effective participation in all other social activities, value processes are correspondingly diminished (McDougal, Lasswell, & Chen, 1976; quoted in Ruíz, 1984). Developing African economies are faced with the challenge of to which extent would the states be obliged to guarantee operationalization of this right? (Mose, 2014). The state has a responsibility to start somewhere; in South Africa thanks to apartheid Bantustan homeland system, dominant regional languages were put together; isiXhosa and Sesotho are spread across neighbouring provinces making it fairly easy to cluster efforts of ensuring linguistic rights. An MTbBE model by definition is based on the human rights model that everyone has a right to their language, it was cognisant of the Constitutional position that, multilingualism is the norm (1996). A right's only orientation without a multilingualism has the possibility of undesirable monolingual tendencies; the advocacy strategy is based on multilingualism hence the production of multilingual storybooks in isiXhosa, Sesotho, Afrikaans, English and braille. Advocacy in what is traditionally poor Afrikaans speaking communities of the Eastern Cape now called the Northern Areas in the Nelson Mandela Metro and Sarah Baartman Municipalities must address issue of language maintenance; so that these communities do not lose their language

Afrikaans and that they also feel that their linguistic rights are protected. A poor province like the Eastern Cape is already battling with developing two African languages at the same time; this is why much needed collaborative partnerships from the a dedicated private sector and non-governmental organisations are key to driving successful implementation. All activities of the department are held jointly with the provincial Pan South African Board (PanSALB); HEIs particularly Rhodes University (Chair of Multilingualism); Fort Hare (African Languages Department; IsiXhosa National Dictionary Unit) and Walter Sisulu University. Together with the Eastern Cape Legislature, Department of Arts, Culture, Sports and Recreation, a Provincial Language Forum was launched. Various bodies and entities are represented including the House of Traditional leaders, Associations for the Deaf and retired academics. There is hope that more organisations can join the collaboration.

4.4.3.3. Language as resource

The languages of a nation are its natural resources on the same level as its petroleum, minerals and other natural resources. These languages can therefore be harnessed and developed, if carefully planned, for the overall interest of the nation…Language planning is consequently as important as any other aspect of economic planning and the place of language planning is therefore the National Development Plan, as a concomitant of all the other aspects of economic planning for national development (Chumbow, 1987).

The resourcefulness of languages is realized in the importance currently attached to bilingualism; it has not always been like this. The argument expressed by Wolff (2011) that language is not everything in education but without language, everything in education is nothing cannot be underestimated as entire generations of linguistically marginalised peoples in the entire world, suffer the same fate of underdevelopment; poverty and unemployment. Baker (2006) lists the following outcomes as benefits of bilingual individuals in educational contexts. Bilinguals have advantages on certain thinking dimensions, particularly in divergent thinking, creativity, early metalinguistic awareness and communicative sensitivity. In spite of all the real or perceived benefits of languages highlighted, Fishman (1974) says that language is certainly an odd kind of resource for current cost-benefit theory to handle, precisely because of the difficulty in measuring or separating it from other resources or variables. In South Africa, we need not look far to see what advantages language as a resource has given dominant language groups; we have also witnessed the dire consequences of linguistic marginalisation so no measure of any other

variables will change this lived reality for the majority. The MTbBE strategy is based on the internationally accepted principle that the mother tongue is a resource; learners in Cofimvaba and in the rest of South Africa like those in developed countries have a protected right to MTE. It was a deliberate attempt to reverse the perception that African language cannot be used as LoLTs. This perception is not on MTE generally in South Africa; mother tongue education is accepted as normal when offered to English and Afrikaans speakers; it cannot be that after 25 years post-apartheid MTE for African language learners is perceived as a problem that an English mainly system will resolve; it has failed dismally. Literature shows that for our learners to learn effectively through English, they need between five to seven years in good English classrooms before they can make the switch (Cummins, 2000; Bamgbose, 2005; Wolff, 2013). There is no educational justification for African language learners to switch medium if this is not the same requirement for English and Afrikaans speakers; the MTbBE strategy asks for no more than what these learners get viz. The use of their mother tongue as a resource to widen epistemological access to knowledge.

4.5. Language Policy and Planning : What is language planning (LP)?

Language Planning is official, government led intervention and efforts to bring about changes in the structure (corpus) and functions (thus status) of languages and or language varieties (Dogancay-Aktuna, 1997). Many believe that Einar Ingvald Haugen, an American linguist was the first person to have defined the concept of language planning. He described it as the activity of preparing a normative orthography, grammar, and dictionary for the guidance of writers and speakers in a non-homogenous speech community. He added that in this practical application of linguistic knowledge, we are proceeding beyond descriptive linguistics into an area where judgement must be exercised in the form of choices among available linguistic forms (Haugen, 1959). James Tollefson in his book titled *Planning language, planning inequality* (1991) argues that language planning refers to all conscious efforts to affect the structure or function of language varieties (Tollefson, 1991). He elaborates that these efforts may involve creation of orthographies, standardization, and modernization programmes, or allocation of functions to particular languages within multilingual societies. In the MTbBE strategy, IsiXhosa (and Sesotho later on) was allocated the function of teaching mathematics and science beyond Grade 3. It was a conscious deliberate effort to make education meaningful for African language learners giving them a better chance than is possible in the current socio-political context where education has taken

a pedantic and overly managerial approach in trying to maintain an unjust status quo. This scenario demands language change. Kaplan and Baldauf (1997), see language planning as a body of ideas, laws and regulations (language policy), change rules, beliefs, and practices intended to achieve a planned change (or to stop change from happening) in the language use in one or more communities. It is claimed that the current quagmire in education being offered via colonial languages in Africa, is primarily due to the politics of association and to an extent submission to former colonial powers for both political and other benefits (Mazrui, 2002). Language policies, therefore, would seem to be by-products of language planning (Mose, 2014). The MTbBE language plan was a product of a series of language planning initiatives that were undertaken to ensure that isiXhosa (and Sesotho) develop as languages of mathematics and science.

4.5.1. Types of Language Planning

There is general agreement amongst Language planning experts on three common types of planning viz. Status Planning, Corpus Planning and Acquisition Planning.

4.5.1.2. Status Planning

The social role of isiXhosa in the Eastern Cape in terms of education, language of government and business does not reflect the fact that it a majority language spoken by about 80% of the populace. The MTbBE project sought ways to enhance the status of the language in terms of the education of the majority. Status planning refers to those aspects of language planning which reflect primarily social issues and concerns and hence are external to the languages being planned. The status planning model selected isiXhosa as the language to be enhanced and used MTbBE as language implementation. Language selection focuses on the development of language policy and it involves choice of languages by or for a society through political leaders. Languages selected establish the specific linguistic form to be the norm and which is to have status in the society. On the other hand, language implementation is consequent to language selection. It focuses on the adoption and spread of the language form that has been selected and codified. Often, this is done through the educational system and through other laws which encourage the use of the selected standard form of a language (Kaplan & Baldauf, 1997). South Africa has eleven official languages since the post-apartheid state in 1994. English and Afrikaans still maintain a hold in all high status functions. There is a circular set of influences on people's attitudes and behaviour which are represented by linguistic habitus and linguistic market. Individual choice is highly

constrained by both, because people are for the most part unaware of how complicit they are in the injustices inflicted upon them. However, transformative action can take place when individuals and groups gain awareness of the constraints of their linguistic habitus and linguistic market, and can make informed decisions that go beyond these constraints and potentially beyond the limitations of their social circumstances (Benson, 2010).

4.5.1.2. Corpus Planning and Intellectualisation in the MTbBE Project

In Corpus planning new words are created or old ones are given new meaning. It is one aspect of language planning that refers to those aspects of language planning which are primarily linguistic and internal to a language (Kaplan & Baldauf, 1997). Cooper (1989) identifies three elements which are harmonisation; standardisation, and intellectualisation (Cooper, 1989). These aspects related to language are orthographic innovation, pronunciation, changes in language structure, vocabulary expansion, simplification of registers, style, and preparation of language material (Bamgbose, 1989). In the MTbBE project, corpus planning was used in an intellectualisation process for isiXhosa and Sesotho later on. Intellectualization is a term originally used by Havranek (1932), a linguist from the Prague School, to characterize a process that a language undergoes in its advancement. By the intellectualization of the standard language, which we could also call its rationalization, we understand its adaptation to the goal of making possible precise and rigorous, if necessary abstract, statements, capable of expressing the continuity and complexity of thought, that is, to reinforce the intellectual side of speech. This intellectualization culminates in scientific (theoretical) speech, determined by the attempt to be as precise in expression as possible, to make statements which reflect the rigor of objective (scientific) thinking in which the terms approximate concepts and the sentences approximate logical judgements. (Havránek, 1932). Intellectualization thus is a clear process of (functionally) cultivating, developing, elaborating and modernizing a language so that the terminology of the language can carry the full weight of scientific rigor and precision, and that its sentences can accurately express logical judgements resulting in a language that has the capacity to function in all domains. As the direct consequence of intellectualization the speakers of the language derive the pride, self-assurance and resourcefulness in the (new) ability to discuss the most complex of issues ranging from the mundane to academic and beyond (Langa, 2016).

The development of Tagalog in the Philippines, has been linked to the intellectualisation process where the cultivation process involved Tagalog's lexical enrichment through

terminology to enable its use in academia. Sibayan (1999) describes an intellectualized language as a language which can be used for educating a person in any field of knowledge from kindergarten to the university and beyond. Rosalie Finlayson and Mbulungeni Madiba wrote in 2002 that an intellectualized language has the capacity to discuss any issue regardless of its complexity; they postulate that in the South African context intellectualization is a meticulous procedure aimed at expediting the growth and development of hitherto underdeveloped African languages to augment their capacity to effectively interface with modern developments, theories and concepts. It is imperative to note that germane to this process is the development of discipline specific terminology (Finlayson and Madiba, 2002). To intellectualise isiXhosa for the MTbBE project meant that specialized terminology had to be expanded and or developed for teaching mathematics and science beyond Grade 3 as languages of learning, teaching and assessment. To also offset the reasoning that African languages cannot be used as languages of teaching and learning, hence their discernment as shallow and inadequate (Shizha 2012). Language panels were setup inclusive of language academics, mathematics and science experts, teachers and Subject Advisors. Training on translation, versioning, terminology development, terminography, lexicography and lexical modernization was done for one week each term during school holidays. The panel created style guides, translated DBE workbooks, question papers, lesson plans and other LTSM. The Eastern Cape is the only province that provides DBE mathematics workbooks in the country and provided bilingual exams for MTbBE.

4.5.1.3. Acquisition Planning (AP)

Spolsky (2004) describes Acquisition Planning (AP) as concerned with the range of language users and the distribution of literacy; as a form of language management, it complements and interacts with status planning (which is about the social function of a language) and corpus planning (used to modify the structure of a language). May (2001) states that this interconnection is particularly evident in multilingual contexts, where (monolingual and bilingual) AP often involves status-linked and ideology-driven language aspects of public legitimization and institutionalization. This includes setting the goals for language in the education system that address the totality of language education such as the target languages, the attitudes to be generated, skills to be developed as well as the levels of proficiency desired for each of the target languages (Ingram, 1989). Acquisition planning also includes literacy development, minority language development, language teaching, learning in a second language or foreign language, bilingual education and mother tongue education (Jones, 2010).

It is a process that includes the setting of goals for the use of language in the education system (Ingram, 1989). Accordingly, languages, attitudes, skills, proficiencies intended in educational settings are the targets of acquisition planning (ibid, 1989). This study addresses the issue of Mother Tongue-based Bilingual Education where the target is developing proficiency in isiXhosa by using it as LoLT and developing proficiency in English; one without compromising the other. In the MTbBE project AP was activated in formal settings viz. workshop, quizzes that learners participate in and assessment where isiXhosa is used as medium unapologetically. It is also used in informal settings for peer assisted learning opportunities; learners talk mathematically with one another using isiXhosa. Teacher training was focussed on what Setati calls the unfinished journey in class where code-switching and mixing is unsystematic and develops neither the target language isiXhosa, and the supportive LoLT proficiency. African language learners are used to rote learning because of the English mainly system; AP Teacher training included when to gauge as a teacher that you are over focussing on instruction, and not on why questions based on their personal connections. Rural children are so used to the social behaviour of them being the non-significant. Education is packaged in such a way that it is generally not interested in their lives and is based on a value and cultural system that must teach them; it has nothing to learn from. The MTbBE strategy is based on the power of connection learning to students' lives (Caitie Meehan, 2016).

4.6. The Annual National Assessments (ANA)

The foreword in the 2014 report of the ANA is done by the Minister of Education Mrs Angie Motshekga (DBE, 2014), she states that the next phase towards the improvement of educational quality in this sector is enhancing the effective utilisation of the assessment data at all levels of the system, particularly at the classroom level. She further states that there is need for a detailed analysis of the knowledge and skills that learners were able or not able to demonstrate in the ANA tests and use that evidence to inform all plans for intervention. She cautions that evidence must lead to appropriate action for it to result in the desired changes, hence the crucial value that the diagnostic report adds towards the utilisation of the ANA data to improve the quality of teaching and learning in schools (DBE, 2014). One senses from her articulation that she tries very hard to defend the ANAs against a tide of critiques that characterised the tenure of the ANAs when she says that the diagnostic report from the 2014 ANA cycle profiles the levels and quality of skills and knowledge that the assessment identified in the system. Evidently, some of the weaknesses that are identified were also raised in previous ANA cycles and new areas of challenge are profiled more sharply in 2014. ANA has added an empirical dimension

to some of the concerns that require special attention. The ANA 2014 diagnostic report, should be utilised fully to inform relevant decision-making in developing and implementing appropriate interventions to improve the quality of teaching and learning in basic education (DBE, 2014). The ANAs are a set of nationally standardised exams testing numeracy (Grade 1-3), mathematics (Grade 4-9) and literacy (Grade 1-3), language (Grades 4-9).

4.6.1. There are 2 types of the ANAs

- **Universal ANA:** all students in public and state-subsidised independent schools write the Annual National Assessment (ANAs). The school sets up a process of invigilation and marking. Some education districts came up with a model of central marking like in the Cofimvaba districts where schools were sampled for marking and moderation by district Subject Advisors.

- **Verification ANA:** Schools were randomly selected to create a nationally-representative sample, where additional verifying procedures were conducted for Grades 3, 6 and 9 by an appointed independent agent. The **Human Sciences and Research Council conducted the** 2011 ANAs; while **Deloitte** conducted the 2013 verification. In 2009 the ANAs were piloted in about 1000 schools preparing the system and doing advocacy. In 2010, despite discontent from Teacher Labour Unions, Provincial Education Departments (PEDs) agreed to test all students in Grades 1-6.

4.6.2. 2014 ANA Methodology

The 2014 Diagnostic Report was compiled by panels of teachers and subject advisors who were identified as specialists in Mathematics and Languages. The data that was used in compiling the report was obtained from marked scripts collected from representative samples of schools and learners, drawn from all nine provinces that participated in Verification ANA 2014 in 2014. For each subject and grade, item (question-by-question) analysis was conducted to identify the content knowledge and skills that learners were able or not able to demonstrate in the relevant tests. Analysis proceeded from calculation of basic descriptive statistics such as the mean, median, mode and range of scores obtained by learners, followed by a systematic interrogation of learner responses to identify common errors and strengths (DBE, 2014).

The ANA 2014 report goes on to explain that Specimens of typical errors made by learners were scanned and included in the report to illustrate possible knowledge "gaps" and common misunderstandings that need to be addressed in each grade and subject. In each content area,

the panels suggested remediation strategies included also in this report that can be used to address the identified weaknesses in learner knowledge and skills (DBE, 2014).

Section B of the report is titled Proposed Framework for Improvement, it suggests appropriate interventions for remediation at school, district, provincial and DBE levels. Provinces were expected to develop improvement plans specific to their context with clear deliverables and timelines, so that interventions could commence at the beginning of the school year (in 2015). The DBE describes the last part of the report as a suggestion on how schools and districts should analyse ANA and any other test data to derive useful information that must be utilised to address identified weaknesses, and ensure that every child in the system achieves learning outcomes of a high quality (DBE, 2014). The ANAs were conducted four times in the system:

- In early 2011 Grades 1-6 were tested on previous grade work.

- In 2012 Grades 1-6 (a sample of grade 9's were tested)

- In 2013 Grades 1-6 and 9 were tested

- In 2014 Grades 1-6 and 9 were tested (a sample of Grades 7 - 8's were tested)

The scope and scale of the ANAs was huge, in 2014 there were 7,376,334 students from 24,454 schools. Spaull (2015) makes the observation that next to the Census, this is the largest data-collection exercise that we undertake in South Africa. He also mentions that 116 Special schools (schools designed for learners with special education needs) also participated with adapted tests for 11837 learners (Spaull, 2015).

4.6.2.1.ANAS National Performance

The Overall performance of the sampled learners was at the "Moderate achievement" level (average of 43%). The distribution of learner percentage scores is shown in the histogram.
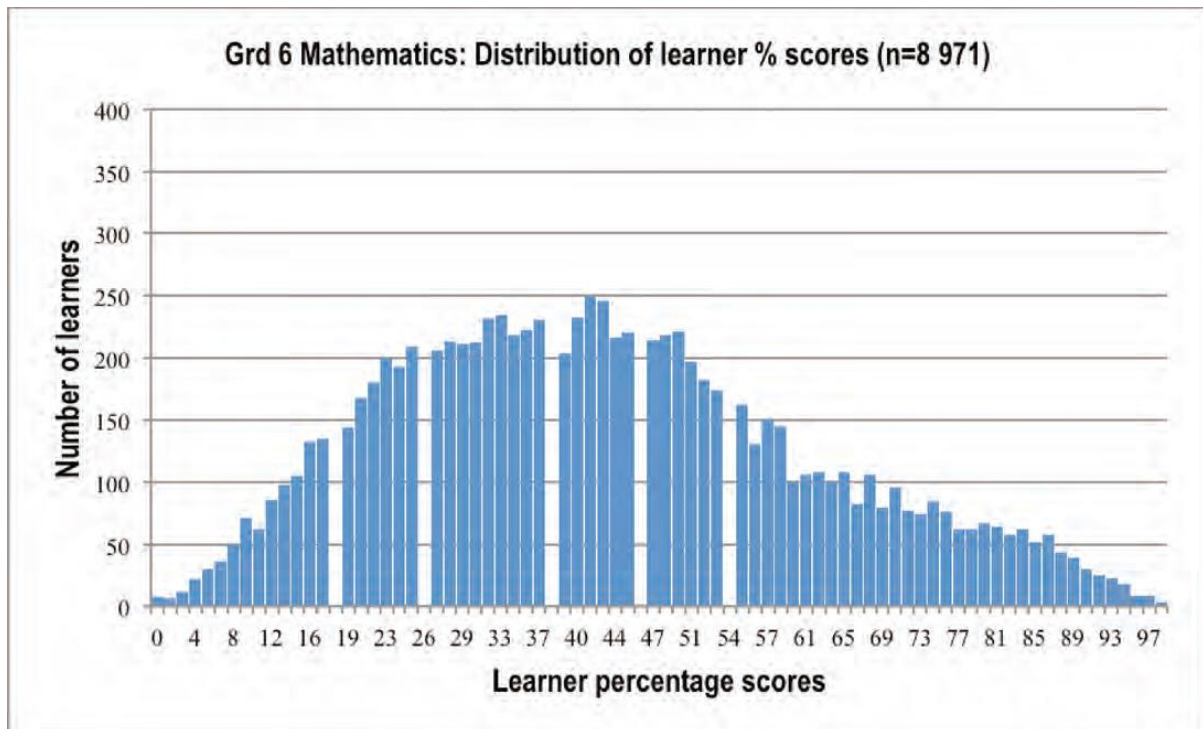
Figure 4.1: Grade 6 Mathematics: Distribution of learner % scores (n=8 971)

The learner scores in Grade 6 Mathematics ranged from 0% to 100% and the modal score (the score most frequently attained by learners) was 41%. Compared to 2013 there was a slight improvement in performance with fewer areas of weaknesses, although the following areas did not show an improvement:

• Understanding of time zones;

• Knowledge of properties of 3-D objects;

• Ability to respond to non-routine questions;

• Ability to do division of numbers;

• Knowledge of multiples of numbers;

• Ability to write number sentences,

• Ability to identify or write number patterns.

Comparing the performance from Grade 4 to Grade 6, it was observed that the distribution of learner scores in Mathematics progressively shifted toward the lower end of the scale. The DBE report said that the reasons for this decline in performance across the grades should be mitigated and addressed.
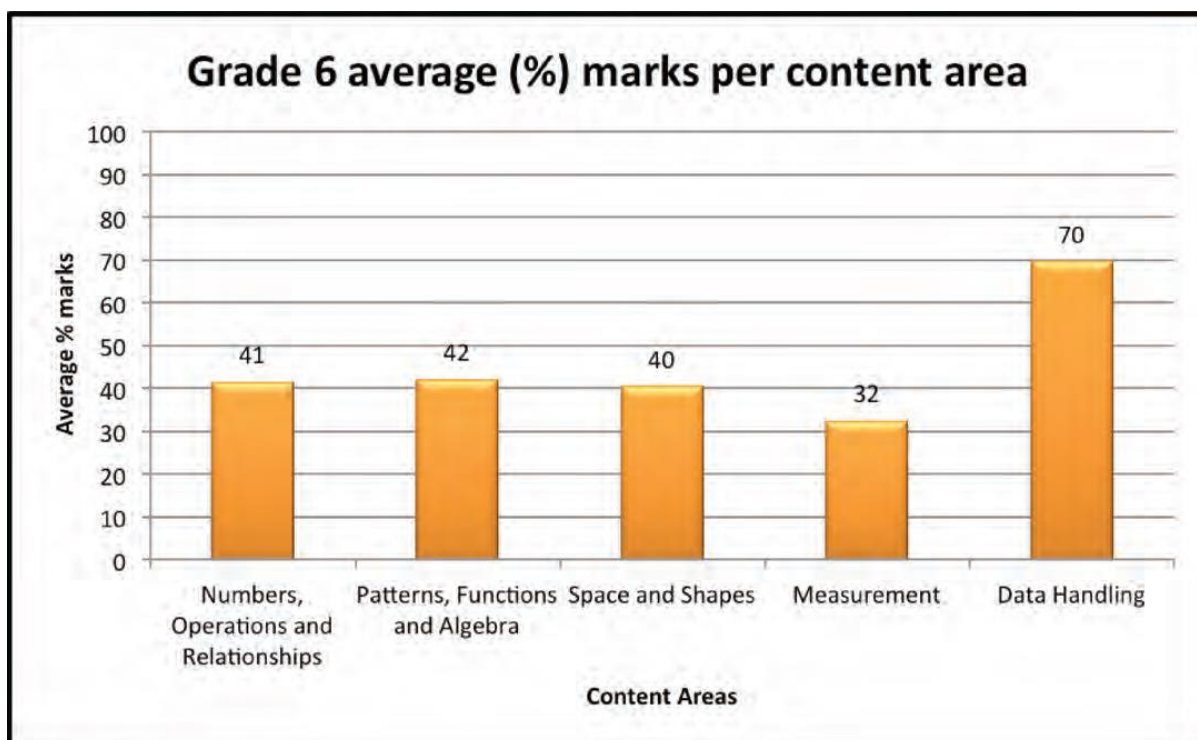
Figure 4.2: Learner performance in the various content areas nationally (DBE, 2014)
According to Figure 1.6, Grade 6 learners experienced the greatest difficulty in responding to questions on "Measurement". The second area of marked difficulty as experienced by learners was "Space and Shape". Learners found questions on "Data Handling" relatively easy to respond to, followed by "Patterns, Functions and Algebra". There was a notable improvement in all content areas from the 2013 results.

Province	Grade	Home Language			First Additional Language			Mathematics	
		Average Percentage Mark	Percentage of Learners Achieving 50% and More	Average Percentage Mark	Percentage of Learners Achieving 50% and More		Average Percentage Mark	Percentage of Learners Achieving 50% and More	
	Grade 4	49.2		52.3	40.1		33.2	34.8	22.3
	Grade 5	49.7		53.5	42.8		39.0	32.2	18.6
	Grade 6	54.7		62.2	41.6		35.1	36.8	23.3

Table 4.4: ANA score of learners in the Intermediate phase

Table: Average percentage ANA score of learners in the Intermediate phase for Home Language, First Additional Language and Mathematics, for the EC and South Africa in 2014

Province	Grade	Home Language		First Additional Language		Mathematics	
EC		Average % Mark	% of learners Achieving 50% and more	Average % Mark	% of learners Achieving 50% and more	Average % Mark	% of learners Achieving 50% and more
	Gr 4	49.2	52.3	40.1	33.2	34.8	22.3
	Gr 5	49.7	53.5	42.8	39.0	32.2	18.6
	Gr 6	34.7	62.2	41.6	35.1	36.8	23.3
South Africa	Gr 4	56.5	66.4	41.0	35.0	37.3	27.4
	Gr 5	57.1	67.5	46.7	46.6	37.3	27.8
	Gr 6	62.7	77.0	45.4	42.3	43.1	35.4

Table 4.5: Average score for a grade 6 learner in South Africa

Table 17 shows that, in 2014, the average score for a grade 6 learner in South Africa was 62.7% in Home Language, 45.4% in First Additional and 43.1% in Mathematics. Of all Grade 6 learners who wrote ANA tests, about 77.0% obtained 50% and more in Home Language, 42.3 in First Additional Language and 35.4% in Mathematics. In Grade 6 Mathematics in 2014, the majority of learners (28.9%) attained not achieved level of achievement, while only 5.3% achieved at outstanding level of achievement.

The researcher will present the test results of the MTbBE group not for analysis but just to demonstrate that besides the criticism levelled against the tests; Grade 6 MTbBe learners still did well compared to the non-MTbBE group in both mathematics and English FAL. Spaull (2014) states that the problem is that these tests are being used as evidence of 'improvements' in education when the ANAs cannot show changes over time. He says that there is absolutely

no statistical or methodological foundation to make *any* comparison of ANA results over time or across grades. Any such comparison is inaccurate, misleading and irresponsible.

The difficulty levels of these tests differ between years and across grades, yielding different scores that have nothing to do with improvements or deteriorations necessarily but rather test difficulty and content covered. He argues further that the changes in results are so implausible that they speak for themselves. He takes the example of Grade 1 mathematics, where the average score was 68% in 2012, plummeted to 59% in 2013 and then soared to 68% in 2014. Very strange. Or if we look at the proportion of grade 3 students with 'acceptable achievement' (>50%) in mathematics we have the fastest improving education system in recorded human history. This went from 36% in 2012 to 65% in 2014. He says some of those changes are, educationally speaking impossible. Some of the provincial results are equally ridiculous. The average score for grade home-language in Limpopo doubled in 2 years, from 24% in 2012 to 51% in 2014. Given that the standard deviation for grade 4 home language in ANA 2012 was 26.5%, this amounts to a one standard deviation increase in two years (Spaull, 2015). Besides the strong criticism against the validity of ANA results, the administration of the ANAs in 2014 was marred with protest from unions particularly SADTU as a result some schools did not write the ANAs. Therefore I cannot vouch for the validity of the 2014 results as originally intended. The researcher to use the Grade 6 June 2018 mathematics and science results as the data is fresh and has been moderated.

4.6.3. 2014 ANA RESULTS FOR MTbBE LEARNERS

For the first time in the history of South Africa, in 2014, the DoE had to version their ANA mathematics paper into isiXhosa for the Grade 6 Cofimvaba MTbBE cohort. The excitement of that time and the realisation that it was possible didn't get to make into newspapers as it didn't say anything exciting for our media; these news wouldn't sell newspapers. The variance of 78 MTbBE learners from the 558 enrolled is not clear whether it was as a result of learner abseeintism on the day of the ANAs; or the learners were from schools who refused to write the ANAs because of the stance of unions, particularly SADTU.

Selected	Subject	'No_Enroll	'No_Wrote
MTBBE	English First Additional Language	558	480
	Mathematics	590	546
Not MTBBE	English First Additional Language	492	427
	Mathematics	545	451

Table 4.6: Number of learners who wrote the exam

Table 4.4. above gives an indication of the number of learners who sat for the ANA exams. From the 558 MTbBE learners who enrolled for the ANAs, 480 wrote the english test and also from the 590 learners enrolled for mathematics 546 wrore the test. Table 4.5 below will explain the Levels of learners passrate.

Values	MTBBE (480 learners)	NON-MTBBE (427 learners)
'Tot_LV1 (0<30)	200	300
'Tot_ LV 2 (30<40)	100	100
'Tot_LV 3 (40<50)	130	27
'Tot_LV 4 (50-60)	50	0
'Tot_LV 5 (60-70)	0	0
'Tot_LV 6 (70-80)	0	0
'Tot_LV 7 (80-100)	0	1
NUMBER WROTE	480	427

Table 4.7: Level of Learner

From the 4.5 above it can be depicted that 180 learners from the MTbBE group were sitting on Level 3 (40-50%) and above and only 28 learners were sitting at this level from the non-MTbBE group.
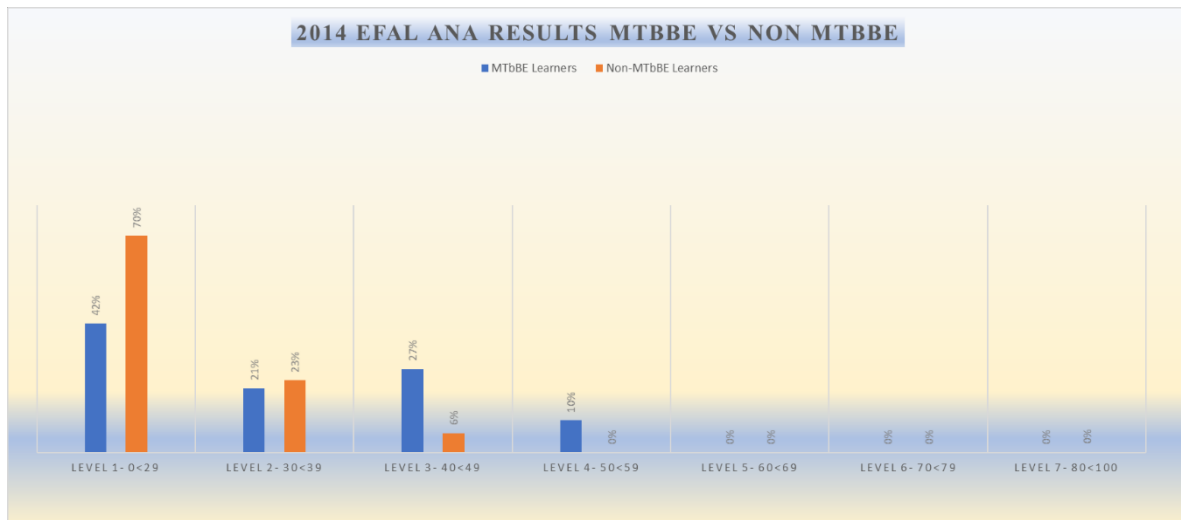
Figure 4.3: EFAL ANA Results MTbBE vs Non-MTbBE
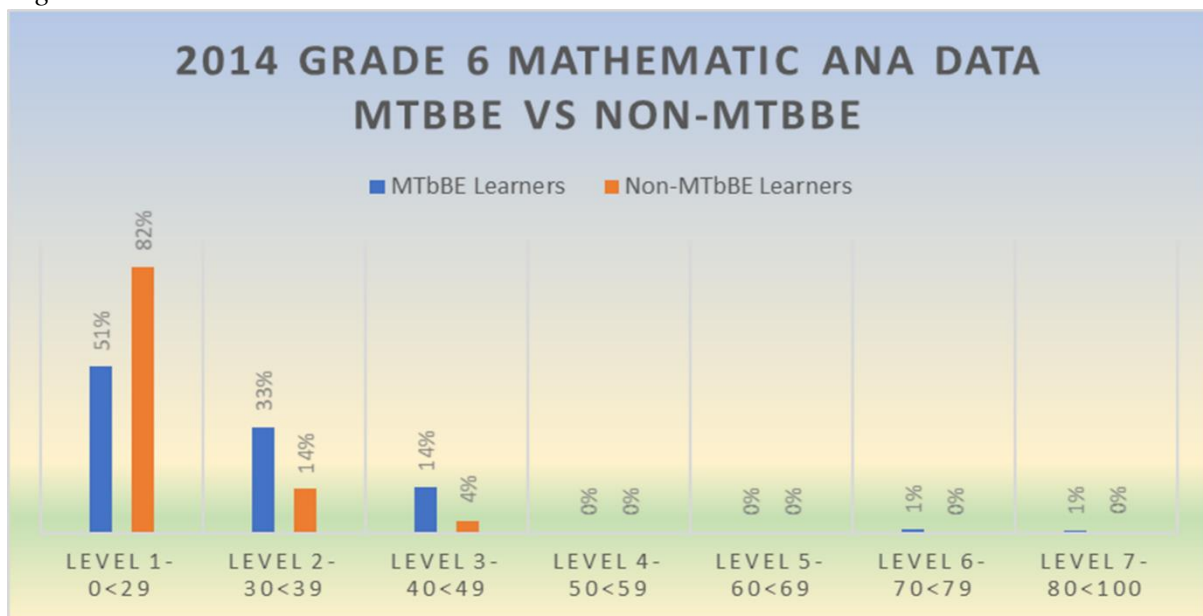
Table 4.4: Mathematics and data MTbBE vs Non-MTbBE

4.7. MTbBE Weaknesses and Challenges:

The attitudes of officials have a crucial role to play in implementation. Any study that depends mainly on government officials is destined to fail if there are no backup researchers or Plan B. The middle class, not ordinary parents want to status climb and understand that to do that it is important to hold on to English as a signifier of class. This study because it was a government initiative depended on officials at Bisho and the District to approve or disprove procurement of vital LTSM as they please. Officials delayed procurement of services for the project and when material finally arrives, it is kept in offices. This severely affected the program. Running the project from Bisho while everything happens in Cofimvaba had a negative effect.

The lack of the use of ICT slowed everything down. Once ICT was integrated there seemed to be leaps and bounds of speed in terms of versioning software and proof emailed on the spot. The online maths and science programs for learners are only available in English. Schools that had Vodacom mobile hotspots experience power failures and this affected network availability. Investing on offline content is the main route to take. The design of the study because of its nature as a case study, was not externally evaluated to increase validity. The department should factor that into the next phase as it moves along. Teacher training is a weakness if it less than a week or two. Taking teachers away from a classroom with small learner numbers for training disables teachers during that time they are away.

4.7.1. MTbBE Best Practises

Teachers do not teach mathematics or science in English, it serves an assessment and homework purpose. The language of teaching and learning in black schools is an African language; the lesson introduction is always in English and right at the end; a summary is given in English. All meaningful learning is negotiated in the home language by both the teacher and learner. The best practise that was observed is the use of translanguaging versus code mixing where teachers were guided on dedicating parts of the lesson to only requiring an answer in isiXhosa only, or English only and use translanguaging whenever there is need. Knowing that they are allowed not only to teach in isiXhosa they can also assess in it; is such a relief.

It is gratifying when MTbBE learners come tops in English quizzes in the District; whether it is in English spelling bees; maths or science quizzes only provided in English as some officials refuse to version for them; these learners prove a point that MTbBE does not delay their learning of English. Chapter 6 and 7 are dedicated to the presentation of data for the 2018 June mathematics and science tests. The significant achievement of MTbBE learners versus non-implementing learners is good news; but it signifies a sad state that the perpetual research done closes the gap of their window of opportunity real time as we try to prove a proven point.

4.7.2. Findings of the MTbBE project:

1. Language Related Factors			
L. of Learning	**L. of Teaching**	**L. of Assessment**	**L. of access to information**
-Proficiency in HL -Proficiency in FAL -Exposure to register -Access to discussion of subject with Peers -Reading skills -Writing skills	-Proficiency in HL -Proficiency in FAL -Qualification in Subject -Motivation to teach/learn -Role modelling ways of talking about MST and -Translanguaging	-Homework -Tasks/ Projects -Tests	-Textbooks -Workbooks -Libraries -E-Learning -Technology -Cell phones -TV, Radio
2. Non-Language Related Factors			
Learners	**Teachers**	**School**	**Community**
-Motivation to attend school and to learn -Levels of emotionality -Levels socio-economic realities and poverty -Access to parents/ guardians/relatives to oversee schoolwork -Health taken care of ear, eye, teeth checks -Social Grant benefits -Nutrition	-Experience in teaching -Experience in teaching subject. -Subject Knowledge -Qualification in Subject -Dynamism meaningful struggles within MST -Pacing, absenteeism -Nurturing curiosity -Journey with learners -Professionalism -Available for extra class	-School culture depicts multiculturalism. -School functional Effective Governance -Child friendly with regards to social issues -Distinction between respect vs fear -Facilities available to learners after school -Multilingualism in tests, tasks and co	-Child friendly -Safe to travel to and from school -If not, community makes plans. -Leaders show interest in education matters. -Members offer care and support to vulnerable children. -Assist with work.
INTERCONNECTED FACTORS			
Language is the most important vehicle determining success, whether in relation to learners, teachers, assessment, peers or SES. Stregthening these levers through MTbBE will ensure success.			
The severity of learner and school SES determines the extent of the role teachers are required to play in the Maths and science classroom. He/she is everything to poor rural children.			
Technology and ICT will be the only equaliser to speed up access to information in MTE.			
The school has infrastructure to become a development hub for everyone in the community.			

Table 4.8: Findings of the MTbBE project

The researcher will use Critical Discourse Analysis (CDA) to engage with this discourse.

4.8. Common ground discourses that highlight Language as a problem

This section critically engages with common ground discourses of some academics, educationists or opinion formers whose ideas, opinions are consumed wholesale by an unsuspecting public. In the real world, all language planning, even that which denies that it is language planning, serves specific ideological and political ends. Because these ends are seldom articulated, the impression is created, especially for the laity, that all that matters, is the correct procedure and sequencing of interventions by language planners and other experts (Alexander, 2004). The researcher will attempt to use Critical Discourse Analysis (CDA) an approach stemming from Critical Linguistics CL). CL was developed by a group of linguists and literary theorists at the University of East Anglia (Fowler et.al., 1979; Kress and Hodge, 1979). Following Halliday CL practitioners aimed at isolating ideology in discourse, they view language in use as having ideational, interpersonal, and textual functions. I deem it necessary to make transparent connections in this discourse that might be opaque to the lay person.

4.8.1. What is Critical Discourse Analysis (CDA)?

Critical Discourse Analysis has become a label for a special approach to the study of text and talk, emerging from critical linguistics. Critical semiotics and in general from a socio-politically conscious and oppositional way of investigating language, discourse and communication (Van Dijk, 1995). It is problem orientated rather than paradigm orientated. He posits that any theoretical and methodological approach is appropriate as long as it is able to effectively study relevant social problems, such as those of gender, racism, language, colonisation and other forms of social inequality. He goes on to further say that CDA does not characterise a school, a field or sub discipline of discourse analysis, but rather an explicitly critical approach, position or stance of studying text and talk. The use of CDA for me is particularly along the lines asserted by Van Dijk that; when studying the role of discourse in society, CDA especially focuses on (group) relations of power, dominance and inequality and the way these are reproduced or resisted by social group members through text and talk. He says that much work in CDA is about the underlying ideologies that play a role in the reproduction of or resistance against dominance or inequality. Among the descriptive, explanatory and practical aims of CDA studies is the attempt to uncover, reveal or disclose what is implicit, hidden or otherwise not immediately obvious in relations of discursively

enacted dominance or their underlying ideologies. Adding the criterion of critical adequacy presupposes social norms and values and introduces a social and political ethics (what we find wrong or right) within the scholarly enterprise as such. It is not surprising that such a view is often seen as political (biased) and hence as unscientific (subjective) by scholars who think that their objective uncritical work does not imply a stance and hence a socio-political position viz. a conservative one that serves to sustain the status quo. Critical Discourse Analysis, thus, emphasizes the fact that the scholarly enterprise is part and parcel of social and political life, and that therefore also the theories, methods, issues and data-selection in discourse studies are always political (Van Dijk, 1995). The researcher will use the article of Andrew Foley (an English professor at Wits in 2010) as an example of common ground discourse as it has all the elements used by refuters of MTE for Africans. Their argument is based on all or some of these issues (1) low levels of development of ALs; (2) too many ALs (3) MTE is costly, (4) MTE not thought through by proponents, (5) dictates (6) condescending language (7) demands evidence of modernisation, materials development and availability of teachers (8) opinionated (9) choice of parents is English (10) MTE leads to tribalism (11) language is not significant to performance. The researcher will italic and bold by number (1-11) the issues as appearing in the documents.

4.8.2. Common threads that run through Common Ground Discourses (Foley, 2010)

The question of mother-tongue education in South Africa remains a vexed one. On the one hand, it seems reasonable and desirable that learners should be able to receive education in their mother tongue, if they so wish. On the other hand, there are some very real difficulties involved in the implementation of this ideal. [12]*The purpose of this paper is to clarify what these difficulties are, and then to suggest what needs to be done to overcome them. The intention is neither to argue for or against the notion of mother-tongue education in the South African context, nor to consider whether its implementation is practically possible*, [5]*but simply to spell out what courses of action need action need to be undertaken if the idea is to be seriously* **pursued (Foley, 2010).**

The South African Constitution guarantees learners the right to receive education in the language of their choice. Most current research suggests that learners entering school are able to learn best through their mother tongue, and that a second language (such as English) is more easily acquired if the learner already has a firm grasp of his/her home language. Furthermore,

the poor throughput rates in South African schools at the moment, where barely a quarter of African language learners who enter the schooling system are likely to reach Matric, seems to indicate that the current practice of using English as the initial language of learning and teaching is at least one contributing factor to this problem. For some years now, educationists have proposed that African language learners should be taught in their mother tongue for at least the first three years of school before switching over to English. More recently, the Minister of Education, Naledi Pandor, speaking at a Language Policy conference at the end of 2006, intimated that this initial period of mother-tongue instruction would be extended to six years, that is, both the Foundation Phase (Grades 1 to 3) and the Intermediate Phase (Grades 4 to 6). *[This has been confirmed by her successor – Ed.]* [6]***If this proposal is to be taken seriously***, there are a number of questions which need to be clarified and considered. The rest of this paper will be devoted to this task. These questions may be divided into four main headings, although, as will become evident, there is much overlap between them: language development, curriculum development, teacher education and school implementation.

In discussing the issue of the nine official African languages are certainly [1, 8]***able to function as media of communication at such levels as interpersonal conversation, narrative and cultural practice.*** As they currently exist, however, the standard written forms of the languages [1, 8]***have not yet been developed to the point where they are able to carry academic discourse effectively and therefore function as full-fledged languages of learning and teaching***, even at the Foundation Phase. [6]***For the most part, they are based on particular rural dialects in conservative contexts, h***aving been standardised in the nineteenth century by missionaries for such specific purposes as proselytization, and later by the apartheid era Language Boards at least partly as a mechanism of social control. [8]***As such, these standard written forms remain in many ways archaic, limited and context-bound, and out of touch with the modern scientific world.*** In addition, [8]***these standard forms are often quite different from the various dialects spoken by the actual language communities, even to the point in some cases of mutual incomprehensibility*** (see Schuring 1993; Herbert and Bailey 2002). Nevertheless, it is axiomatic, as the Canadian linguist, William F. Mackey (1992:52), has pointed out, that 'the lack of standardisation jeopardises the potential status of a language' and that a language which lacks a well-established written form cannot become empowered. [5]***If they are to be implemented as academic languages of learning and teaching, therefore, the standard written forms need to be modernised, regularised, codified and elaborated.***

This entails a number of large-scale projects: the revision of the spelling and orthography rules of the languages; the elimination of dialectal variation in the writing of the languages; the enlargement of their vocabulary, especially though not only in the fields of science and technology, together with the creation of modern dictionaries; and the codification of their grammars, based on the actual current practices of their speech communities, [6] *rather than on otiose cultural norms.* It is clear that this is a very large undertaking, [3] *which will require the provision of very large resources, both material and human*. Of course, [6]*in theory it can be done, a*nd the example of Afrikaans in this country is often cited as evidence for this. It must be remembered, however, that the development of Afrikaans was made relatively easy by the fact that it emerged out of Dutch, an already fully functional scientific language; that enormous resources were made available through the National Party government; that it was fuelled by an intensely nationalistic political will; and that it was whole-heartedly supported by a community seeking exclusivity and autonomy from English. [8]*None of these conditions obtains in the case of the African languages in the present cont*ext, which makes the possibility of their development into academic languages far less certain. And it must be realised that [2,3]*all the investment put into the elaboration of Afrikaans would have to be increased at least ninefold* if all of the official African languages are to be developed to the same degree. It must be noted, furthermore, that the development of the indigenous languages into academic media of communication cannot be achieved merely through the endeavours of a few scholars working in isolation, however industrious and well intentioned they may be. This technicist and artificial view of language development is plainly insufficient. Instead, what needs to occur is that the entire intellectual speech community of each language becomes actively involved in the development of the language as academic discourse by strenuously attempting to use the language to write scholarly articles, give formal lectures, present conference papers, produce textbooks and scientific manuals, and the numerous other activities which require a rigorous academic register. [5]*It is only when* co-ordinated and systematic linguistic research is able to draw on, and feed back into, an actual, developing discourse of practice in a mutually enhancing relationship, [8]*that a language can begin to evolve into a functioning mode of academic and scientific expression*. [8]*After a period of some inertia*, a number of projects have recently been undertaken to develop the African languages by both the university sector and the Pan South African Language Board (PanSALB). These include the establishment of research centres at some universities, as well as the creation of new courses in translation and terminography. The nine African National Language Bodies (under the aegis of PanSALB) have initiated projects aimed at orthographic standardisation; lexicography and

terminology development; and the promotion of literature in the indigenous languages (see, for example, Webb, Deumert and Lepota, 2005). It remains true, however, that progress has not been rapid and that a very great deal more needs to be done if the ideal of the African languages functioning fully as academic and scientific media of instruction in South Africa is to be actualised.

4.8.3. Curriculum Development

[5]If the African languages are to be used as languages of learning and teaching in the classroom, the first and most obvious step that must be taken is to translate the Revised National Curriculum Statement (the RNCS) into these languages. At the moment, the only subject curricula which appear in the indigenous languages are the African languages as subjects themselves. The rest are available in English and Afrikaans only. It is plainly unjustifiable to propose that subjects be taught in the African languages when the RNCS – the very basis of all subject content and methodology – is not available to teachers in the putative languages of learning and teaching. In the Outcomes Based Education system which South Africa has adopted, there are three Learning Areas in the Foundation Phase: Literacy, Numeracy and Life Skills. The subjects making up the Literacy Learning Area – the eleven official languages as subjects – are obviously written in the particular languages themselves. But the Numeracy and Life Skills Learning Areas have not yet been written in the nine African languages. [5]*Now, for this translation to be conducted successfully*, it is imperative to amplify and clarify the subject-specific terminology in the African languages, as well as to develop their capacity for generic academic discourse. Thus, [5]*it is necessary to develop the African languages as academic and scientific languages, at least to a certain level, before the Foundation Phase curriculum can be translated,* and, consequently, [5]*before one can expect teachers to begin teaching the curriculum in the learners' mother tongues with any degree of consistency and precision.* In the Intermediate Phase, matters are rather more complex. Here, there are eight Learning Areas: Languages, Mathematics, Natural Sciences, Social Sciences, Arts and Culture, Economic and Management Sciences, Life Orientation, and Technology. Moreover, within these Learning areas there may be one or more distinct subjects: for example, Natural Sciences comprises both Physical Science and Biology; Social Sciences includes both History and Geography. As is to be expected, the curriculum for these Learning Areas becomes increasingly detailed and specialised as the learner progresses through the various Grades. In consequence*, [5]the translation of the RNCS in this Phase can only proceed successfully if the African languages have been developed to a significantly higher*

degree as academic languages. And [5, 7, 8}*at the risk of repetition, it is only once the RNCS has been translated that teachers will be able to begin teaching the various Learning Areas effectively in the African languages.* Naturally, it is not only the both History and Geography. As is to be expected, the curriculum for these Learning Areas becomes increasingly detailed and specialised as the learner progresses through the various grades. In consequence, the translation of the RNCS in this Phase can only proceed successfully if the African languages have been developed to a significantly higher degree as academic languages. And, at the risk of repetition, it is only once the RNCS has been translated that teachers will be able to begin teaching the various Learning Areas effectively in the African languages. Naturally, it is not only the RNCS which must be available in the indigenous languages. All textbooks, readers, support material, teaching aids, guides and literature must be made readily accessible in these languages and kept continuously up to date. This is particularly important in the fields of mathematics, science and technology where an extensive range of new terms and phrases will have to be developed, learnt by the teachers and then communicated to the learners. Apart from the translation of the RNCS and related learning and teaching materials, it is also essential that the curricula for the African languages themselves be revisited and revised. [1, 8]***The content structure and methodology for the teaching of the languages remains, like the languages themselves in many ways, rooted in an outmoded and ineffective pedagogic model which hampers learning and diminishes interest.*** As a result, many learners emerge from the schooling system unable to write their own mother tongue with any acceptable level of competence. [8]***Moreover, since they have often not been taught English (or Afrikaans) successfully, they find themselves unable to communicate effectively in their second language, in either oral or written mode***. While they may have attained a certain level of basic interpersonal communicative competence, they lack what Jim Cummins (2000, for example) termed cognitive academic language proficiency, and thus they are unprepared for higher education or for training in a sophisticated work environment. At this point, it is necessary to make a distinction between employing the African languages as authentic media of instruction throughout the curriculum and using the languages in the classroom in an informal, ad hoc manner in some or other form of code-switching. Given the diverse linguistic profiles of many South African classrooms, together with learners' limited grasp of English, it is inevitable that teachers will resort to a mixture of languages for purposes of clarification and explication. In such contexts, codeswitching is frequently a vital and indispensable pedagogical tool. Nevertheless, if the goal is to develop the African languages into genuine academic languages, and have teachers use them as such, then code-switching cannot be viewed as anything more

than a partial and transitional support mechanism. This becomes ever more apparent as learners move into the Intermediate Phase and beyond, where increasing emphasis is placed on independent reading and writing skills.[8] *Learners who remain reliant on mixed-language modes of communication will find it extremely difficult to read texts written in the standard form of a particular language, as well as to write essays and assignments and to answer tests and examinations.* Furthermore, given the highly context-specific, personal and arbitrary nature of code-switching, it is impossible to construct generally comprehensible and enduring academic texts in a mixed-language format. Thus, while codeswitching practices currently play an important role in many South African classroom environments, they can never be construed as constituting a target language of acquisition, or as representing a viable alternative to the development of formal academic proficiency in the standard form of a language.[7] *It ought to be clear from the foregoing discussion just how much work needs to be done in order for teachers even to begin teaching the first six Grades of school in the indigenous languages*. To suggest that such teaching could begin imminently, and to propose rapid policy changes to this effect, is both disingenuous and irresponsible.

4.8.4. Teacher Education

In addition to language and curriculum development, a crucial aspect of providing mother tongue education in South Africa lies in the field of teacher education (or teacher training as it used rather inelegantly to be termed). In the early years of this decade the responsibility for teacher education was transferred from the former colleges of education to the universities. During the same period, the numbers of students enrolling for African language courses at universities dwindled, for various reasons, to almost nothing. Even in Teacher Education programmes where an African language is a compulsory credit, the number of students who proceed with the study of an African language beyond the obligatory first level course is negligible. There is, as a result, a real crisis in African language teacher supply. [5]*As a first step in addressing this crisis, i*t is essential that the government offer service contract bursaries for student teachers specialising in African languages. In this scheme, students receive a full bursary (covering tuition, board and living expenses), but then have to pay the bursary back through a year of service for every year of study in which they received the bursary. Over the past few years, such bursaries have been offered for Maths and Science students only. In 2006, however, the Minister of Education announced that such bursaries would be extended to students specialising in Technology and Languages (both African languages and English). It is gratifying to note that this service-linked bursary scheme, which teacher education institutions

have been demanding for some time, has begun to be implemented in 2007, through the Fundza Lushaka project (see Metcalfe 2007). It remains to be seen, however, whether sufficient numbers of student teachers will enrol for and graduate in African language courses, and then [8]*whether the Department of Education has the capacity to ensure that they do actually take up African language teaching posts in the schools*. Even this is not enough, however. Incentives must be provided for graduating teachers to accept employment in the rural areas and township schools where the need for teachers qualified to teach in the African students' mother tongues is most needed. Such incentives could take the form of higher salary packages, performance bonuses and better promotional opportunities. If this does not happen, the current trend of successful black education graduates taking posts in private schools or government schools in the affluent suburban areas will continue. [7, 11*Here it is necessary to remember that the issue is not merely that of teaching the African languages as subjects, but rather the ability to use the African languages as the media of instruction for the entire curriculum*. For student teachers to be empowered to achieve this goal, [5]*a number of further steps need to be taken*. *Firstly,* as with the African language school curriculum, the African language curriculum at tertiary level needs to be drastically revised and modernised, so that students are enabled to study and learn these languages as effective carriers of academic discourse. Secondly, the entire Teacher Education curriculum (or at the very least the undergraduate Bachelor of Education programme) needs to be translated into each of the African languages. This would include all the official school subjects, but most especially Mathematics and the Sciences. [7]*As was noted in the first section of this paper, however, for this to be made possible the languages themselves need to be significantly developed.* Thirdly, it will be necessary to provide a very large number of new Teacher Education lecturers who are able to teach the newly translated curriculum in the medium of the African languages. At the moment, a very small percentage of university teacher educators a*re[6] able to provide quality tertiary tuition through the African students' mother tongues,* and even fewer in the scientific subjects. Finally, for the requisite development and continuous upgrading of mother tongue tuition at tertiary level to be possible, it is necessary for [6]*high-level research to be conducted*. Thus, optimally, each university's Faculty or School of Education would need to attract and support top quality education researchers working specifically in the field of African languages in education, whether through research units, centres of excellence or individual fellowships, grants or professorial chairs.

In addition to the training of pre-service student teachers, it will also be necessary to upgrade the competence levels of teachers already in the system. Universities will have to provide a range of additional courses for in-service teachers so that they are able to acquire academic proficiency in the newly-developed African languages as well as enhanced methodological skills in utilising the languages as media of instruction in all the various Learning Areas. Such courses would, of necessity, need to be taught part-time (after hours, during the vacations, or as block-release programmes) which would place an enormous burden on both the schools and the universities, [3]*and would again require a heavy investment on the part of the State in terms of additional lecturing staff, tuition and transportation costs, and perhaps even temporary teacher-replacements.* Such courses would also by their very nature have to be completed over an extended period of time and would thus require a strong commitment on the part of both lecturers and teachers over and above the normal duties which they have to perform in an already highly pressurised work environment. As was the case with language and curriculum development, it is evident that for all of this to become possible, [3]*the State will have to make extremely heavy investments in human and material resources far beyond* the provision of the limited number of student bursaries it currently offers. [3]*Whether the State budget for education can or will ever be enlarged to meet all of these multiple costs remains unclear*.

4.8.5. Implementation in the School

The fourth aspect of mother tongue education involves its actual implementation in the schools. [6]*Even assuming that at some point in the future the African languages have been effectively developed, that the curriculum has been efficiently translated, and that a full quota of properly trained teachers is available*, there is still the question of whether schools will adopt the policy and implement it thoroughly. For this to take place, a number of stakeholders will have to be convinced of the broad benefits of mother tongue education, not merely in a cognitive sense, but in a much larger socio-economic context. Such stakeholders include government education officials, school governing bodies, principals, teachers, and, most importantly, parents and learners. [9]*If learners and their parents do not actively desire mother-tongue instruction, then all the effort in the world will not make the policy viable*. And for this desire to be inculcated, parents and their children will have to see that mother-tongue education leads to palpable benefits in such spheres as economic empowerment, social mobility and influence, and pathways to further academic opportunities. All of this raises

questions of the instrumental value of the African languages in South African society more generally which, though of interest and importance, lies beyond the scope of the present paper.

A more specific question related to mother-tongue education in schools concerns the role of English. [6, 8]*No matter how rapidly or to what degree the African languages are developed, it is safe to assume that English will continue to occupy a role of crucial importance in South Africa for the foreseeable future*. [5, 6]*Even if the African languages are utilised as languages of learning and teaching in the first years of school, at some point there will have to be a switch to English as the medium of instruction, whether this takes place after three years, or, as is now proposed, after six years*. [5]*Thus, English will have to receive systematic and sustained attention, and will have to be taught extremely effectively as a subject during the initial years of schooling so that when the transition does take place (be it gradually or immediately) learn*ers will be sufficiently competent in the language to be able to cope with learning through it. Indeed, even if mother tongue education were one day to be employed right through to Matric level, learners would still need to be proficient in English for the purposes of higher education where*, [6]in a globalised academic environment, English is indispensable*. At the moment, however, English is, in many cases, badly taught in South African schools. [5]*Just as important as the production of large numbers of competent mother-tongue teachers, therefore, is the development of high-quality teachers of English who can be deployed in the rural and township schools*. Again, a system of service-linked contract bursaries and incentives to work in areas of greatest need must be implemented immediately for student teachers specialising in the teaching of English. [8]*The Minister of Education, as mentioned previously, has included English in the list of priority subjects for student teachers, and this is to be welcomed as a long overdue practical measure*. But, as in the case of African language teaching, steps must be taken, over and above this, to ensure the upgrading of in-service teachers in terms of academic proficiency in the language, content knowledge and improved methodological practice. [8]*It is a simple truism that any educational system which prioritises the African languages at the expense of English is destined to fail at the levels both of practical reality and educational theory*. As even so avid a proponent of heritage languages as Tove Skutnabb-Kangas has observed, in multilingual societies it is essential that all learners are enabled to 'learn enough of the power language to be able to influence the society or, especially, to acquire a common language with other subordinated groups, a shared medium of communication and analysis' (1981)**. [5]***In the best of all possible worlds, learners, especially in areas where English is rarely used, would begin*

their schooling in their mother tongue and then at some point switch over to English as the medium of instruction, having acquired enough English through subject study to be able to cope with it. At the same time, they would continue to study their home languages as subjects in a model of additive bilingualism. Conversely, in areas where English is able to be used as the language of learning and teaching from the outset, it is just as important that learners acquire proficiency in at least one official African language. In schools where Afrikaans is the medium of instruction, it is not unreasonable to require that in addition to their mother tongue, [8]*Afrikaans-speaking learners acquire both English (as they invariably wish to do anyway) and an African language*. From this it ought to be apparent that there can be no single language policy which would suit every school context in South Africa. The society simply remains too disparate and differentiated for any 'one size fits all' system to be practicable or even desirable. [5]*What is not unfair to expect, however, is that by the time learners leave school they will all have full academic proficiency in at least one language (for the moment this would continue to be English or Afrikaans*) as well as [6]*some degree of academic* proficiency in one and perhaps two other official South African languages. However, even within this ideal linguistic scenario, there are some possibly unexpected and certainly ironic implications. [5]*For schools seriously to implement initial mother-tongue instruction (followed later by English)* means that schools would have to be divided into particular language groupings, and learners would have to attend a school offering their particular language. [10]*While this does happen informally to a certain degree, a formalised policy would in effect return South Africa (at least in the primary schools) to a kind of linguistic apartheid reminiscent of a former er*a. Even in the unlikely event of township schools being able to offer parallel-medium education in two or more African languages, there would still effectively exist a language apartheid between the various classes within the school. [4]*It is not clear whether the current proponents of mother-tongue education in this country have thought through these matters with sufficient care*. Finally, there remains the question of [9] *individual choice*, and this brings the present discussion full circle. In any democracy [9]*parental (and learner) choice is paramount,* especially when it comes to such issues as the language in which a child is to receive his or her education. [9]*It is no small matter that this right is enshrined in the Constitution*. If, after all is said and done, parents continue to insist, [8, 9]*as the majority currently does,* that their children be educated in English rather than their mother tongue, then onus rests on the State to ensure that this is provided as effectively as possible for everyone who wants it. And if this does indeed continue to be the [8, 9]*will of the majority, then the teaching and learning of English in South African schools than has hitherto been the case*.

No language in education policy which is forced on the majority against its will can ever succeed, and will serve only to perpetuate the [12]*unequal and inefficient conditions which currently exist in South African education.*

4.8.6. Discussion on the Common Ground Refutation Discourse (refutations to MTE)

I have decided to tabulate the results of the Foley article so as to show the number of instances where he uses language in a certain way to put his point across.

1 = Low Level of ALs Score= **3x**	2=Too many ALs Score= **2x**	3=Costs Score= **5x**
4: MTE not thought through Score= **2x**	5: Dictative discourse Score= **16x**	6: Condescending language Score=**10x**
7: Prove … before implementation Score= **5x**	8: Opinionated Score=**17x**	9: Choice of parents Score=**6x**
10: MTE will lead to tribalism Score=**1x**	11: MoI is not a significant issue Score=**1x**	12: Need to defend position as not against MTE Score=**2x**

Table 4.9: CDA results of Foley (2010) article Mother Tongue Education in South Africa

The article has all the Common features of the discourse I call: MTE Common Ground Refutation Discourse (CGRD) prevalent among academics or opinion formers of note who unfortunately dominate the space of education debate by their highly publicised academic work and articles. The results show that of the (1-12) numbers delineated, Foley has representation of each in varying degrees. I grouped the scores of the Foley article in categories that I determined as Category 1 for (Low Scores 1-4) is termed Non-Influential CGRD but still a confirmed CGRD participant with a green colour. Instances where these comments are made in the text are few and insignificant. Instances in the articles of Category 2 are grouped as Medium Scores (5-8) and are categorised as Domineering CGRD. The colour is amber as it indicated that the article is highly skewed to an MTE CGRD. The last Category is 3, with instances of 9 and above termed as extreme MTBE CGRD; this would assist me to determine how much of the article passes as an academic paper by a Professor of language (English) who has a position not favourable on MTE; Category 1 is green as it shows how much of an academic article is left, or how much qualifies as an opinion piece; it doesn't take away the value of genuine advice. A category 2 CGRD article would mean that there is value to the article despite a high skewedness to obstacles which means although the individual professes

not be against MTE, the text says it all. The features in Category (CAT 3) are negative, authoritarian, opinion pieces of know-alls that are typical of the mentality of superiority posing as academic discourse.

MTE Common Ground Refutation Discourse (CGRD) CATEGORIES		
CAT 1	CAT 2	CAT 3
Lowest score (1-4): Non-Influential CGRD	**Medium score (5-8) Domineering CGRD**	**Highest score (9+ Extreme CGRD**
1: States Low Development Levels of ALs [1x]	3: Costs of MTE too high [5x]	5: Dictative Discourse Instances [16x]
2: Too many ALs [2x]	7: Prove … before MTE	6: Condescending Language Instances [10x]
4: MTE not thought through [2x]	9: Highlights parental choice [6x]	8: Opinionated Instances [17x]
11: MoI is not an issue [1x]		
12: Starts by defending that neither for, or against. [2x]		

Table 4.10: MTE CGRD Category Tables (Mbude, 2019).

4.8.7. Why Ethics of discomfort are important in South Africa today

I read the article of Jaco Barnard-Naude (2019) *Ethics of discomfort* with great jubilation in my heart as he was able to express what is happening firstly with the eloquence of English (something I do not have) and blessed with the right race to make such statements without the fear of being judged later as being racist and being driven by 'politics of enmity' (Mbembe, 2016). The choice of verbs used by Foley (2010) in his article when referring to African languages is negative and very condescending typical of a superior mentality viz. *based on otiose forms, archaic, limited, context bound, out of touch with the modern scientific world. Based on rural dialects in conservative contexts, standard forms are different from local dialects.*

This tone and attitude changes when talking about English 'that is a 'scientific' language; he starts to raise the need for 'high quality' English teachers; he is concerned that English and Afrikaans are badly taught to African language learners; to him African language learners

'must change or transition to English at some stage; he states that all leaners must leave school proficient in English or Afrikaans, and must learn some African language. While he insists that these learners must transition to English and that the development of African languages must not be at the expense of English; the tone changes to '*it would not be unreasonable to expect that Afrikaans learners learn an African language*'.

I do not know Andrew Foley, but I do not know that he doesn't seem to know the fact that all languages are dialects and all languages have a standard and a dialect; not only African languages. Foley questions Naledi Pandor's announcement that the department would extend MTE for another three years in the Intermediate Phase (Grades 4-6); he questions whether MTE proponents have thought out the various issues related to MTE instruction. The same Foley, welcomes the announcement from the same Minister of Education that English is on the priority list; he says it came late but it is welcome.

To be fair, it is not only Foley who tries to dilute the importance of MTE for African language learners as key to learning; one reads in various articles that the issue of language is deliberately being diffused by sometimes well-meaning academics. Hoadley (2012) in her article on reading, posits that divided opinions over the language of instruction issue have masked the issue of poor literacy teaching per se, as is evident in the low home language literacy levels amongst learners to a certain extent, in other words, debates around language deflect attention from the quality of instruction, irrespective of the language of instruction (Hoadley, 2012). What Hoadley does not understand is the fact that quality of instruction is a direct result of the language of instruction in higher education institutions. Teachers who are unable to teach literacy in the foundation phase in African languages have Foundation Phase qualifications degrees from universities like Stellenbosch, UCT, Rhodes, WSU, Fort Hare and other institutions. The language of instruction in all these HEIs is English or Afrikaans. How do you then divorce the teacher when they are unable to do what you taught them in a language that they are not proficient in? How do you divorce the quality of instruction of the institution that produced that teacher? It cannot be that when universities produce teacher qualifications, what the teacher does in her class is entirely her fault. African Language Foundation Phase teachers are the only racial group in the country who receive a qualification in a language through which they will not teach in. They are then blamed later on for poor teaching; who taught them in the language they will teach in? Spaull (2016) falls into the same trap like other MTE CGRD participants, in his paper tilted *'Disentangling the language effect in South African schools: Measuring the impact of 'language of assessment' in grade 3 literacy and numeracy.*

The article aims to address the extent to which language factors (relative to non-language factors) can explain the high levels of underperformance in reading and mathematics in South Africa (20106). The findings were that that the language of assessment effect is between 0.3 and 0.7 standard deviations in literacy and 0 and 0.3 standard deviations in numeracy. This is approximately 1–2 years worth of learning in literacy and 0–1 year worth of learning in numeracy. By contrast, the size of the composite effect of home background and school quality is roughly 4 years worth of learning for both numeracy (1.2 standard deviations) and literacy (1.15 standard deviations). He argues that these results clearly show that the 'language effect' should be seen within the broader context of a *generally dysfunctional schooling system [in black schools]*. (My own emphasis; he just was short of saying it). He further posits that these results further stress the importance of the quality of instruction, not only the language of learning and assessment. The fact that the literacy and numeracy achievement of South African children is so low in grade 3 (prior to any language switch to English in grade 4) should give pause to those who argue that language is the most important factor in determining achievement, or lack thereof, in South Africa. By doing so, these findings, including those presented in this article aim to stress the importance of the quality of instruction, not only the language of learning. The fact that the literacy and numeracy achievement of South African black children is so low prior to any language switch to English should give pause to those who argue that language is the most important factor in determining achievement, or lack thereof in South Africa (Spaull, 2016). His simplistic observation is based on the fact that looking at grade 3, the confounding factors of language fall away as students are assessed in the language they know best and in which they have been taught for 3 years, most teachers are teaching in their mother tongue (which is also the LOLT of the school [in the FP] and students have not yet switched to English. Thus, there are few (if any) confounding language factors that could affect a child's numeracy or literacy performance at the end of grade 3. Put differently, one cannot talk about language-switching factors being a main cause of poor performance for non- English learners at the end of Grade 3, something which is probably not true of learner performance in Grade 4 or Grade 6, for example. By the end of Grade 3, most non-English students have had very little (if any) exposure to English LoLT (Spaull, 2016). Spaull confuses the issue of the effect of 'language factors' and the issue of the 'language switch' that does not happen in Grade 3. He aims to detangle or separate the issue of language from the quality of instruction in Grade 1-3, using the logic of a non-switch to English in these three grades. In typical MTE CGRD style, Spaull finds it necessary to state the intention of authors in the literature who reiterate his findings viz. (Fleisch 2008; Hoadley 2012; Murray 2002) that their intention is not to negate

the importance of language, but rather to situate the language effect within the discussion of a generally dysfunctional schooling system (Spaull, 2016). Yes, black education is characterised by dysfunctionality, yes it is characterised by teachers who have low morale and who have very low subject knowledge although the majority of them are qualified. I have no problem with the description; I have a problem with the why part? Yes, white schools are well run and are deemed functional, yes white teachers produce learners who know how to read, write and count and it has been found that some are SGB employees whose qualifications cannot be accounted for in the system; why do they produce better learners? These teachers had MTE.

The reasons for the dysfunctionality and poor instructional quality in black schools is not stated explicitly by both Hoadley (2012) and Spaull (2016) except to describe that non-English learners couldn't cope with high order questions, while English learners could. Taylor on the other hand, knows what wrong with South African schools in his paper titled '*what is wrong with South African schools*' in 2008. He posits that SACQMEC and systematic evaluation results powerfully illustrate the scale of the achievement gap. While more than four out of five children in former white schools were reading at the appropriate level, as defined by the national curriculum, the figure, while improving, was less than half in former Coloured schools, and in former DET schools only four children in a hundred were reading at grade level. Both the poor comparative performance and the within-country inequities are, of course, traceable back to a history of 350 years of colonial selective development, exacerbated by the policies of systematic discrimination and isolation pursued between 1948 and 1994 (Taylor, 2008). He uses the studies on poor performance of South African schools compared to those in both developed and developing countries citing Moloi and Strauss, 2005; Howie et al, 2007; Howie, 2001; Reddy, 2006; Taylor et al, 2007 and the SACMEQ1 scores for mathematics at Grade 6 level. He examines the contributing factors of poor performance in the domains of school leadership and management and teachers and teaching. What I find interesting is that he uses the Christie et.al (2007) study on *effective disadvantaged schools* to highlight the issue of time management and curriculum leadership. He cites their argument that the extent to which time is used for teaching and learning is the most valid and obvious indicator of the extent to which the school is dedicated to its central task (Christie et. al., 2007). The issue of how African language schools spend hours translating and interpreting from English to the HL is not mentioned as a time management issue by Taylor. School leadership, teacher abseeintism, highly unionised environment and teachers who do not have sufficient subject knowledge who

are not taking their own learning into their hands; are cited as the main reasons. The most profound admission that he makes is that:

> *Every indication is that the subject knowledge of many teachers does not meet the curriculum standards set for the children they are teaching. It goes without saying that teachers cannot teach what they do not know, and improving the subject knowledge of teachers must be a top priority for any intervention*

He continues by stating that it is self-evident that what children learn is heavily dependent on what teachers know and do in their classrooms. This is especially true for poor children who get little support for schoolwork from their homes and little intellectual stimulation in their broader social environments (Taylor, 2008). In the words of Barber and Mourshed (2007), the quality of an education system cannot exceed the quality of its teachers, and the only way to improve outcomes is to improve instruction. Elmore and Fuhrman (2001) agree: in order to improve performance, all schools, no matter what their demographic characteristics or prior performance, must do different things, not just do the same things differently; these new things require new knowledge and skill (Taylor, 2008). How does one acquire new knowledge? Where? In which language? While school organisation provides the prerequisite conditions for effective learning, it is in the classroom that learning happens, and classroom level variables account for a far greater proportion of learning variance than school level factors. But which are the key pedagogical levers? The evidence is strong that teaching in most South African schools is very ineffective, moving too slowly and at too low a cognitive level to cover anywhere near the demands of the curriculum. But what to do about this, while the subject of the most strongly held views, is not well served by firm evidence in favour of any particular approach (Taylor, 2008). While Taylor accedes to not knowing what to do about the situation; nowhere does the issue of language not only of the children; the language in which all these teachers in dysfunctional schools were trained is not mentioned. One gets the sense that it is deliberate; it sets to blame one set of people for their dire situation (Christie even says teachers must take responsibility and stop put the blame on external factors); while they exonerate another set as just leaders who manage time well. I do not see in both reports the common thread of all black functional schools; access to extra classes. No school, even wealthy schools will teach any black child successfully without their wealthy parent or poor school offering morning, evening or weekend classes. To achieve an acceptable pass rate comparable to wealthy schools, black schools spend time repeating what textbooks say before school (morning classes) or after school (afternoon classes) or during weekends and holidays.

There still is a great need of research as to what extent this affects learners in terms of fatigue; high levels of corporal punishment to draw results and maintain the image of a performing black school. How much learning actually happens in extra classes' vs actual teaching and measuring concentration and fatigue levels is not done. This might be the reason why so many of them drop out and are lost along the way to a percentage less than half of those who originally started Grade 1 by the time they reach Grade 12. You do not see this unique feature with English and Afrikaans speakers. The HEIs that train these educators in English, are not blamed for an incomplete journey; teachers are left to sink or swim on their own once they graduate. Universities are autonomous good institutions; what, how, in which language/s they teach seems to have no bearing on the quality of teachers they produce that ultimately populate black schools. This narrative is not only unscientific it is divisive and encourages stereotyping.

Back to Naude's article about becoming-minor; he argues that there is in contemporary philosophy a concept that is activated by the notion of becoming minority. It relates to and sounds similar to such a becoming minority, but it is at the same time entirely different from what is entailed in becoming a political minority. It is rather, the idea, in the philosophy of Deleuze, of 'becoming –minor'. What distinguishes becoming –minor from becoming a minority is that becoming-minor involves a fundamental shift in disposition or orientation, a shift that amounts to, Deleuze's terms, to a deterritorialisation which is a divergence from the standard in terms of which a given majoritarian identity is defined (Naude, 2019). He argues that becoming-minor is turning away from the oppressive given of a status quo in order to traverse the emancipatory 'new', it is a different way of thinking and thus a different way of doing – one which begins, in fact, with the fact of difference. He says to begin with difference is, at its most radical, to give up, in the first place, one's predilection for and predisposition to dominate and control. The MTE CGRD participant base views delays MTE for Africans.

When I look at the modes of engagement and styles of rhetoric that prevail across South Africa, I think that the white minority has not come very far in terms of becoming-minor. For one thing I think that becoming-minor entails a considerable measure of humility and that the possibility of such humility is too often foreclosed by a visceral and fairly melodramatic politics of outrage, indignation and feigned victimhood. Humility does not mean that the only proper mode of democratic engagement on the part of whites is or should be silence. But humility does imply patience, listening, introspection, a willingness to change and even hesitance (Naude, 2019).

The message in this article that resonates with me is how white South Africa uses English and Afrikaans as an example of modernised languages that African languages must be comparable

to in order to be deemed ready to be as medium of instruction. As in the Foley article, references to English are words like 'quality', 'modernised', 'advanced', 'scientific'; versus discourse referring to African languages where verbs like archaic, culture bound, based in otiose forms . The article written by Achille Mbembe (2016) translated from French into English by Giovanni Menegallenotes describes the epoch we live in as an epoch of the politics of enmity; where doubt of anything coming from the other unsettles us and must be ridiculed, demeaned or diffused. It cannot be that the evidence we see daily of MTE working for whites and other racial groups is refuted when it comes to the education of blacks. Naude pleads to fellow white South Africans to listen and to be prepared to learn from the process of change that must happen offering the same opportunities to others, that they enjoy. He calls for an ethics of discomfort as the best model for moving towards (Naude, 2019). His makes a request for those who benefitted from advantages of the past reminding them that they should not forget that South Africa's interim Constitution, Act 103 of 1993 was made possible by the negotiations that would effectively ensure that apartheid's apparatchiks would not be tried and judged in the ordinary courts of justice for the crimes they committed against black people in South Africa; he argues that parliamentary sovereignty played a critical role for whites at that time and it consisted of a democratic injustice (Naude, 2019). He goes further to say that the parliamentary sovereignty of a minority parliament always operates in a zone of illegitimacy, falsity, fiction and indeed, invalidity. He laments that it is not often explicitly pointed out that the apartheid government operated under an enormous pretence, a spectacular fraud, an abominable 'as if', namely that its domination of institutionalised politics meant that it operated as if it was a majority parliament constituted by a popular majority through a general election. He postulates that it was the fundamental state racism of apartheid which enabled this 'as if'. The pathological ideology that black people in South Africa were not fully human, served as the basis for excluding the black majority from equal belonging and equal participation in the body politic (Naude, 2019). He concludes by stating that the ethical significance of the apartheid parliament's enactment of the Interim Constitution and indeed the white population at large, finally becomes *juridically* what it always already was socially: a minority. Minorities have rights in South Africa and those rights were well protected by white negotiators in the two drafts of the Constitution; and we all agree that everyone has a right whether in numbers or in minority. The profoundness of this article for me lies in the fact that the posturing, self-importance, affectation and expertise posturing that dominates discussions about African languages brings back violent imagery of the past. It will not cost the minority anything to support MTE education as beneficiaries of it; so that they do not only speak about democracy,

they also ensure a better future for everyone by attesting to the benefits of MTE. When Africans carry on about the efficacy on MTE as a viable strategy for teaching and learning mathematics and Science; one understands that they do not have a reference point in their history or heritage destination in any African continent where education was skewed to favour their wellbeing. They see things through a borrowed lens that was not designed for them; this in no way suggests that their concerns and biases are ill-informed and must therefore be ignored. Our role is to assist one another to see the bigger picture. In the same manner that we do not condone those who believe genital mutilation in young children enhances sexual pleasure; we will not say it is their bodies it is their democratic right leave them. It might seem very racist or judgemental on my part to hammer on the part of who voices their opinions on MTE for Africans; this is done deliberately to demonstrate that African language speakers have been listening; watching and have lived with the devastation of being given limited choices with somebody deciding for you what is suitable for you, your future and future generations. The time has come to say it is enough and not understandable at all when beneficiaries of MTE previously in the old South Africa and now currently act 'as if' maintaining the status quo that favours them is fine. It was not fine then, it is not fine now and will never be. South needs everyone both black and white in this struggle.

4.9. Chapter Summary

This chapter has given a description of the MTbBE project, it outlined its development within a language planning discourse and presented activities embarked on and lessons learnt. In a nutshell, languages of themselves have no problems neither have they the capacity to cause any. Problematizing languages is a human act; this chapter discussed in depth the discourses at play in the education space hindering development of African languages as LoLTs by problematizing them. It demonstrated how, specifically, socially and economically privileged individuals in positions of influence, especially in multilingual contexts, look at some languages as impediments to achieving their goals. In the process, one thing they have to address is the place of many languages in such a society (Mose, 2014). The valued use of the MTbBE strategy is in its infancy in classrooms in South Africa, much more work has to be done especially around the digitisation of African languages to speed up their development. The next chapter is on methodology underlying the MTbBE study.

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CHAPTER FIVE
5. RESEARCH METHODOLOGY

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5. 1 Introduction

Chapter 4 discussed the Grade 6 MTbBE Project in Cofimvaba, what could be learnt from it and the discourses dominating MTE education and critique thereof. The focus on this chapter will be on the methodology processes followed in conducting this study, it discusses research paradigms and the reason for choosing a particular one, the research design employed in the study, issues of sampling, data collection, data analysis, issues of validity and reliability, limitations of the study and ethical considerations. The choice of the research method is determined by several factors, including the type of research question, the control an investigator has over actual behavioural events, and the focus on contemporary as opposed to historical phenomena (Yin, 2009). Blaxter et al points out that research is not a wholly objective activity carried out by detached scientists, they posit that it is a social activity powerfully affected by the researcher's own motivations and values. It also takes place within a broader social context, within which politics and power relations influence what research is undertaken, how it is carried out, and how it is reported and acted upon (1996). The literature around MTE is on research studies carried out in the West and in Asia to a large extent. Blaxter posits that like in any research activities, these are not wholly objective activities; research interest is a subjective matter (Blaxter et al, 1996). There is a great concern around paucity of research that is both theory building and theory testing carried out in Africa particularly around MTE. One gets a sense of the paucity by the whisper of the African voice, this may be as a direct result of the ton of bricks of criticism hailed at research in Africa by academics who value certain types of research (particularly scientific) as useful. This research is a mix of everything as it attempts to plug various holes. Find the Chapter outline below:

- Research design
- Research paradigms
- Research method
- Sampling
- Data collection
- Data analysis
- Validity and reliability
- Limitations
- Ethical considerations

5.2 Research Design

Before beginning a study; a decision must be made on how to design the study; the research design refers to the overall strategy that you choose to integrate the different components of the study in a coherent and logical way, this will ensure that you will effectively address the research problem (De Vaus, 2001). Amongst the various ways of describing and classifying research designs is the explanation that research design is the set of methods and procedures used in collecting and analysing measures of the variables specified in the research problem. A research design is a framework that has been created to find answers to research questions. It should be noted that the research problem determines the type of design that should be used, not the other way round (Trouchim, 2006).

5. 3. Research paradigms

5. 3. 1. Paradigms explained

Among the many explanations about what a paradigm is, the most common one is that a paradigm is a worldview (your worldview), a belief, a concept or assumptions about how things work. According to Rossman and Rallis (1998) a paradigm is shared understandings of reality. A paradigm refers to the overall effect of the acceptance of a particular general theoretical approach, and the influence it has on your worldview as a scientist (Walliman, 2005). Al Shalloway (2008) defines paradigms as a set of experiences, beliefs, and values that affect the way you perceive what is real and how you should react. He says a paradigm is a habit of reasoning. It is deeply held and one may not always be aware of it (Shalloway, 2008). For Lincoln and Guba (1985) paradigms represent what we think about the world but cannot prove; this makes us to rethink the rhetoric in our work claiming that things are research proven. Social sciences view research paradigm as model according to which the object of research is viewed. Therefore the framework used to define research questions, subjects, and processes and finally the research interpretation is a research paradigm. Shallow posits that because paradigms affect our view of what is real and unreal; true and untrue; we are slow to change them (Shalloway, 2008). Shalloway being a software developer; makes an interesting distinction between paradigms underlying waterfall methods and agile methods in that industry that I find very common in social science research. He, like most researchers argues that it is important being clear about your foundational beliefs because they must be consistent with your actions (Shalloway, 2008). This is the same position advocated in social sciences that researchers must identify their own worldview (Cresswell, 2007; Bryman, 2008).

Research methodologies are said to be differentiated by four axioms; epistemology (what counts as knowledge and how people come to know it), ontology (what counts as nature, reality, feeling, existence, or being), logic (what is acceptable as rigor and inference in the development of arguments, judgments or insights), and axiology (what counts as fundamental values and what is consciousness-moral choices, ethics, and normative judgments (McGregor & Murnane, 2010). When researchers talk about different approaches to research, they talk about paradigms. Rossman and Rallis (1998) identify different research paradigms although they claim there are mainly two primary paradigms where subtypes come from:

(5.3.1. 2) Positivism is associated with quantitative research and has been used mostly in the physical sciences. Involves hypothesis testing to obtain "objective" truth in a scientific way. This paradigm assumes that knowledge is true if it is created using the scientific method consisting of proposed hypotheses and designed experiments for testing the hypothesis. The positivist places premium on the objectiveness of a research process; the scientific examination process (issues of sampling, data collection, data analysis) must be replicable anytime in the future to enable scholars to predict future results using the same methodologies. Knowledge discovered by positivist scientist enables one to provide explanations of the causes of things that happen in the world independent of the intentions of people (Maree, 2008). Positivism is characterized by three postulates: an objective external reality, the subject-object distinction, and value free social science. It is important to mention that although in the next definitions, positivism is heavily criticized; it does not mean that it no longer has an important place in research. Scholars like Holsti in the field of International Relations (IR) view the theories that positivism has given them as valuable (Holsti, 1995). This sentiment is also shared by Buzan (1996) that with its focus on realism possesses a relative (not absolute) intellectual coherence. For education research we do not agree with Hume that we only find knowledge on what we observe; critical theory argues that human needs and purposes are the glue that binds these observations. **(5.3.1. 2a) Critical realism** is a subtype of positivism that incorporates some value assumptions on the part of the researcher. It involves looking at power in society. It is a philosophical approach associated with the British philosopher Roy Bhaskar (1944-2014); it combines a general philosophy of science with a philosophy of social science to describe an interface between natural and social worlds (https://en.m.wikipedia.org). Critical realism stands in contrast to positivist scientist claims, that all scientists can do is to observe the relationship between cause and effect and impose meaning. Causal relationships are not located at the level of events as posited by Hume; critical realism locates them at the level of generative

mechanism, arguing that causal relationships are irreducible empirical constant conjunctions. Critical theory rejects the three basic postulates of positivism i.e. an objective external reality, the subject object distinction, and value free social science. By denying the subject-object distinction, critical theory strikes at the epistemological heart of positivism (Jackson, 2015).

(5.3.1.3) Interpretivism is associated with research work that discovers reality through participant's views, their own background and experiences (Creswell, 2003; Yanow & Scwartz-Shea, 2011). Taking account from a number of scholars, Nguyen & Tran (2015) posit that interpretivism is a trend of research approach, that prefers to using qualitative methods for data collection. They further argue that the interconnection between interpretivist paradigm and qualitative methodology is explained by the fact that one is a methodological approach and one is means of collecting data. (Nguyen and Tran, 2015). Interpretivist researchers understand the world of human experience (Cohen & Manion, 1994). It allows researchers to view the world through the perceptions and experiences of the participants; in seeking the answers for research, the investigator who follows interpretive paradigm uses those experiences to construct and interpret his understanding from gathered data (Nguyen & Tran, 2015). They further argue that specifically, interpretivism supported scholars in terms of exploring their world by interpreting the understanding of individuals. Willis (2007) argues that interpretive research is more subjective; and that interpretivists believe that an understanding of the context in which any form of research is conducted is critical to the interpretation of the data gathered. Nguyen and Tran (2015) admit that the interpretive paradigm is not a dominant model of research; they argue that it is gaining considerable influence, because it can accommodate multiple perspectives and versions of truths. **(5. 3.1.3a) Critical Humanism** is a subtype of the Interpretive paradigm. The critical humanism approach is one in which the researcher involves people studied in the research process. Plummer (2011) explains the humanism approach as suggesting a multiplicity of ways of being human; he posits that critical humanism embraces this multiplicity, but also puts it under scrutiny. Challenging any simple unitary view, it is critical of all claims that human beings can be understood 'transcendentally' and taken out of the contexts of time (history) and space (geography) of which they are always a part. For critical humanists, the human being is most emphatically not a free-floating universal individual: rather it is always stuffed full of the culture and the historical moment, always in process and changing (Ken Plummer in Lincoln & Denzin, 2011). Mbembe& Posel (2005) refer to Critical Humanism as a humanism which breaks with essentialised notions of difference. What we take from this paradigm is that it applies a critical lens to the concept of humanity as just unitary.

5. 3.1.4 Post-positivist research paradigm

In philosophy and scientific enquiry, post-positivism also called *postempiricism* is a metatheoretical stance that critiques and amends positivism (Popper, 1963). Post-positivists accept that theories, background, knowledge and values of the researcher can influence what is observed. Niglas (2002) defines it as a paradigm that denies positivism. In the explanation on positivism earlier on it mentioned that positivists emphasize independence between the researcher and the researched (object); on the other hand post-positivists accept the multitude ways of knowing besides scientific methods. Instead of testing hypotheses, research in this paradigm generates hypotheses through inductive reasoning. Rather than try to explain how something operates, scholars strive to understand why people operate in the manner they do and or to reveal power relationships and structures.

The post-positivist approach is not so ontologically dogmatic; in using it, debates on various issues are widened and marginalised groups which were denied importance and urgency in traditional positivist assumptions (Loughlin, 2012). Barnett and Duvall call this 'productive power', this refers partly to the discursive production of the subjects, the fixing of meanings, and the terms of action, of world politics; where this productive power is inherent in the positivist assumptions based on Western experience. Research should be value-laden, subjective and intersubjective; there is a place for the voice and role of the researcher and subjects in the study. In it humans are central to the research process and research should therefore happen in communities and in the daily lives of people in natural settings rather than experimental settings. While positivists emphasize quantitative methods, post-positivists consider both quantitative and qualitative methods to be valid approaches (Moore, 2009) and posits that bias is undesirable in research but it is inevitable. Guba & Lincoln (2006) posit that positivism uses validity and reliability as tests of rigor, while post-positivism strives for trustworthiness criteria instead of unbiased criteria. Post-positivists endeavour to achieve credibility (instead of internal validity), transferability (instead of external validity), dependability (instead of reliability), and confirmability (instead of objectivity). Be that as it may, the investigator therefore must work to detect their own bias and try to correct it. Post-positivists work to understand how their axiology (i.e. values and beliefs) may have influenced their research, including through their choice of measures, populations, questions and definitions, as well as through their interpretations and analysis of their work. The authenticity criteria become paramount when participants are involved in the research design and context is everything (Guba & Lincoln, 2005; Shah & Corley, 2006).

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The studies conducted within this paradigm are usually in small groups as the intention of searching for meaning is not to apply the results to everything as in positivist research. It is seeking to understand specific cultural and social contexts. It is therefore accepted that neither the researcher nor the subjects will remain neutral. Precisely because post-positivists accept that their research will not be neutral, caution and concerns have been raised by various scholars (Maree, 2008) that for post-positivists to acknowledge that knowledge could not be exclusively sought by experiment is a merit. They commend the approach for its stance on the role of humans in research; but caution that unless controls are put in place, humans have the potential of interpreting research findings to suit personal agendas and interests. They propose that the subjective interpretations from post-positivist research must be exposed to multiple validation procedures to justify conclusions. Excessive subjectivity could be subjected to triangulation of instruments and data analysis procedures; and involving independent critics to comment on one's interpretations may assist in pointing out the excessive bias before a claim is made to form part of knowledge. Another criticism to post-positivism is that the multiple, numerous and competing explanations of what could cause phenomena is confusing; and the fact that within the broad post-positivist camp of academics there is no consensus (Loughlin, 2012).

5. 3.1.5. Constructivist research paradigm

Some researchers claim that Constructivism is more a theory than a research paradigm. Mertens (2005) argues that theories provide frameworks for thinking about the interrelationships of constructs and are more limited in scope than paradigms. Mertens (2005) uses labels to describe constructivism that are adapted. Lather (1992) and Guba & Lincoln (1989, 2005) describes constructivism as naturalistic, phenomenological, hermeneutic, symbol interaction, ethnographic, qualitative, participatory action research. This approach assumes that the meaning of experiences and events are constructed by individuals and so people construct the realities in which they participate (Crotty, 1998; Mertens, 1998; Charmaz, 2006). Research in this paradigm aims to elicit and understand how research participants construct their individual and shared meanings around the phenomenon of interest. Particular to constructivism is a similar construction by researchers that their interpretation of the studied phenomenon is itself a construction (Walliman, 2005; Charmaz, 2006; Lauckner, Paterson, & Krupa, 2012). The basic beliefs associated with constructivism are outlined in terms of its axiology (nature of ethical behaviour) as a balanced representation of views, raise participants awareness and community rapport. Its ontology (nature of reality) is multiple, socially constructed realities; its epistemology (nature of knowledge) favours an interactive link between researcher and

participants, values are made explicit, created findings. Its methodology is primarily qualitative, hermeneutical, dialectical, where contextual factors are described (Mertens, 2008 adapted from Guba & Lincoln (1994, 2005) and Morgan (2007).

5. 3.1.6 Transformative

Mertens (2008) outlines the following labels as associated with the Transformative Paradigm as adapted from Lather (1992) and Guba & Lincoln (2005): Critical theory, neo-Marxist, feminist theories, critical race theory, Freirean, Participatory, Emancipatory, Postcolonial/indigenous, queer theory. Disability theories and Action research. She did this to emphasize that the agency for change rests in the persons in the community working side by side with the researcher towards the goal of social transformation. The basic beliefs associated with the transformative paradigm are related to its axiology (nature of ethical behaviour) as respecting cultural norms, beneficence is defined in terms of the promotion of human rights and increase in social justice and reciprocity. The ontology (nature of reality) is its rejection of cultural relativism, recognises that various versions of reality are based on social positioning; its conscious recognition of consequences of privileging versions of reality. The epistemology (nature of knowledge, relation between knower and would-be known) is characterised by an interactive link between the researcher and participants; knowledge is socially and historically situated, and there is need to address issues of power and trust. The methodology (approach to systematic enquiry) is qualitative but quantitative and mixed methods can be used, contextual and historical factors are described, especially as they relate to oppression (Martens, 2008).

My study is based on this paradigm; my research problem and questions seek answers that have a sense of urgency to make a material difference to the lives of poor, black children in South Africa. My worldview point is informed by the plight of the disadvantage I experienced as a child, that I cannot see experienced by those behind me that I cannot ignore; it forces me to embark on a journey of seeking no more for black children than what white and so called children have always had in this country; quality MTE provision throughout the schooling.

5.4. Choice of paradigm

This study borrows elements of post-positivism in so far as it shares its view that ethics is intertwined with methodology, the researcher has an ethical obligation to conduct good research. Good research in this paradigm means, intellectual honesty, the suppression of personal bias, careful collection and accurate reporting of data, and candid admission of the limits of the scientific reliability of empirical studies (Jennings & Callahan, 1983) as cited in

Christians, 2005). It also borrows quasi-experimental type methodology for the experimental group design. The study also borrows to varying levels from constructivism in so far as the assumption that reality is multiple and that there are multiple ways of knowing other than purely observed scientific methods. It was also leaning towards giving prominence to critical humanism in the sense that it rejects essentialist notions of humanism; one can already see that it was difficult to confine myself to one paradigm. A decision had to be finally made as it is the case with research studies that the main paradigm guiding the researcher must be declared, so that the actions are in line with that particular paradigm. This study adopts a critical theory or transformative paradigm, with a major overlap on post-positivism and some constructivism.

Axiology: Social justice mustn't exist in theory books; it advocates that poor, black children have the same constitutional rights to MTE enjoyed by Afrikaans and English speakers.

Ontology: The assumption that MTE will lead to tribalism and English will unify all peoples of South Africa is a myth. Nobody should lose their identity to fit into an imaginary nation.

Epistemology: Unlike in the positivist paradigm where researchers and participants in the study were assumed to be independent and did not influence each other (Lincoln & Guba, 2000); in this study there is an interactive link between the researcher and study participants through structured/semi-structured interviews and observation to construct meaning.

Methodology: This study employed a mixed methods approach for various datasets so as to holistically present all the elements of the research context to answer the research question.

Qualitative research: Denzin & Lincoln (2011) posit that qualitative researchers generally assume that social reality is a human creation. Analyzing dataset from interviews and classroom observations utilised this method to give a textual narrative of MTbBE.

Quantitative research: Quantitative analysis was used in this study to analyse and interpret the scores of both the Grade 6 learners (MTbBE and non-MTbBE) for the June 2018 mathematics and science test. Find below an explication of each research approach.

5.5. Research approach

There are different approaches to research depending on a researcher's philosophical orientation, type of knowledge sought and methods and strategies used to obtain this knowledge. Each approach has its own purposes, methods of conducting the inquiry, strategies

of collecting and analyzing data and criteria for judging quality. These approaches are quantitative, qualitative and mixed methods (Maree, 2008).

5.5.1. Quantitative research approach

Scientists use this approach using numerical data to test relationships between variables whether in surveys or in experiments. Informed by heavy reliance on the post-positivist approach to knowledge, it implies that existence of one objective reality (Tashakkori & Teddlie, 1998; Charles & Mertler, 2002). The researcher tests the theories about reality, looks for cause and effect, and uses quantitative measures to gather data to test the hypotheses. The researcher relates the variables to determine the magnitude and frequency of relationships. Quantitative studies are either descriptive or experimental (Maree, 2008).

The goal of quantitative research is explaining any relationship that might/exists between variables. It therefore means that researchers formulate hypotheses about variables that can be measured. Quantitative samples are usually large and are randomly selected so as to generalize results to larger populations. Major quantitative designs are experimental, quasi-experimental, correlational, and survey research designs. To determine what numeric data needs to be collected the researcher identifies independent, dependent and control variables (Creswell, 2005; Maree, 2008). Data are collected using existing or pilot-tested, self-developed instruments such as surveys, tests, scales or behavioural checklists intended to generate reliable and valid scores. Data analysis consists of describing trends, comparing groups and relating variables. The analysis is at the level of descriptive statistics and inferential statistics. Results are interpreted in the light of initial predictions and prior research. The report reflects standardized, fixed structure and excludes personal reactions to the study (Maree, 2008). This approach is given credence as that its results may bear a higher level of objectivity versus the qualitative approach. The limitation with it is that it may not be used to measure human beliefs, feelings, and other metaphysical phenomena. Pure scientists tend to value quantitative research as based on objectivity and the story told by numbers not words. They critique the validity of claims of quantitative research as subjectivity is reduced; we are clear in this study that no research is wholly objective; research theory is made for people by people, therefore subjective.

5.5.2. Qualitative research approach

This research involves unstructured interviews, observation and content analysis. The researcher develops a complex, holistic picture, analyses words, reports detailed views of informants, and conducts a study in a natural setting. A qualitative researcher adopts

constructivism as a view which allows for multiple meanings of individual experiences (Denzin & Lincoln, 2005; Creswell, 2007). In this approach the structure is less rigid, it is inductive and takes a great deal of time to conduct. Scholars refer to it as; naturalistic, subjective, interpretivist, and constructivist (Maree, 2008). Research questions are general and broad and seek to understand participants' experiences with the central phenomenon. There is little social distance between the researcher and the subject to be studied.

Major qualitative designs in this approach are case study, grounded theory, ethnography, and narrative research (Patton, 2002; Creswell, 2005, 2007). Qualitative approaches are concerned with understanding the processes and the social and cultural contexts which underlie various behavioral patterns and they are mostly concerned with exploring the 'why' questions of research. This type of research typically studies people or systems by interacting with and observing the participants in their natural environment and focusing on their meanings and interpretations (Holloway & Wheeler, 1996). Emphasis is on the quality and depth of information and not on the scope or breadth of the information provided as is the case in quantitative research (Maree, 2008).

Qualitative data is collected through individual/focus groups; structured and unstructured interviews, observations, documents, audio-visual materials, and artifacts (Walliman, 2005; Maree, 2008). Data are recorded by making notes on interview and observation protocols and by using audio and video recording devices. Data analysis is based on values and meanings that subjects perceive for their world. Interpretation involves stating the larger meanings of the findings and personal reflections about lessons learnt (Lincoln & Guba, 1985). The structure of the report is flexible, but typically follows the standard format as used in quantitative research, but with considerable space devoted to data collection and findings. It also contains rich descriptions of the setting and participants, supporting participants' quotes, and explanation of the researcher's prior experience with the phenomenon studied. This approach accepts the personal experiences, beliefs, and narratives as true for those who have lived through them. According to Maree, the stories, experiences and voices of the respondents are the mediums through which we explore and understand reality (Maree, 2008).

Qualitative research has an important to play in research; but as its weakness is in the fact that different people can perceive the truth differently and therefore it hinges on subjectivity. As it attempts to find out how people perceive their lives; perspectives will be highly different. The researcher's experiences, beliefs, and values are incorporated into the research design and

analysis of data. Qualitative research approach prizes what the participants view as knowledge, emerging from interactions between the participants and the researcher. Subjective knowledge produces a subjective relationship between elements of the inquiry. Therefore, knowledge of 'what is' is always subjective as it is perceived and described through the observations by a human observer (Burell & Morgan, 1979; Guba & and Lincoln, 1989; Maree, 2008). Qualitative is very important to increase knowledge of people or situations that are not usually studied especially, the experiences of women, persons of color, and people who are often marginalized in society as it provides information that can be used for social change .

5.5.3. Mixed-Method Design

Mixed methods research represents more of an approach to examining a research problem than a methodology (Katrin, 2009). Mixed methods is characterised by a focus on research problems that require: 1) an examination of real life contextual understandings, multi-level perspectives, and cultural influences; 2) an intentional application of rigorous quantitative research assessing magnitude and frequency of constructs and rigorous qualitative research exploring the meaning and understanding of the constructs; and, 3) an objective of drawing on the strengths of qualitative and quantitative data collecting techniques to formulate a holistic interpretative framework for generating possible solutions or new understandings of the problem. Tashakkori and Creswell (2007) and other proponents of mixed methods argue that the design encompasses more than simply combining qualitative and quantitative methods but, rather, reflects a new 'third way' epistemological paradigm that occupies the conceptual space between positivism and interpretivism (http:/libguides.usc.edu/writing …). I would find it very difficult to narrow my work into one approach taking into consideration the nature of the issues raised in this study. In making a decision about which research method to use I realised that I needed both the qualitative strengths offered by Qualitative research to interact with the data from interviews, lesson observations, documents and various activities aimed at Status and corpus planning. I then needed to draw on the quantitative strengths offered by this approach to analyse the mathematics and science test results of MTbBE learners versus the control group. This method was most suitable to answer my research question. This method is often referred to as multimethod, integrated, combined, multi-methodology, mixed methodology and triangulation (Tashakkori & Teddlie, 2003). This method has had its fair share of contestations from within the mixed methods community and from outside of the mixed methods academics, as described by Creswell that with the growth of mixed methods as a popular research approach across many disciplines in various countries, it is not surprising that critical commentaries have surfaced

from within (e.g. Greene, 2008; Morse, 2005; Creswell, Plano Clark, & Garrett, 2008) and outside (Denzin & Lincolin, 2005; Howe, 2004) the mixed methods community (Creswell, 2009). I find solace in the fact that no research method is ever without contestation.

5.6. Using Thematic Analysis as a framework

The test transcripts for mathematics and science, were analysed following the principles of Framework analysis (Ritchie *et al.*, 2003). This method was designed to facilitate the exploration of the qualitative data in a systematic staged-approach moving from organising the data to summarising and finally to interpretation within a thematic framework. Framework analysis was chosen for the following reasons (Roberts et al., 2009, p23):

1. It provides coherence and structure to otherwise cumbersome, qualitative and quantitative data (i.e. transcripts).

2. It facilitates systematic analysis, thus allowing the research process to be explicit and replicable.

3. Despite the inherent structure, the process of abstraction and conceptualisation allows the researcher to be creative with the data.

Ritchie et al (2003) describe four key stages in the analysis process:

i. *Identifying initial themes or concepts* – similar to other analytical approaches to the analysis of data the researcher must become familiar with the data. This stage of familiarization involves revisiting the aims and objectives of the research, re-examining the sampling strategy to better understand the 'diversity' of the data, and thoroughly reading the transcripts to identify any recurring or key themes. Following identification of themes a conceptual framework can be developed. Further refinement of this framework allows for themes to be presented hierarchically with the grouping of broad themes under those considered to be the main themes.

ii. *Labelling or tagging the data* – In this stage of data analysis the raw data (e.g. interview transcripts) is systematically 'indexed' by applying the conceptual framework. Ritchie et al (2003) recognise this stage as different from coding where they define indexing as – *'when applying an index, it simply shows which theme or concept is being mentioned or referred to within a particular section of the data…'* whilst they consider coding to *'refer to a process of capturing dimensions or content that has already been more precisely defined and labelled'*

(Ritchie et al., 2003, p224). Throughout the process of indexing there is the opportunity to refine the conceptual framework should it be deemed necessary

iii. *Sorting the data by theme or concept* – data is sorted in a logical manner to enable data of similar 'content' or 'properties' to be collated. Different methods can be adopted here to conduct this sorting whilst some researchers prefer to sort data manually others prefer to use computer programs such as NVivo to assist this process.

iv. *Summarising or synthesizing the data* – The aim of this final stage of data management is to make the data more manageable. Whilst researchers may choose to do this by different means, Richie & Lewis state that the following requirements should be met:

- the language of the participant is unchanged to ensure that key terms or phrases used by the participant are retained throughout analysis;

- interpretation, at this stage, is limited to allow for easy access back to the original data if required and; all data should be considered important regardless of whether or not its purpose or meaning is clear as its significance may become clearer at later stages of interpretation.

5.7. Sampling

In research terms a sample is a group of people, objects, or items that are taken from a larger population for measurement. It is the selection of some part of an aggregate or totality on the basis of which a judgment about the aggregate is made. A researcher cannot study everything hence research, both qualitative and quantitative, involves sampling (Miles & Huberman, 1994; Thomas, 2009; Punch, 2009; Kothari, 2010). There are two main types of sampling procedure; random and non-random techniques. Random sampling techniques give the most reliable representation of the whole population while non-random ones could not generally be used to make generalizations about the whole population (Walliman, 2005; Maree, 2008).

Post-positivists recognise that many of the assumptions required for rigorous application of the scientific methods used in positivist research were difficult, if not impossible, to achieve in many educational studies with people, therefore quasi-experimental methods (methods that are sort of experimental, but not exactly) were developed (Campbell & Stanley, 1996, Cook & Campbell, 1979; Shadish, Cook, & Campbell, 2002). In this study, it was not possible to randomly assign learners to conditions, therefore researchers devised modifications to the experimental methods of the natural sciences in order to apply them to people (Mertens, 2008).

In this study I could not randomly assign learners to conditions, however, I could randomly assign schools to conditions (experimental or control). The sampling approach was therefore non-random for learners but random for schools. Non-random sampling usually involves smaller sample sizes. Sampling is flexible and it often continues until no new themes emerge from the data collection process-what is called data saturation (Maree, 2008). The decisions made are not restricted to selection of participants but also involve the settings, incidents, events and activities to be included for data collection. Non-random sampling for learners was used so that individuals are selected because they have experienced the central phenomenon (Creswell, 2003); in this case it was MTbBE teaching for 3 years from Grades 1 to 6. Subject Advisors could freely choose any 25 schools that offered the MTbBE strategy; and another 25 schools that didn't offer MTbBE. The criteria for selection was:

- The school must have all or the majority of learners being isiXhosa home language (HL) speakers
- The school must have all or the majority of educators being HL speakers
- The school must be rural (whether just rural, deep rural or rural with urban features)
- The MTbBE school educators for MSTE must have attended training
- There would be a balanced mix of Category 1 MTbBE schools (0-3 years in the program); Category 2 (3-6 years in the program) and Category 3 schools (6+ in the program).
- The June 2018 examination scripts for both mathematics and MST should be moderated.
- Only those schools who were willing to allow me to analyse their learner scripts would form part of the sample.
- MTbBE schools would allow lesson observations, interviews and fill in questionnaires after the analysis.

5.8. Classification of final Research Schools, teachers and learners

Home Language classification	All schools are rural			GENDER		School Rurality Type
	HL	Total No	Subject Teacher	M	F	RT 1, 2, 3
HL of MTBBE Teachers: Mathematics	IsiXhosa	14 of 20	The same teacher taught Maths and Science in 6 schools.	8	12	11 of 20 schools are Deep Rural
HL of MTBBE Teachers: Natural Science and Technology	IsiXhosa	16 of 20	The same teacher taught Maths and Science in 4 schools.	8	12	7 of 20 schools are Rural
HL of Grade 6 MTBBE learners	IsiXhosa	100	All learners were isiXhosa HL speakers.	45	55	2 Schools are Rural with Urban features.

Table 5.1: Classification of final Research Schools, teachers and learners

5.9 Coding of research participants and sites

The communication to the schools and research participants through the consent form was that a coding system would be used to respect their confidentiality. The coding is as follows

CODING OF SCHOOL, TEACHERS AND LEARNERS			
MTbBE	NON-MTbBE	TEACHERS	LEARNERS
MMT 1 to 20	NMT 1 to 20	SMT 1 to 20	MMTL 1 to 100
			NMTL 1 to 100
CODING OF VARIABLES			
RT=Rural Type	PA=Parent Access	Category 1= years in the program	TS=Teacher Stability

Table 5.2: Coding of research participants and sites

The coding was done for the experimental group; as the only group analysed for variables.

5.10. Data source

5.10.1. Teacher variables

I used the responses of teachers and principals to questions in the teacher and school questionnaires to determine the independent teacher variables. Six variables came from the teacher questionnaires; the remaining two came from the school questionnaire. Those variables already known to be associated with science and mathematics achievement (see, for example, extensive reviews by Darling-Hammond, 1999; Greenwald et al., 1996; Wayne & Youngs, 2003). They describe teachers' qualification, their experience in teaching, their experience in teaching MSTE, their feelings of happiness to teach through the MTbBE strategy and their stability in the school they're placed in. Teacher variables are:

1. The ethnic affiliation of the teacher, as inferred from the language used by the teacher with his or her students: isiXhosa XHL, Sesotho -SHL, Afrikaans – AHL, English- EHL.

2. Teacher's gender: 0–*male*; 1–*female*.

3. Seniority as inferred from the number of years of teaching, a continuous variable.

4. Teachers Qualifications (levels of education): Matric+2 (Underqualified teacher); Matric+3 (has a 3 year Teacher Diploma). Matric + 4 (has a Degree), Matric + 5 (MA or Post-Degree qualification).

5. Teachers' experience in the subject they teach (maths or science): 0-3 years, 3-6 years, .

6. Teachers' feeling of happiness to teach using the MTbBE strategy, the index developed

1–*not feeling happy to teach through the MTbBE; 2 – feeling happy to teach the MTbBE and 3–feeling very happy to teach through the MTbBE.*

7. Teacher stability in terms of movement of educators for Post Provisioning Norms:

8. Years of participation in teacher in the MTbBE program focusing on content knowledge categorised as Category 1 0 – 3 years, Category 2 (3-6 years) and Category 3 (6+ years).

5.10.2 Learner variables:

The learner data source contained four variables describing learner characteristics. The first of these was:

Parent Access (PA) 1 (No adult), 2 (1 relative), 3 (1 parent), 4 (2 parents).

This variable provides a proxy of the individual socioeconomic (SES) background of each participating learner.

The second variable was Student's self-confidence in learning the subject taught a dummy variable derived from an index constructed for the TIMSS 2003 survey (Martin, Mullis, & Chrostowski, 2004). This variable indicated whether a student had a lot of confidence (1) or not (0). The third variable described the dependence of students to the social grants system, Totally dependent on social grant (), 1 working parent; 2 working parents

5.10.3. School variables

School SES was limited to access to library and whether there was a library = 1, the library was not fully equipped = 2; the library was partially equipped = 3; the library was fully equipped=4.

5.11.1. Instrumentation and data collection

Data collection was two-fold, it included data collected for the report on the MTbBE pilot (2014 ANA results, departmental documents, lesson observations, interviews and questionnaires), and data collected for the analysis of the 2018 June examinations (learner scripts for mathematics, natural science and technology; memos; questionnaires).

Silverman (2000) argues that data collection, like all other key choices in the process of research, depends on the researcher's overall aim, research questions, theoretical framework, paradigmatic orientation, choice of design, and data analysis procedures anticipated. The data collection process had been accumulative from 2011 when the pre-pilot started and various data sources have been collected and used to various degrees. Data on language use for teaching mathematics and science was collected in the pilot schools prior and after the 2018 June examinations during classrooms observations; recordings of live lessons and teacher workshop data. It was important for me to separate the pilot data for this study as it would make the datasets quite huge and unmanageable.

Some data wad outdated and it was replaced with the current 2018 June examinations of mathematics and science. No extensive data was collected at the non-MTbBE schools as we had not established a working relationship with them. The key tenet of Transformative research is that there must be a close link between the researcher and the researched which

does not exist in the control group. MTbBE schools had established a rapport and trust, that relationship was reciprocal as they knew why the research was important. Visits to the non-MTbBE schools were for normal classroom visits and on observing whether there was anything different from what was observed pre-pilot. Data collection instruments employed in the study were classroom (mathematics) and field (science) observations, interviews, document analysis and results analysis.

5.11.2. Observation

Classroom observation, both formal and informal is a data gathering tool where actual teaching and learning is taking place. My observation was at various instances based on learning; what learners were learning was important; while on other sites it was based on teaching depending on what it was that I wanted to observe. The systematic process of recording the behavioural patterns of participants, objects and occurrences without necessarily questioning them within a structured or an unstructured schedule was important. Observations give us answers that cannot be answered by questionnaires and other data collecting instruments. Maree (2008) agrees with Walliman (2205) that observations can be used to collect both qualitative and quantitative data.

Observations allowed me to observe instances of language choices both by educators and learning; when language was used for what purpose; which language was used and what vocabulary and terminology learners found easy in mathematics and science and which one were they still learning or opting not to use.

Classroom observations were in two phases; Phase 1 (2012 to 2015) for the pilot phase they were in August 2012 for area 1 (25 schools, at least 10 schools for the month); August 2013, at area 2 (25 schools, at least 10 schools for the month) and August 2015 area 3 (20 schools, at least 10 schools per month). Each visit would alternate a mathematics and a science lesson per area. August allowed the school to be at a space where most of the work had been done; the half year period was over with its administration duties and one could get a sense of the readiness of learners to move to the next Grade. Phase 2 was the phased implementation phase (2017 to 2018) there were now 120 MTbBE schools with the new cohort. I started visiting the old cohort starting in July 2017 and July 2018. In areas 1-3 I did 5 old school and 5 new schools per visiting month.

Number of classroom observations in MTbBE schools in Cofimvaba

School Area	Description	Quarterly	Subject
Area 1	25 schools within a Circuit Proximity	10 schools per quarter	Natural Science
			Maths
Area 2	25 schools within a Circuit Proximity	10 schools per quarter	Natural Science
			Maths
Area 3	20 schools within a Circuit Proximity	5 schools per Quarter	Natural Science
			Natural Science

Table 5.3: Number of classroom observations in MTbBE schools in Cofimvaba

5.12. Document analysis

Documents can serve as sources of data in research and can be used to uncover meaning and discover insights in respect to a research subject (Merriam, 2001). When documents are used as a data gathering instrument, the researcher will focus on all types of written communications that may shed light on the phenomenon under investigation. Written data sources may include published and unpublished documents, company reports, memoranda, agenda, administrative documents, letters, reports, email messages, faxes, newspaper articles, etcetera (Maree, 2008). Researchers observe that documents do not alter the natural setting as would other means of data collection and therefore ideal as sources of data. They however caution that such documents should be used as data sources carefully for somebody could alter them for their own reasons (Delamont, 2002; Yin, 2003).

Yin and Maree state that use of documents is to corroborate evidence from other data sources (Yin, 2003, Maree, 2008). Documents can be used as sources of data or as part of literature review (Denscombe, 2003; Maree, 2008). In this research, analysis of documents was done specifically to see how the three languages were treated by schools and the MoE (see Appendix 11 for documents analyzed) and therefore add to the response to specific research question 2. Document analysis was done soon after the start of the third school term. The choice of this time for document analysis had a two-fold rationale: to avoid the feeling among teachers that the research was a quality assessment project and secondly to be able to obtain complete records covering the just ended second term.

5.13. Data analysis procedures

The paradigm and method adopted in this study generated data of a dual type-qualitative and quantitative both of which adopt different approaches of analysis. Qualitative data analysis is based on an interpretive philosophy aimed at examining meaningful and symbolic content of data. It tries to establish how participants make meaning of a specific phenomenon by analyzing their perceptions, attitudes, understanding, knowledge, values, feelings, and experiences in an attempt to approximate their construction of the phenomenon. This is achieved through a process of inductive analyses of qualitative data where the main purpose is to allow research findings to emerge from the frequent, dominant or significant themes inherent in raw data, without the restraints imposed by a more structured theoretical orientation (Maree, 2008).

The process of analysis in qualitative research tends to be ongoing and iterative, implying that data collection, processing, analysis, and reporting are intertwined. Researchers in this approach usually find it necessary to go back to the original field notes and verify conclusions or to participants to collect additional data and to verify it. The researcher's goal is to summarize what he/she has seen or heard in terms of words, phrases, themes or patterns that would aid one's understanding and interpretation of that which is emerging (Seidel, 1998; Maree, 2008). The main data analysis techniques in qualitative research are hermeneutics, content analysis, conversation analysis, discourse analysis, and narrative analysis.

Content analysis, the first approach used in analysing documents in this research, is a systematic approach that identifies and summarizes message content (Neuendorf, 2002). Content analysis is a term used to refer to the analysis of books, brochures, written documents, transcripts, news reports and visual media. Sometimes it is also used to analyze, diaries/journals, qualitative responses, open-ended questions on surveys, interviews or focus groups. It is a process of looking at data from different angles with a view to identifying keys in the text that would help one understand and interpret the raw data. It is an inductive and iterative process where similarities and differences in text are sought to corroborate or disconfirm theory. A thematic approach to analysis of interviews and observations was also adopted. Using this approach I started analysing qualitative data from my initial days of classroom observation; several things caught my attention and this always broadened my scope of observation. The final formal analysis of observation and interview data was

preceeded by transcription of recorded classroom observations and the interviews. This is the data I studied and from which emerged the themes discussed in Chapters Six up to Chapter Nine.

On the other hand, there was a quantitative analysis. This one uses the syntax of mathematical operations to investigate the properties of data (Walliman, 2005). The quantitative data analysis started by marking of the learner scripts in the two tests. Then scores were entered of all the learners in the SPSS table in readiness for statistical analysis. A univariate test was then run to clean the data, check for accuracy, and to generate frequencies. This was followed by a bivariate test to check the relationship between the variables. Pearson Product-Moment correlation was used in the determination of correlations between the variables identified, also Whitney U test was utilized for data anlysis purposes.

5.14. Validity

Employing multiple sources of evidence can contribute to construct validity by providing multiple measures of the same phenomenon. Designing the case study so that the chain of evidence is maintained should allow reviewers to trace from conclusions back to the initial research questions, or from questions to the conclusions (Sarker & Lee, 1998). The corrections made through reviews by key informants may enhance the accuracy of the case study as well as identify a range of competing perspectives.

Internal validity, which is concerned with justifying causal relationships, only applies to explanatory and not to descriptive or exploratory case studies (GAO, 1990). In the MTbBE case study of Cofimvaba, internal validity would not apply.

External validity deals with the problem of knowing whether the findings are generalisable to other cases. Threats to external validity include interaction of the causal relationship with units, interaction of the causal relationship over treatment variations, interaction of the causal relationship with outcomes, interaction of the causal relationship with settings, and context dependent mediation (Shadish et al., 2002). However, it has been argued that the use of one case is similar to the use of one experiment, in the sense that neither one is sufficient to reject or disprove propositions and that several are necessary to demonstrate accuracy of a theory (Eisenhardt & Graebner, 2007; Lee, 1989; Yin, 2009). In other words, "case studies, like experiments, are generalisable to theoretical proposition and not to populations or universes.

In this sense, the case study, like the experiment, does not represent a 'sample', and the investigator's goal is to expand and generalise theories (*analytical generalisation*) and not to enumerate frequencies (*statistical generalisation)* (Yin, 2009). Nevertheless, it is worth noting that the methodological literature provides little consensus regarding how exactly analytical generalisation may be achieved (Halkier, 2011).

Reliability is concerned with demonstrating that same results can be obtained by repeating the data collection procedure. In other words, other investigators should in principle be able to follow the same procedures and arrive at the same results.

In addition to construct/internal/external validity and reliability, *data quality* is also a key validity criterion. Research has identified a range of relevant data quality dimensions, including accuracy, objectivity, believability, reputation, interpretability, ease of understanding, concise and consistent representation, relevancy, value-added, timeliness, completeness, amount of information, accessibility, and access security (Wang & Strong, 1996). In relation to these dimensions, data may become corrupted during collection, transmission, storage, integration, retrieval, and analysis (Baškarada, 2010, 2011).

5.15. Data Collection

Data collection involved following the case study protocol, I used multiple sources of evidence, creating a case study database, and maintaining a chain of evidence (Yin, 2009) including the ANA results of 2014 for Grade 6 learners in the pilot schools and analysing the quarterly test papers for mathematics and science. GAO (1990) similarly recommends that multiple sources of evidence should be used, that a case study database should be used to store relevant evidence, and that an auditable chain of evidence (also referred to as an "audit trail") should explain how any conclusions have been drawn (Miles & Huberman, 1994).

According to Yin (2009), one major difference between survey based studies and case studies is that surveys capture perceptions and attitudes about events and behaviours, whereas case studies collect direct evidence. Furthermore, in case studies, data are analysed as they become available, and the emerging results are used to shape the next set of observations (GAO, 1990), or the next data collection activity (Dooley, 2002). The direct evidence collected in this study was about variables that were influencing results. As the analysis of the June Mathematics Test was done, it emerged that variables besides language which were impacting on performance

were important. Lesson observations and interviews with teachers and learners assisted a great deal to explain the variance in scores.

Theoretical sampling, which differs from *statistical sampling*, originated with the development of *grounded theory* (Glaser & Strauss, 1967). In contrast to statistical sampling, the goal of theoretical sampling is not to undertake representative capture of all possible variations, but to gain a deeper understanding of the cases in order to facilitate the development of theories. Theoretical sampling implies that the researchers guide their data collection activities on the basis of provisionary theoretical ideas (Boeije, 2002). Thus, it enables answering of questions that have arisen from the analysis of and reflection on previous data, since each piece of analysed data provides indications about where to look next. Theoretical reasons for sampling cases include revelation of something unusual/unexpected, seeking replication/falsification, elimination of alternative explanations, and elaboration of emerging theory (Eisenhardt & Graebner, 2007). Selecting extreme case-pairs (e.g., good vs. bad) is a common theoretical sampling approach. In this case I did select extreme case pairs from sample question papers from both the experimental and the control, and paired them in terms of those who did extremely well against those who did extremely bad to see what issues of interest came up that could help us in theory building. As such, the theory is continually modified as a consequence of further research. Such comprehensive data collection approach helps ensure that key aspects have not been missed, the associated flexibility provides an ability to collect the most relevant data, and multiple sources of evidence lead to enhanced validity and reduced bias (Eisenhardt & Graebner, 2007; GAO, 1990). Further evidence was collected of whether MTbBE as a strategy would work in another subject besides Mathematics by collecting the Natural Science and Technology results of June 2018 of both groups to see whether similar results could be sourced from another learning area. The ability to search for disproving evidence may lead to a reduction in confirmation bias, and maintaining a chain of evidence allows for stronger justifications of any conclusions. In addition to investigator bias that may result from personal values and assumptions, and which can unduly influence data collection and analysis, potential effects of the investigators on the behaviour of the study participants also need to be taken into consideration (Darke et al., 1998). For instance, "double hermeneutics" refers to the situation where researchers influence the interpretations of the study participants (Giddens, 1984). Arguments that such type of bias may be minimised by building rapport between the investigators and the participants (Miles & Huberman, 1994) are questionable. In any case,

researchers should explicitly acknowledge any such aspects and critically reflect on how meanings may have been socially constructed (Klein & Myers, 1999).

5.15.1. Developing an MTbBE Study database

Relevant data was collected for this study through Hansard Documents (1954), DET Documents (1976). DBE LiEP (1997) documents, archived June Mathematics and Natural Science and Technology scripts, 2014 ANA records, Quarterly Tests, interviews, and direct classroom observations. According to Yin, when reviewing documents, researchers should bear in mind that they may not always accurately reflect reality (e.g. policy and process documents may be out-of-date). Archival records are arguably more reliable, as they are usually used for record keeping purposes. The 2018 June examination scripts were archived records and were used precisely because the 2014 ANA records are out of date.

A research study database allows investigators to develop an audit trail from data collection, through analysis, to final conclusions. According to Yin, any interested reader should be able to link the conclusions presented in the case study report to the underlying analyses, the supporting evidence, the case study protocol, and the original research questions. A database may include interview transcripts, investigator notes, documentary evidence, preliminary analyses, and the like. As such, the use of a research study database enhances the reliability of the study. All items in the database should be categorised, indexed, and cross-referenced in order to facilitate easy retrieval. Before data collection is completed, researchers should ensure they have collected enough confirmatory evidence for most of the main study topics, and that the evidence included attempts to investigate major rival hypotheses or explanations. Multiple sources of evidence allow for data triangulation and the development of converging lines of inquiry. In other words, "examining consistency of evidence across different types of data sources is akin to verification" (GAO, 1990). Construct validity is also supported as multiple sources of evidence provide multiple measures of the same construct (Yin, 2009).

5.15.2. Interviews

Interviews constitute guided conversations that are usually one of the most important sources of qualitative research; however they should only be used to obtain information that cannot be obtained in any other way (Darke et al., 1998). For instance, information about organisational functional areas, reporting structures, and roles and responsibilities can be obtained from a range of internal documents (e.g., policies and procedures), public documents (e.g., annual reports), and websites. Even though the interview conversation has been described as a

"pipeline for transmitting knowledge" (Silverman, 1997), effective interviewing remains a very difficult undertaking (Fontana & Frey, 1994). Interviews can be *structured*, *semi-structured*, or *unstructured*. *Structured interviews* involve asking pre-defined questions, with a limited set of response categories. The responses are coded by the interviewer based on an already established coding scheme (Miles & Huberman, 1994).

This study had a set of both structured and semi-structured interviews for teachers with possible answers categorised as Teacher feelings about the program, Teacher movement stability, Materials usability, teaching experience, subject teaching experience and Travelling distance to the school.

Interviews for learners were also both structured and semi-structured. Structured interviews for Learners had the following categories: Parent Access, Individual SES, School SES, Rurality Type. *Semi-structured interviews,* or focused interviews (Dane, 2010), can be more flexible and allow the researcher to better understand the perspective of the interviewees (Daymon & Holloway, 2002). In semi-structured interviews, a researcher is able to refocus the questions, or prompt for more information, if something interesting or novel emerges. *Unstructured interviews*, on the other hand, do not impose any predefined answer categories can be more flexible and allow the researcher to better understand the perspective of the interviewees (Daymon & Holloway, 2002).

In *semi-structured interviews*, a researcher is able to refocus the questions, or prompt for more information, if something interesting or novel emerges. *Unstructured interviews*, on the other hand, do not impose any predefined answer categories (Fontana & Frey, 1994). They utilise open-ended questions, thus allowing for even more flexibility. While such interviews are least efficient, they may generate rich data (and uncover surprising/unexpected evidence (Daymon & Holloway, 2002). The experience of an interviewer with regard to technique and subject matter expertise is a key factor in identifying and maximising the collection of relevant information. It is recommended interviewers mainly use probe questions, which start with "How…?" and cannot be answered with a "yes" or a "no," in unstructured interviews (Perry, 1998). Unstructured interviews were used with community and traditional leaders to source their ideas about the MTbBE program and language policy in general; all these were held in isiXhosa and they are transcribed in English.

All the learners whose scripts were analysed were interviewed (5 per school), all the teachers who were part of the June analysis were interviewed (20), 30 adults in the community were

interviewed including (3 Chiefs); councillors, SGB members of participating schools; ordinary members of the community and principals of MTbBE schools (20) in total. I did that cognisant of the fact that anything less than 15 interviews per study organisation is generally not considered sufficient. Three researchers participated in each interview, while I was focussing on the interviews, the other 2 were recording interviewee responses (Kasunic, 2010). Interviewers require relevant subject matter expertise as well as information collection (i.e., interviewing) skills. They also need to have a flexible approach, be objective, and critical.

Yin argues that interviewing people with different perspectives can be a valuable approach. If possible, views of individuals from all relevant sections of the organisation should be obtained, and the views of more senior officials should not be given greater weight than views of less highly placed persons (Eisenhardt & Graebner, 2007; GAO, 1990). Interviewees themselves may also suggest other persons to interview, or other sources of evidence that may be of interest (Yin, 2009). For this study; traditional leaders, suggested that councillors should also be interviewd as they often complained of non-consultation and had potential to derail the project. 4 Interviews with ward councilors were done; it is interesting how they all refused to be named in the research. It might be ascribed to a fact raised by Yin (2009) that the posing of *why* questions may create defensiveness on the part of the interviewees, and that *how* questions are usually a better choice (Yin, 2009).

My contestation with this assertion is that it must take into consideration that it is important to certain sections of the study population to receive authentic answers. Asking why questions to political leaders is important because their role is different to teachers, parents and learners; they have a bigger responsibility towards social justice; therefore why questions would be a means of getting them to understand that they are key to any development of community resources be it language or skills amongst community members. The question was asked why do African children change the Language of Learning and Teaching in Grade 4? Do you know why this happens? Why do community leaders not participate in discussions about school language streams, choices, which languages to be offered in that community and why? Extending these questions to a negotiated solution of how do we change this situation, then becomes the next question Why questions are not necessarily about making people to account for inaction, accusation or ignorance; they also probe whether if there are any obstacles that might hamper the responsible persons' ability to do his or her work or access to information that might need to be highlighted in the recommendations.

5.16. Procedures of analysis

The data from the June mathematics and science examination consisted of 246 Grade 6 mathematics scripts and 225 Science scripts half of which were Bilingual and the other half are in English. To analyse June 2018 results, only the scripts of those pupils who were correctly moderated and signed off by Subject Advisors were utilized to increase validity of the examination results. The final sample was of 200 learners (100 MT and 100 Non-MT); in 40 schools and 20 teachers. Also analysed not for any purpose of deep analysis was the 2014 ANA Grade 6 data for mathematics and English FAL for illustration not any other purpose. The validity and reliability of 2014 results became a source of contestations with Unions and on different fronts; ranging from the results being labelled not depicting true results; I have therefore decided not to use them for in-depth analysis but only for descriptive purposes.

5.16.1. Data analysis

The transformative paradigm's central tenet is that power is an issue that must be addressed at each stage of the research process (Mertens, 2013). The analysis stage of the research relies on theoretical propositions and other strategies, considers and employs analytic techniques, explores rival explanations, and displays data (facts) apart from interpretations (Yin, 2009). As already discussed, qualitative research aims towards analytical generalisation, as opposed to statistical generalisation usually aimed at in quantitative studies. Analytical generalisation involves the extraction of abstract concepts from each unit of analysis (Yin, 2013). These abstract concepts should link to the theoretical foundations and be potentially applicable to other contexts. It is important to note that even purely quantitative studies presuppose some qualitative knowledge; otherwise, the numbers would be meaningless (Meredith, 1998). Where statistical generalisation aims to make an inference about a population on the basis of empirical data collected from a sample, analytical generalisation uses previously developed theory with which empirical case study results are compared. For this study both qualitative and quantitative data analysis methodologies were used. Narrative texts were coded and categorized, that were collected through interviews and those obtained as documentary evidence (Yin, 2009).

An important point to make is that computer assisted tools can only assist an investigator with data analysis, and that much of their functionality is not automated, but analyst-driven, and does not negate the need for subject matter expertise (Walsham, 2006). This is especially the case with the qualitative (as opposed to quantitative) data analysis tools. Any meaningful

patterns and categories in qualitative data as well as any explanatory/descriptive theories need to be identified and interpreted by the analyst. With that in mind, "nearly all scholars express strong caveats about any use of computer-assisted tools" (Yin, 2009, p. 129).

5.16. Context and participants of the research study

The MTbBE study is located in the village of Cofimvaba, a rural area in the Chris Hani District Municipality of the Eastern Cape, one of the nine provinces of South Africa. Formed in 1994 out of the Bantustan homelands viz. Transkei and Ciskei together with the eastern portion of the Cape Province. The Eastern Cape is one of the poorest provinces in South Africa with the majority living below the Lower Bound Poverty Levels. It produces amongst the lowest academic results for the national and international evaluations. South Africa is a nation of extremes. We have among the highest levels of income inequity in the world (National Planning Commission, 2011) and TIMSS results from 1999 to 2011 show that we have among the highest performance gaps in mathematics and science education (Reddy *et al.,* 2015). Essentially, South Africa has two systems of education: one, a functional system for the wealthy (where performance in TIMSS compares favourably to international benchmarks); the other, a largely dysfunctional system in crisis serving the majority of learners living in poverty (where TIMSS performance is amongst the lowest of participating countries) (Reddy *et al.,* 2015; Fleisch, 2008). Cofimvaba is one of the areas, where abject poverty is everyday life.

The area an agrarian massive piece of land situated in a landscape of a total of 168, 966 km ^{2} with a population of about 6, 522, 700 (2018 estimate); ordinary people depend on survival agriculture and social grants. There eight municipal districts vary in wealth and are markers of where 'life' happens; with the poor in- migrating towards them leaving scores of children with grandmothers; relatives, single mothers and some child-headed. The Nelson Mandela Bay is the richest Metro district where most whites in the province are found offered MTE; there are indigenous people in this Metro who history has forgotten. They are the Khoi and San; their descendants have thankfully regrouped and joined forces to demand their linguistic, cultural and land rights as they have now experienced language loss and speak mainly Afrikaans. The majority in the Nelson Mandela Bay Metro are black, poor, concentrated around townships and offered MTE for 3 years. The Buffalo City Metro is the next rich city in the Eastern Cape; where the majority of business are in the hands of the white minority; there are a number of affluent schools that offer MTE for Afrikaans and English speakers; the poor, black majority are densely populated in a sprawling township called Mdantsane; MTE is only offered for 3

years. The next district is Sarah Baartman; now named after the Khoisan Sarah who was humiliated by colonisers who paraded her for her body. The majority of whites mainly speak Afrikaans and English; they are offered MTE in their wealthy schools. Black speakers are in the majority townships offered MTE for 3 years. The Amathole district has a tiny minority of whites, they are offered MTE from preschool to university; they are mostly farm owners and run businesses amongst a majority of black, poor people who are offered MTE for 3 years. Joe Gqabi is a far flung district lying on the outskirts of Lesotho and the previous Afrikaner Boer states; whites are in the minority and speak mainly Afrikaans; are farm and business owners. They have MTE all the way; the black, poor majority live in townships and villages and are offered 3 years MTE. The OR Tambo district is a unique district where there is an unusually large number of black business owners and are wealthy probably due to an out-migration of whites to the more affluent ruling. Affluent schools offer English as LoLT; there is a large number of black poor people residing in villages and offered 3 years MTbBE. Alfred Nzo is a mainly black people populated district with huge numbers of young people as adults migrate to outside the province to find jobs. It is far from urbanity and modernity; the many schools for the poor offer 3 years of MTE. Lastly, the pilot study takes place in Cofimvaba; part of the Chris Hani District, a poor district with a minority of whites who won businesses.

The Eastern Cape density is 39/km (100/sq ml) and it ranks 6th in South Africa in terms of density. The population makeup according to the 2011 Census was 98.3% Black African, 0.5% Coloured, 0.3% White, 0.3% Indian and 0.5% other foreign nationals. The recent trend has shifted with a decrease in population numbers to 86.3% for Black African, 8.3% Coloured, 4.7% White, Indian or Asian 0.4%. Adults move into the cities leaving children alone.

The languages spoken are isiXhosa 80.8%, Afrikaans 6.6%, English 2.6%, Sesotho 2.5% (2018, www.ecprov.gov.za). In the Cofimvaba village, isiXhosa is spoken by 95.1% of the villagers, English is spoken by 2.6% while the other 2.4% uses a mix of other languages (Census, 2011). Queenstown is the nearest town at 79km away; In Cofimvaba, like in the rest of South Africa; African language learners make use of their home language as a language of teaching and learning (LoLT) in the first three years of education. In Grade 4, they then switch to an English LoLT system until they finish Grade 12 and higher education. Precisely because the journey of these learners is becomes narrowed with the Grade 4 switch; the focus of this study is investigating what we can learn from the delayed exit in Grade 3 to Grade 6 when teaching and learning mathematics using a Mother Tongue based-Bilingual Education strategy? In this monolingual rural setting of Cofimvaba, isiXhosa is the home language of the

majority of children and educators; it was used as the main LoLT until Grade 7. In 2011, 72 schools that underperformed in the ANA in mathematics were selected to partake in this pilot study where mathematics and science would be taught using the Mother-Tongue-based Bilingual Education strategy (MTbBE). Underperformance was the criteria of inclusion in the sample.

5.17. Research process followed

This is an outline of the multi-step process followed for the MTbBE research study; it is an outline of a simple and effective strategy for carrying out the study. It has nothing to do with the seven prescribed process steps in research; it is a sequencing of the process followed.
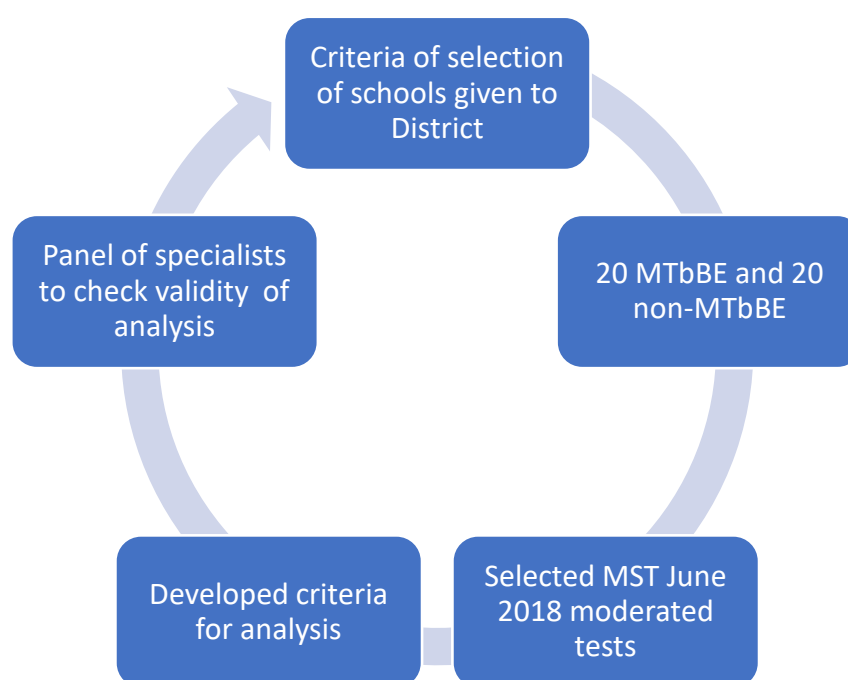
Figure 5.
Stage 1: Criteria of selection of schools given to district Subject Advisors.

Stage 2: Final number 20 MTbBE and 20 non-MTbBE

Stage 3: Selected MST June 2018 moderated tests -

Stage 4: Developed criteria for analysis

Stage 5: Panel of specialists to check validity

5.18. Validity and reliability

Both terms are used in research in reference to data collection instruments especially in quantitative research. Validity of an instrument is the extent to which an instrument measures what it is supposed to measure. According to McGregor and Murnane (2010) it refers to the strength of the conclusions and inferences and can also refer to whether it is appropriate to generalize findings of a study to larger populations. On the other hand, reliability of an instrument is meant that if it is used at different times or administered to different subjects from the same population, the findings should be the same (Walliman, 2005; Ruane, 2006; Maree, 2008). In the qualitative aspect of this study, the researcher is the data gathering instrument (Maree, 2008). Validity and reliability in this approach is a research that is credible and trustworthy. Lincoln and Guba (1985) include credibility, applicability, dependability, and confirmability as key criteria of trustworthiness and these are constructed to parallel the conventional criteria of inquiry of internal and external validity, reliability and neutrality respectively. Since there can be no validity without reliability, a demonstration of validity is sufficient to establish reliability. Generally, it is accepted that engaging multiple methods of data collection (observation, interviews, and document analyses in this study) leads to trustworthiness. Involving peer researchers to assist in the interpretation of the data could also enhance trustworthiness.

I took the following steps to purposely increase the validity and reliability of the findings for both the qualitative and quantitative data elicitation procedures as reported in this thesis. My proposal was read and approved by my supervisor and members of the School of Languages at Rhodes University. The Higher Degrees Committee approved the proposal before the actual data collection was conducted. There was a pre-pilot in 2011 which preceded the actual pilot. Observation and document analysis did not need a pilot exercise. Lastly, the adoption of a multi-method which provided diversity of approach in answering the core research question. Going by Cohen, Manion and Morrison's (2000) claims, the use of four data collection instruments was an intentional step towards raising the validity and reliability of the overall result. The next deliberate measure was using of two different reading comprehension tests (in each language) and setting them in conjunction with practicing teachers. The last approach was exposing the final analysis to my supervisors whose suggestions were used to focus the discussion, conclusion and recommendations of the study.

5.19. Ethical considerations

The following are steps undertaken to ensure that ethics expected of scholarly research were upheld during the research. Ethics refer to the morals, tenets or principles of conduct considered fair, especially those of a given profession or group (Kumar, 1999). I wrote to the Head Of Department Education who gave me permission to conduct the research; to the District Director of Cofimvaba who also gave me permission; I sought permission from the Traditional Leadership through Nkosi Ngangomhlaba Matanzima who wrote and gave me permission as he resides over the area. (find permission letter as Appendix 1).I went to the proposed project schools; had a meeting with the parents, principals and teachers and explained the research purpose and the issue of consent forms. The learners were also asked for permission for the one on one interviews. The consent form used for each participant is in the appendixes section. All schools were coded accordingly, educators, learners and all those interviewed including interview transcripts. Every effort has been done to reference the work of others when used, including in the references section. No identity of any person will be revealed relating to examination scores.

5.20. Limitations of the study

The limitations of the study were that it is tries to do two things at the same time. It tries to give an overview of the MTbBE project and lessons learnt, while it also tries to report on the academic performance of the Grade 6 MTbBE and non-MTbBE cohort in mathematics and general science and technology in the June 2018 examination. The challenge with that is that I couldn't do concentrate on one aspect without the other; I feel that I didn't do justice in reporting on all the MTbBE project activities as I would have preferred, as this is a research study of what lessons could be learnt from the Cofimvaba MTbBE pilot study, it is not a report document – I kept reminding myself. Secondly I didn't collect substantial data on the non-MTbBE cohort; my focus was on the MTbBE cohort. This might limit my interpretation of interesting features that could have added value to the context of the non-implementing cohort. The limitations of the transformative paradigm are related to its lack of 'a particular methodology', to its focus on power structures and social justice, very subjective notions which cannot be scientifically measured. The quantitative element of the mixed methods design was an effort to have measurement of what learners achieved to reduce the subjectivity associated with this kind of paradigm. This is in no means that the research is less important and less significant because it is not a pure scientific study; ensuring representation of both

methodologies would help in balancing out the limitation. The last limitation for me was the fact that the transformative research paradigm requires that community members be part of the initial discussions of the research focus. I could not accommodate all the suggestions proposed by the community in interviews and seminars; due to time constraints and the nature of any research of whittling down the research questions to a particular focus.

5.21. Chapter Summary

The transformative paradigm has relevance for people who experience discrimination and oppression on whatever basis, including (but not limited to) language, race and ethnicity, disability, immigrant status, political conflicts, sexual orientation, poverty, gender, age, or the multitude of other characteristics that are associated with less access to social justice. In addition, the transformative paradigm is applicable to the study of the power structures that perpetuate social inequities. Finally, indigenous peoples and scholars from marginalized communities have much to teach us about respect for culture and the generation of knowledge for social change. Hence, there is not a single context of social inquiry in which the transformative paradigm would not have the potential to raise issues of social justice and human rights (Mertens, 2009). This chapter outlined the various research paradigms and research paradigm adopted; methodologies utilised and explained the research context, research sample and research ethics and limitations of the study. The processes of data gathering, data analysis and data collection techniques were explicated. The next chapter will present the data for the Grade 6 Mathematics June examination for both groups.

CHAPTER SIX
MATHEMATICS DATA PRESENTATION AND ANALYSIS

6.1.INTRODUCTION

The focus of this chapter is on the data presentation and analysis of the performance of 20 MTbBE schools (N=100 Grade 6 learners) in the 2018 June Mathematics Examinations. This performance is compared to 20 Grade 6 schools in the same area of Cofimvaba who are not participating in the MTBBE project (N=100 Grade 6 learners); they are thus coded as non-MTBBE. Question by question comments on the performance of each group are made using the following criteria:

- An analysis of the generic score per question and a Comparative Analysis for both cohorts (MTbBE and Non-MTbBE) in Mathematics.
- An analysis of the variables related to the performance of both cohorts using nominal and ordinal scales where necessary.
- A critique of the translated Bilingual question paper in terms of its quality and to see whether it made an impact on the performance of the learners.

6.1.1. Analyzing results in a case study

Various scientists have different positions about the value of case study results; some claim that the analysis of case study results tends to be more opinion based statistical methods. I have used various types of data analysis for different datasets including the descriptive type, exploratory and causal. My datasets are both quantitative and qualitative in nature and each data analysis type is based on the specific dataset presented; the study therefore employs a mixed methods design. To limit basing my analysis on opinions the researcher will show numerical data for all the questions that learners wrote. I am well aware that case studies, unlike in a statistical or scientific study are mainly trying to judge trends and not analysis of every piece of data. The tools of measurement used are *Nominal scales* are used for labeling variables without any quantitative value. They are used to label the different key indicators of performance of both the MTbBE and Non-MTbBE cohorts like the dataset on gender of learners and Socio Economic Status (SES) indicators. *Ordinal scales,* are used to measure the non-numeric concepts like teacher happiness and stability; with ordinal scales the order of the values is what's important and significant. The intention is not trying to get central tendency or mean from using ordinal scales, as many purists will argue, it is the order of the values of the variables which is significant with this measurement tool. While, the main focus of the

study is mathematics; the 2018 June results for both mathematics and science are presented and analysed for comparative purposes. Mathematics will be discussed on this chapter, followed by the presentation of science data in Chapter 7. Blaxter et al (1996) posits that the business of analyzing the data you have collected involves two closely related processes viz. managing your data, by reducing its scope and size, so that you can report upon it adequately and usefully; and analyzing your managed set of data by abstracting from it and drawing attention to what you feel is of particular importance and significance (Blaxter et al, 1996). I felt that presenting only the mathematics would not tell the whole story; without moving away from the questions guiding the research and objectives it serves a significant purpose to present both while focusing on mathematics. The mathematics exam script was versioned into isiXhosa as it happens each year and each term when assessment is done for Cofimvaba MTbBE learners. In 2018, the Natural Science and Technology translated version was not printed on time; MTbBE learners only had the English test paper What transpired in the test results of this cohort is of significance. It also sets to prove that the fear that learning in African languages retards development in English is misguided and misinformed.

6.2 Cognitive Academic Mathematics Proficiency (CAMP) in Mathematics Achievement

To be able to effectively participate in school, learners must achieve a significant Level of proficiency in the Language of Teaching and Learning in this case isiXhosa and English to a lesser extent. Cummins (1981) theorizes that there exists a minimal Level of linguistic competence—a threshold—that a student must attain to function effectively in cognitively demanding, academic tasks. This threshold of cognitive academic language proficiency (CALP) can take between five and seven years to develop in a student's second language. Using CALP as a basis, we examine the area of achievement in mathematics for the MTbBE cohort and non-MTbBE cohort, focusing mainly at mathematical problem solving in the 2018 June Examinations. Various research studies imply that there is a close relationship between language proficiency and mathematics achievement. Thorndike (1912) more than eighty years ago referred to this when he said, "Our measurement of arithmetic is a measure of two things: sheer mathematical knowledge on the one hand, and acquaintance with language on the other." Language skills are the vehicles through which students learn, apply, and are tested on math concepts and skills. Unfortunately, the language of mathematics is often too difficult for many students as it doesn't utilize the same language in everyday contexts. It is therefore not appropriate to assume that math is "language *independent*," and further why it is not correct to assume that limited-English-proficient students will do well in mathematics without any help

through a language approach. MTbBE is designed as an approach that simultaneously combines language and mathematics content, this is why examinations are versioned and provided bilingually to provide a backup to learners.

Researchers suggest that there is an academic proficiency Level (similar to CALP) in mathematics. The cognitive academic mathematics proficiency (CAMP) is described as the threshold Level of proficiency that students must reach to effectively perform cognitively demanding mathematical tasks (Dawe, 1984). CAMP consists of cognitive knowledge (mathematical concepts and how they are applied) embedded in a language specifically structured to express that knowledge. The threshold Level for CAMP consists of proficiency in both the content of mathematics and in mathematics language (Cocking and Mestre, 1988). For analysis of the June Mathematics examination, we use CAMP to determine how much mathematics learners understand by analyzing performance in higher order questions and those questions that require calculations with dependence on linguistic features. The analysis of performance in the questions demanding linguistic comprehensibility should tell us if indeed the use of isiXhosa in the June Mathematics caused better achievement. In mathematics there are areas heavily reliant on linguistic features that need to be taken into considerations when teaching and assessing mathematics. These have been described by Morris (1955) as *syntactics, semantics,* and *pragmatics* of language. The complex interplay between syntactic, semantic, and pragmatic features that occurs when learners attempt to interpret mathematical rules and concepts indicate the many facets of the isiXhosa and English language used in mathematical problem solving. It also points out why it is essential to incorporate a language approach to the teaching of mathematics. The Grade 6 June Mathematics examinations is versioned into a bilingual question paper designed for MTbBE learners, this analysis should demonstrate whether this provided learners with multiple opportunities to understand the test. Performance in High to Medium order questions should tell us whether the bilingual test enabled MTbBE learners to perform open ended questions with ease comparable to the other group.

6.3. Progression and Promotion Requirements of the Department of Basic Education

6.3.1. Learning Areas in the Intermediate Phase: Grades 4-6

The Learning Areas in Grade 6 are Home Language **(HL)** isiXhosa for learners in Cofimvaba, First Additional Language **(FAL)** English in this case, Mathematics**,** Life Orientation **(LO),** Social Sciences **(SS: History and Geography)** and Natural Sciences and Technology **(NS Tech).** South African learners are assessed per term and progressed annually from Grades 1 -

8 based on the evidence of their performance throughout the year. The Grade 6 learners in this study would pass the June Examinations if they satisfied the following achievement requirements:

- At least a "moderate achievement" or Level 3 rating in Mathematics and in the HL,
- At least an "elementary achievement" or Level 2 rating in the FAL; and
- At least "moderate achievement" or Level 3 rating in THREE other Learning Areas.

All other learning areas are compulsory and the assessment of all six is compulsory. It is a requirement that they must also satisfy requirements for School-based Assessment (SBA) or Continuous Assessment (CA) (100% must be completed) in all the Learning Areas.

6.3.2. Fundamental Learning Areas and the 7 points scale

Language 1 (HL), Language 2 (FAL) and Mathematics are fundamental Learning Areas. A learner must pass them per term and in the final exams. Achievement is categorized on a 7 points scale.

Level number	Level percentage %	Level description
Level 1	29.99	Not Achieved
Level 2	30 – 39.99	Elementary Achievement
Level 3	40-49.99	Moderate Achievement
Level 4	50 – 59.99	Adequate Achievement
Level 5	60 – 69.99	Substantial Achievement
Level 6	70 – 79.99	Meritorious Achievement
Level 7	80 – 100	Outstanding Achievement

Table 6. 1: Departmental 7-Point scale

6.4 The purpose of analyzing the June Mathematics Exams

Mathematical assessments may produce inaccurate results if the language background of learners being tested is not factored into the test (Abedi, 2006). The June examinations for MTbBE is offered bilingually like in all other terms; to take care of the language factor. It is therefore important to investigate whether this treatment will produce the desired result. Assessment is dynamic. When teachers assess learning, two actions are at play: the action of the teacher and the action of the student. Teachers set the stage by building performance tasks,

and students attempt to complete these tasks. The effectiveness of assessment tasks bring to the spotlight other elements to be assessed: classroom conditions and the effectiveness of the performance tasks (Troutman and Lichtenberg, 2003). Of the various purposes for assessment in an education system viz. reporting progress, analyzing patterns of growth or modifying curriculum goals the most important for this study, was to investigate whether bilingual MTbBE testing did improve student learning of mathematics. This assessment Task was not set by me and not marked by me. In case studies; it is important to be an observer rather than an experimenter to increase the validity of results. My interest in data analysis of learner scripts for the June exams was not about how many answers were correct; it was more about how MTbBE learners went about solving mathematical problems utilizing language as a resource (Ruiz, 1984). The procedures learners followed in their effort to answer questions in the June Mathematics (the process area) and which language they used was more important to me (Landsberg et. al., 2005). Physical scientists avoid case studies using the argument that case studies cannot be generalized to fit a whole population like in scientific studies. This is understandable Pure scientists might be trying to prove or disprove a hypothesis, a case study might introduce new and unexpected results and might lead to research taking new directions (Shuttleworth, 2008). This analysis is intended to tell us something about MTbBE that will lead us to new research directions. This is an attempt to test the theory around MTbBE and learn from it even from one particular population of Cofimvaba. The test instrument was not designed for my research, it was designed to comply with Mid Term Curriculum requirements for Grade 6. The researcher to use the June Test as set by Provincial Subject Specialists as it was moderated by officials from 6 districts. It is important in case studies to take the position of an observer, to increase reliability. Murphy (2018) makes a statement that the best case studies highlight completed work supported by measurable results that show how a problem was solved. If you don't have results to share, you don't have a case study (Murphy, 2018).

6.5. The composition of the Grade 6 June Mathematics Paper 2018

The Grade 6 June 2018 Mathematics paper had a total mark of 75 comprised of 18 questions, each subdivided into sub-questions dealing with different skills and concepts under it.
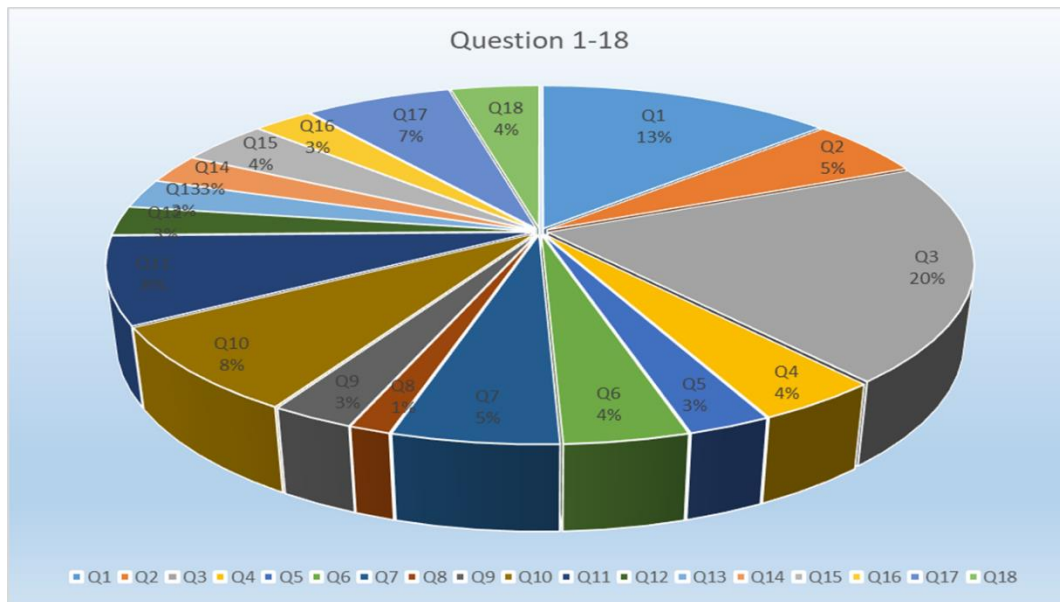
Figure 6.1: Composition of the Grade 6 June mathematics paper

Figure 6.1 It was a balanced mix of high, medium and low order questions; and a mixture of high, medium and low order questions.
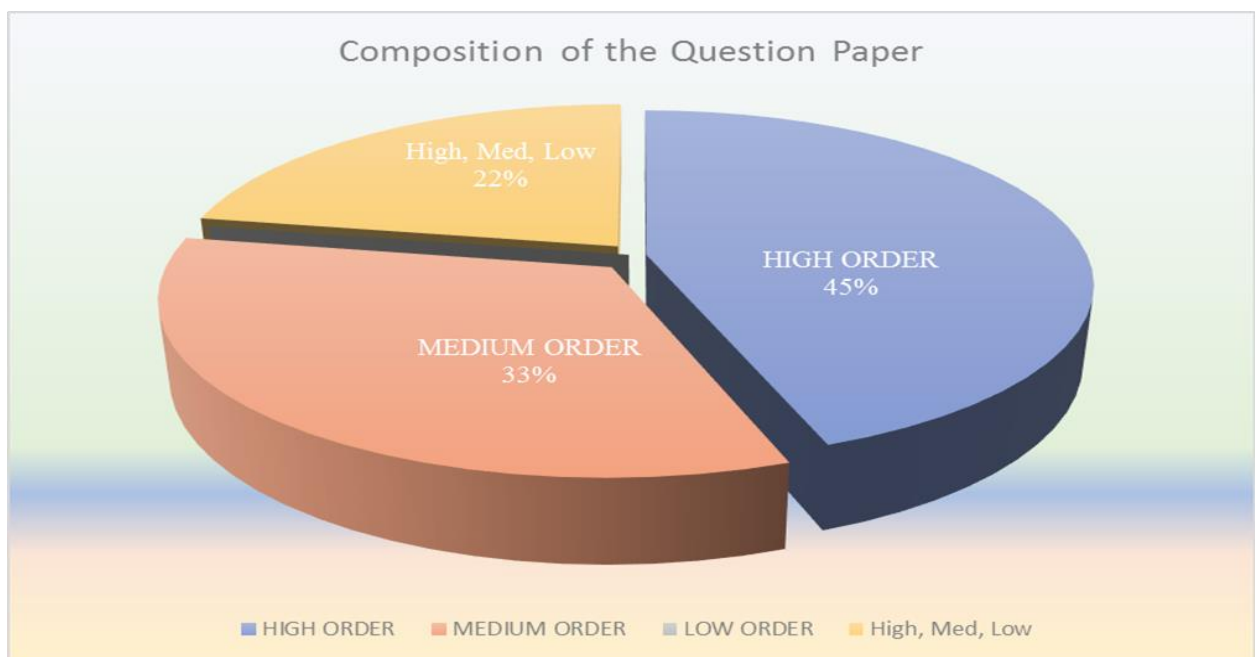

Figure 6.2: Composition of the Question Paper

6.6. Section a Question by Question Analysis

Question 1 is comprised mainly of Multiple Choice questions (MCQs). MCQs have been criticized by educators on two fronts (1) as incapable of truly measuring understanding and (2)

on changing the tone of learning. Heick (2013) argues that when a multiple-choice question is given to a student it hopes of measuring how well he or she understands something, it manufacturers the illusion of right and wrong, a binary condition that ignores the endlessly fluid nature of information (Heick, 2013). It is now accepted that well designed MCQs can be effective test in-depth understanding. Question 1 was entirely MCQs. When writing multiple choice items to test higher-order thinking, design questions that focus on higher Levels of cognition as defined by Bloom's taxonomy. A stem that presents a problem that requires application of course principles, analysis of a problem, or evaluation of alternatives is focused on higher-order thinking and thus tests students' ability to do such thinking. In constructing multiple choice items to test higher order thinking, it can also be helpful to design problems that require multilogical thinking, where multilogical thinking is defined as thinking that requires knowledge of more than one fact to logically and systematically apply concepts to a problem (Morrison and Free, 2001). The design of the Maths test satisfied the alternatives of MCQs that require a high Level of discrimination, therefore contributing to Question 1 as multiple choice items that test higher-order thinking. Question 1 could have been better formulated if the typical complex multiple choice items were avoided, in which some or all of the alternatives consist of different combinations of options. As with "all of the above" answers, a sophisticated test-taker can use partial knowledge to achieve a correct answer. It was redeemed by keeping the specific content of items independent of one another increasing the validity of the test.

6.6.1. Question 1

INSTRUCTION
Four possible answers are given in question 1 and only one is correct. Choose the correct one. **Iimpendulo ezine ezilindelekileyo zinikiwe kumbuzo 1 yaye inye kuphela echanekileyo. Khetha impendulo echanekileyo.**
1.1. What is the place value of the underlined digit in 734 <u>6</u>89 532? **Lithini ixabiso lendawo yedijithi enomgca ku 734 <u>6</u>89 532**
1.2 Which number is a prime number? **Leliphi inani?**
1. 3: what is the next number in the sequence/ **Leliphi inani eliyiprayim?**   0,17; 0,15; 0,13; 0,11; _____
1.4 Which of the following figures has more than one line of symmetry/ **Yeyiphi kwezi figa zilandelayo enomgca wesimetri ongaphezulu kwesinye?**
1.5 Sandra wrote the following pattern on the board/ **USandra ubhale iphatheni elandelayo ebhodini:**

3; 6; _____ ; ____; 48
Which numbers are missing/**Ngawaphi amanani angekhoyo?**
1.6 A regular pentagon has _____ sides.   **Iphentagoni eredyula inamacala a _____**
1.7 The number of hours in 3 days is/**Inani leeyure kwiintsuku ezi 3 ngu?**
1.8 Which number is the nearest to 13 800? **Leliphi inani elisondezwe ku 13 8000?**
1.9 Which percentage has the same value as 0,32? **Yeyiphi ipesenti enexabiso elifanayo njengo 0,32?**
1.10 A glass has a volume of 250 ml. How many glasses can a 2,5l bottle of cold drink contain?   **Iglasi inevolyum engu 250 ml. Zingaphi iiglasi ezinokuqulathwa yibhotileyesiselo engu 2,5l**

Table 6. 1`Question 1 Bilingual question paper

Question 1 had 10 sub-questions covering the following concepts and skills: Place Value, Prime Numbers, Extending numeric patterns (decimal fractions), Identifying 2-D shapes, Time conversions, Estimation, Comparing fractions and Problem solving with each having a range of Multiple Choice questions with varying requirements for higher order thinking questions.
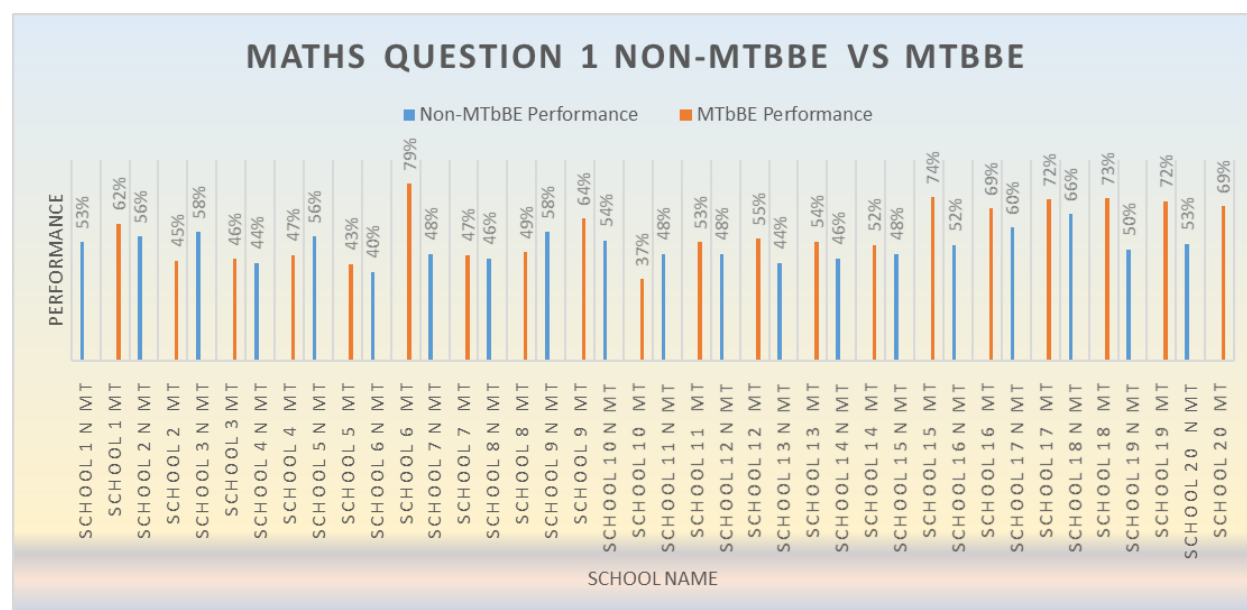
Figure 6.3: Qouestion 1 comparision between MTbBE and non-MTbBE

6.6.1.1. Comparative Analysis

Using the departmental 7-point scale of achievement, none of the MTbBE and non-MTbBE cohorts were on Level 1 (0-29%). 4 MTBBE schools achieved Level 2 (30-39%), no non-MTbBE school was on Level 2. There were 2 MTbBE schools on Level 2 (40-49%) and 9 non-MTbBE schools on this Level. The real difference is on Level 4; this Level demonstrates nder

study School 6 MT did extremely well on this question with an average of 96%, followed by School 1 MT with 82% and school 9 MT scored the third with an average of 80%. Both School 19 MT and School 20 MT received the lowest marks on this test item as they both scored less than 35%. Using the departmental 7 points scale, none of the sampled MTbBE schools would have failed the question as none of them achieved Level 1.

Out of the 20 Non-MTBBE schools, 11 of them (55%) managed to get an average of 50% and above. The highest scorer was School 17 N MT and School 18 N MT both with an average of 60% whereas School 6 N MT was the lowest with an average of 40%.

6.6.2. Question 2

2.1. From a group of numbers below, choose a number divisible by 5**:**   116   140   122   144   **Kwiqela labantwana elingentla, khetha inani elohluleka ngo 5.**
2.2. Arrange the numbers below in descending order   **Cwangcisa amanani angezantsi nge-oda eyehlayo**
2.3 Insert the correct relationship sign/**Fakela uphawu lolwalamano oluchanekileyo** $>$; $<$; $=$ 100% ☐ 2 $\frac{1}{4}$ ☐ $\frac{1}{5}$

Table 6.2: Question 2

The skills covered by Question 2 were identifying multiples, ordering 5-digit numbers and comparing fractions. It fell into the category of a mix of High, medium and low order Mathematics question 2 was subdivided into 3 sections.
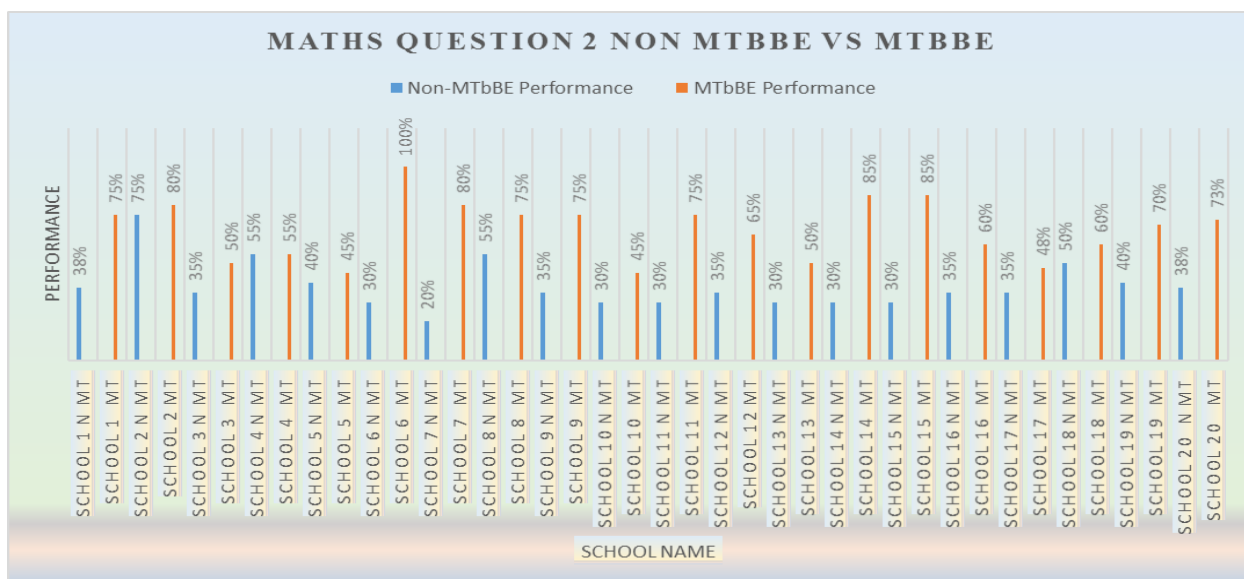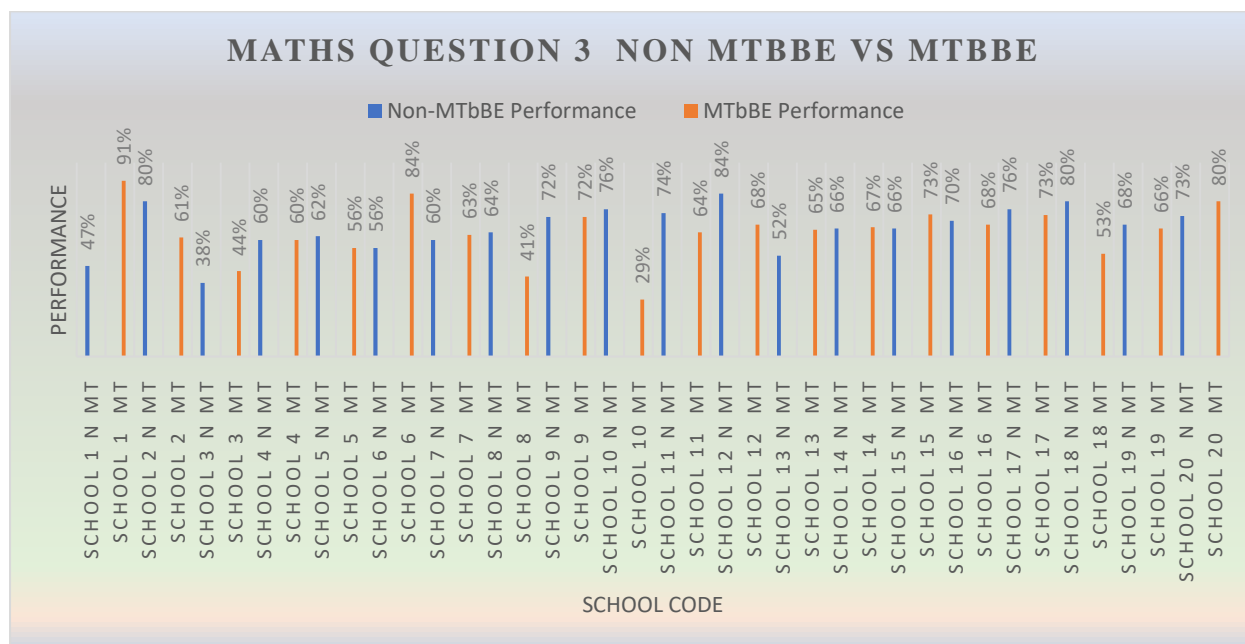
Figure 6.4: Question 2 Comparision between MTbBE and non-MTbBE

6.6.2.1. Comparative Analysis

According to the departmental 7-point scale of achievement, 1 non-MTbbE school was sitting at Level 1 (0-29%) whilst none of the MTbBE schools achieved Level 1, 13 non-MTbBE schools achieved Level 2 (30-39%) none of MTbBE schools achieved Level 2, in both cohorts 2 schools managed to achieve Level 3 (40-49%). It is imperative to note that 3 schools which translates to 15% of MTbBE schools achieved level 4(50-59%), again 15% of the MTbBE schools managed to achieve level 5 (60-69%). In addition, 6 MTbBE schools i.e. 30% of the schools in that cohort achieved Level 6 (70-79%), also 5 MTbBE schools achieved Level 7 (80-100%). This entails that 85% of the MTbBE schools managed to achieve level 4 (50-59%) and above with the majority of them achieving Level 6 (70-79%). On this question MTbBE schools outweighed non-MTbBE schools since only 20% of non-MTbBE schools managed to reach Level 4(50-59%) and above. The majority of non-MTbBE schools were sitting on Level 2 (30-39%) which is a fail.

5.6.3. Question 3

Addition to at least 5-digit numbers, subtraction to at least 5- digit numbers, multiplication of 4 by 2 digits, division of 4 by 2 digits, Subtraction of decimal fractions from whole numbers, addition and subtraction of mixed numbers and additional of decimal fractions.
3. Simplify the following/ **Yenza okulandelayo lube kwimo elula**
3.1. 32 385 + 9 456 + 4 710
3.2. 89 066 − 49 625
3.3. 3 604 × 34

$9\,648 \div 37$
$8 - 3,75$
$5\dfrac{3}{7} \;+\; 1\dfrac{4}{7} \;-\; 2\dfrac{2}{7}$
$4,35 \;+\; 6,37$

Table 6.3: Question 3

Question 3 was a high order question with a maximum total of 15marks and covered seven aspects which includes, In this question, most of the schools did well and except only 3 schools that failed to score an average of 50%. Despite this setback, the majority of schools did well in this question. School 1 MT had an average of 91%, followed by School 6 MT that had an average of 84% and School 15 MT was the 3rd highest with an average of 73%.

Figure 6.5: Question 3 Comparision between MTbBE and non-MTbBE

6.6.3.1. Comparative Analysis

Referring to the departmental 7-point scale of achievement, 5 schools in the MTbBE cohort were on Level 1 (0-29%) whereas on the same question on the non-MTbBE, none of the schools were sitting on Level 1. None of the MTbBE schools were sitting on Level 2 (30-39) whereas only 1 school from the non-MTbBE managed to achieve Level 2. On Level 3 (40-49%), 2 MTbBE schools achieved this Level on the other hand, only 1 school managed to achieve this Level on the non-MTbBE cohort. 10% of MTbBE schools achieved level 4 (50-59%), more so, 9 schools which translate to 45% of MTbBE schools achieved Level 5(60-69). 15% of

MTbBE schools managed Level 6(70-79%) and also 15% of the schools managed to attain Level 7 (80-100), 90% of non-MTbBE schools managed to achieve level 4 and above where as 80% percent of the MTbBE schools managed to achieve level 4 and above. The majority at 45% of MTbBE schools achieved Level 5 (60-69%) on the other hand, the majority at 35% non-MTbBE schools were sitting at level 5 (60-69%) followed by 30% non-MTbBE schools that managed to achieve Level 6 (70-79%).

6.5.4. Question Four

Concept/ skill to be tested: Problem solving involving addition; making sense of word sums.
There are 535 boys in the camp. An equal number of girls join them in the camp. How many learners at the camp? **Kukho amakhwenkwe ayi 535 enkampini. Inani elilinganayo lamantombazana libajoyinile kwinkampu. Bangaphi abafundi abasenkampini?**

Table 6.4: Question 4

Question 4 comprised of a concepts related and the total marks for this question were 2. This was a high order question. Out of the 20 schools 14 of them managed to score beyond 50% but their performance on this question was not satisfactory as no school happened to score above 67%. Only three schools managed to school 67% and those were School 9MT, School 12 MT and School 17 MT. On the other hand, 5 schools scored an average of 40% and those were School 1MT, School 5 MT, School 10 MT, School 13 MT and School 16 MT. It is worth noting that School 19 MT scored the least with an average of 33% on this question.
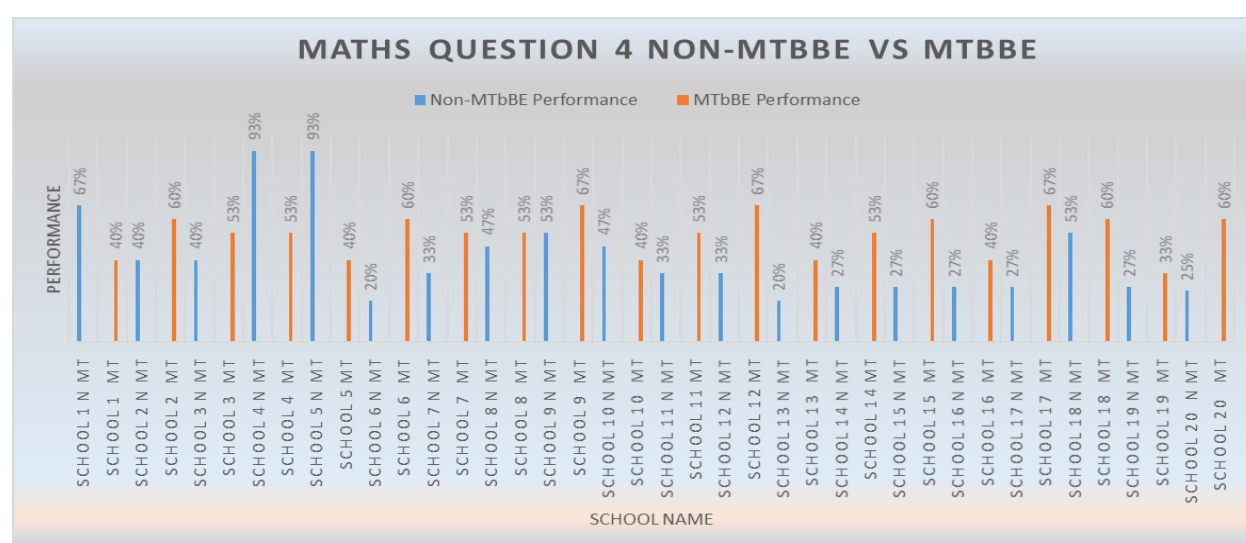
Figure 6.6: Comparison between MTbBE and non MTbBE

6.6.4.1. Comparative Analysis

Making use of the departmental 7-point scale of achievement, none of the MTbBE schools managed to achieve Level 1 (0-29%) whereas 8 non-MTbBE schools achieved Level 1(0-29%). In addition, on Level 2 (30-39%) in MTbBE cohort only 1 school managed to achieve this Level and on non-MTbBE cohort 1 school managed to score Level 2 as well. The were 5 MTbBE schools on Level 3 (40-49%) and 4 Non-MTbBE on this Level too. 6 MTbBE schools managed to achieve Level 4(50-59%), In addition, 8 schools that translates to 40% of the MTbBE schools managed to achieve Level 5(60-69%). The majority of the schools from the MTbBE cohort were sitting on Level 5 (60-69). It can be noted from the graphs above that 70% of the MTbBE schools achieved Level 4(50-59%) and above which is a significant percentage when comparing it to 25% of non-MTbBE schools that managed to achieve the same Level.

6.6.5. Question Five

Concept/ skill to be tested: Problem solving involving ratio.
Kenny must decide whether she wants half of 40 sweets or a quarter of 180 sweets. Which one must she choose to get the most sweets? **UKenny [umele] (mak)agqibe ukuba ufuna isiqingatha seswiti eziyi 40 okanye ikota yeeswiti eziyi 180. Yeyiphi amakayikhethe ukuze afumane iiswiti ezininzi?**

Table 6.5: Question 5

Question 5 was a high order question focusing on problem solving involving ratio and had a total mark of 2. There were differences in the pass rates relating to this question. School 15 MT that has a qualified maths teacher scored the highest with 90% and it was followed by 3 schools that had 80% namely School 6 MT, School 17 MT and School 20 MT. Of these three 2 schools did not have qualified mathematics teacher. However, School 8 MT was the lowest with an average of 0% and it should be noted that this school does have a qualified mathematics teacher.
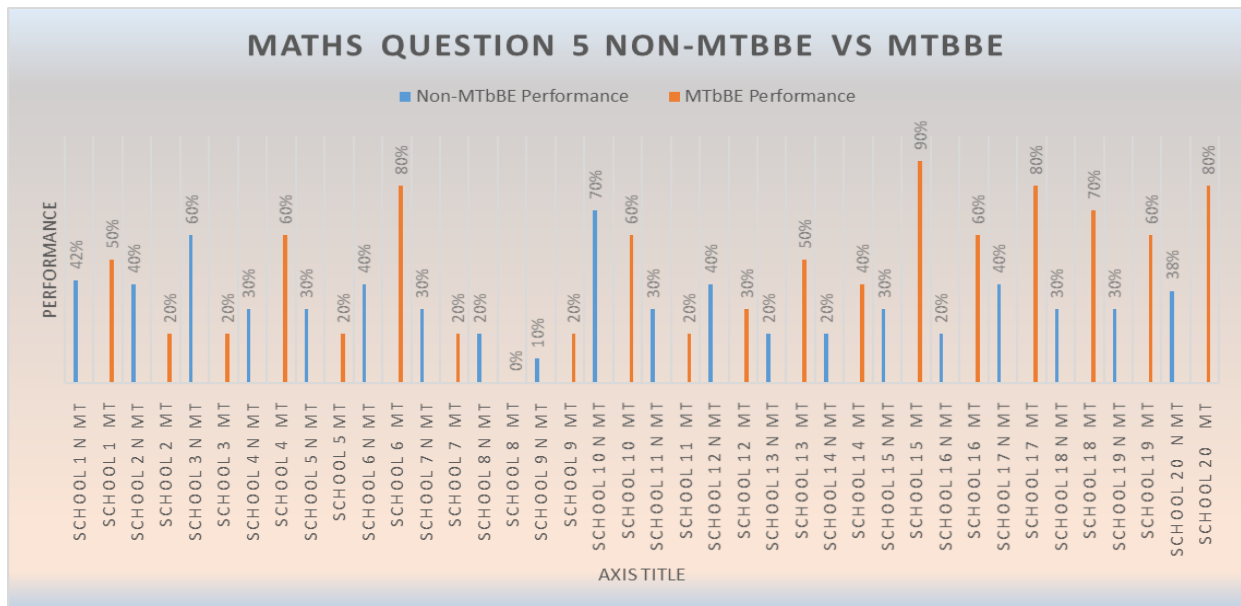
Figure 6.7: Comparison between MTbBE and non-MTbBE

6.6.5.1. Comparative Analysis

From the above, using the 7-pont scale of achievement, 7 MTbBE school were on Level 1 (0-29%), 5 non-MTbBE schools were on this Level as well. Only 1 MTbBE school managed to achieve Level 2(30-39%) and 8 non-MTbBE schools were on this Level. There was also 1 school from the MTbBE cohort that managed to achieve Level 3 (40-49%) whereas on the non-MTbBE cohort, 5 schools were on this Level. 10% of the MTbBE schools achieved Level 4(50-59%), 20% of the MTbBE schools managed to achieve Level 5(60-69%) also 20% of the MTbBE schools managed to achieve Level 7(80-100%). The majority of the in the MTbBE cohort were sitting on Level 1 (0-29%). Despite this 55% of the MTbBE schools managed to achieve Level 4 (50-59%) and above. On the other hand, only 10% of the non-MTbBE schools achieved Level 1 and above on this question.

6.6.6. Question Six

Concept/ skill to be tested: Problem solving in context involving calculation as a concept.
Ammy wants to buy a second hand car for R18 000. He has R14 500 in his savings account. **UAmmy ufuna ukuthenga isekeni lemoto nge R18 000. Une R14 500 kwi-akhawunti yolondolozo.**
How much does he still need to buy the car? **Usafuna malini ukuze athenge imoto?**
His mother will give him R2 300. How much does he still need? **Umama wakhe uza kumnika I iR2 300. Usafuna malini?**
The car needs 4 new tyres and a new spare wheel at the cost of R650 each. How much will the tyres cost him? **Imoto ifuna amavili amatsha ama- 4 kunye nelinye elisisipere ngexabiso eliyi R650 Lilinye. Ayakuxabisa ntoni amavili ewonke?**

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Table 6.6: Question 6

Question 6 as a high order question constituted problem solving in context involving calculation as a concept/skill with a total of 3 marks. On this question the majority of schools failed to get an average beyond 50%, only 8 schools managed to score above 50% and school 17 MT had an average of 100% followed by both school 18 MT and school 20 MT with an average of 93%. 4 schools failed to score an average beyond 30% and these are school 10 MT 27%, school 11 MT 27%, school 13 MT 27% and the lowest was school 14 MT with 20%.
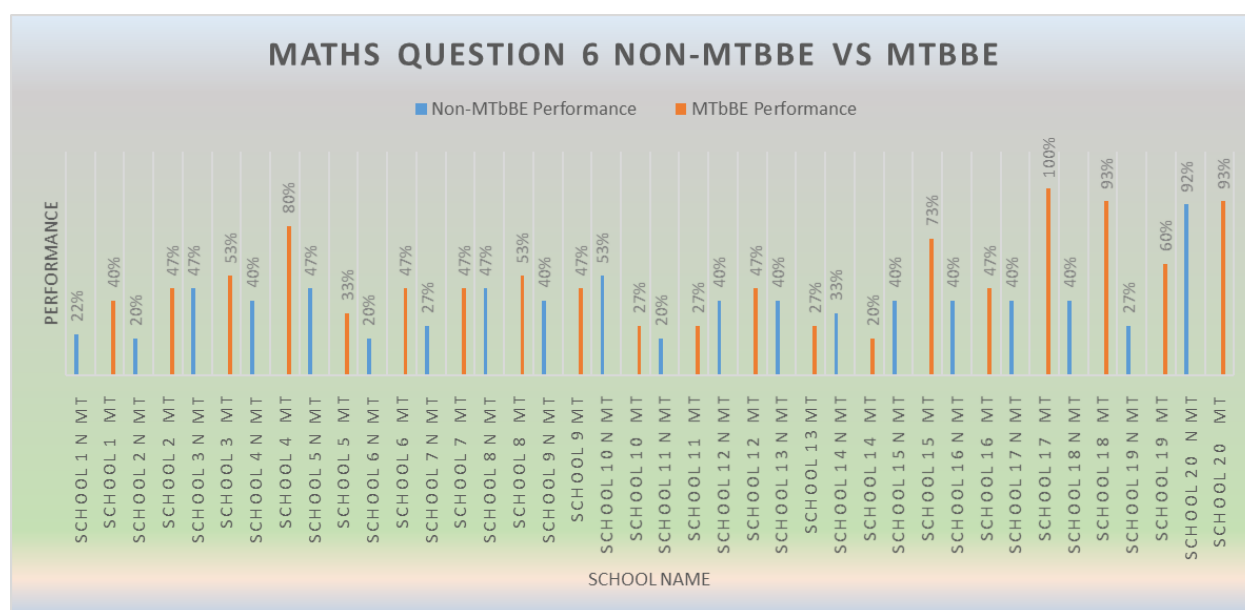
Figure 6.8: Comparison between MTbBE and non-MTbBE

6.6.6.1. Comparative Analysis

On this question 4 schools from the MTbBE cohort achieved Level 1 (0-29%), whereas 6 non-MTbBE schools were also sitting on this Level. 1 school from each cohort was sitting on level 2 (30-39%). There were only 3 schools that achieved Level 3 (40-49%) where as a pool of schools thus 11 schools from the non-MTbBE cohort were sitting on this Level. 10% of the schools from the MTbBE group managed to achieve level 4(50-50%), 5% achieved level 5 (60-69%), 5% of MTbBE schools achieved level 6(70-79%) and 20% MTbBE schools managed to achieve level 7(80-100%). This means that 40% of the MTbBE schools managed to achieve Level 4 (50-59%) and above whereas only 5% of the nopn-MTbBE schools managed to achieve Level 4 50-59% and above.

6.6.7. Question Seven

Concept/ skill to be tested are number representation
Each picture below represents a number. By adding the numbers, you will find the totals in the boxes. Calculate the rest of the totals and fill in the empty boxes. **Umfanekiso ngamnye ngezantsi umele inani. Ngokudibanisa amanani uyakufumana iitotali kwiibhokisi. Bala intsalela yeetotali uze ugcwalisele iibhokisi ezingenanto.**

		11	14
4	2	4	
2		2	4
5	5	5	

15

13

Sipho is paid R155 per hour. How much will he get paid for working $6\frac{1}{2}$ hours?

USipho ubhatalwa i R155 ngeyure. Uyakubhatalwa malini ngokusebenza iiyure eziyi $6\frac{1}{2}$?

Table 6.7: Question 7

Question 7 was a medium order question and covered number representation as a concept with a total mark of 4. 65% of the schools managed to score 50% and above and School 7 MT had the highest average of 100%. This was followed by school 4 MT and school 8 MT with 95% and 90% respectively. However, on the other hand school 17 MT and School 20 MT were the lowest with an average of 20% each. It is of paramount importance to note that on this question all the 4 highest schools all had qualified mathematics educators and the schools that failed to score above 50% all have non-qualified mathematic educators with the exception of school 20 MT.
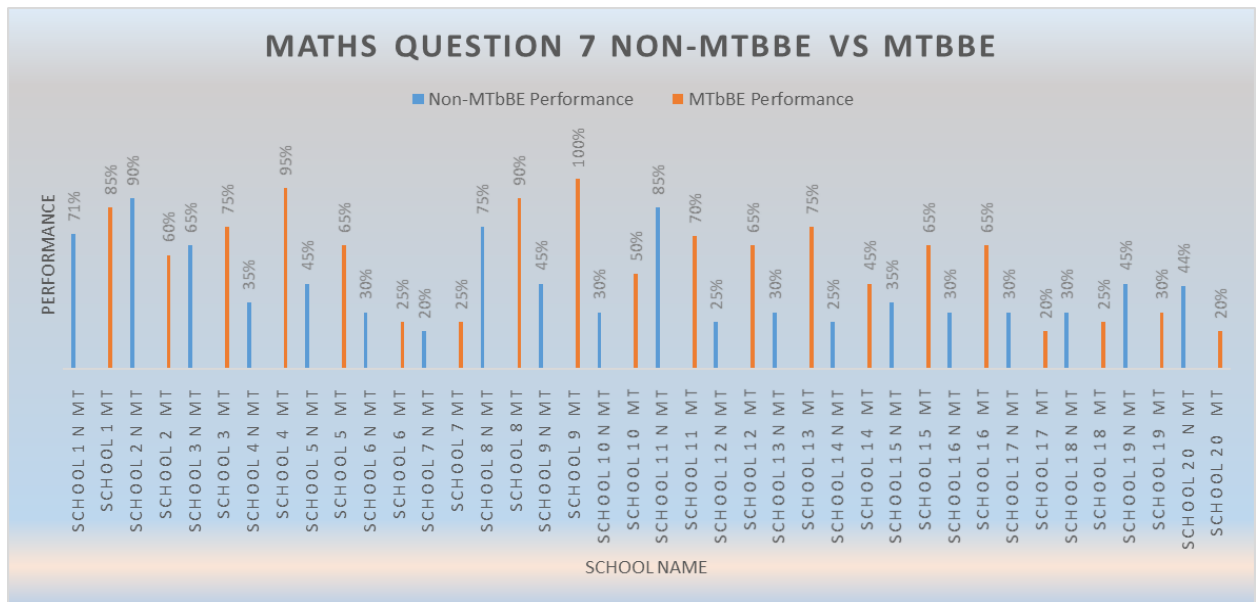
Figure 6.9: Comparison between MTbBE and non-MTbBE

6.6.7.1. Comparative Analysis

On question 7, 5 schools from the MTbBE cohort achieved Level 1 (0-29%), this number was higher that the number of schools on the same level for non-MTbBE cohort where 3 schools were on this level. There was only 1 school from the MTbBE cohort that managed to achieve level 2 (30-39%) and 8 non-MTbBE schools were sitting on this level. In addition, on Level 3 (40-49%) 1 school was from the MTbBE cohort whereas 4 schools were from the non-MTbBE cohort. Only 5% of the MTbBE schools managed to attain Level 4 (50-59%), 25% of the schools from the same cohort managed to achieved Level 5(60-69%) and 15% of MTbBe schools achieved Level 6(70-79%). It is worth noting that 20% of the schools from this cohort attained level 7(80-100%), from the above it is clearly that 65% of the MTbBE schools managed to achieve Level 4(50-50%) and above with the majority of the schools achieving Level 5(60-69%). On the other hand, only 25% of non-MTbBE schools managed to achieve level 4(50-59%) and above.

6.6.8. Question Eight

Concept/ skill to be tested: Problem solving in context involving calculations
Ammy wants to buy a second hand car for R18 000. He has R14 500 in his savings account.
UAmmy ufuna ukuthenga isekeni lemoto nge R18 000. Une R14 500 kwi-akhawunti yolondolozo.
How much does he still need to buy the car?
Usafuna malini ukuze athenge imoto?
His mother will give him R2 300. How much does he still need?

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Umama wakhe uza kumnika I iR2 300. Usafuna malini?
The car needs 4 new tyres and a new spare wheel at the cost of R650 each. How much will the tyres cost him? **Imoto ifuna amavili amatsha ama- 4 kunye nelinye elisisipere ngexabiso eliyi R650 Lilinye. Ayakuxabisa ntoni amavili ewonke?**

Table 6.8: Question 8

Question 8 proved to be the most challenging question in the mathematics paper. It was a high order question and constituted problem solving in context involving calculations with a total mark of 2. Only 5 school out of 20 managed to School 50% and above. 80 % of the schools that scored above 50% does not have qualified mathematics educators. School 18 MT had an average of 90% followed by School 20 MT with an average of 80% and school 17 MT with 70%. On the other side, School 5 MT and School 7 MT had an average of 0% each.
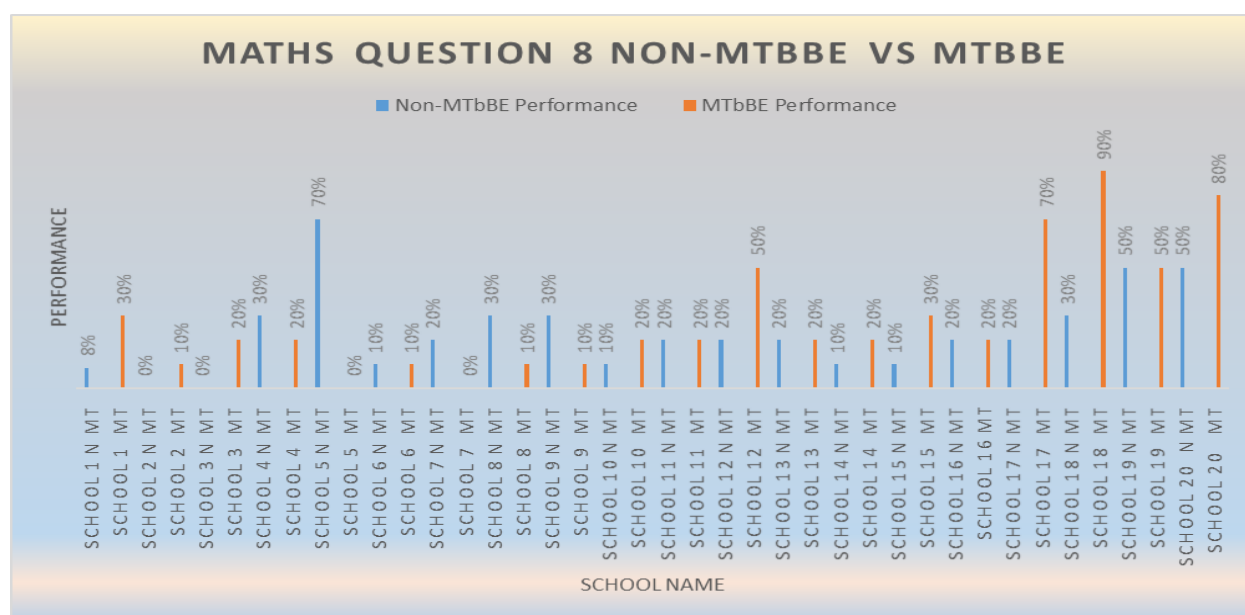

Figure 6.10: Question 8 Comparison between MTbBE and non-MTbBE

6.6.8.1. Comparative Analysis

In line with the department 7-point scale of achievement, on question 8, 7 schools from the MTbBE cohort achieved Level 1 (0-29) and this number was 6 schools lower that the number of schools sitting on this Level on the non-MTbBE cohort. There were 2 schools that achieved Level 2 (30-39%) from the MTbBE against 4 from the non-MTbBE cohort. None of the MTbBE and non-MTbBE cohorts were on Level 3 (40-49%). It is worthy noting that 10% of the MTbBE schools managed to achieve Level 4(50-59%), none of the schools were sitting on

Level 5(60-69%), 5% of the schools were sitting on Level 6(70-79%) and 10% of the schools from this cohort were sitting on Level 7 (80-100%). 25% of the schools from the MTbBE cohort managed to achieve Level 4(50-59%) and the majority of the schools achieved Level 1 (0-29%). This question was failed not only by MTbBE schools but with schools from both cohorts and this can be attributed to the fact that the question involved, Problem solving in context involving calculations.

6.6.9. Question Nine

focused on input and output value as a concept
Fill in the missing input and output values in the flow diagram below. **Fakela ixabiso legalelo nesiphumo kwiflow dayagramu engezantsi.**

Table 6.9: Question 9

Question 9 focused on input and output value as a concept carryied a total mark of 2 marks and was a medium order question. 45% of the schools scored above 50% with School 18 MT as the highest with an average of 93%, followed by School 20 MT with 87%. Schools 11 MT, 13 MT and 14 MT had the lowest averages with 20% and the majority of these questions had an average do not have qualified mathematics educators.
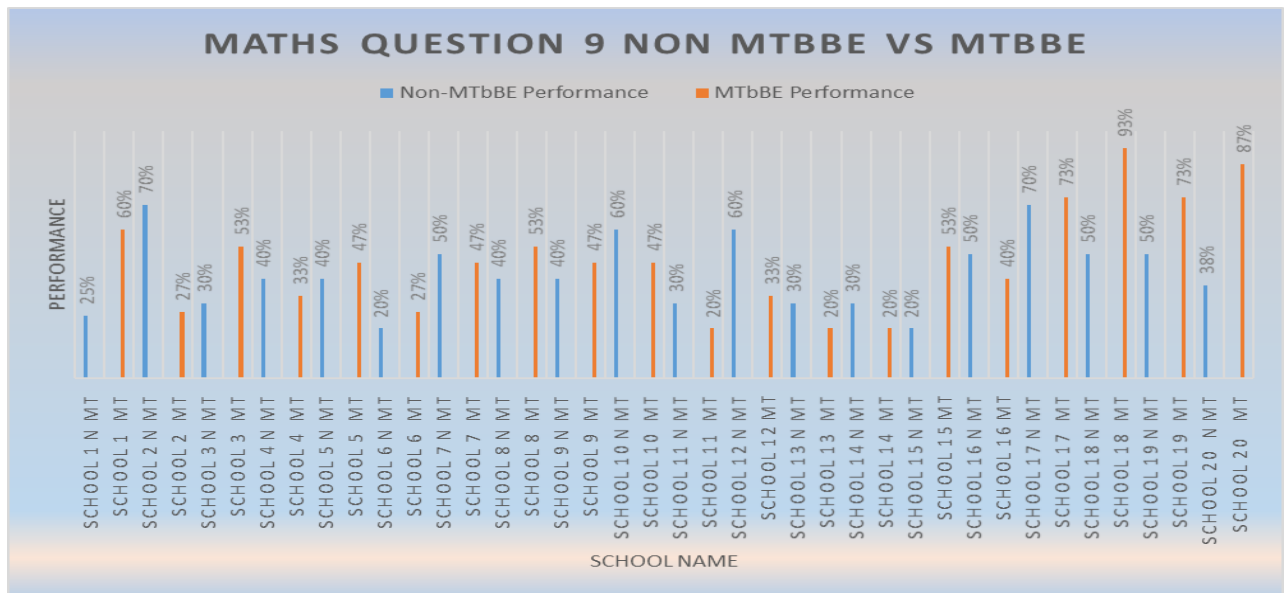
Figure 6.11: Question 9 Comparison between MTbBE and non-MTbBE

6.6.9.1. Comparative Analysis

On question 9, making use of the 7-point scale of achievement, 5 schools from the MTbBE cohort achieved Level 1(0-29%) against 3 schools that achieved this Level from the non-MTbBE cohort. The tables turned on schools that achieved Level 2 (30-39) as 2 MTbBE schools were sitting at this Level against 5 schools that were sitting at this Level from the non-MTbBE cohort. There were 5 schools that achieved Level 3 whereas 4 non-MTbBE schools were at this Level. From the MTbBE cohort 15% of the schools achieved Level 4(50-59%), 5% of the schools achieved Level 5(60-69%), 10% achieved Level 6 (70-79%) and also 10% achieved Level 7(80-90%). 40% of MTbBE schools achieved Level 4(50-59%) and above, the majority of the schools managed to attain Level 3 (40-49%).

6.6.10. Question Ten

Extending geometric patterns, investigate and extend patterns represented in a table and writing a rule in own words
Look at the pattern below and draw stage 4. **Jonga le patheni ingezantsi uze uzobe isigaba sesi-4.**
 Stage 1 Stage 2 Stage 3

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Table 6.9: Question 10

As a medium order question, question 10 focused on 3 main aspects namely Extending geometric patterns, investigate and extend patterns represented in a table and writing a rule in own words and it carried a total of 5 marks. 35% of the schools got an average beyond 50% with School 18 MT being the highest with 92% followed by School 6MT and School 17 MT both having 88%. All the top 3 schools on this question do not have qualified mathematics educators. School 10 MT had the lowest average with 12%.
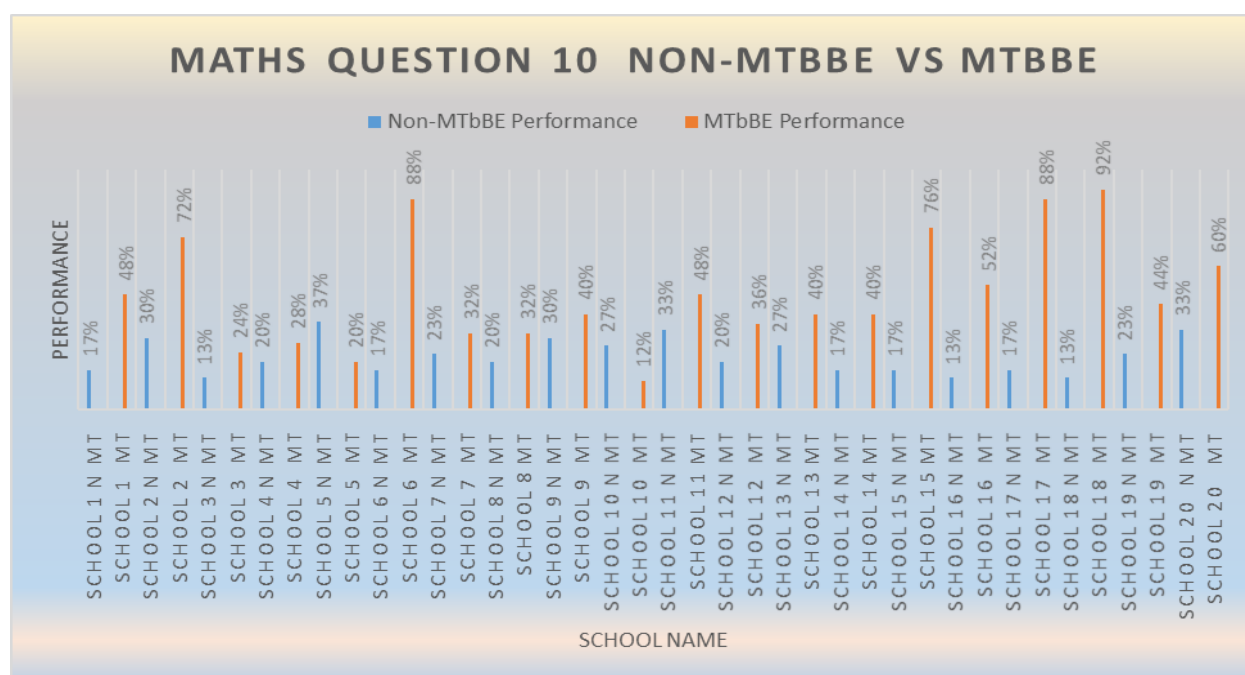

Figure 6.12 : Question 10 Comparison between MTbBE and non-MTbBE

6.6.10.1. Comparative Analysis

From the departmental 7-point scale of achievement, only 3 schools from the MTbBE cohort achieved Level 1 (0-29%) on the other hand 15 schools from the non-MTbBE schools achieved Level 1. 3 MTbBE schools were sitting on Level 2 (30-39%) were as 5 schools were sitting on this Level from the non-MTbBE cohort. 5% of MTbBE schools managed to attain level 4(50-59%), also another 5% of the schools in the same group achieved Level 5(60-69%). More so, 10% of the MTbBE were sitting on Level 6 (70-79%) and 15% of the schools in this cohort managed to achieve level 7(80-100). This entails that 35% of MTbBE school managed to achieve Level 4 and above. In line with the above the majority of the schools at 35% were on Level 3(40-49%).
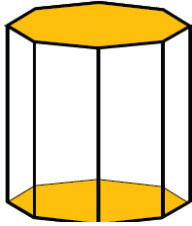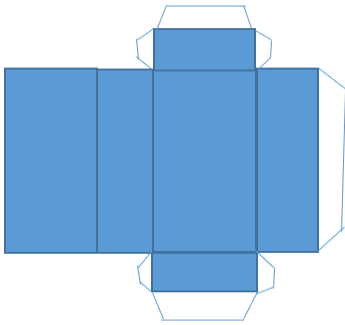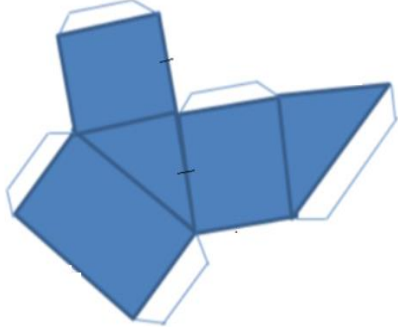
6.6.11. Question Eleven

Properties of 3-D objects
Complete the table below/**Gqibezela itheyibhule engezantsi**:

11.1

SHAPE/ **IMILO**	NAME OF OBJECT/ **IGAMA LE-OBJEKTHI**	NUMBER OF FACES**/ INANI LEEMBU-SO**	NUMBER OF VERTICES/ **INANI LEEVETHEKSI**	NUMBER OF EDGES/ **INANI LEMIPHE-THO**
	_____	_____	_____	_____

11.2 Look at the nets in box A and B below and answer the questions that follow.

Jonga iinethi kwibhokisi A no B ngezantsi uze uphendule imibuzo elandelayo.

Box A

Box B

Which 3-D object can be folded with the net in
Yeyiphi i-objekthi e3-D enokusongwa ngenethi

11.2. 1 Box A ?

11.2. 2 Box B?

Table 6.11: Question 11

Question 11 was a medium order question allocated 6 marks. Its main focus was on Properties of 3-D objects, only 20% of the schools managed to score beyond 50% and these include School 6 MT with 73%, School 9 MT with 70% and School 15 MT with 63%. However, School

3 MT, School 5 MT and School 18 MT scored the lowest with an average of 20% each on this question.
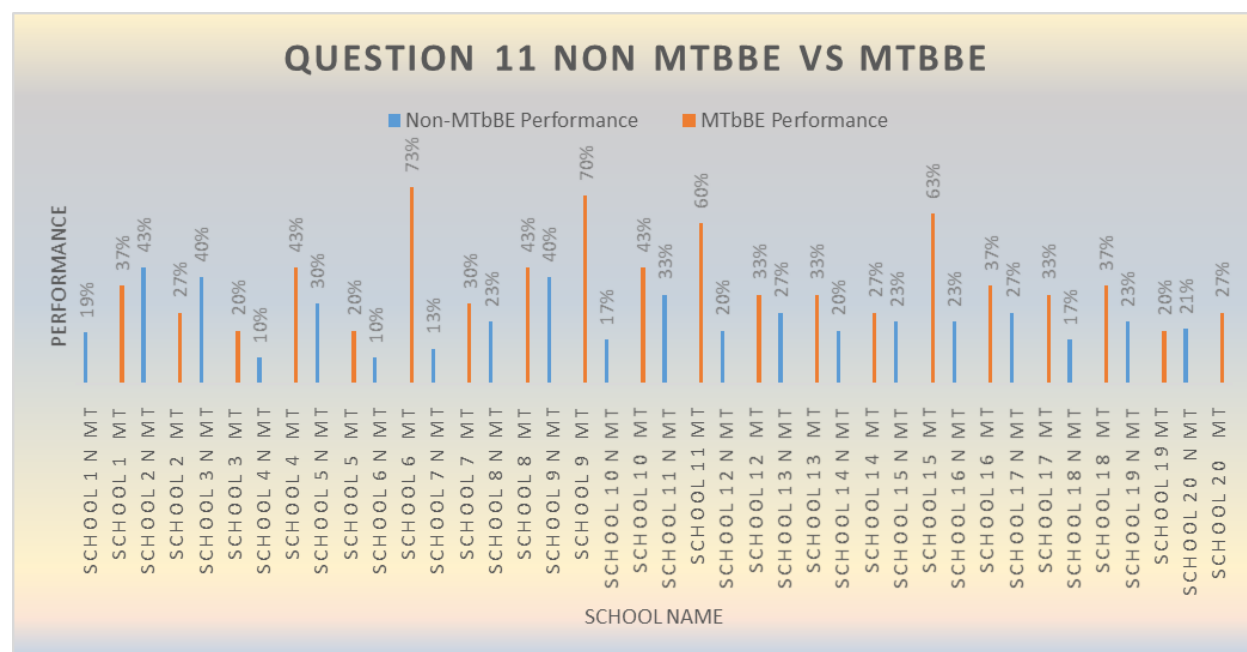

Figure 6.13: Question 11 Comparison between MTbBE and non-MTbbe

6.6.11.1. Comparative Analysis

Question 11 proved to be problematic most especially for the non-MTbBE group as 15 schools from this cohort managed to achieve Level 1 (0-29%) and this number was 9 schools more than the 6 schools that achieved the same level. There were 7 schools from the MTbBE cohort that managed to achieve Level 2 (30-39%) whereas 2 schools from the non-MTbBE cohort managed achieve this level. In both cohorts MTbBE and non-MTbBE, 3 schools from each cohort managed to achieve level 3. The highest performing school was School 6 MT with an average of 73%. 10% of schools from the MTbBE cohort managed to achieve Level 5(60-69%), none of the schools were sitting on Level 4(50-59%). In addition, 10% of the schools in the MTbBE cohort attained Level 6 (70-79%) this translates to 20% of the school attaining Level 4(50-59%) and above. On the other hand, none of the non-MTbBE schools attained Level 4(50-59%). The majority of the schools from the MTbBE cohort achieved Level 3(40-49%).

6.6.12. Question *Twelve*

What is the difference between a sphere and a cone?
Yintoni umahluko phakathi?

Table 6.12: Question 12

Question 12 was a high order question with a maximum mark of 2. 40% of the schools managed to score an average of 50% and above School 6 MT had the highest average of 100% followed by School 17 MT with an average of 80%. On the other hand, School 5 MT and School 7 MT with both scoring of 0%. It is worth noting that all the top schools on this question do not have qualified mathematics educators.
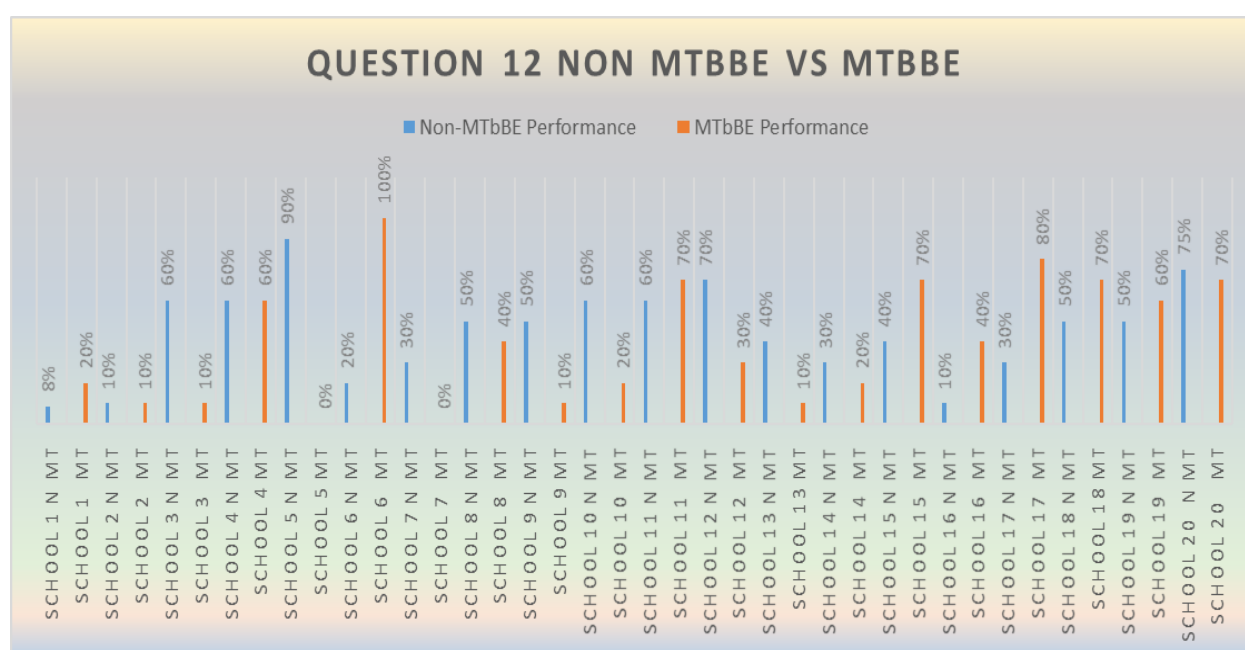

Figure 6.14: Question 12 Comparison between MTbBE and non-MTbBE

6.6.12.1. Comparative Analysis

Question 12 showed an improvement performance in both MTBbE and non- MTbBE schools groups as 5 schools from the MTbBE cohort managed to achieve Level 1 (0-29%) and this number was 1 school more than the 4 schools that achieved the same level in non- MTbBE group. There were 3 schools from the non- MTBbE cohort that managed to achieve Level 2 (30-39%) whereas 1 school from the MTbBE cohort managed to achieve this level. In both cohorts MTbBE and non-MTbBE, 2 schools from each cohort managed to achieve level 3. None of the schools from MTbBE cohort achieved Level 4(50-59%), 10% of the school attained Level 5(60-69%), 20% of the schools from this cohort managed to achieve Level 6(70-

79%). In addition, 10% of MTbBE schools achieved Level 7(80-100%), this means that 40% of the MTbBE schools achieved Level 4(50-50%) and above. The majority of the schools were sitting on Level 1(0-29%) at 45%. On the other hand 55% of non-MTbBE schools managed to achieve Level 4(50-59%) and above
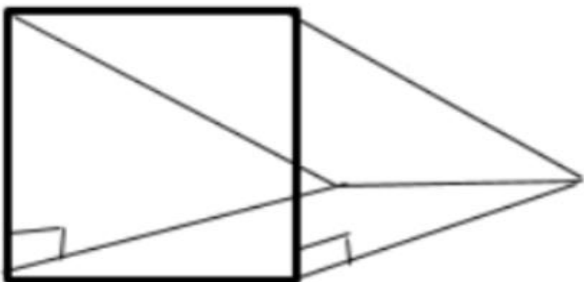
6.6.13. Question Thirteen

Properties of 2D and 3-D objects.
13. Name the 2-D shapes and the number of each shape that form the 3-D object below. /**Xela iimilo ze2-D nenani lemilo nganye eyenza le objekthi engu 3-D ngezantsi.**

| Copy the table below to answer the question/ **Kopa itheybhule engezantsi ukuphendula imibuzo**. |

Name of 2-D shape/ Igama lemilo engu2-D	Number/ Inani

Table 6.13: Question 13

Question 13 as a medium order question constituted of 4 marks and it focused on Properties of 2D and 3-D objects. Most schools did fairly well on this question as 75% of the schools managed to score an average of 50% and above. School 10 MT, School 18 MT and School 20 MT all scored an average of 80% each and School 4 MT had the lowest average of 10%.
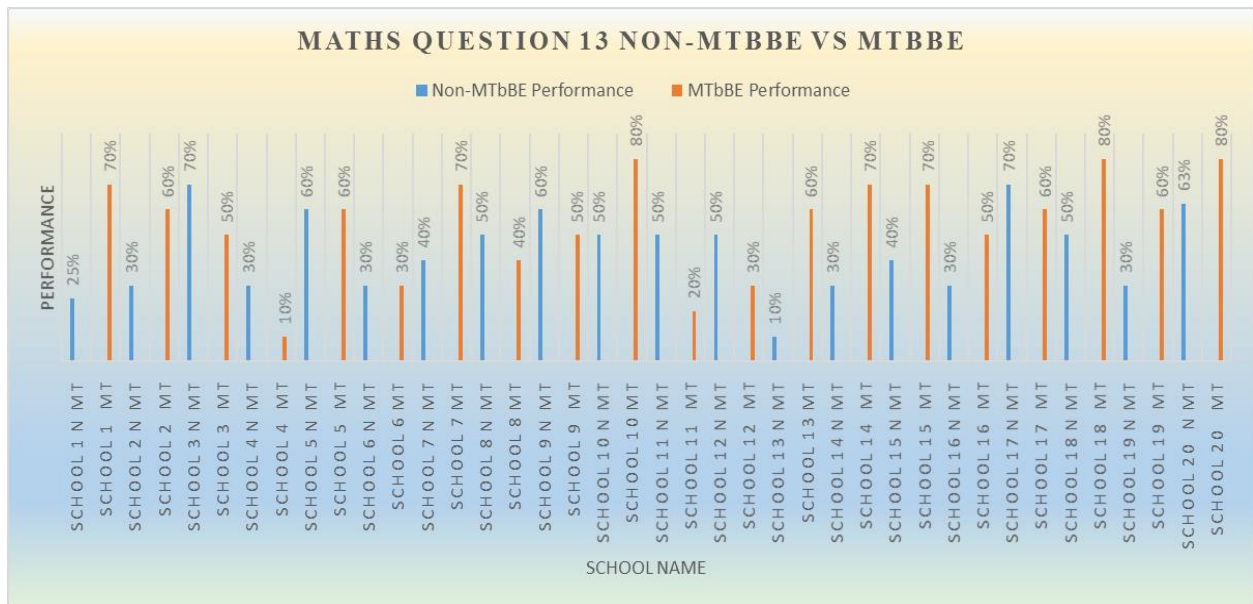
Figure 6.15: Question 13 Comparison between MTbBE and non-MTbBE.

6.6.13.1. Comparative Analysis

Question 13, showed that there are 2 schools in both non- MTbBE and MTbBE cohort who managed to achieve Level 1 (0-29%). In non- MTbBE group 6 schools managed to accomplish level 2(30-39%) this number was 4 schools more than the 2 schools that achieved the same Level in the MTbBE cohort. Only 1 MTbBE school managed to achieve level 3(40-49%). 15% of MTbBE schools managed to achieve Level 4(50-59%), 25% of the schools attained Level 5(60-69%), 25% of MTbBE schools achieved Level 6(70-79%) and 15% of the schools attained Level 7(80-100%). This translates to 75% MTbBE schools attaining Level 4(50-59%) and above. On the other hand, 45% of the non-MTbBE schools managed to achieve Level 4(50-59%) and above, the majority of MTbBE schools were sitting at Level 5.

6.6.14. Question Fourteen

Concept / skill covered was Time.
The two trains (train A and train B) use the same route, stop at different stations at different times along the Gauteng Metrorail route.
Read the table below that shows stations and time, then answer the questions that follow.
Iitreyini ezimbini zisebenzisa indlela efanayo kwizitishi ezohlukileyo ngamaxesha ahlukeneyo kwindlela iGauteng Metrorail.
Funda itheybhule engezantsi ebonisa izitishi nexesha, phendula ke imibuzo elandelayo.

Station/isitishi	Time/ixesha	
Orlando	10:47	
Mlamlankunzi	10:50	

New Canada	10:53	
Longdale	10:57	
Croeses	10:58	
Langlaagte	11:02	
Grosvenor	11:05	
Mayfair	11:07	
Braamfontein	11:10	
Johannesburg	11:15	

How long does train A take to travel from Orlando to Johannesburg?

Ithatha ixesha elingakanani itreyini A ukusuka eOrlando ukuya eJohasnnesburg?

At what time does train B on the Orlando – Johannesburg route will arrive in Johannesburg when it leaves Orlando station at 12:55?
Iyakufika nini itreyini B eJohannesburg kwindlela iOrlando – Johannesburg xa iphuma kwisitishi iOrlando ngo 12:55?

Table 6. 14: Question 14

Question 14 was a high order question with the main focus on time and had a total of 2 marks. 60% of the schools managed to score 50% and above and School 17 MT was the highest with an average of 90% followed by School 5 MT and School 14 MT both with 80%. On the other hand, School 4 MT, School 8 MT and School 10 MT scored an average of 0%.
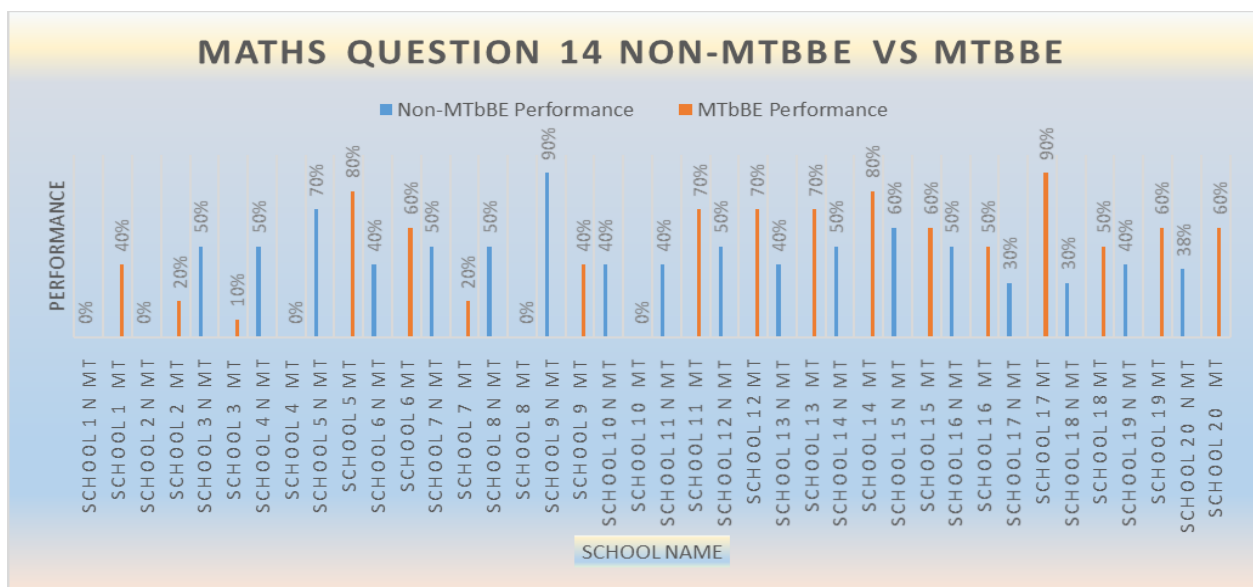

Figure 6.16: Question 14 Comparison between MTbBE and non-MTbBE

6.6.14.1. Comparative Analysis

According to the departmental 7-point scale for performance question 14 seemed to be a bit challenging to the MTbBE group as 6 schools from this cohort managed to achieve level 1 (0-

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29%) as compared to non- MTbBE group where only 2 schools were on this Level. In addition, there were 7 schools from the non- MTBbE cohort that managed to achieve Level 4 (50-59%) whereas 2 schools from the MTbBE cohort managed achieve this level. 20% of MTbBE school managed to achieve Level 5(60-69%), 15% of MTbBE schools achieved Level 6(79-79%). In addition also 15% MTbBE schools achieved Level 7(80-100%) this means that 60% of the MTbBE schools managed to achieve Level 5(50-59%) and above with the majority of the schools sitting on level 5(60-69%). On the other hand, 50% of non-MTbBE schools managed to achieve Level 4 (50-59%) and above.

6.5.15. Question Fifteen

The municipality wants to empty the dam that holds $6kl$ of water to $20l$ tanks. How many tanks can be filled from a dam?

UMasipala ufuna ukukhupha amanzi onke kwidama eliginya isi $6kl$ samanzi kumatanki ayi $20l$. Kungagcwaliswa amatanki amangaphi ngedama?

Table 6.15 :Question 15

Question 15 was also a high order question specifically focusing on Ratios with a total of 3 marks. 9 out of 20 schools scored more than 50% and School 6 MT had 100% followed by School 9 MT with an average of 87%. School 2 MT and School 7 MT managed to score 0% which is really a cause for concern and it's also has to be noted that both schools do not have qualified mathematic educators.
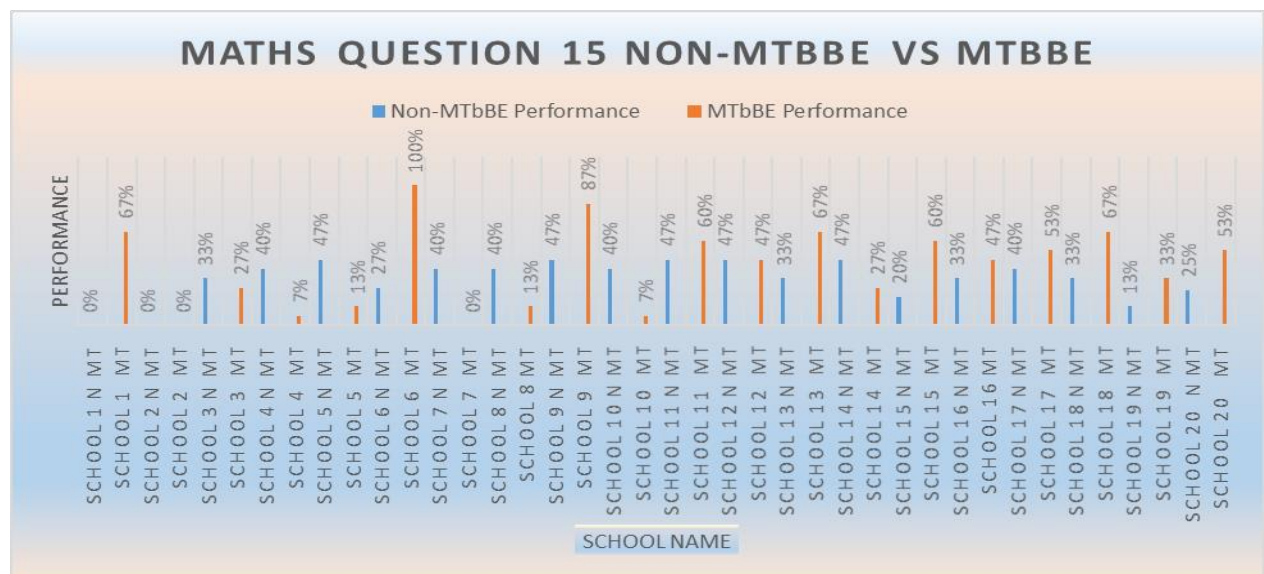
Figure 6.17: Question 15 Comparison between MTbBE and Non-MTbBE

6.6.15.1. Comparative Analysis

Question 15 proved to be problematic for the non-MTbBE group as compared to the MTbBE group. In both cohorts MTbBE and non-MTbBE, 6 schools from each cohort managed to achieve level 1 (0-29%). Furthermore 10 schools from non- MTbBE managed to achieve 3 (40-49%) and this number was 8 schools more than the 2 schools that achieved the same level from the MTbBE cohort. The highest performing school was School 6 MT with an average of 100%. 10% of MTbBE schools managed to achieve level 4(50-59%), 25% MTbBE schools achieved Level 5(60-69%) and 10% of MTbBE schools achieved Level 7(80-89%). 45% of MTbBE schools achieved Level 4(50-59%) and above, the majority of MTbBE schools on this question achieved Level1(0-29%) at 40%. On the other hand, none on non-MTbBE schools managed to achieve beyond level 3.

6.6.16. Question Sixteen

Focussed on Rate
The municipality wants to empty the dam that holds $6kl$ of water to $20l$ tanks. How many tanks can be filled from a dam?
UMasipala ufuna ukukhupha amanzi onke kwidama eliginya isi $6kl$ samanzi kumatanki ayi $20l$. Kungagcwaliswa amatanki amangaphi ngedama?

Table 6.16: Question 16

 As a medium order question 16 was focused on Rate and had a total of 2 marks. School 6 MT, School 17 MT, School 18 MT, School 19 MT and School 20 MT scored an average of 100% each but shockingly School 4 MT scored 0%.
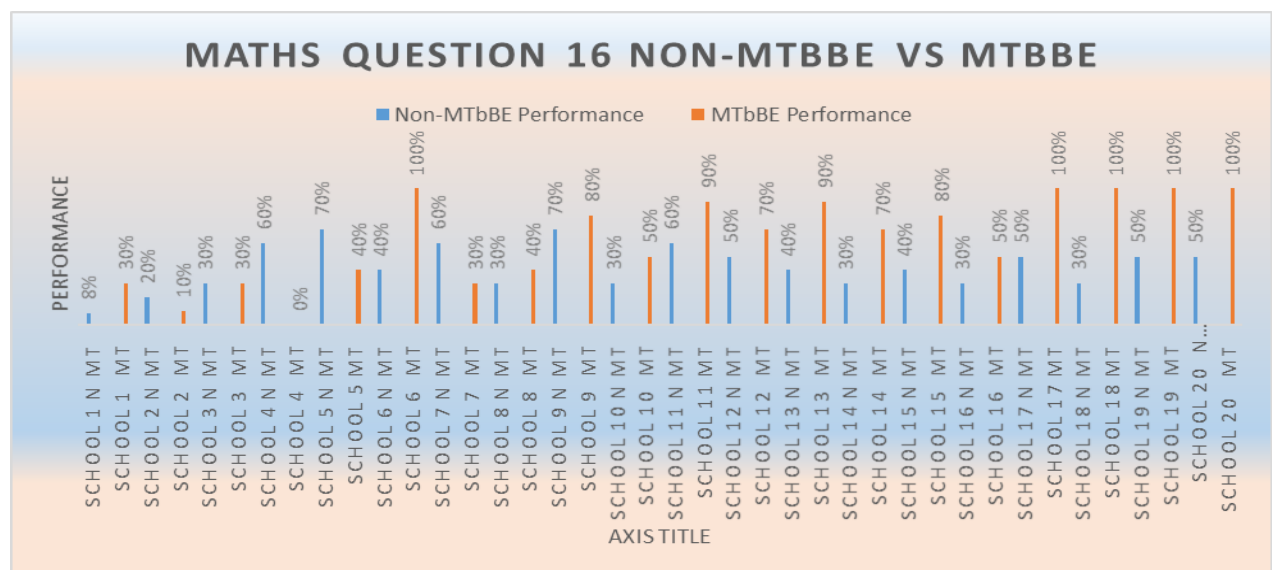
Figure 6.18: Question 16 Comparison between MTbBE and non-MTbBE
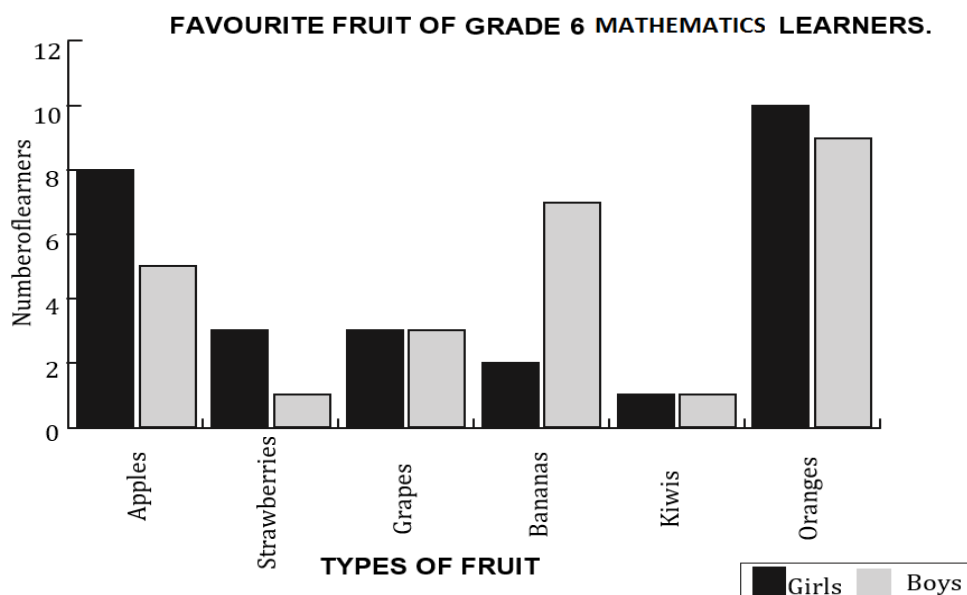
6.6.16.1. DISCUSSION

Question 16 proved that MTbBE groups are performing better than non- MTbBE groups. In non- MTbBE group 2 schools managed to achieve level 1 (0-29%) whilst there is no school in MTbBE group scored this level. 3 MTbBE schools achieved level 2(30-39%) whereas 6 non-MTbBE schools achieve this level. In addition 2 MTbBE schools attained Level 3(40-49%) whilst 3 non-MTbBE schools achieved this Level. 10% of MTbBE schools managed to achieve level 4(50-59%), none of the MTbBE schools managed to achieve level 5(60-69%), 10% of MTbBE schools achieved Level 6(70-79%). In addition, 45% of MTbBE schools achieved Level 7(80-100%), it is worth noting that on this question the majority of MTbBE schools were sitting on Level 7(80-100%). 65% of MTbBE schools achieved level 4(50-59%) and above whereas 40% of the non-MTbBE schools achieved Level 4 (50-59%) and above.

6.6.17. Question Seventeen

Interpreting data
17. Read the double bar graph below which shows grade 6 learners' favourite fruit and answer the questions that follow. **Funda ibha grafu ephindiweyo ngezantsi ebonisa iziqhamo ezithandwayo ngabafundi bebanga 6 uze uphendule imibuzo elandelayo.**   FAVOURITE FRUIT OF GRADE 6 MATHEMATICS LEARNERS.
17.1 How many Mathematics grade 6 learners? Show the number of girls and the number of boys.

Bangaphi abafundi beMathematika kwibanga 6? Bonisa inani lamantombazana namakhwenkwe?
17.2 Which fruit was the girls' favourite?/**Sesiphi isiqhamo esithandwa ngamantombazana?**
17.3 If you were a fruit seller outside the school, which fruit would you not like to bring to sell? Why?   If you were a fruit seller outside the school, which fruit would you not like to sell? Why?   **Ukuba ungumthengisi weziqhamo ngaphandle kwesikolo, sesiphi isiqhamo ongenakuthanda ukusithengisa? Kutheni?**

Table 6.17 : Question 17

Question 17 was a high order question and had a total of 6 marks. School 4 MT had the highest average of 100% followed by School 6 MT and School 9 MT with an average of 85%. School 2 MT is the only one that got an average of less than 30% and it does not have a qualified mathematic educator.
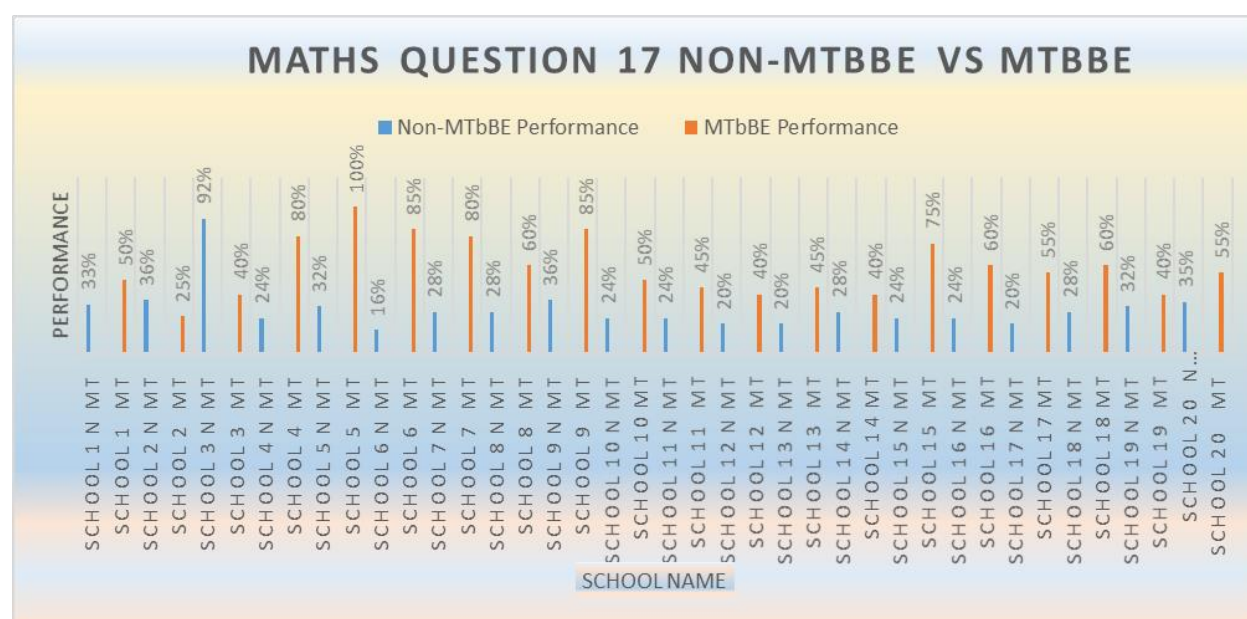
Figure 6.19: Comparison between MTbBE and non-MTbBE

6.6.17.1. Comparative Analysis

Non-MTbBE group struggled on t question 17 as 13 schools from this cohort managed to achieve Level 1 (0-29%) and this number was 12 schools more than the number of schools that achieved this Level from the MTbBE cohort. In the non- MTbBE group 6 schools managed to score level 2 (30-39%) whereas none of the MTbBE schools achieved Level 2. None of the schools from the non-MTbBE group managed to scores levels 3 to Level 7 and this showed

that the non- MTbBE cohort was faced with challenges in tackling this question. 20% of MTbBE schools managed to achieve level 4(50-59%), 15% of the schools in this cohort achieved level 5(60-69%) and only 5% of MTbBE schools managed to achieve level 6(70-80%). 5 schools from the MTbBE school achieved level 7(80-100%) and the majority of the schools from the MTbBE cohort were sitting on Level 7.

6.6.18. Question Eighteen

Focus on organising data, determining the mode of grouped numeric data and determine the median of grouped numeric data	
Below are Mathematics percentage marks obtained by Thandile and his grade 6 friends. **Ngezantsi yipesenti yamanqaku eMathematika afunyenwe nguThandile nabahlobo bakhe bebanga 6.**	
Arrange the marks in ascending order/**Cwangcisa amanqaku ngokwemo yonyuko.**	
What mark is the/**Ngubani inqaku eliyi**	
18.2.1	Mode/ **Mowudi**?
18.2.2	Median/**Midiyeni**?

Table 6.18: Question 18

Question 18 was a low order question with focus on organising data, determining the mode of grouped numeric data and determine the median of grouped numeric data. School 6 MT, School 9 MT, School 16 MT and School 18 MT had an average of 100% each. It is worth noting that School 10 MT had the lowest with 20%.
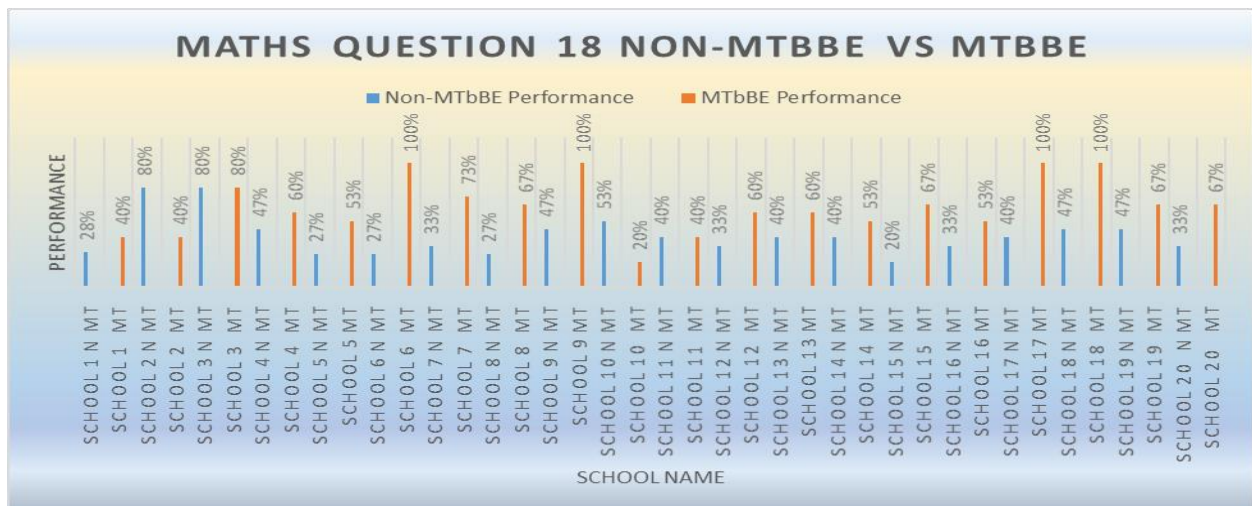
Figure 6.20: Comparison between MTbBE and non-MTbBE

6.6.18.1. Comparative Analysis

In line with the departmental 7-point scale for performance, 5 schools from the non-MTbBE cohort managed to achieve Level 1 (0-29%) and this number was 4 schools more as only 1 school from the MTbBE cohort achieved the same level. In non- MTbBE group 8 schools managed to score level 3 (40-49%) as compared to 3 MTbBE schools that managed to achieve the same level. 3 MTbBE schools managed to achieve level 4(50-59%), 35% of the schools achieved Level 5(60-69%) also only 1 school from the same cohort achieved Level 6(70-79%). More so, 25% of MTbBE schools achieved level 7(80-100). From the above graphs it can be noted that 80% of MTbBE schools managed to achieve Level 4(50-59%) and above the majority of MTbBE school attained level 5(60-69%).

6.7. OVERALL PERFORMANCE OF MTbBE AND NON-MTbBE LEARNERS
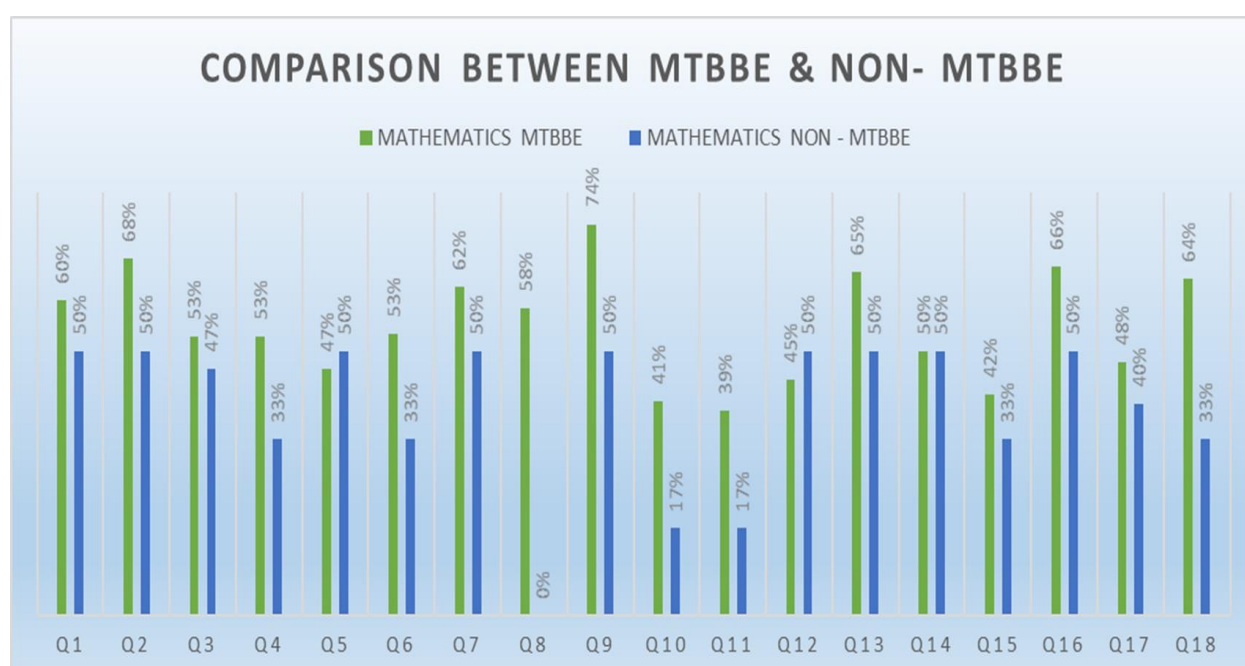
Figure 6.21.   Comparison of Mathematics for MTbBE and Non-MTBbE Average Performance

From the graph above one can say that mathematics is made easier when students are taught in their mother tongue. There were 3 questions where in Non-MTbBE cohort no school managed to score an average of 50%. As clearly shown in the diagram above not even in any question where Non-MtBBE schools got an average that is above that of MtBBE schools. The only question where the Non-MtBBE schools were closer was question 14 where both cohorts managed to score an average of 50%.

6.8.Mathematics Comparative Analysis

	Maths MTbBE	Percentage %	Maths Non-MTbBE	Percentage %
Level 1- 0<29	5 out of 100 learners	5%	18 out of 100 learners	18%
Level 2- 30<39	9 out of 100 learners	9%	33 out of 100 learners	33%
Level 3- 40<49	31 out of 100 learners	31%	38 out of 100 learners	38%
Level 4- 50<59	25 out of 100 learners	25%	10 out of 100 learners	10%
Level 5 -60<69	14 out of 100 learners	14%	1 out of 100 learners	1%
Level 6- 70<79	10 out of 100 learners	10%	0 out of 100 learners	0%
Level 7- 80<100	6 out of 100 learners	6%	0 out of 100 learners	0%

Table 6.41: Mathematics Comparative Analysis

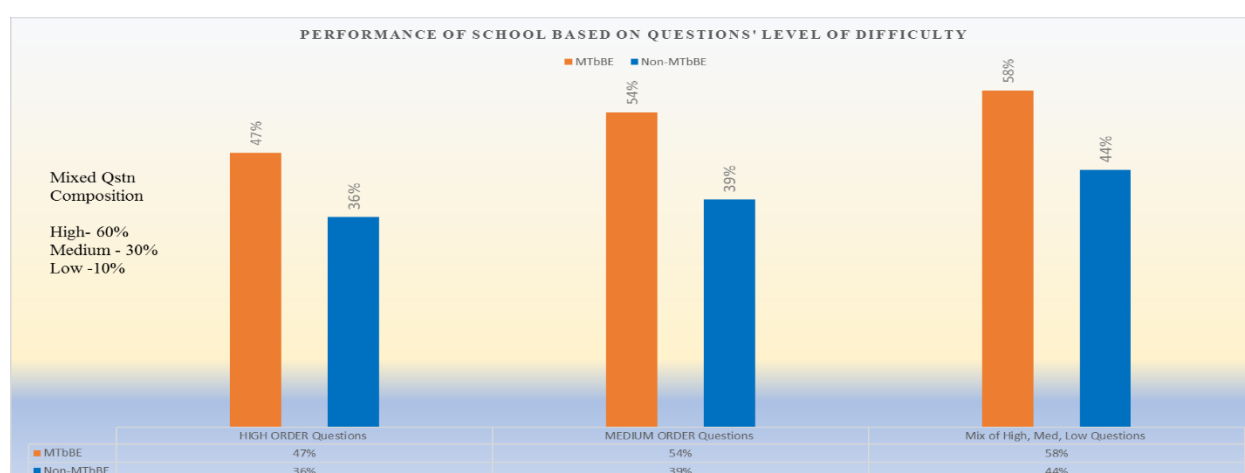## Comparative Analysis Level of Difficulty

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Figure 6.22: Comparative Analysis   level of difficulty
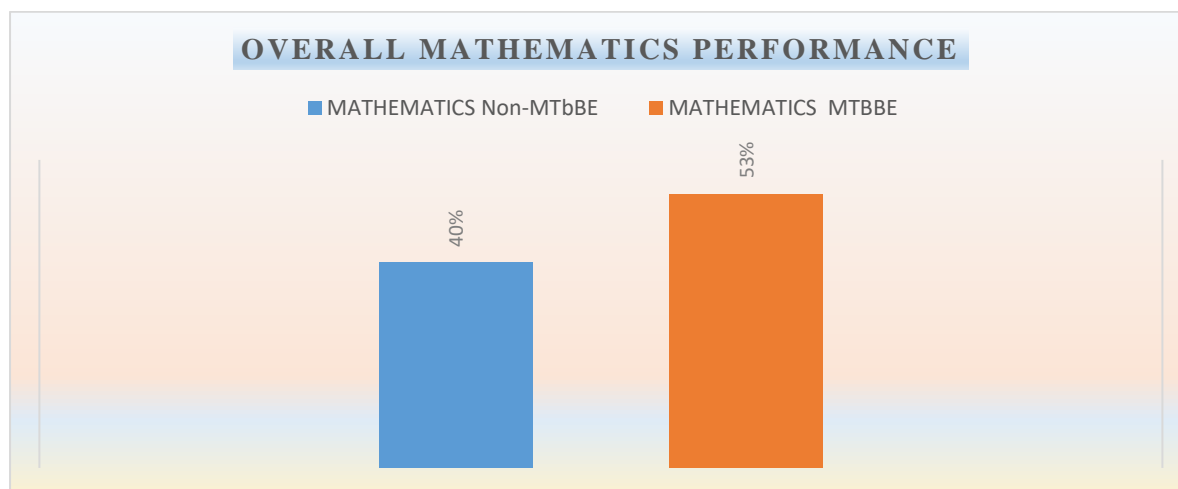
6.9.Overall Performance both groups

Figure 4.23: Overall Performance of both groups.

Figure 4.23 above illustrates the average passrate between the two cohorts the MTbBE and the non-MTbBE. The graph above shows that the MTbBE group did very well when compared to the non-MTbBE group with an average of 53% against an average of 40% from the non-MTbBE cohort. This answers the following question;

Question: Did the MTbBE group perform significantly better than the non-MTbBE group in Mathematics?

The answer is that the presentation of data in this chapter demonstrates that the results of the MTbBE shows beyond any reasonable doubt that the bilingual Question Paper given to MTbBE learners provided an advantage for this group. The opportunity to write the June examinations in isiXhosa gave them a head start in terms of question comprehensibility and in the quality of their responses.

6.12. Chapter Summary

In conclusion one can say that teaching learners in their mother tongue gives the learner an advantage as they are able to conceptualise and understand mathematics in their language. This chapter played an instrumental role in presenting the finding of this study relating to Grade 6 mathematics. The findings proved that learners understand more when their home language is used as a medium of instruction. The next chapter will focus entirely on the presentation of the June examination results for Natural Science and Technology (NS Tech) for both the MTbBE and Non MTbBE groups.

CHAPTER SEVEN
NATURAL SCIENCE AND TECHNOLOGY DATA PRESENTATION AND ANALYSIS

7. 1 INTRODUCTION

The presentation of data for the June 2018 Natural Science Examination is only for illustrative purposes and is not the focus of the study. The focus of this study is about MTbBE learners learning mathematics, the research results of the Science paper presents a unique opportunity as unlike the mathematics question paper the scienc examination paper was only available in English. This chapter presents the findings of Natural Science data, performance of 18 MTbBE schools (N=100 Grade 6 learners) in the 2018 June Natural Science Examinations. This performance is compared to 18 Grade 6 schools in the same area of Cofimvaba who are not participating in the MTbBE project (N=100 Grade 6 learners); they are thus coded as non-MTbBE. The researcher made question by question comments on the performance of each group using the following criteria:

- Providing an analysis of the generic score per question and a Comparative Analysis for both cohorts (MTbBE and Non-MTbBE) in Natural Science.

Data presented on this chapter supports the notion as to why it is of paramount importance to teach learners in their home language. Natural Science involves formulae, laws, and experimentation. If the learner fails to sequence events, follow directions, or arrive at conclusions, science theory will be abstract, and hard to understand (Merkel-Piccini, 2001). Gudula (2017) postulates that for learners whom the language of instruction is their second language, there tend to be an added burden as the language of instruction needs to be translated to their home language when they are being taught. The same leaners are faced with a myriad of challenges when it comes to answering the questions as they have to think the answers in their language and then translate them into the language of instruction before they actually answer them. The language changing within a lesson with the aim of creating an understanding of a concept or phenomenon is referred to as code-switching. The issue of the language of instruction has been a matter of debate in contemporary South Africa. Current languages that are being used as languages of instruction favoures the English and the Afrikaans-speaking learners who happen to be 'White People' since each group was allowed to have their children learn with their home languages as language of instruction. African learners are forced to

abandon African languages as languages of instruction and adopt English language as their language of instruction. Setati & Adler (2000) alluded that inorder for learners to think, they have to talk nevertheless their fluency in expression and complex thoughts expression tend to be limited if they are allowed to use their mother-toungue. Learners are not able to prove their full poteintial to learning the content as they reach a deadlock in expressing what they mean. The researcher fully concurs with Hornberger (2002) who postulated that as many languages as possible should be recognised in order to upsurge the linguistic resources so as to enable the goals of teaching and learning.

7.2. Fundamental Learning Areas and the 7 points scale

Achievement is categorized on a 7 points scale.

Level number	Level percentage %	Level description
Level 1	29.99	Not Achieved
Level 2	30 – 39.99	Elementary Achievement
Level 3	40-49.99	Moderate Achievement
Level 4	50 – 59.99	Adequate Achievement
Level 5	60 – 69.99	Substantial Achievement
Level 6	70 – 79.99	Meritorious Achievement
Level 7	80 – 100	Outstanding Achievement

Table 7.1: 7-point scale

7.3. QUESTION BY QUESTION ANALYSIS: Natural Science and Technology

Natural Science was divided into 2 cohorts namely non-MTbBE and MTbBE, The question paper consisted of 10 questions, with question 9 carrying the highest total of 11 marks. This question paper had 3 high order questions, 1 multiple choice question, 3 medium order questions and 3 mixture of high order and medium order questions.

7.4.1. QUESTION 1

INSTRUCTION

Read each question and **make a circle** around the letter A, B, C or D that is the correct answer.

1.1 Green plants are just like factories because they…

A. recycle oxygen. B. make carbon dioxide C. make food for themselves and the animals.
B. use water to make minerals.

1.2 Photosynthesis is the process where plants make use of sunlight. Which of the following statements is describing the process correctly?
 	
    A. Energy from the sun is changed into light energy.
    B. The plant absorbs or takes in oxygen from the air through the openings mostly found on the upper side of the leaves.
    C. Plants use energy to make sugar from water and oxygen.
    D. Plants use chlorophyll, sunlight energy, carbon dioxide, water and mineral salts to make food and oxygen.

1.3   Plants store food in different parts that humans will eat. They can store it in their leaves, stems, roots, flowers fruits or seeds. The potato is an example of a plant that stores food in the…..   A.leaves B.seeds C.roots D. stem.

Table 7.2. Question 1

This question comprised of 3 multiple questions. From the information presented on the graph above it shows that all the schools passed with high marks above 70% which is very pleasing. 2 schools got everything correct and 4 schools got above 90% which is very pleasing. The performance of students can be attributed to the type of questions which is a multiple-choice question which makes it easy for the students to select the answers.
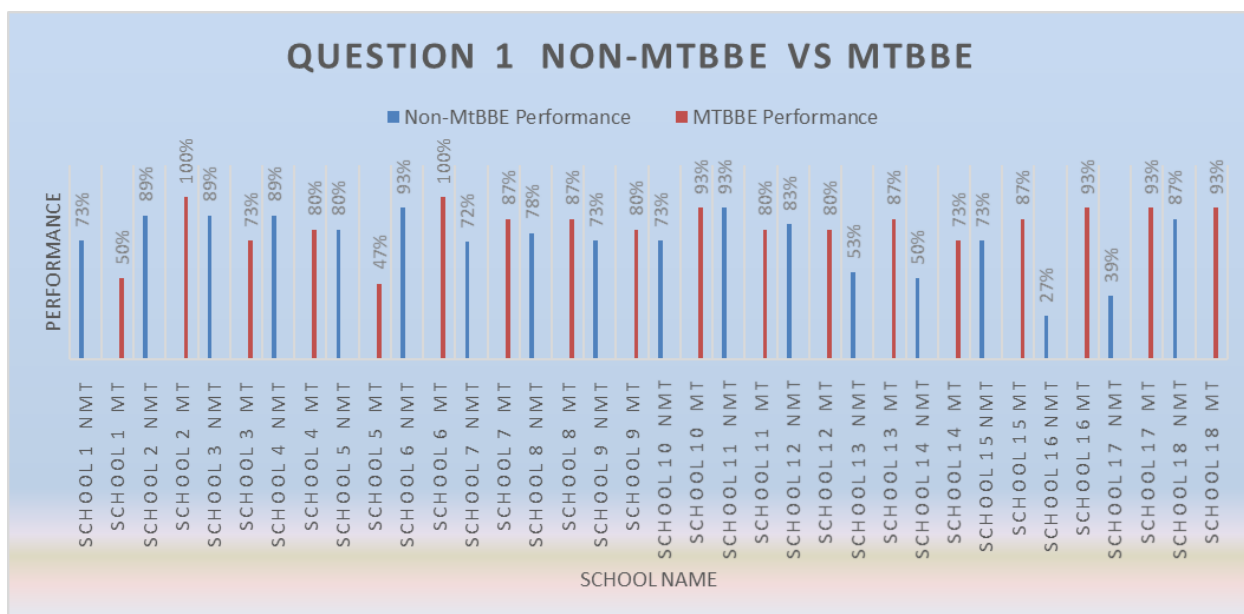
Figure 7.2: Comparison between NS question 1 MTbBE and non-MTbBE Performance

7.4.1.1. Comparative Analysis

According to the departmental 7-points scale, on question 1, none of the schools from the MTbBE cohort achieved Level 1 (0-29) whereas from the non-MTbBE cohort only 1 school scored Level 1. There was only 1 school that managed to achieve Level 2 (30-39%) from non-MTbBE and none from the MTbBE cohort. On level 3 (40-49%) only 1 school achieved this level from the MTbBE cohort and none from non-MTbBE cohort. 17 schools managed to achieve Level 4 (50-59) and above from the MTbBE cohort and 16 schools achieving level 4 and above with the major difference on the number of schools who achieved level 7 (80-100%). 14 schools from the MTbBE cohort achieved Level 7, which was 6 schools more than the 8 that achieved this Level from the non-MTbBE cohort. On this question the highest performing schools were from the MTbBE cohort with 2 schools managing to score an average of 100%.

7.4.2. Question 2

2.1   Match the food group in **column A** with the correct food example in **column B**.

Write down the **corresponding letter** in the middle column next to the question number that matches.

COLUMN A	ANSWER	COLUMN B
2.1 Carbohydrates		A. Beans

2.2 Proteins		B. Fruits
2.3 Vitamins and minerals		C. Rice
		D. Cooking oil

Table 7.3: Question 2

The question consists 3 marks and the type of question is medium order, from the graph, 6 schools got everything correct which 100%. All the schools passed with more than 70% which is very pleasing and outstanding performance. The performance of the students can be linked to the type of the question which is medium order and the students understands the demands of the question.
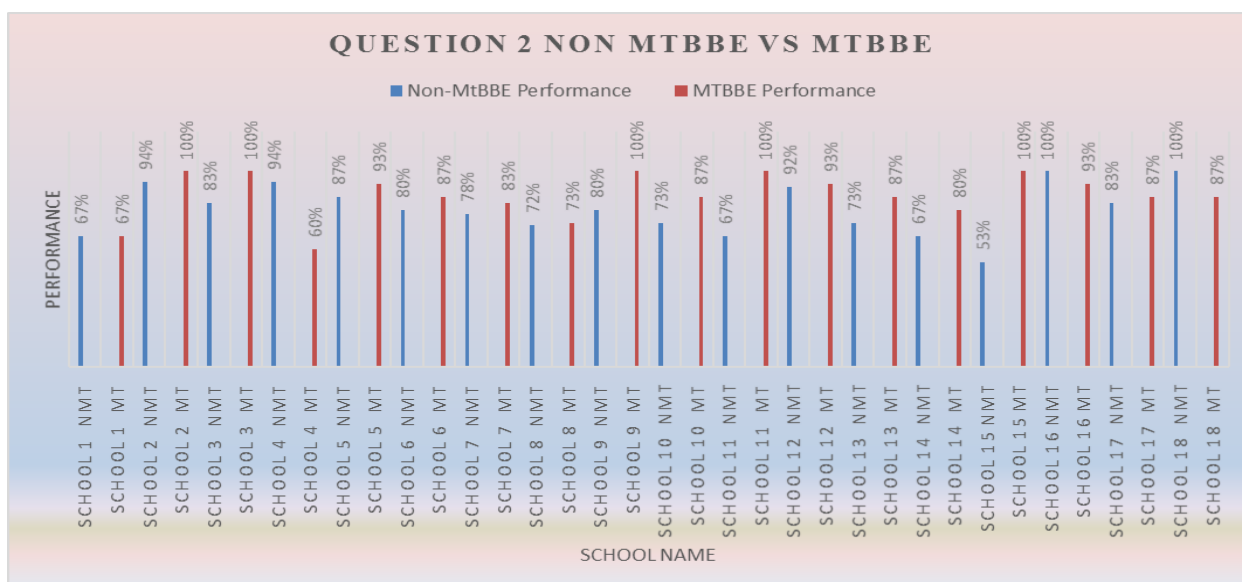
Figure 7.3: Comparison between NS question 2 MTbBE and non-MTbBE

7.4.2.1. Comparative Analysis

In line with the departmental 7-point scale for performance, on question 2 in both cohorts none of the schools achieved Level1, Level 2 and Level 3. There were only 2 schools that managed to achieve Level 4 (50-59%), 1 school from each cohort. The significant difference was on Level 7 where 14 schools from MTbBE cohort managed to achieve this Level against 10 schools from the non-MTbBE cohort. 5 schools from the MTbBE cohort managed to score an average of 100 % and only 2 scored an average of 100% from the non-MTbBE. In general students from both cohorts did very well on this question and this can be attributed to the type

of the question since it was a medium order question it required the learners to apply their general understanding of the subject matter.

7.4.3. Question Three

Tommy carried out an experiment using iodine solution and different food products. The results of the investigation are described in the following paragraph:

The colour of the potato turned to blue black and the colour of the cucumber changed to brown when the iodine solution was added.

Draw a table below to translate the results of Tommy's investigation.
Provide the table with appropriate headings.

Table 7.4 : Question 3

The question constitutes 3 marks and the type of question used is a medium order. 3 schools managed to get everything correct which is 100%, 2 schools got above 90%, 8 schools got above 80%, 4 school managed to score an average ranging between 50% and 75% and 1 school got 33%. 17 out of 18 schools managed to score an average beyond 50% which is very pleasing. The performance of the schools can be linked to the type of the questions where most schools were able to understand the demands of the questions.
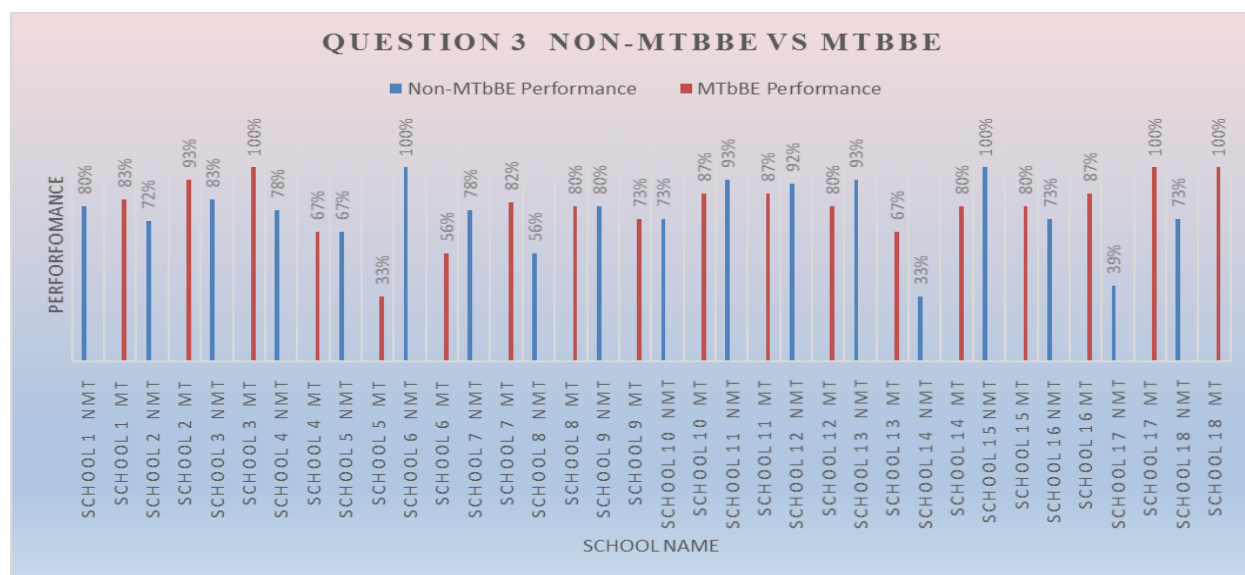

Figure 7.4: Comparison between NS question 3 MTbBE and non-MTbBE

7.4.3.1. Comparative Analysis

Since question 3 was a medium order question, only 1 school from the MTbBE cohort managed to achieve Level between Levels 1 and Level 3 thus level below 50% and on the non-MTbBE

cohort there were only 2 schools that were in this range. There wasn't any significant difference from both cohorts on Level 4 (50-59) and level 5 (60-69). The major difference was on Level 7 (80-100) as 12 schools from the MTbBE cohort achieved this Level compared to 8 schools that achieved this level from the non-MTbBE. The high performance on this question can be attributed to the type of question and the us of mother tongue in answering the questions**.**

7.4.4. Question Four

INSTRUCTION		
The table below shows what four people ate for lunch.		

Name	Lunch
Alex	Chicken and salad
Zukiswa	Cheese burger and fried chips
Portia	Fizzy drink e.g. Fanta and a jam doughnut
Jan	Mushroom soup and an orange

4.1 Whose lunch had the most sugar in it?	
4.2 Whose lunch had the most fat in it?	
4.3 Eating too much fat is bad for you. Give one reason for this.	

Table 7. 5: Question 4

The question carried 3 marks and was a medium order question. The highest school got 100%, the least school got 44%. The majority of the schools management to pass with over 60%, the performance was pleasing. From the graph, some schools failed to understand the demands of the questions resulting in getting lower marks.
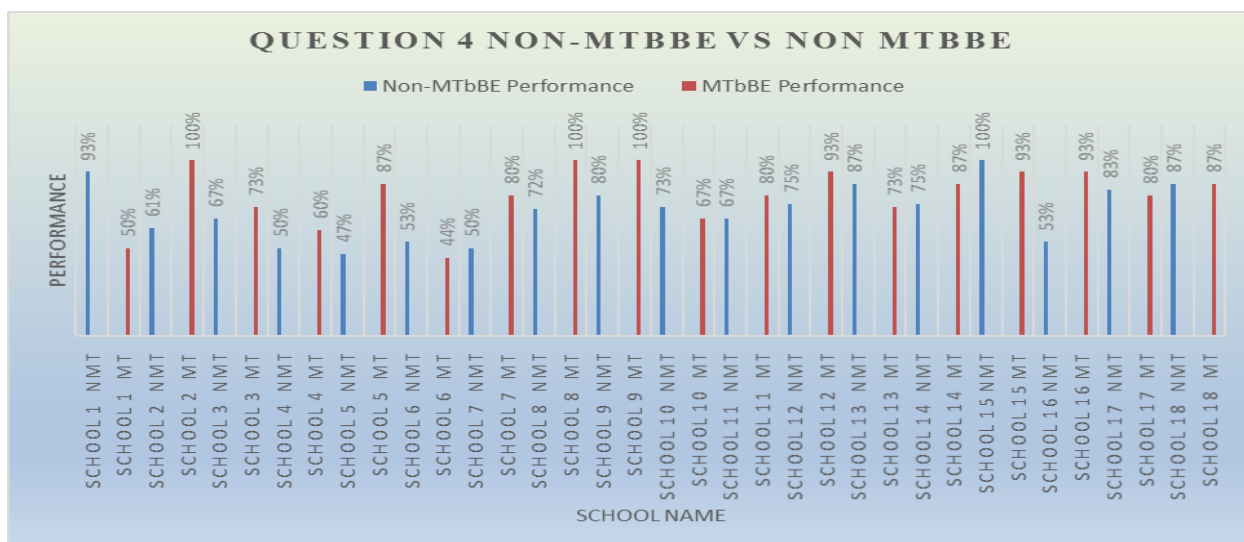
Figure 7.5: Comparison between NS question 4 MTbBE and non-MTbBE

7.4.4.1. Comparative Analysis

According to the departmental 7-point scale for performance from both cohorts MTbBE and non-MTbBE none of the schools achieved Levels 1 (0-29) and Level 2 (30-39). Only a single school from the MTbBE group achieved Level 3(40-49) and on the non-MTbBE cohort 2 schools were sitting at this level. In addition, 4 schools from the non-MTbBE group managed to achieve Level 4 (50-59) whereas only 1 school from the MTbBE cohort achieved this level. On question 4 a great difference was shown on Level 7 (80-100) where 11 MTbBE schools thus 55% of the MTbBE school managed achieve this level, and this number was 6 schools more than the 5 non-MTbBE schools that achieved this level. There were 3 MTbBE schools that managed to score an average of 100% and only 1 non-MTbBE school that scored an average of 100%. The lowest performing school on this question was School 6 MT with an average of 44%.

7.4.5. Question Five

5.1	What is meant by the following words in relation to food processing?
a.	Preserving
b.	Cooking or Frying

c. Fermenting
5.2 Give two reasons why many people believe that highly processed food is not good for their health.

Table 7.6: Question 5

The question constituted 5 marks and it is a high order question. The highest school got 84% and the least school got 57%. All the schools managed to pass with 50% and above. The performance was lower as compared to other questions. The performance of the schools can be attributed to the type of the question which is high order, the questions were quite challenging. Most schools failed to understand the demands of the questions thereby providing wrong answers.
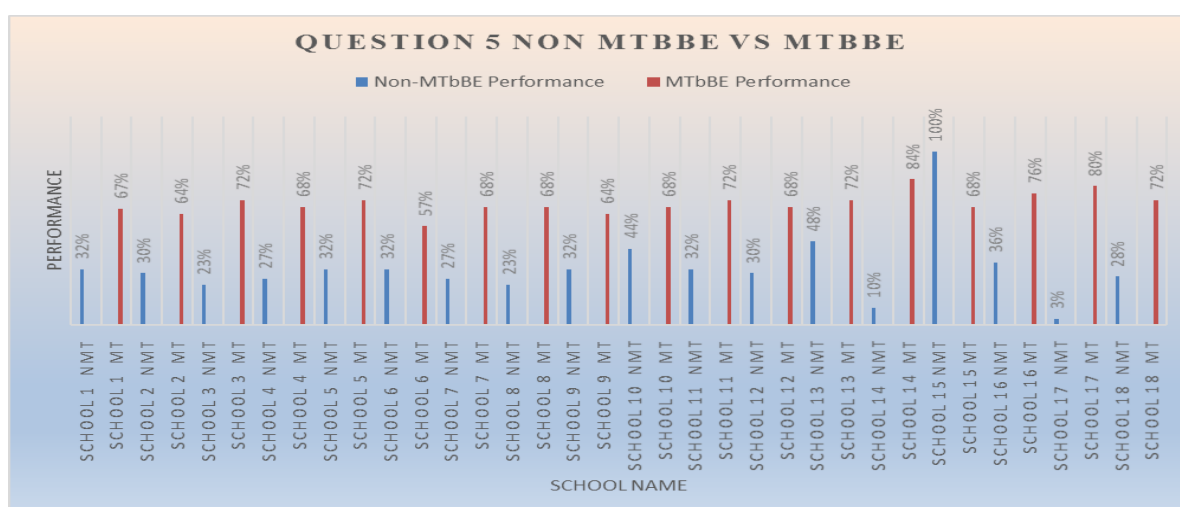
Figure 7.6: Comparison between NS Question 5 MTbBE and non-MTbBE

7.4.5.1. Comparative Analysis

Question 5 proved to be challenging to the non-MTbBE group as the majority of the schools failed to achieve Level 3 (40-49), only 1 school from this group managed to achieve beyond Level 4 (50-59) and this school was the highest performing school in both cohort with an average score of 100%. On the other hand, the MTbBE cohort schools did extremely well on this question as all of the school achieved Level 5 (60-79) with the highest performing school in the MTbBE group managing to score an average of 84%.

7.4.6. Question Six

INSTRUCTION

Study the illustration of the forest food web below and answer the questions that follow.
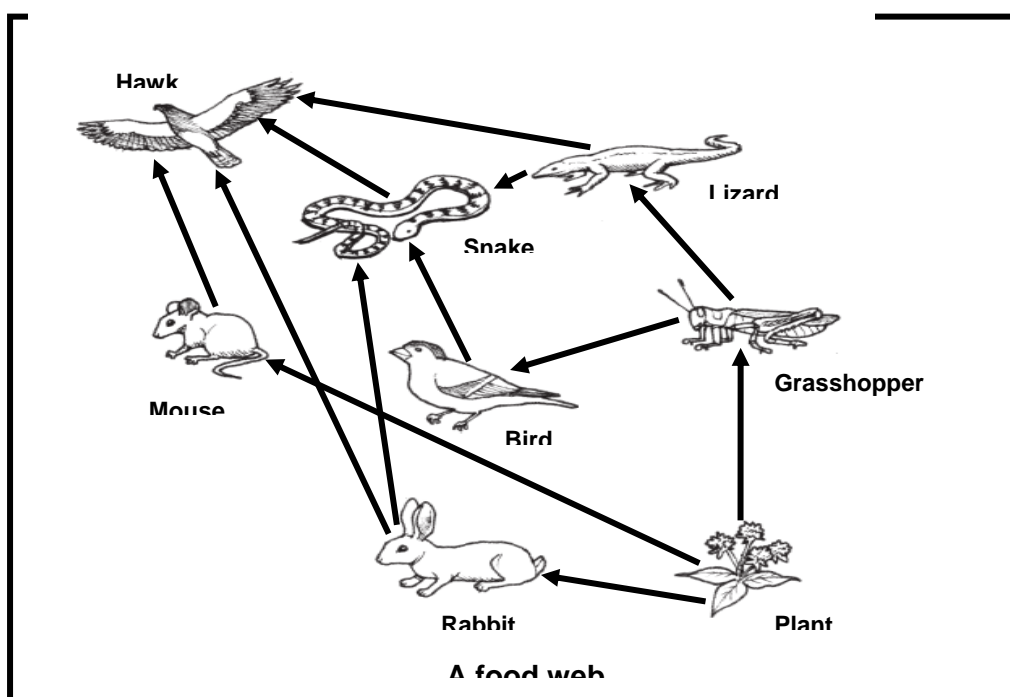
A food web

6.1 How many carnivores are present in this food web?	
6.2	Suggest what would happen to the number of insects and hawks if most of the lizards died?
6.3	There was a drought in the forest. All the plants died. Give ONE animal that will be directly affected by the drought.
6.4	Draw ONE food chain consisting of FOUR of the animals from the organisms shown above.

Table 7.7: Question 6

The question comprised of 5 marks and it's a high order question, the highest school got everything correct which is 100% and the least school got 64%. All the schools managed to score 64% and above. The performance was fairly good, although many schools were scoring between 70% and 83%. Most of the schools failed to understand the demands of the questions. The performance of the schools can be attribute to the type of the question which is high order and many schools got challenges in understanding the demands of the questions.
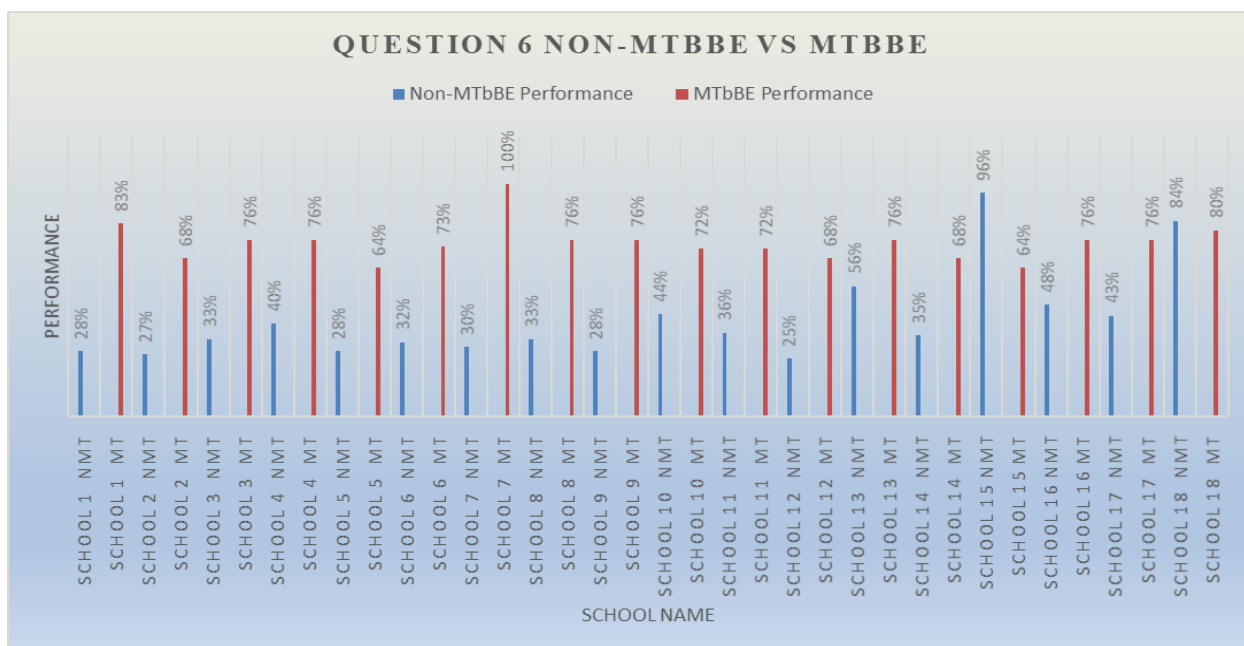
Figure 7.7: Comparison between NS Question6 MTbBE and non-MTbBE

7.4.6.1. Comparative Analysis

Using the departmental 7-point scale for performance it is clearly shown that non-MTbBE schools struggled a lot on this question as 15 schools from the total of 18 schools failed to achieve level 4 (50-59). 5 schools from this cohort achieved level 1 (0-29%), 6 non-MTbBE schools achieved Level 2 (30-39%) and 4 schools from this cohort achieved Level 3 (40-49). Comparing MTbBE and non-MTbBE performance on this question one can note that the MTbBE group did extremely well as only 3 schools managed to achieve Level 5 (60-60%) and these were the low performing schools in this cohort on this question. The majority of the schools achieved level 6 (70-79). The highest performing school on this question was School 7 MT with an average performance of 100% and this school is from the MTbBE group. This second highest performing school was School 15 NMT with an average performance of 96% from the non-MTbBE cohort. School 12 NMT was the list performing school on this question with an average of 25%.

7.4.7. Question Seven

We have learnt that matter can exist in 3 different states or phases.

The picture below shows ice cubes placed in a glass of cold water.

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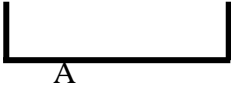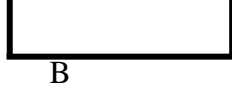
7.1	What will happen to the: a. ice cubes b. temperature of the water
7.2	The outline of two containers labelled (a) and (b) is given below. Use the drawings to sketch **the arrangements of the particles** in: a. solid and b. liquid. A B

Table 7.8: Question 7

MTBBE: The question consisted of 6 marks and the type of the question was a high order 2 schools got 100% which was very impressive. The least performing school in this cohort school got 50%. Many schools were performing from 50% to 100%. The performance of the schools were quite good although many schools got between 50% to 67%. Many schools were finding difficulties in understanding the demands of the questions which made them to get lower marks.
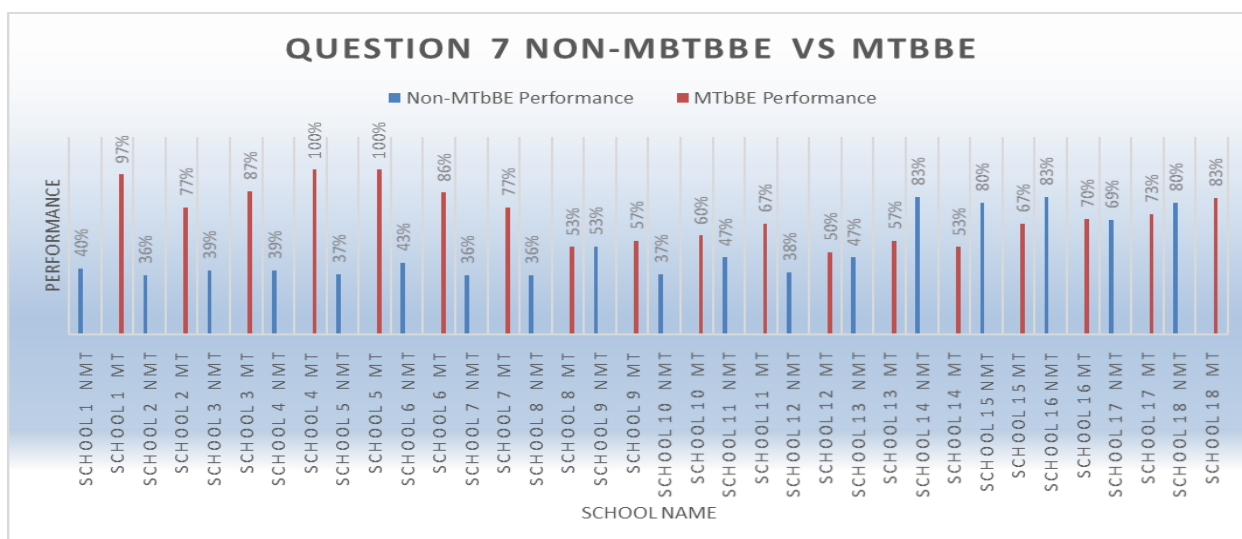
Figure 7.8: Comparison between NS Question 7 MTbBE and non-MTbBE

7.4.7.1. Comparative Analysis

None of the schools in both the cohorts managed to achieve level 1(0-29%). 8 non-MTbBE schools managed to achieve Level 2 (30-39) and not even a single school from the MTbBE

cohort achieved this Level. On Level 3 (40-41%), 4 schools from the non-MTbBE cohort were sitting at this Level but none from the MTbBE cohort achieved this Level. 5 schools from the MTbBE cohort achieved level 4 (50-59%) whereas only 1 school achieved this level from the non-MTbBE cohort. In addition 6 MTbBE Schools achieved Level 7 (80-100%) on the other hand, only 4 non-MTbBE schools managed to achieve this Level. Top performing schools scored an average of 100% and they were all from the MTbBE cohort.

7.4.8. Question Eight

INSTRUCTION
Teboho mixes sand and water in a glass or beaker.
The mixture can be separated by using the equipment shown below.

Sand and water mixture

Paper

R

Glass OR beaker
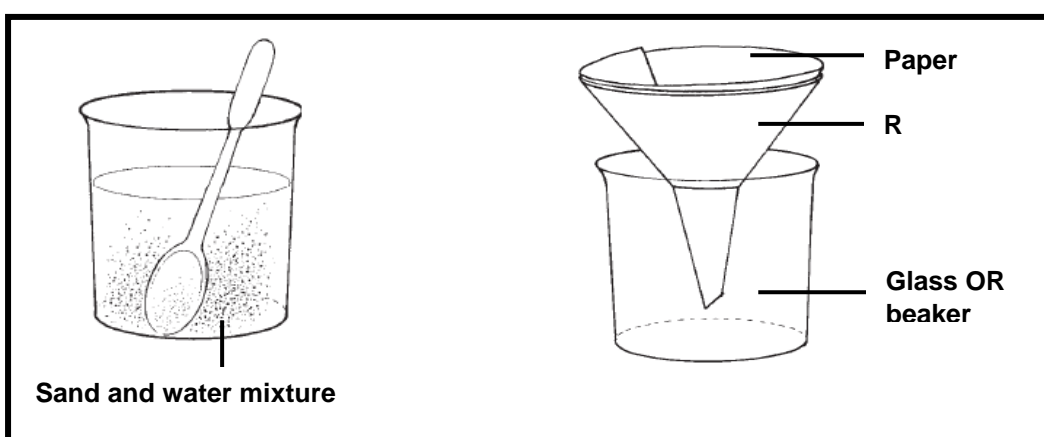
8.1	What do we call this method of separation?
8.2	What is the part labelled R called?
8.3	Explain why this method can be used to separate sand from water.
8.4	Teboho would also like to separate flour which was mixed with rice. Give the name of the method he will use to separate the mixture quickly.

Table 7.9: Question 8

MTBBE: This question comprised of 5 marks and the question was a mix of high and medium order questions. The highest performing school got 93% and the least performing school got 64%. All the schools managed to pass with 64% and above. The percentage pass rate was ranging from 64% to 93%. The performance of schools can be attributed to the type of the questions were schools were facing challenges in understanding the question as well as the wording in the question.
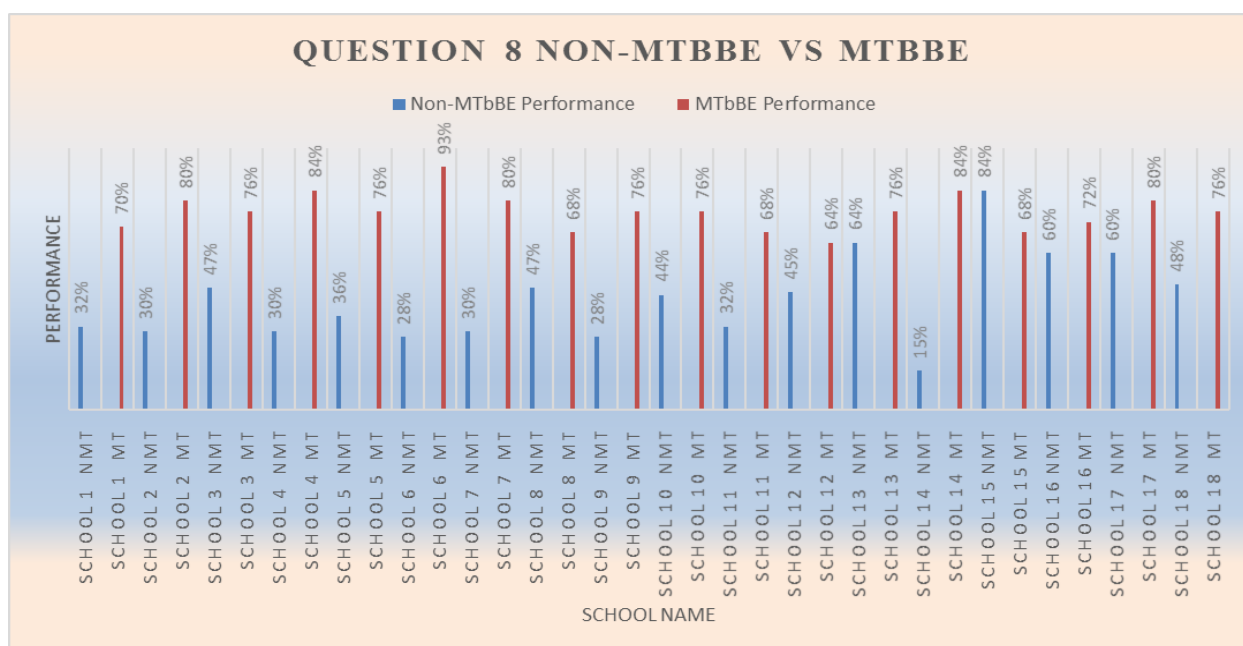
Figure 7.9: Comparison between Question 8 MTbBE and non- MTbBE

7.4.8.1. Comparative Analysis

In line with the 7-point scale, question 8 also proved to be posing a challenge to the non-MTbBE group as 14 schools from this cohort failed to achieve Level 4 (50-59%) and above. The major differences were on Level 6 (70-79) where none of the schools from the non-MTbBE cohort managed to reach this Level where as 8 MTbBE school managed to achieve this level, also 5 of the MTbBE schools achieved Level 7 (80-100%) whereas only 1 school from the non-MTbBE cohort achieved this Level. The highest performing school was School 6 MT from the MTbBE cohort with an average performance of 93%.

7.4.9. Question Nine

INSTRUCTION

8.4   Teboho would also like to separate flour which was mixed with rice.

Give the name of the method he will use to separate the mixture quickly.

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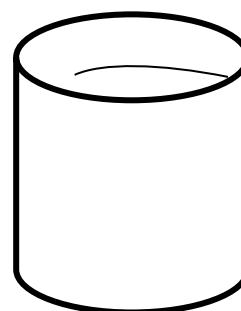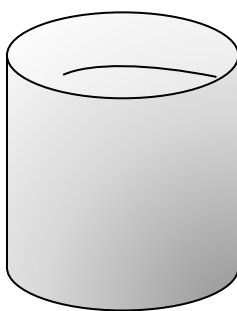
| Water from the fridge 100 ml | Tap water 100 ml | Hot water 100 ml |

Carefully read the steps of the method Fatima decided to use and then answer the questions that follow.

METHOD:

1. Measure the same quantity (100 ml) of water from the fridge, tap water, and hot water. Study the diagram of the setup above.
2. Place one sachet of cool drink into the container with the water from the fridge.
3. Stir the mixture with a spoon 5 times
4. Measure the time it takes for the cool drink mix to dissolve completely.
5. Record the time in a table.
6. Repeat steps 2-5 with the tap water and record the time it takes for the mixture to dissolve.
7. Repeat steps 2-5 with the hot water and record the time it takes for the cool drink mixture to dissolve.
8. The results of the investigation were recorded in the table shown below:

The effect of temperature on dissolving

Solution	Time to dissolve (in minutes)
Sachet of cool drink in water from the fridge	17
Sachet of cool drink in tap water	9
Sachet of cool drink in hot water	4

9.1 Name the three things that are the same in the investigation.

9.2 What did Fatima change in the investigation?

9.3 Complete the conclusion below by filling in the missing word.
CONCLUSION:
The cool drink mix dissolved _____ in the hot water than in the water from the fridge.

Table 7.10: Question 9

MTBBE: The question consisted of 11marks and the question comprised of high and medium order questions. The highest performing school got 84% and the lowest performing school got 64%. Most schools' percentages were ranging from 71-78% thus 11 schools were performing with in this range. The performance was quite good, the schools were getting challenges in

drawing the graph. Some questions were really tricky and difficult and most schools provides wrong answers.
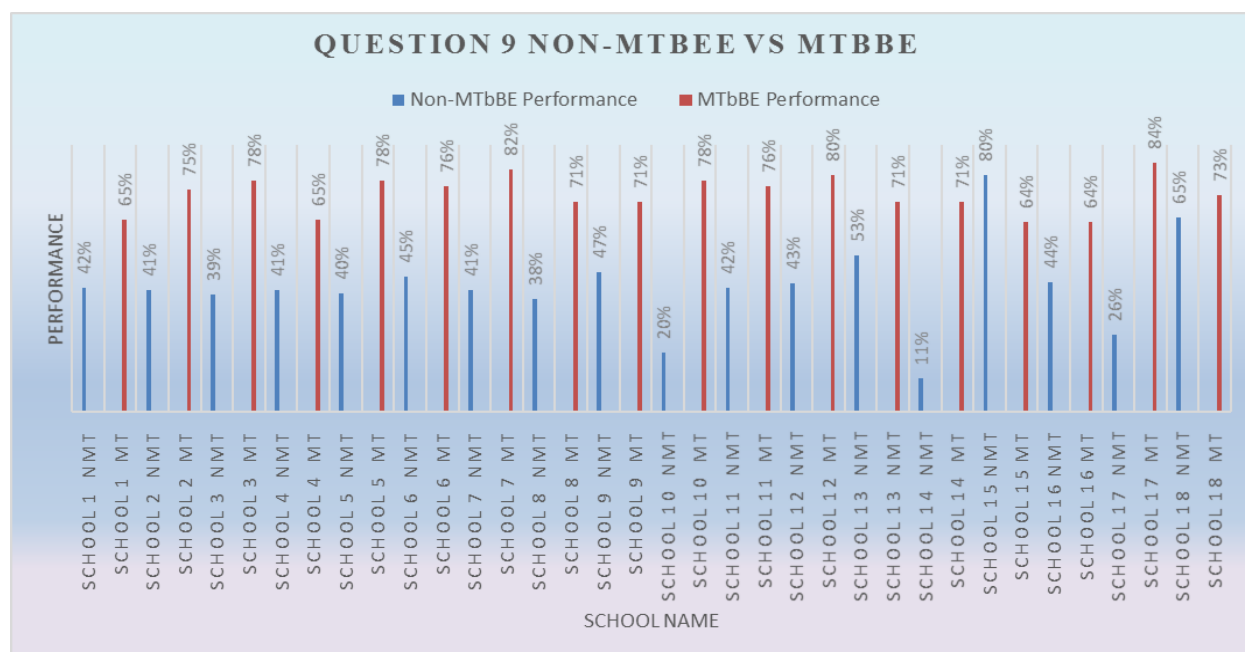
Figure 7.10: Comparison between NS Question 9 MTbBE and non MTbBE.

7.4.9.1. Comparative Analysis

Non-MTbBE schools seemed to struggle a lot when tackling this question when compared to MTbBE group. In line with the departmental 7-Point scale 3 non-MTbBE schools achieved Level 1 (0-29%), this was followed by 2 schools from the same cohort achieving Level 2 (30-39) and 10 non-MTbBE schools achieved Level 3 (40-49). On the other hand, from the MTbBE cohort none of the schools managed to achieve Level 1(0-29%) to Level 3 (40-49%). The was a significant different on Leve 6 (70-79%) where 11 MTbBE schools were sitting on this Level whilst none of the non-MTbBE schools managed to achieve Level 6. The highest performing school on this question was School 17 MT with an average performance of 84%. The lowest performing school had an average of 11% from the non-MTbBE cohort.

7.4.10. Question Ten

Instruction

Read the paragraph below and answer the questions that follow.

Your friends are planning a camping trip and invited you to join them. They have all the equipment such as tents, sleeping bags and mats. The only problem is that there is no clean drinking water at the campsite. To overcome this problem you have suggested building a w
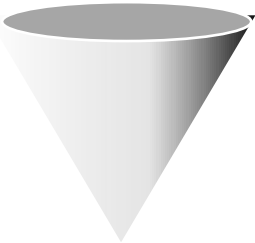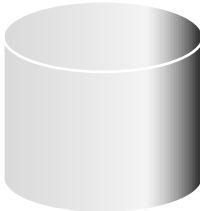
filter to purify the water from the nearby wetland, but they do not know how! You need to help them design and build a filter. The filter must be able to take a cup of muddy water. The water which comes out must be cleaner than the water that went into the filter. The filter must be able to hang from a branch or be mounted onto something.
10.1   Write a design brief to state what you are going to be designing and making, and say why you are making it.
10.2   Two possible designs for the filter are indicated below. Complete **any one** of the sketches to show how you will hang or mount the filter. Use notes to explain your design
10.3   After you have designed, made and used the filter, you must be able to evaluate it. State one question you can ask to evaluate the success of the filter.
10.4   What impact will a public campsite have on a protected wetland area if it is placed next to it?

Table 7.11: Question 10

MTBBE: The question carried a weight of 6 marks and the question order was a mixture of high and medium. On this question the top performing schools managed to scope 93% and they were only two schools that managed to reach that percentage and the least performing school got an average of 70%. 9 schools were getting percentages ranking from 70-77%. All schools performed very well on this questions. The schools were understanding the demands of the questions and the wording used in the questions can be easily understood by learners.
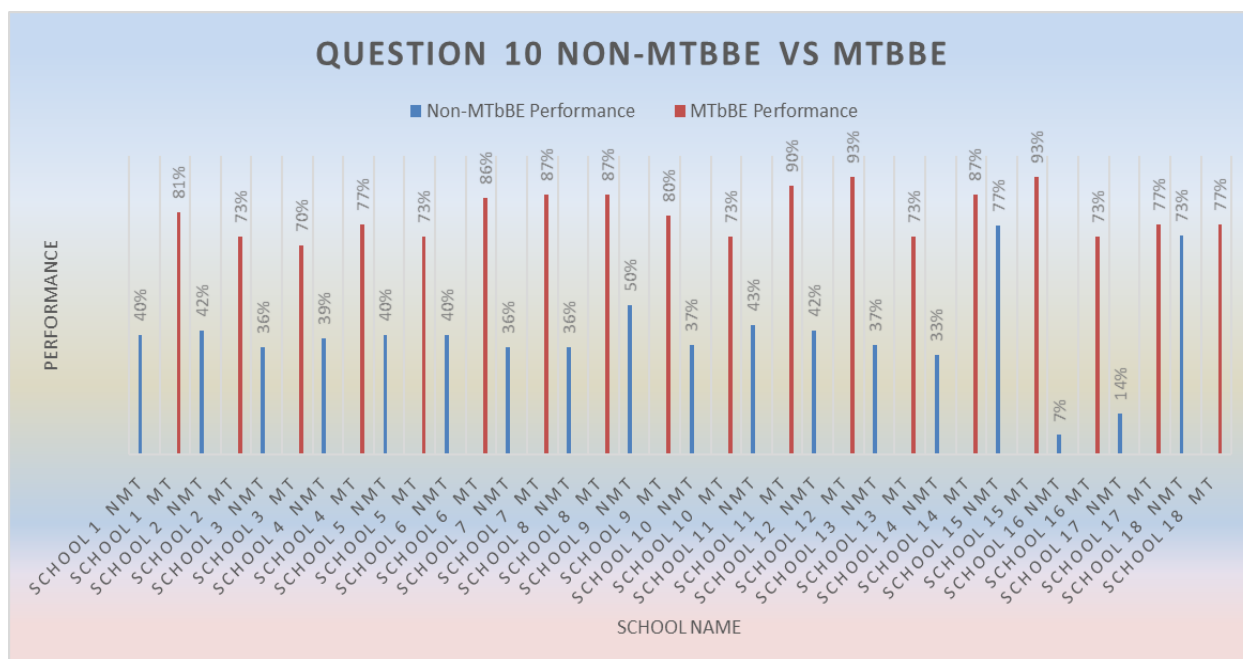
Figure 7: 11: Comparison Between NS Question 10 MTbBE and non-MTbBE

7.4.10.1. Comparative Analysis

Question 10 also proved to be problematic to the non-MTbBE as the majority of the schools in this group achieved below Level 4 (50-59%). 2 non -MTbBE schools achieved Level 1(0-29%), 7 non-MTbBE schools achieved Level 2 (30-39%) and 6 non-MTbBE schools achieved Level 3 (40-49%). Whilst the majority of non-MTbBE schools were legging below Level 4, the majority of MTbBE schools were achieving Level 6 (70-79%) and above. All the MTbBE schools achieved Level 6 (70-79%) and above. The highest performing school on this school was from the MTbBE cohort with an average of 93% whereas the lowest performing school on this question was from the non-MTbBEE cohort with an average of 7%.

7.4.10.2 Translanguaging

The concept of translanguaging is essentially based on various notions of language use and bi/multilingualism (García and Wei 2014). Baker (2011: 39), who first translated the word into English, defines it as 'the process of making meaning, shaping experiences, gaining understanding and knowledge through the use of two languages'. García (2009a:41), however, has developed the term further, and what began as a pedagogical theory she now conceptualises as the 'multiple discursive practices used as a "norm" in which bi/multilinguals engage in order to communicate effectively and make sense of their bilingual worlds'. This study explored the potential advantages of using translanguaging as classroom pedagogy for assessment as learners used it extensively in the Natural Sciences and Technology June examination test.

Question 6

Study the illustration of the forest food web below and answer the questions that follow.
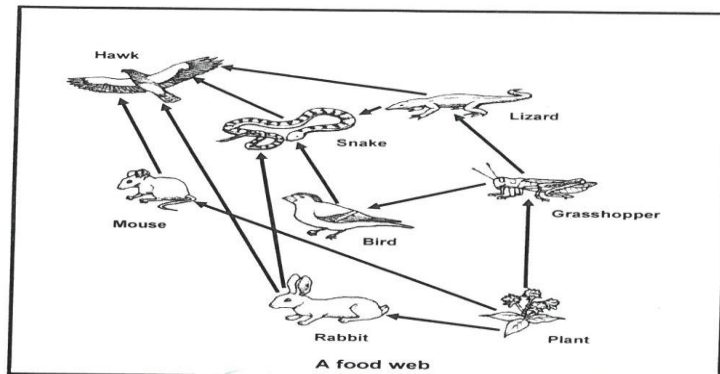
A food web

6.1 How many carnivores are present in this food web?   (1)

     4

6.2 Suggest what would happen to the number of insects and hawks if most of the lizards died?   (1)

     I-insects zinganda kodwa ihawks zingacutheka.

6.3 There was a drought in the forest. All the plants died. Give ONE animal that will be directly affected by the drought.   (1)

     Rabbit.

6.4 Draw ONE food chain consisting of FOUR of the animals from the organisms shown above.   (2)

     Plant ⟶ Grasshopper ⟶ Lizard ⟶ Snake Hawk ⟶ Hawk

                                    (5)

D E

Question 2

2.1 Match the food group in **column A** with the correct food example in **column B**.

Write down the **corresponding letter** in the middle column next to the question number that matches.

COLUMN A	ANSWER	COLUMN B
2.1 Carbohydrates	C	A. Beans
2.2 Proteins	A	B. Fruits
2.3 Vitamins and minerals	B B	C. Rice
		D. Cooking oil

(3)

Question 3

3.1 Tommy carried out an experiment using iodine solution and different food products. The results of the investigation are described in the following paragraph:

The colour of the potato turned to blue black and the colour of the cucumber changed to brown when the iodine solution was added.

Draw a table below to translate the results of Tommy's investigation. Provide the table with appropriate headings.

Ukutya	umbala	isitatshi sikhona/ASikho
intapile	blue black	sikhona
Cucumber	brown	AS.kho

(3)

SN

Figure 7.12: Translanguaging in Science Paper

The above answer sheet its is clear that the learners had sufficient English understanging which enbled them to understand and use translanguaging. For the learners in the Cofimvaba district English was not a barrier for them as they were given an English paper and answered it in isiXhosa. This is in line with a study conducted by Baker (2001) where he postulates that the process for meaning when learners has to write an essay be successful if the subject matter is understood fully. The above can be achieved if learners read and discuss a topic in one language then the writing part is produced in another language and this ensures that the concept has been practiced and internalized.

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Translanguaging assisted the learners to express their points across as it can be noted that learners tried to answer each question even if they were not sure about the answer. From the above it is evident that translanguaging is crucial for language students whether they are emergent bilingual or not, because it builds on students' linguistic strengths"(García & Wei 2014).

7.5. Overall Performance in Natural Science and Technology

It was imperative for the researcher to do an overall performance analysis of Natural Science and Technology. The graph below shows how both the MTbBE and non-MTbBE cohort performed on average.
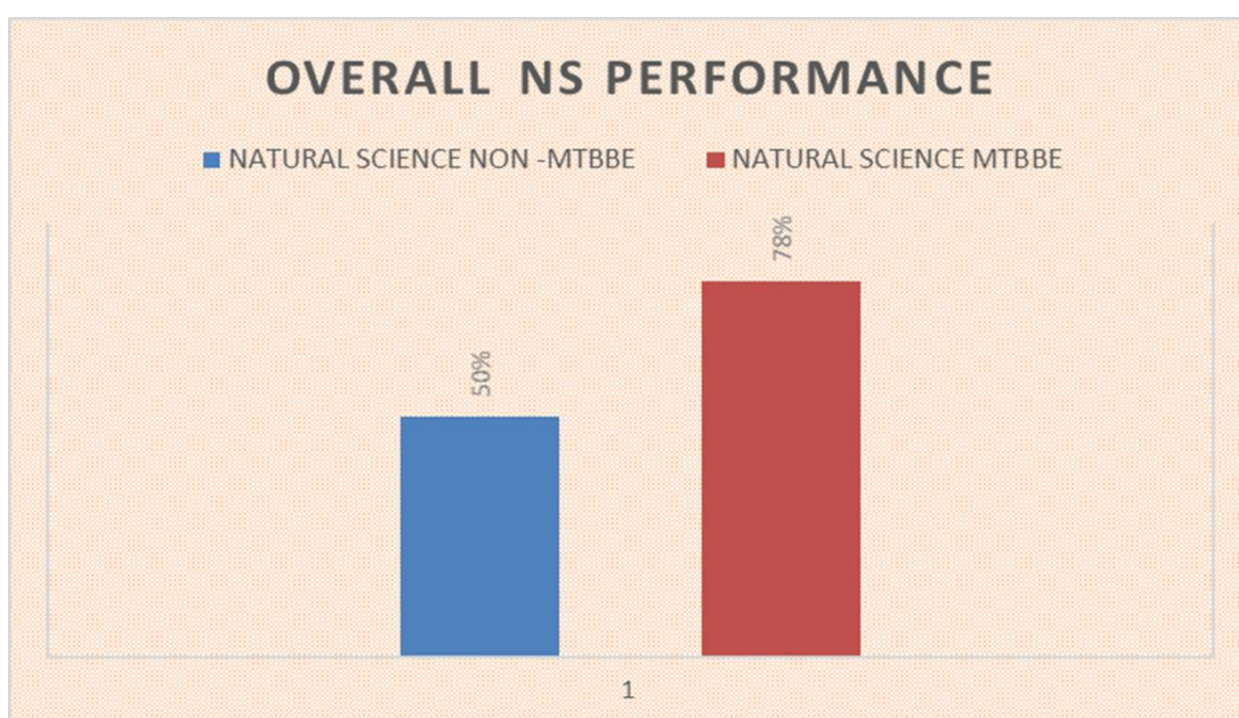
Figure 7. 12: Overall NS Performance from both Cohorts.

The graph above shows how both cohorts are performing, from a closer look at the performance of schools in both cohorts one can conclude that it is imperative to have science being taught in mother tongue as the MTBbE cohort is out smarting the Non-MTBbE cohort. From the graph above MTBbE cohort had an average performance of 78% which was 28% higher than the overall performance of Non-MTBbE cohort with an average of 50%.

7.6. Comparative Analysis for Natural Science and Technology

	Natural Science MTbBE	Percentage %	Natural Science Non-MTbBE	Percentage %

Level 1- 0<29	1 out of 100 learners	1%	3 out of 100 learners	3%
Level 2- 30<39	3 out of 100 learners	3%	11 out of 100 learners	11%
Level 3- 40<49	14 out of 100 learners	14%	49 out of 100 learners	49%
Level 4- 50<59	53 out of 100 learners	9%	25 out of 100 learners	25%
Level 5 -60<69	16 out of 100 learners	53%	2 out of 100 learners	2%
Level 6- 70<79	9 out of 100 learners	16%	3 out of 100 learners	3%
Level 7- 80<100	4 out of 100 learners	4%	7 out of 100 learners	7%

Table 7.12 : Comparative Analysis for Natural Science and Technology

7.8. Chapter Summary

In a nutshell one can conclude that learners understand better when they are taught in their mother tongue. The presentation above proves that the cohort of learners in MTbBE schools who are being taught in their home language are doing extremely well when compared to the ones who are taught only in English. The focus of the next chapter will be data interpretation, analysis and will attempt to answer the research questions.

CHAPTER EIGHT
8. DISCUSSION ON DATA ANALYSIS AND FINDINGS

8.1 Introduction

Chapter 6 and 7 presented data that was collected for this study for both mathematics (the main focus) and Natural Science and Technology (for illustrative purposes). In this chapter the focus will be on discussing variables that also influenced the analysis of learner achievement related to the Cofimvaba MTbBE study and a discussion of related findings. The study employed a mixed method approach, which made use of both qualitative and quantitative methods. The purpose of this chapter is to provide a description of the mixed analysis conducted for this research, the term used for analyzing data in mixed research and link the variables that usually confound a study of this nature and see to what extent they influenced the findings. Broadly speaking, a mixed analysis involves using quantitative and quantitative data analysis techniques within the same study. This study is heuristic using real data and will illustrate how the researcher conducted a quantitative dominant mixed analysis, wherein the quantitative analysis component is given higher priority and qualitative data analysis is incorporated to increase understanding of the underlying phenomenon of bilingualism in the mathematics paper and how MTbBE learners used translanguaging in the Science paper. The theoretical framework underlying the research study is based on the conceptual framework relating to theories *on mother* tongue education, (bi)multilingual education and the link between language and mathematics/science learning. Qualitative analysis was done using thematic analysis (themes coming through in the analysis of the Bilingual Mathematics Question paper); whereas quantitative analysis employed a number of statistical techniques aided by both Microsoft excel and Statistical Package for Social Science (SPSS) to determine factors affecting performance of Grade 6 learners in both the MTbBE cohort and non MTbBE cohort. The first section of the chapter will describe what mixed analysis of data is; data questions presented; then followed by interpretation of the research findings.

8.2. Mixed Research Defined

This research adopted a Mixed Research design as declared on Chapter 5. What is referred to as mixed methods research, involves "mixing or combining quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study" (Johnson

& Onwuegbuzie, 2004). Collins, Onwuegbuzie, and Sutton (2006), identify main phases of the mixed research process namely:

- research conceptualization (i.e., determining the mixed goal of the study, formulating the mixed research objective/s (done in Chapter 5),
- determining the rationale of the study and rationale/s for mixing quantitative and qualitative approaches (done in Chapter 5),
- determining purpose of the study and the purpose/s for mixing quantitative and qualitative approaches (done in Chapter 5),
- determining the which questions will be qualitative, quantitative and or mixed research questions), find the questions below in 8.3
- research planning (i.e., selecting the sampling design, selecting the research design), and research implementation (i.e., collecting quantitative and qualitative data) Chapter 5
- analyzing the quantitative and qualitative data and interpreting the research findings (focus of this chapter).

Creswell (2008) argues that of the research steps outlined above, analyzing data in a mixed research study is potentially the most complex step because the researcher(s) involved has to be adept at analyzing both the quantitative and qualitative data that have been collected. The researcher has to integrate the results that stem from both the quantitative and qualitative analysis "in a coherent and meaningful way that yields strong meta-inferences (i.e., inferences from qualitative and quantitative findings being integrated into either a coherent whole or two distinct sets of coherent wholes (Tashakkori & Teddlie, 1998; Onwuegbuzie & Combs, 2010). The study is based on a mixed research design; analysing data (using QUAL+QUAN) was difficult but rewarding. Qualitative analyses enriches the narrative; quantitative analyses provides numerical evidence; this thesis has the advantage of both.

8. 2.1. Mixed Analysis Defined

Mixed analysis is the term used for analyzing data in mixed research. Onwuegbuzie and Combs (2010) recently provided an inclusive definition of mixed analysis that incorporates the definition and typologies that have been presented in major methodological works. These works included articles, book chapters, books, and paper presentations across numerous fields and disciplines such as the social and behavioral sciences (including psychology and education), nursing and allied health, business, and linguistics that spanned 21 years. Based on their interpretations of the extant literature, Onwuegbuzie and Combs (2010) identified 13

criteria that represent decisions that mixed researchers make before, during, and/or after the conduct of their mixed analyses:

8.3 Research Questions guiding this study

In discussions about methods, researchers typically do not see specific questions or hypotheses especially tailored to mixed methods research. However, discussion has begun concerning the use of mixed methods questions in studies and also how to design them (see Creswell & Plano Clark, 2007; Tashakkori & Creswell, 2007). In interpreting the data; the discussion will be divided into three subsections: Learners learning; Teachers Teaching and System Provision. The findings presented in this study are related to the research questions that guided the study.

Data analysis seeks to answer the following main research questions and sub-questions:

5. What lessons that can be learnt from the Mother Tongue-based Bilingual Education (MTbBE) pilot in Cofimvaba, and whether these lessons support the case for extending MTBBE for African language learners beyond Grade 3? *(in terms of Question 2, 3, 4, 5)*

From these lessons:

6. What is the performance of MTbBE learners in the mathematics test in their 6th year of exposure to learning mathematics in isiXhosa compared to that of learners who are not part of the program? Does this say anything about the role of language in mathematics learning, in the Cofimvaba case study?

7. The language of tests: what elements could present comprehensibility challenges in how mathematics examination scripts are set, whether in isiXhosa or English or bilingually?

8. What strategies do learners use to mitigate language barriers when faced with tests?

5. Do the Natural Science and Technology test results; demonstrate that MTbBE learners were able to understand questions in English and respond as required? What does this tell us about their development of proficiency in English? Does this disprove the oft cited concern that English proficiency will suffers as a result of instruction in the Mother Tongue?

The following section will address the importance of doing data interpretation within the transformative paradigm. It takes into consideration what critical issues should be considered that are of the nature of the mathematics packaged for schools and how they impact on performance of the marginalized groups. Transformative research doesn't only tell 'what'

narratives; it states the why part; in so doing it cautions prior the lens that we should use to interpret the data. Only describing what is of very little use, hence there is a balance of both.

8.4. Transformative analysis of mathematics

8.4.1. Hersh (1991) argues that the myths of unity, objectivity, universality and certainty are propagated by the institute of mathematics through a frontside-backside regionalism in its social structure. The frontside portrays mathematics in "finished form" to the public as formal, precise, ordered and abstract. The backside is characterized as the "backstage" mathematics of mathematicians: informal, messy, disordered and intuitive. Hersh's essay points to the fact that "all is not as it would seem" in mathematics, that there is a "behind closed doors" social element which goes unrecognized. It is this doubt that "all is not as it would seem" in mathematics that has prompted the rise of social constructivism as a philosophy of mathematics. Here, the creation of mathematical knowledge is presented as the result of a heuristic cycle in which subjective knowledge of mathematicians is presented to the public where it undergoes a process of scrutiny and criticism. This period of evaluation leads to either rejection or (social) acceptance of the conjecture as "tentative" mathematical knowledge thereby becoming "objective" knowledge.

The successful acceptance of new mathematical knowledge always remains open to refutation or revision (Ernest, 1991). If we accept that mathematical knowledge is constructed in such a fashion then we can recognize that there is an inherent social aspect to the formulation of mathematical knowledge. The connection between mathematics and certain social groups can be critiqued by examining the social construction of mathematical knowledge and the social systems in which mathematics is created, taught and used (Martin, 1997). The following questions are assessed:

- What counts as mathematical knowledge or academic performance?

- What do we study in mathematics? Who will teach mathematics, in what language and why? And, what counts as learning in mathematics?

A critical analysis of these questions will give us a fuller understanding of the interactions between mathematics and the social groups in question. What counts as mathematics? Mathematics as a socially constructed knowledge is subject to social influence. Historically we can see the "social imprint" of mathematical knowledge in the development of arithmetic to

support taxation, trigonometry to support navigation, mechanics and calculus to support military science, and statistics to support actuarial sciences (Martin, 1987).

He points out that the field of operations research was prompted by military needs in World War II and continues to be "maintained by continuing military interest" (p. 159). In the modern era, Hodgkin (cited in Martin, 1997) argues that the rise of "mathematics of computation" in mathematical study is the result of the influences of industrialization, meeting its needs for the development of computationally intensive technologies. So, what counts as mathematics is at least partly determined by the needs of society, these needs are linked to the social interests of those who hold power in society.

8.4. 2. What do we study in mathematics?

In modern schools the answer can be easily found: arithmetic, geometry, algebra, trigonometry, calculus, and so on. It is a science, we are told, which initiated with the ancient Greeks and was subsequently rediscovered in the Renaissance and developed by Europeans and their cultural descendants. It is what Joseph (1997) calls "the classical Eurocentric trajectory". Many historical revisionists have pointed out that myths about the history of mathematics are pervasive in the common textbook and classroom portrayal of the subject. Euclid, who both lived and studied in Alexandria in modern day Egypt, is portrayed as "a fair Greek not even sunburned by the Egyptian sun" (Powell & Frankenstein, 1997a, p. 52). What do we study in mathematics? We study the inventions of mostly white, European men, the dominant culture in the world today. Some have pointed out that this portrayal aligns scientific progress with European culture, leaving non-Europeans with the difficult choice of cultural assimilation in order to enjoy the benefits that scientific progress has provided (Powell & Frankenstein, 1997a).

What counts for learning in mathematics? If we avoid the temptation of objective absolutism in mathematics it becomes evident that even assessment can be seen in a "social" context that is differentially applied to certain social groups. Walkerdine (1997) argues that "mathematical truth" understood socially is inherently linked "with the truths of management and government which aim to regulate the subject". Thus the imagined "objective" assessment in mathematics can be seen as the extension of an organizational and managerial scheme which ultimately "sorts" pupils according to ability. Furthermore, Walkerdine notes that ability is measured in terms of "dominant" socially constructed notions in mathematics, thus, assessment in mathematics can be seen as a subtle means of "sorting" academic advancement according to

predetermined socio-cultural factors. Powell & Frankenstien (1997b) noted this phenomenon in their case study review of individuals possessing rich and varied "ethno-mathematical" knowledge which does not serve for advancement in school settings (D'Ambrosio, 1997). This discussion demonstrates that "what counts for learning in mathematics" interacts favourably with dominant social groups and unfavourably with social groups which occupy the margins of society like those of the majority of learners in South Africa. Questions concerning the interaction of the institution of mathematics and certain social groups should start with an admission that mathematics is a socially constructed human invention, once humans have invented something by laying down the rules of existence, like chess, the theory of numbers, or the Mandelbrot set, the implications and patterns that emerge from the underlying constellation of rules may continue to surprise us. But this does not change the fact that we invented the game in the first place. It just shows what a rich invention it was (Ernest, 1996). A Platonic denial of any interaction fails to recognize and acknowledge that mathematical concepts do not exist in isolation, but, are organized by humans with an intended purpose. In the social organization of the subject, we can see that mathematics does interact with social groups such as females, minorities, non-native speakers of English and those of lower social economic status. As non-members of the dominant class these social groups are systematically disadvantaged as mathematics does not serve their interests but rather reflects the interests of the dominant culture. Mathematics as it is presented overlooks the social historical contributions of the disadvantaged groups to the science and implies a necessary assimilation in the dominant culture in order to enjoy the rewards that the science has to offer; and the vistas it will open for the select few who can manage mathematics well. The transformative paradigm regards mathematics as an institution that disadvantages marginalized social groups by ensuring that English (and Afrikaans to a lesser extent) in South Africa; is the supreme language to teach it contributing to its unassailability thereby maintaining social structures while simultaneously devaluing rich and varied ethno-mathematical knowledge embedded in African languages. Those who know and possess the language of mathematics as a science and those who possess the language of instructing mathematics, can be assured of better future prospects. Lakatos (2002) posist that knowledge creation is part of a larger overall cycle in which mathematical knowledge is presented to learners in teaching and testing conversations in schools and universities, before they themselves can become mathematicians and participate in the creation of new knowledge. This study accepts that mathematics is cultural knowledge packaged in forms far removed from the poor and their lives.

8.5 Learners learning

1. What is the performance of MTbBE learners in the mathematics test in their 6th year of exposure to learning mathematics in isiXhosa compared to that of learners who are not part of the program? Does this say anything about the role of language in mathematics learning, in the Cofimvaba case study?

8.5.1 Discussion

There is general agreement as to the aims of teaching and learning mathematics as follows:

- to encourage and enable students to recognize that mathematics permeates the world around us
- to enjoy mathematics and develop patience and persistence when solving problems
- to understand and be able to use the language, symbols and notation of mathematics
- to develop mathematical curiosity and use inductive and deductive reasoning when solving problems
- to become confident in using mathematics to analyse and solve problems both in school and in real-life situations
- to develop the knowledge, skills and attitudes necessary to pursue further studies in mathematics
- to develop abstract, logical and critical thinking and the ability to reflect critically upon their work and the work of others

To do the above, learners would have to demonstrate an adequate level of

- **knowledge and understanding** as these are fundamental to studying mathematics and form the base from which to explore concepts and develop problem-solving skills. Through knowledge and understanding students develop mathematical reasoning to make deductions and solve problems. This is when language opens access to or inhibits what learners know or don't know. Language shrouds what learners know or don't know as the preoccupation becomes how to say it correctly in English; moving away from what I know or don't understand. The central concern of this study is ensuring that at least we remove the barrier that inhibits demonstrates what learners know and focus on finding out more.
- **investigating patterns**, it allows students to experience the excitement and satisfaction of mathematical discovery. Mathematical inquiry encourages students to become risk-

takers, inquirers and critical thinkers. Through the use of mathematical investigations, students are given the opportunity to apply mathematical knowledge and problem-solving techniques to investigate a problem, generate and/or analyse information, find relationships and patterns, describe these mathematically as general rules, and justify or prove them

- **communicating mathematically.** Mathematics provides a powerful and universal language. Students are expected to use mathematical language appropriately when communicating mathematical ideas, reasoning and findings, both orally and in writing. The mistake has been that this communication must happen in English for African language learners or other minorities in developed countries. There is no scientific explanation why African learners cannot use appropriate mathematical language (notation, symbols, terminology, formulae, diagrams, tables, graphs) in both oral and written explanations in their home languages. Not a single study has given empirical evidence as to why this cannot happen.

- **reflection in mathematics.** Critical reflection in mathematics helps students gain insight into their strengths and weaknesses as learners and to appreciate the value of errors as powerful motivators to enhance learning and understanding. How does a teacher encourage students to reflect upon their findings and problem-solving processes and encourage them to share their thinking with the class and peers and to examine different problem-solving strategies when they lock at the basic level of general communication. That is why the only strategy that is prevalent in poor, African language schools is teacher centred talk and rote learning dominates. It is the only way out.

The following section will interpret findings from the Grade 6 June examinations of both the MTbBE and non-MTbBE schools. It outlines the specific skills and concepts that were assessed, giving a detailed analysis of the findings, specimens of learner responses, possible explanations for observed performance and recommended remediation where possible are presented. The researcher states upfront that years of doing the same or trying out the same teaching and learning strategies without external assistance dominates the MTbBE environment. Any innovation or strategy introduced must take this contextual reality into consideration. Fortunately with MTbBE; it is what they did anyway (unsystematically), and minus extending it to assessment.

8.5.2 The findings of the Grade 6 June Mathematics Results
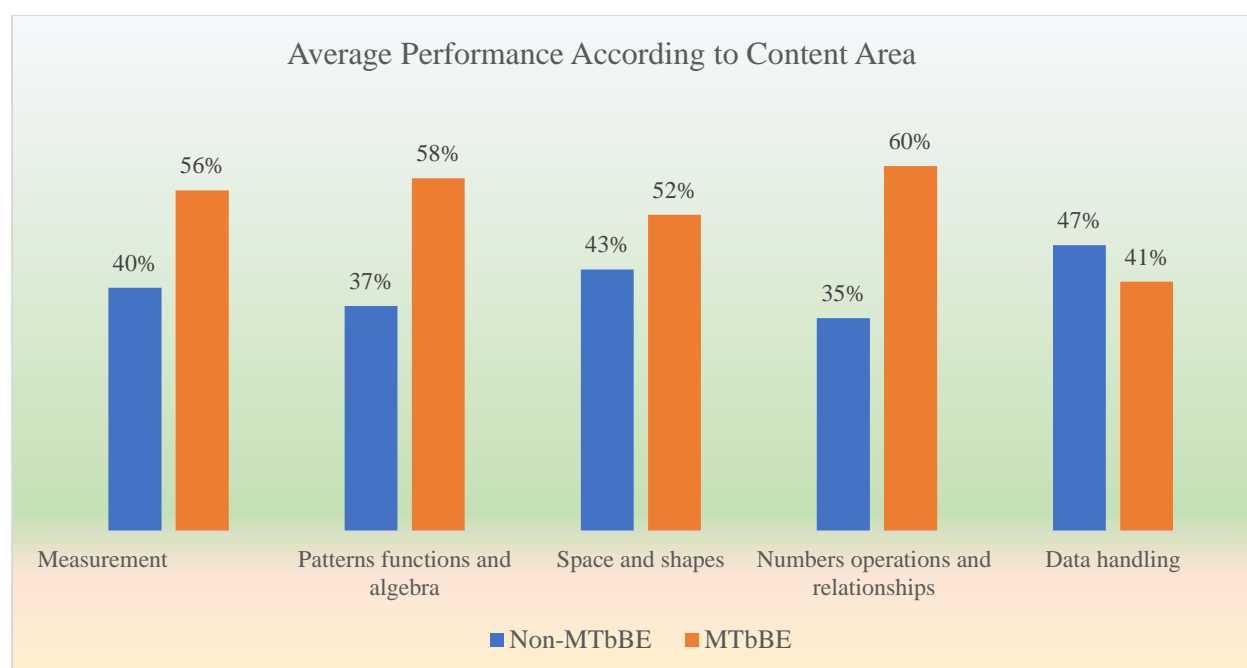
Figure 8.1: Average performance according to content Area

Content in Grade 6 is organized around the 5 content areas; the researcher decided to organize and package the analysis in no specific order of importance.

8.5.2.1. Measurements:

The MTbBE group did very well in this content area and achieved an average of 56% vs the non-MTbBE group. Scientists use many skills as they investigate the world around them. Measurement is perhaps one of the most fundamental concepts in science. Without the ability to measure, it would be difficult for scientists to conduct experiments or form theories. Not only is measurement important in science and the chemical industry, it is also essential in farming, engineering, construction, manufacturing, commerce, and numerous other occupations and activities. The MTbBE teaching strategy for both mathematics and science focused on measurement as rural children live with measurements. Whether it is measuring doses for animals (invitro or oral); doses for the grandparents; siblings or being the adult in the child-headed home dispensing medication or scarce resources; or simply measuring ingredients to make phuthu; cooking porridge or disinfecting water. Or estimate and measure distances from one homestead to another using and justifying the appropriate metric unit to measure length or distance in a given real life situation. The main strategy around teaching measurements was using the experience of rurality to bring home the concept of measurement. It should not be too difficult to extend this concept to demonstrate an understanding of the relationship between estimated and precise measurements, and determine and justify when

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each kind is appropriate. It was interesting to reverse the stereotypes of traditional roles by giving boys tasks that girls would usually do like estimating and measuring the volume and mass of sugar, flour, water and dried yeast used for baking bread and actually make it in class. Whereas girls would be given a task of estimating and measuring the area of a chicken coup or goat pen estimating the lengths of the structure and amount of wire mesh to be used for the door and collecting funds through selling items to get girls building equipment using terminology according to the SI system. This only serves as the basis of further learning; it is never a good idea to limit children to their environments; but using the old adage of moving from the known to the unknown is the best remedy to scaffold further learning. The determination of the relationships among units and measurable attributes, then progresses easier.

8.5.2.2. Numbers, operations and relationships

This strand examines numerous topics that encompass understanding numbers, representations, relationships, and number systems; the meanings of operations and relationships among those operations; and reasonable estimation and fluent computation. The MTbBE group performed on this strand at an average of 60% vs the non-MTbBE group. This strand covers questions on place value, divisibility, factors, fractions, decimals, percentages, ratios. There is general consensus that this strand maybe the most difficult than others due to its reliance on understanding numbers, number representations and its relationships in the number system. It is a remarkable achievement; for this group compared to an average performance of 35% of the non-MTbBE group.

8. 5.2.3. Space and shape

Pierre van Hiele (1986) posits that there are four levels of geometric thought that are sequential and hierarchical, these are the visualization level, the analysis level, analysis or descriptive level; the deductive level or rigour. Although it is unlikely that children at the early grades will move beyond the descriptive level. For learners to function at any given level, they must have developed confidence at the preceding level. Recognising the difference between the different properties of shapes happens during the deductive level of geometric thinking. People at this developmental level progression is based more on instruction and experience more than age or physical development. Developing geometric thinking depends on play and Geometry begins with play (van Hiele, 1999); this means playing with resources. Children in Cofimvaba do not have access a lot of resources like tangrams to play with; at their disposal were beads; teachers were encouraged to encourage children to bring as many beaded artwork as possible both

finished and products to be made (bead and string) so that children could get the exposure and experience of geometric and other properties of shapes and objects. It has been a joy observing lessons where beads with intricate geometric patterns were brought to class and discussed naming them in isiXhosa and isiZulu doing research on the meanings of the different shapes and objects covered in beads. The MTbBE group outdid the non-MTbBE group on this content area too with an average of 52% and 43% respectively for the latter. There needs to be a concerted effort to purchase materials for learners as manipulatives that learners can handle and experience to improve on this content area.

8. 5.2.4 Patterns, functions and algebra

Algebraic thinking is a crucial and fundamental element of mathematical thinking and reasoning. It initially involves recognizing patterns and general mathematical relationships among numbers, objects and geometric shapes (Windsor, 2010). The strand of Patterns, functions and Algebra in the mathematics curriculum is intended to explore the big ideas in algebraic thinking. Windsor argues how the ability to think algebraically might support a deeper and more useful knowledge not only of algebra, but the thinking required to successfully use mathematics (Windsor, 2010). It MTbBE learners performed on an average of 58% on this content area, which not only is exciting but attests to the fact that using a bilingual approach to mathematics allows our learners the ability to develop algebraic thinking skills to make sense of the different situations describing situations through pictures, charts, graphs and words, then we are on the right track to widening epistemological access to mathematics. MTbBE learners did extremely well on Questions 3, 4 and 17 which required interpreting and drawing conclusions from graphs; finding, describing and using patterns; using functions to make predictions; understanding linearity and proportional reasoning; understanding non-linear functions; and understanding and exploring algebraic structure.

8. 5.2.5. Data handling

At the level of primary school, data handling means gathering data and probably recording information to present it in a way that is meaningful to others, whether it is grouping it or classifying it through categories. Question 17 and 18 were Data Handling. The Non-MTbBE group outdid the control group on this content area, with an average performance of 47% and 41 % respectively. I ascribe this to the fact that the terminology around mode and median receives has been purely transliterated with very little concept formation in isiXhosa.

The overall performance of the MTbBE group is indicated below demonstrating gains.
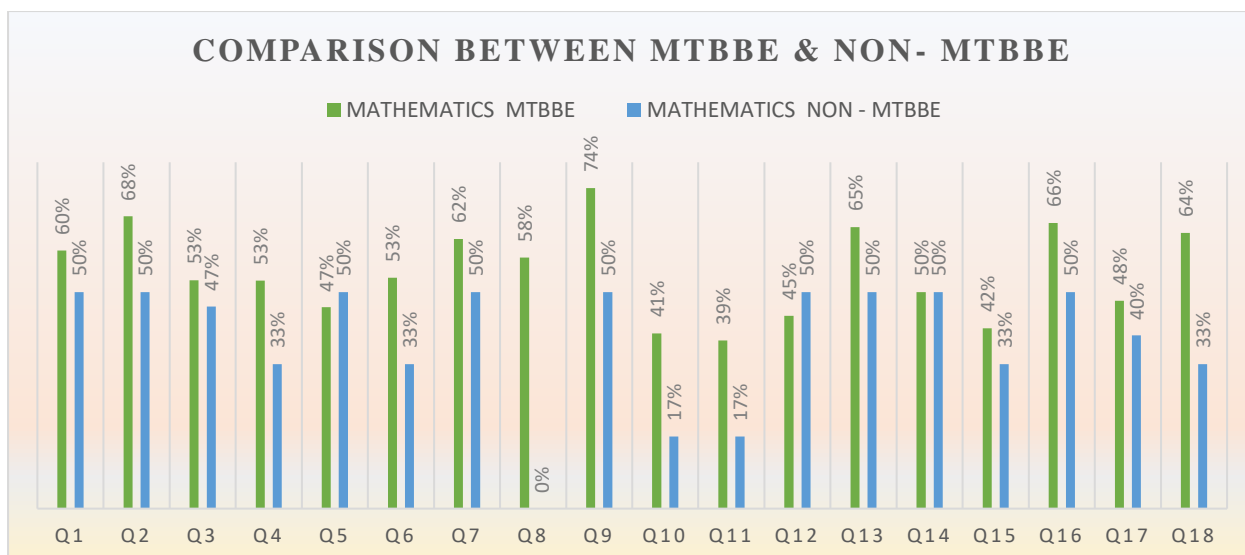
Figure 8.2: Comparison between MTbBE and Non-MTbBE

Question 1 Answer: The data interpretation and discussion above, demonstrate that the performance of Grade 6 MTbBE learners performed at an average of 53% in the 2018 maths June exams is significantly higher than the non-MTbBE learners performed at 40% in the same exam respectively. This is welcome news for the MTbBE program as it gets rolled out through all districts in the Eastern Cape. There are implications for exposure to more data handling activities.

8.6 Teachers Teaching

One of the key lessons we learn on the MTbBE study is the centrality of the teacher in the teaching of mathematics for poor, rural children. Teachers are absolutely key in determining whether a young person succeeds or fails in mathematics (Vorderman, Porkess, Budd, Dunne, & Rahman-hart, 2011, p. 82): The realisation that you do not teach good maths, unless you get inspirational teachers is a luxury associated with wealthy schools in South Africa. The levels of poverty both of the community, of the school and of learners make the most inspirational teachers to lose hope. One of the question asked in 8.5., is who will teach mathematics in which language and why? Well, naturally, teachers trained in mathematics will teach mathematics; this is rarely the case in rural South Africa. Issues of Teacher Provision determine what teachers kind of a teacher will teach mathematics. But here, again, the social effects of the construction of mathematical knowledge can be seen to have a particularly influential effect on the learning of mathematics in certain social groups. The study of Hill, Rowan and Ball (2005) found that the specialized content knowledge of mathematics possessed by teachers significantly affected student gains in mathematical knowledge over the course of a school year. In the discussion of

their findings they note that the measurement of teacher's mathematical knowledge was negatively correlated with the socio-economic status of the students. That is, poorly trained teachers, in terms of content knowledge of mathematics, have a tendency to teach in poorer schools; in our case it is African language schools in both township and rural schools. They go on to note that at least a portion of the gap in student achievement routinely noted in the Annual National Assessment and other assessments "might result from teachers with less mathematical knowledge teaching more economically disadvantaged students" (Hill. et.al., 2005). It then becomes apparent that "who will teach mathematics interacts with certain social groups according to economic status. This makes us to characterize the social construction of mathematical knowledge facilitated or disadvantaged according to our membership in the dominant economic class. Unfortunately, the majority of African language learners fall into the disadvantaged class.

The MTbBE pilot study report highlights the importance of good teaching in mathematics (as in all subject areas) although this is not always explicitly stated in what way. This study makes a number of recommendations related to teachers and teaching that start from recognising the importance of good teaching. Others are more explicit, highlighting the important role of the teacher. The policy issue at the heart of this study relates to the need to ensure the presence of "highly qualified teachers in every classroom" and to determine how best to define and prepare these "qualified" teachers. Quality teachers are often seen simply as "good" teachers and are considered to be those who exhibit desirable traits and uphold the standards and norms of the profession. But quality teachers are also considered to be those who bring about "student learning." These teachers are called "effective" (Berliner, 1987, 2005) or "successful" (Fenstermacher & Richardson, 2005). Fenstermacher and Richardson (cited in Berliner, 2005) distinguish between good teaching and successful teaching as follows: By "good teaching" we mean that the content taught accords with disciplinary standards of adequacy and completeness and the methods employed are age appropriate, morally defensible and undertaken with the intention of enhancing the learner's competence with respect to content. By "successful teaching" we mean that the learner actually acquires some reasonable and acceptable level of proficiency from what the teacher is engaged in teaching. Schleppergrell notes that a key challenge in mathematics teaching is to help students move from every day, informal ways of construing knowledge into the technical and academic ways that are necessary for disciplinary learning (2007). While many of SA's black African teachers are competent bilinguals (or, indeed, multilinguals), the fact of their not being native speakers of English may make it less

easy for them to guide learners towards these more 'technical' and 'academic' ways if they are only possible in English.

8.6.1 Sub-questions related to Teachers

1. Does educator's gender make a difference to achievement?

2. What does the age of educators tell us about the future and state of mathematics education in Cofimvaba District?

3. Do qualifications matter in the teaching and learning of this MTbBE group?

4. Does experience make a material difference in the achievement in mathematics and science?

5. What is the correlation between learner achievement in MST and happiness of the teacher in being part of the MTbBE program?

6. What is the performance of learners in the various categories? Do years in the program make any material difference?

7. Does teacher PPN stability make a significant difference to the achievement levels of learners?

The questions above were answered using different techniques from the SPSS package, correlation analysis and regression analysis. The first question seeks to determine if teacher gender has a positive impact on learners' performance. Before a regression analysis was carried to determine the role of teacher gender to learner's performance, the researcher started by doing a gender analysis so as to determine the number of female educators and the number of male educators. The graph below showed the number of participants in each gender.
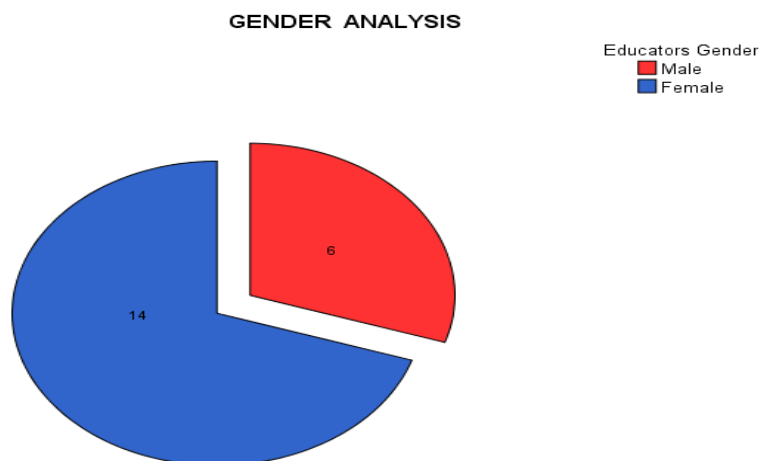
Figure 8.3: Data on Teacher Gender

From the graph above out of the 20 MTbBE schools that participated in this study, mathematics at 14 schools is being taught by female educators whereas on the other hand, in the remaining 6 schools mathematics is being taught by male educators. The information above clearly shows that the Department of Basic Education is making significant strides towards ensuring that equity targets are met by hiring more women from the previously disadvantaged group to teach mathematics. The mathematics education field comes from a history where males dominated mathematics teaching.

8.6.2. Relationship between teachers' gender and student's achievement

The study employed non-parametric test in SPSS using Mann Whitney U test, to answer the following research question: *Does educator's gender make a difference to achievement?* Therefore, we can hypothetically say that;

h_0. There is no statistically significant relationship between teachers' gender and student's achievement.

h_1. There is statistically significant relationship between teacher's gender and student's achievement.

 The results are presented in tables below.

Descriptive Statistics

			Std.			Percentiles		
	N	Mean	Deviation	Minimum	Maximum	25th	50th (Median)	75th
Maths MTbBE Performance	20	58.10	12.557	37	79	47.00	54.50	71.25
Educators Gender	20	1.7000	.47016	1.00	2.00	1.0000	2.0000	2.0000

Ranks

	Educators Gender	N	Mean Rank	Sum of Ranks
Maths MTbBE Performance	Male	6	9.17	55.00
	Female	14	11.07	155.00
	Total	20		

Test Statistics[a]

	Maths MTbBE Performance
Mann-Whitney U	34.000
Wilcoxon W	55.000
Z	-.661
Asymp. Sig. (2-tailed)	.509
Exact Sig. [2*(1-tailed Sig.)]	.547[b]

a. Grouping Variable: Educators Gender

b. Not corrected for ties.

Table 8.1: Relationship between teachers' gender and student's achievement

The ranks table results show us the group which has resulted in higher student's achievement, in this regard are female teachers who have a higher mean rank than male teachers. The test

statistics table though, shows us that the level of significance of the test is not significant. From this data it can be reported that performance of students in class of female teachers is not statistically significantly higher than performance of students in classes of male teachers (U=34, p = 0.509). Therefore, we accept the null hypothesis that; ***there is no statistically significant relationship between teachers' gender and students' achievement***. This implies that while female teachers are doing well in their classes; the ability to teach is the same between both genders and it has significant policy implications. Thus, both male and female teachers have similar ability to teach, meaning that there should not be any discrimination in recruiting teachers in the MTbBE program. The inclination to hire male teachers for mathematics teaching is therefore not substantiated. The Wayne and Youngs (2003) also posit that failing to reject the null hypothesis [i.e., that the relationship can occur by chance] does not rule out a relationship. Perhaps the study's sample size was too small then the measurement error too great to provide statistical confirmation. These issues prevent rejection of the possibility that differences occurred randomly, even if the qualification being studied does influence student achievement (p. 93). For these reasons, Wayne and Youngs sum up by saying that studies may establish that an observed teacher quality indicator matters but cannot convincingly show that an observed teacher quality indicator does not matter (p. 93).

8.6.3. What does the age of educators tell us about the future and state of mathematics education in Cofimvaba District?

The researcher did an analysis so as to determine the future of Mathematics education in Cofimvaba district. The graph below explains the future of mathematics in the district.
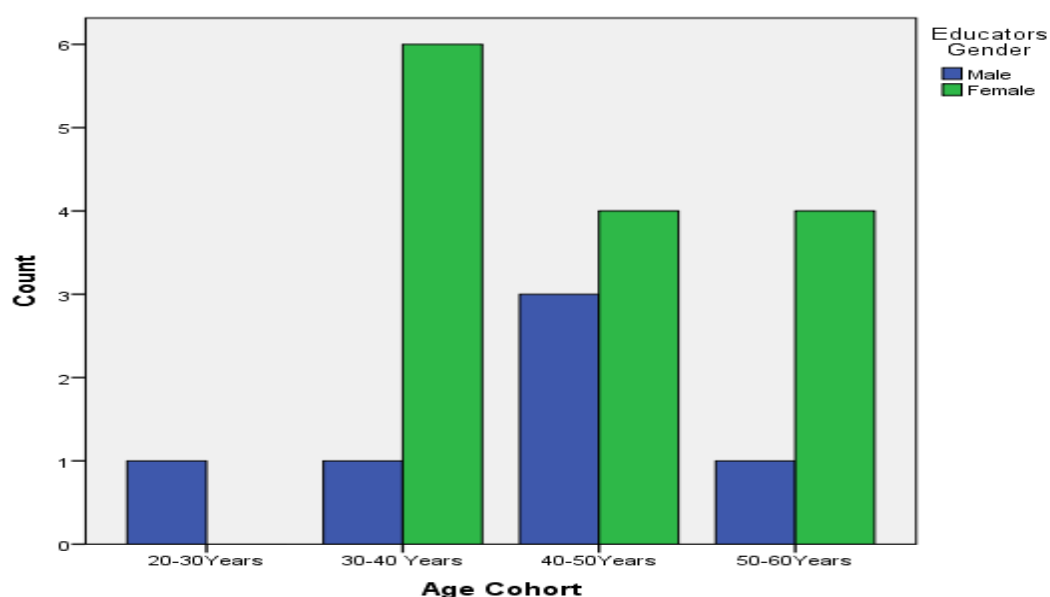
Figure 8.4: Future of Mathematics in the Cofimvaba District

From the above graph one can note that the future of mathematics may be bleak as the Province tends not to have a succession plan. The majority of the educators for this cohort are in the age range between 40 to 60years of age. There is only 1 educator within the age range of 20 to 30 years and this is a cause for concern; it shows that young people are not willing take the responsibility of teaching mathematics in rural areas. It is worth noting that educators age plays a significant role towards ensuring good performance as a regression analysis done by the researcher proved age to be statistically significant with .037; this means that the more experienced the educator; the better the results. The system though, has introduced the Fundza Lushaka Bursary scheme for students who want to do mathematics, Science and African languages and teach in the rural areas (DBE, 2009). We need to ensure that these new recruits are paired with experienced MTbBE educators.

8.6.4 Do qualifications matter in the teaching and learning of this MTBBE group?

Mathematics is considered as one of the most challenging subjects hence at time it is very difficult to have educators with their relevant expertise in teaching the subject. In the Cofimvaba district from the 20 MTbBE schools that participated in the study 10 of them had qualified mathematics teachers and 10 schools did not have the qualified personnel. The researcher conducted a correlations analysis so as to determine if qualification really matter in the teaching and learning of MTbBE group.

Correlations matrix the relevance of qualification in the teaching and Learning of MTbBE group.

		Maths MTbBE Performance	Educators qualification
Maths MTbBE Performance	Pearson Correlation	1	.641[**]
	Sig. (2-tailed)		.002
	N	20	20
Educators qualification	Pearson Correlation	.641[**]	1
	Sig. (2-tailed)	.002	
	N	20	20

**. Correlation is significant at the 0.01 level (2-tailed).

Table 8.2: relevance of qualification in the teaching and Learning of MTbBE group.

Source Author Field Data, 2019

The researcher computed the correlation matrix above so as to depict the relationship that exist between our 2 variables namely educators' qualification and Mathematics MTbBE performance. The table above shows a positive correlation with the value of r. (.641) significant at 0.01 (2-tailed) and this means that high scores for both variables go together and low scores for both variables also go together. To explain this in the Zuzovsky (2003) study on the correlation between teacher qualifications and learner achievement in Israel; they found that if a teacher has a first academic degree in mathematics, he or she is much more likely to have students gaining the higher scores on achievement tests than if he or she has only a non-university education. However, teachers' further education, for a second academic degree in mathematics had no relationship with student achievement. Multicollinearity between teacher variables can also mask the relationship between some of these variables and student achievement. Wayne and Youngs (2003) used the following example to illustrate this problem: analysis may show that having a Masters' degree matters, but it is likely that teachers with a

Masters' degree also have more teaching experience. Thus, what appears attributable to a Masters' degree may instead be attributable to experience.

8.6.5. What is the correlation between learner achievement in MST and happiness of the teacher in being part of the MTbBE program?

Individual teachers were interviewed from the sampled MTbBE schools for the June examinations that participated in the study and the aim of it was to determine the correlation between the educator's feeling and learner's performance in Maths and Science. Educators expressed their feelings on being part of the MTbBE program and the majority of the educators were happy to be part of the MTbBE program.

Educators from schools MMT2, MMT 4, MMT12, MMT13 and MMT 17 feel extremely happy about being part of the MTbBE program as they are teaching a learner of the African origin in his/her home language. Most of these teachers felt that the program assists the learners to be in touch with reality as they tend to get lost when the educator uses English only. Educators from 4 schools in the MTbBE cohort are not happy at all about being part of the MTbBE program as they feel that the protection of the department of the MTbBE post is a disadvantage to them. They want to be in excess so that they can move to more urbanized towns. Another issue is the workload associated with the MTbBE program. The 4 educators complained of the amount of work that must go into the teaching and the new vocabulary and terminology that they themselves have to re-introduce as time consuming. They are used to opening a textbook and continue with the work without thinking deeply of who might understand or not understood. They feel that the department must bring the program to them when it is complete; they do not want to be action researcher and reflect on their teaching. They do their studies with universities after school leaving them no time.
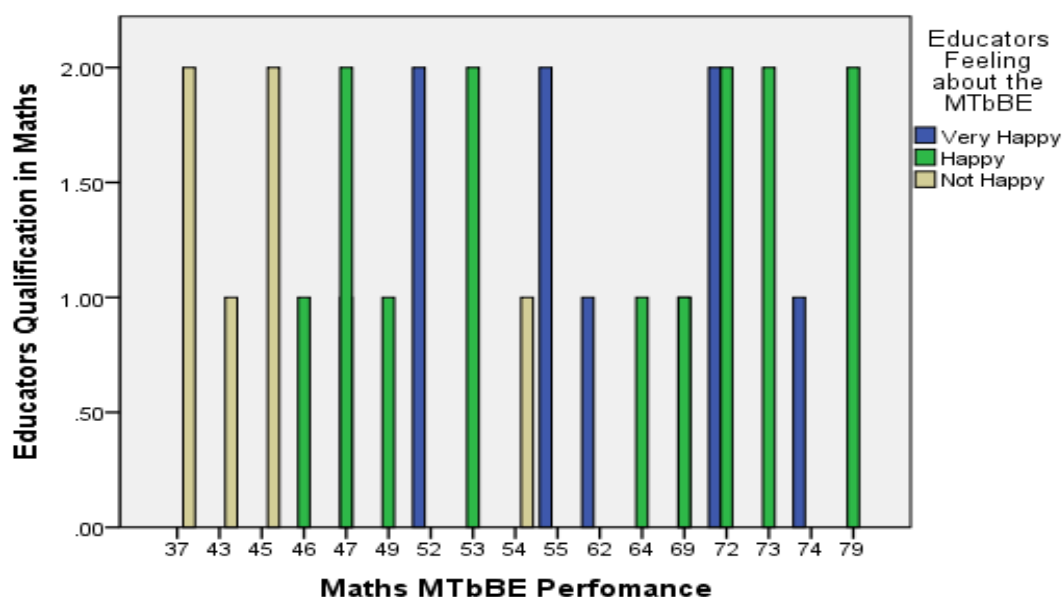
Figure 8.5 : Effects of Educators feelings on Learners performance

From the diagram above one can deduce that all the 3 lowest performing schools does have educators who are not even happy about being part of the MTbBE program. On the other side top 3 performing schools in this cohort, number 1 and number 3 have educators who are extremely happy about being part of the program, also the second highest performing school have an educator who is happy to be part of the program.

8.6.6. Correlation Analysis: Effects of Educators feelings on Learners performance

The researcher made an assumption that there is a direct relationship between educators feeling about being part of the MTbBE program and the performance of the learners. The study conducted a Pearson correlations analysis to determine if truly the feelings of educators for being part of the MTbBE has a bearing on learners' performance. The correlations are presented in the table below.

Correlations matrix for educators feeling on learner's performance

		Educators Feeling about the MTbBE	Maths MTbBE Performance
Educators Feeling about the MTbBE	Pearson Correlation	1	-.476[*]
	Sig. (2-tailed)		.034
	N	20	20
Maths MTbBE Performance	Pearson Correlation	-.476[*]	1
	Sig. (2-tailed)	.034	
	N	20	20

*. Correlation is significant at the 0.05 level (2-tailed).

8.3: *Correlations matrix for educators feeling on learner's performance*

Source: Author Field Data, 2019

The table above shows the Pearson correlation matrix that was computed using SPSS so as to depict the relationship between educators' feelings about being part of the MTbBE program and learner's performance. The above table proved that there is an inverse correlation between these two variables with significance at 0.03(2-tailed). This entails that if the value of 1 variable goes up, the value of the other variable goes down.

8.6.7. Does teacher PPN stability make a significant difference to the achievement levels of learners?

In order to answer the questions as to whether PPN stability make a significant difference to the achievement level of grade 6 leaners, a nonparametric test in SPSS was employed using the Mann Whitney U test. We can Hypothetically say;

h0. There is no statistically significant relationship between educators PPN stability and learners' achievement level.

h1. There is a statistically significant relationship between educator's PPN stability and learner's achievement.

The tables below present the results.

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Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Maths MTbBE Performance	20	58.10	12.557	37	79
Stability W.R.T. movement of Educators	20	1.4000	.50262	1.00	2.00

Ranks

	Stability W.R.T. movement of Educators	N	Mean Rank	Sum of Ranks
Maths MTbBE Performance	Stable	12	12.96	155.50
	Not Stable	8	6.81	54.50
	Total	20		

Test Statistics[a]

	Maths MTbBE Performance
Mann-Whitney U	18.500
Wilcoxon W	54.500
Z	-2.279
Asymp. Sig. (2-tailed)	.023
Exact Sig. [2*(1-tailed Sig.)]	.020[b]

a. Grouping Variable: Stability W.R.T. movement of Educators

b. Not corrected for ties.

8.4: Relationship between teacher PPN stability and performance

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Maths MTbBE Performance is the same across categories of Stability w.r.t. movement of Educators .	Independent-Samples Mann-Whitney U Test	.020[1]	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

[1]Exact significance is displayed for this test.

The test statistics table shows us the level of significance of the test. From this data it can be reported that performance of students is heavily influenced by educator's PPN stability and we can safely say that educators' PPN stability is statistically significant in enhancing learner's achievement level (U= 18.500, p = 0.023). Therefore, we strongly reject the null hypothesis that; *There is no statistically significant relationship between educators PPN stability and learners' achievement level.* This means that the performance of learners is heavily influenced by the stability of the educator, the more unstable the educator is the poor the performance of learners and the more stable the educator is the better the performance.

Teachers are often reported to be at the heart of the crisis (Shalem and Hoadley 2009; Graven 2012). Teacher morale is at an all-time low with a large percentage of teachers indicating that they would leave the profession if they could (OECD, 2008). Teacher attrition is greater in mathematics and science as these skills are highly sought after. Furthermore, it is becoming increasingly difficult to attract students into teaching as it holds low status as a profession. While teachers are often 'blamed' for the crisis, little systemic support is provided for teachers. Short one- or two-day courses by district officials do little to empower teachers to enact and make sense of the new mathematical and pedagogical practices promoted in curriculum revisions. Shalem and Hoadley (2009) argue that the relations between enduring economic inequalities in South Africa, an underspecified new curriculum and the bureaucratization of teachers' work have created an intractable pattern of accumulation of educational disparity among teachers in South Africa. Teacher morale needs to be considered in the context of these

structural conditions. With this contextual background I turn to review the literature relating SES and mathematical performance or learning opportunities. I engage first with large-scale studies identifying key factors and then with research seeking understanding of the complex relationships and mechanisms of influence of the factors. Through this review various questions about the nature of the relationship between mathematics and SES emerge, as particularly illuminated by the extremes of poor performance and inequality in the SA context.

The SES as a Factor influencing performance

Carnoy et al. (2012) pointed to teacher quality and opportunity to learn (e.g. average of 52 lessons in SA and 78 in Botswana over a ten-month period) as key influencing factors on the differential performance across the border. While their study did not particularly pose questions addressing learner and teacher agency and dispositions, they note a 'South African effect', that is, the years of apartheid may still weigh on teachers' and students' perceptions of how successful both can be academically'' (p.3). Their data suggests under-expectation of learners to be a key problem in South Africa.

An important aspect of this study is that it measured gains in student learning through pre- and post-tests over an academic year rather than simply looking at SES and performance at a particular point in time. This design contributes a richer understanding of the relationship between SES and mathematics achievement as it places at its centre the Opportunity to Learn (OTL).

8. 7. ANALYSIS OF THE EXAMINATION SCRIPT

The mathematics question paper comprised of 18 questions with different features that I term mainly linguistic (for those questions that rely heavily on the understanding of the language of the question); it comprised of 28% Linguistic features. The other part was 28% of what I term symbolic features; these are questions that are mainly composed of numbers; they do not necessarily require a huge reliance on understanding linguistic features. The remainder of questions paper had 44% of the questions with both linguistic and symbolic features. The question paper was analyzed for:

- features that were found in the examination script,
- features that were specific to the Bilingual Question paper,
- how these features landed themselves into themes,
- whether these themes did have an impact on the results of the MTbBE learners.
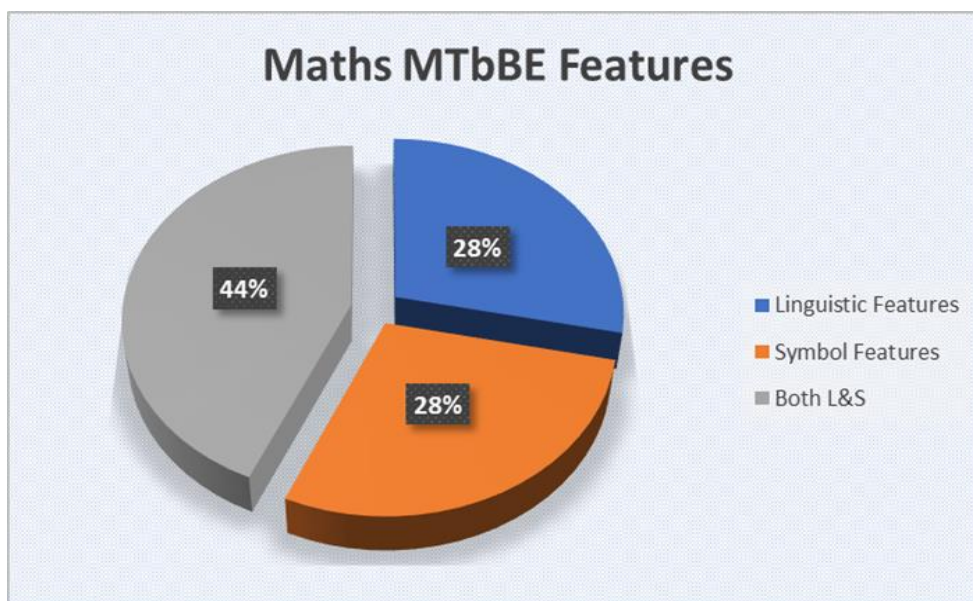
Figure 8.6. Mathematical Language
8.7.1. The nature of mathematical discourse

Mathematical discourse has a number of distinctive features, including some aspects which are particular to mathematics classrooms. Mathematical discourse has a specialist mathematical vocabulary, which includes: technical terms specific to mathematics (viz. khoshiyenti/quotient, okunokwenzeka/probability); specialist use of more general terms (e.g. line, factor, frequency); mathematical terms that use everyday words used for unrelated ideas (viz. khapasiti/capacity, function, umahluko/difference, ieriya/ area). Relevant mathematical vocabulary must still be used and learnt in isiXhosa. MTbBE teachers were initiated into a number of distinctive features, including those aspects which are particular to mathematics classrooms. Mathematical discourse includes specialised ways of talking, including written and spoken forms of mathematical explanation, proof or definition, as well as text types like word problems. These broader ways of using language are important in expressing mathematical ideas and reasoning. Strategies for supporting to the development of mathematical ways of talking have to involve creating rich opportunities for students to explain their thinking (Barwell, 2002). Another important point is that in classrooms, mathematical discourse has a social dimension ranging from the particular ways that learners and teachers talk in class that are not specifically mathematical in nature, but are associated with mathematics i.e. The June 2018 Question paper 3.5 requires that learners 'simply the following'; or question 11: 'complete the table below'. Mathematics activities must support language development in relation to different aspects of mathematical discourse within mathematics teaching whether in isiXhosa or any other

language; teaching in an African language doesn't remove this aspect. It is an important aspect; especially when using isiXhosa or Sesotho, that are young scientific or mathematical languages; teachers need to be aware of this aspect.

8.8. Content or Thematic Analysis of the question paper:

Imiyalelo/ Instructions:

Funda yonke imiyalelo yombuzo ngamnye (Read all instructions in each question).

Phendula yonke imibuzo kwiphepha olinikiweyo (Answer questions on given script).

Bhala ngokucocekileyo nangokubonakalayo (Write clearly and legibly).

Bonisa konke osebenze ngako (Show all your calculations)

Nambarisha iimpendulo zakho ngokuthe ngqo (Number answers correctly)

Zingasetyenziswa iikhaltyhuleytha (Use of calculators is not allowed).

Iidayagram zingangazotywa kwiskali (Diagrams might not be drawn to scale)

Content or Thematic Analysis of the question paper:

NB: I have inserted colour to my analysis of the question paper for

Giving a translation for the thesis reader where there is none

I have created a rubric in terms of themes that emerge in the questions paper as ff:

Source / Target Language	Question Comprehensibility depends on Linguistic or symbol features (yellow)	Major or Minor Error in Translation (red)
Source Language Problem SLP= A/C (ambiguity)	QC= LF	Major Language Error (MjLE)
Target Language Problem (TLP)	QC = SF	Major Translation Error (MjTE)
This will identify whether the problem is with the Source Language (English) or whether is with the Target Language (isiXhosa)	QC= Both (BLS)	Minor Language Error (MiLE)
	This theme relates to whether the comprehensibility of the question depends on understanding language features (LF) or symbols (SF) or both (BLS)	Minor Translation Error (MiTE)
		This theme relates to severity of either Target Language Errors or Translation Errors. Will the error make a material difference to

Style:
S = relates to orthographic rules like spacing, hyphenation, capitalisation etc.

	learner's response to the question paper (Major Language or Translation Error = MjL or MjTE or will it not make any difference to how the learner will respond (MiLE or MiTE)

The Discourse Analysis (DA) is marked in red, yellow and green on the examination script for ease of reference.

Umzekelo (Example)

Four possible answers are given in question 1 and only one is correct. Choose the correct answer/

Iimpendulo ezine ezilindelekileyo zinikiwe kumbuzo 1 yaye inye kuphela echanekileyo. Khetha impendulo echanekileyo.

1   **800** $\times$10 =

A   9 000
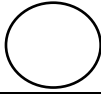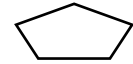
B   18 000

C   8 000

D   81 000
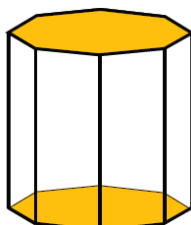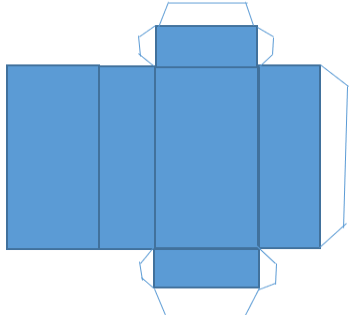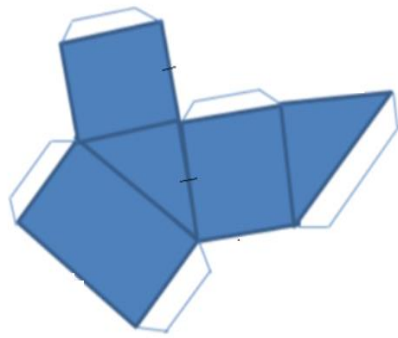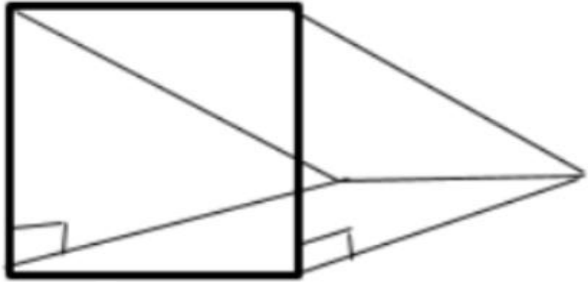
     Xa ukhetha u C. Ukhethe chanekileyo

1	1.1 BLS	What is the place value of the underlined digit in 734 689 532? Lithini ixabiso lendawo ledijithi enomgca ku 734 689 532?	
	A	Hundred Millions/Ikhulu lemiliyoni	
	B	Ten Thousand Millions/Ishumi lamawaka eemiliyoni	
	C	Millions/miliyoni [MjTE 1] Millions is in singular.	
	D	Hundred Thousands/Ikhulu lamawaka [Style=C] no capitalisation w	(1)
	1.2 BLS	Which number is a prime number/Leliphi inani? [MjTE 2] Left out prime number. It reads which number?	
	A	35	
	B	27	
	C	17	
	D	15	(1)
	1.3 BLS	What is the next number in the sequence/Leliphi inani eliyiprayim? 0,17; 0,15; 0,13; 0,11; _____ [MjTE 3] Wrong Translation	
	A	0,09	
	B	0,9	
	C	0,009	
	D	0,100	(1)

	1.4 LF	Which of the following figures has more than one line of symmetry/Yeyiphi kwezi figa zilandelayo enomgca wesimetri ongaphezulu kwesinye?	
	A		
	B		
	C		
	D		(1)
1.5	BLS	Sandra wrote the following pattern on the board/ USandra ubhale iphatheni elandelayo ebhodini: 3; 6; _____; ____; 48 Which numbers are missing/Ngawaphi amanani angekhoyo?	
	A	9; 12	
	B	9; 19	
	C	12; 21	
	D	12; 24	(1)
1.6	BLS	A regular pentagon has _____ sides. Iphentagoni eredyula inamacala a _____	
	A.	8	
	B.	7	
	C.	5	
	D.	6	(1)
1.7	LF	The number of hours in 3 days is/Inani leeyure kwiintsuku ezi 3 ngu? [S=H] left out hyphen between ezi-3	
	A.	72	
	B.	24	
	C.	36	
	D.	48	(1)
1.8	BLS	Which number is the nearest to 13 800? Leliphi (elona) inani elisondezwe ku 13 8000?[MiTE 1] left out elona	
	A	13 900	
	B	13 850	
	C	13 950	
	D	13 650	(1)
1.9	BLS	Which percentage has the same value as 0,32? Yeyiphi ipesenti enexabiso elifanayo njengo (no) 0,32? [MiTE 2]	

	A.	3,2%	
	B.	0,32%	
	C.	2,3%	
	D.	32%	(1)
1.10	LF	A glass has a volume of 250 ml. How many glasses can a 2,5l bottle of cold drink contain? Iglasi inevolyum engu 250 ml. Zingaphi iiglasi ezinokuqulathwa yibhotileyesiselo engu 2,5l?[Style spacing – yibhotile yesiselo]	
	A.	2	
	B.	8	
	C.	10	
	D.	4	(1)
			[10]
2			
2.1	BLS	From a group of numbers below, choose a number divisible by 5:	(1)
		116 140 122 144 Kwiqela Labantwana elingentla, khetha inani elohluleka ngo 5.	
2.2	LF	Arrange the numbers below in descending order Cwangcisa amanani angezantsi nge-oda eyehlayo. 189 243; 891 123; 918 143; 198 123	(1)
2.3	BLS	Insert the correct relationship sign/Fakela uphawu lolwalamano oluchanekileyo > ; < ; =	
	2.3.1	100% 2	(1)
	2.3.2	$\frac{1}{4}$ $\frac{1}{5}$	(1)
3	LF	Simplify the following/ Yenza okulandelayo lkube kwimo elula:[S]	
3.1	SF	32 385 + 9 456 + 4 710	(2)
3.2	SF	89 066 – 49 625	(2)
3.3	SF	3 604 × 34	(2)
3.4	SF	9 648 ÷ 37	(2)
3.5	SF	8 – 3,75	(2)
3.6	SF	$5\frac{3}{7} + 1\frac{4}{7} - 2\frac{2}{7}$	(3)
3.7	SF	4,35 + 6,37	(2)
4.	BLF	There are 535 boys in the camp. An equal number of girls join them in the camp. How many learners are at the camp? Kukho amakhwenkwe ayi 535 enkampini. Inani elilinganayo lamantombazana libajoyinile kwinkampu. Bangaphi abafundi abasenkampini?	(2)
5.	BLF	Kenny must decide whether she wants half of 40 sweets or a quarter of 180 sweets. Which one must she choose to get the most sweets? UKenny [umele] (mak)agqibe ukuba ufuna isiqingatha seswiti eziyi 40 okanye ikota yeeswiti eziyi 180. Yeyiphi amakayikhethe ukuze afumane iiswiti ezininzi? [Style- T]	(2)

6.	BLF	Ammy wants to buy a second hand car for R18 000. He has R14 500 in his savings account. UAmmy ufuna ukuthenga isekeni lemoto nge R18 000. Une R14 500 kwi-akhawunti yolondolozo.	
6.1	LF	How much does he still need to buy the car? Usafuna malini ukuze athenge imoto?[MiTE 3] Usadinga …	(1)
6.2	BLF	His mother will give him R2 300. How much does he still need? Umama wakhe uza kumnika I iR2 300. Usafuna malini?[MiTE 4] Usadinga malini?	(1)
6.3	BLF	The car needs 4 new tyres and a new spare wheel at the cost of R650 each. How much will the tyres cost him? Imoto ifuna amavili amatsha ama- 4 kunye nelinye elisisipere ngexabiso eliyi R650 lilinye. Lilinye. Ayakuxabisa ntoni amavili ewonke? [MiTE 4] separated lilinye as a standalone.	(1)
7.	BLF	Each picture below represents a number. By adding the numbers, you will find the totals in the boxes. Calculate the rest of the totals and fill in the empty boxes. Umfanekiso ngamnye ngezantsi umele inani. Ngokudibanisa amanani uyakufumana iitotali kwiibhokisi. Bala intsalela yeetotali uze ugcwalisele iibhokisi ezingenanto. [MiTE 5] uzalise	
			(4)

8. BLF		Sipho is paid R155 per hour. How much will he get paid for working $6\frac{1}{2}$ hours? USipho ubhatalwa i R155 ngeyure. Uyakubhatalwa malini ngokusebenza iiyure eziyi $6\frac{1}{2}$?	(1)
9.	BLF	Fill in the missing input and output values in the flow diagram below. Fakela ixabiso legalelo nesiphumo kwiflow dayagramu engezantsi.	

			(2)

Flow diagram: inputs 3, 6, 9, (blank) → × 12 → −4 → outputs 32, 68, (blank), 140

10.	10.1	Look at the pattern below and draw stage 4. Jonga le patheni ingezantsi uze uzobe isigaba sesi-4. [S=H]	

Stage 1   Stage 2   Stage 3

10.2	BLF	Complete the table below/Gqibezela le theyibhule ingezantsi:	

Stage No.	1	2	3		10		____	(2)
No. of match sticks	3	5	7		____		75	

10.3	LF	Describe the rule in your own words. Chaza umthetho ngamazwi akho.[S=T] iruli	(2)

11.	BLF	Complete the table below/Gqibezela itheyibhule engezantsi:	

	11.1							(4)

SHAPE/ IMILO	NAME OF OBJECT/ IGAMA LE-OBJEKTHI	NUMBER OF FACES/ INANI LEEMBU-SO	NUMBER OF VERTICES/ INANI LEEVETHEKSI [S=S]	NUMBER OF EDGES/ INANI LEMIPHE-THO
	_____	_____	_____	_____

11.2	LF	Look at the nets in box A and B below and answer the questions that follow. Jonga iinethi kwibhokisi A no B ngezantsi uze uphendule imibuzo elandelayo. [MiTE 6] inethi = iinethi and Spelling -o-	

Box A   Box B

	LF	Which 3-D object can be folded with the net in Box B Yeyiphi i-objekthi e3-D enokusongwa ngenethi kwibhokisi [MiTE 7]	
	11.2.1	Kwibhokisi A? Box A ? remove kwibhokisi above, bring it down here.	(1)
	11.2.2	Kwibhokisi B? Box B? do the same for this question.	(1)
12.	LF	What is the difference between a sphere and a cone? Yintoni umahluko phakathi?[MjTE 4] Incomplete translation. Yintoni umehluko phakathi kwesifere nekhowuni?	(2)
13	LF	Name the 2-D shapes and the number of each shape that form the 3-D object below. /Xela iimilo ze2-D nenani lemilo nganye eyenza le objekthi engu 3-D ngezantsi.[MjTE 5] Incorrect translation. Chaza amagama eemilo ezi 2-D kunye nenani lemilo nganye eyenza le 3-D objekthi ingezantsi.	(2)

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Copy the table below to answer the question/ Kopa itheybhule engezantsi ukuphendula imibuzo.

Name of 2-D shape/ Igama lemilo engu2-D [S=T e 2-D]	Number/ Inani

14.	LF	The two trains (train A and train B) use the same route, stop at different stations at different times along the Gauteng Metrorail route. Read the table below that shows stations and time, then answer the questions that follow. Iitreyini ezimbini zisebenzisa indlela efanayo kwizitishi ezohlukileyo ngamaxesha ahlukeneyo kwindlela iGauteng Metrorail. [S=T umzila instead of indlela] Funda itheybhule engezantsi ebonisa izitishi nexesha, phendula ke imibuzo elandelayo.	

	SF	Station/isitishi	Time/ixesha	

Station/isitishi	Time/ixesha
Orlando	10:47
Mlamlankunzi	10:50
New Canada	10:53
Longdale	10:57
Croeses	10:58
Langlaagte	11:02
Grosvenor	11:05
Mayfair	11:07
Braamfontein	11:10
Johannesburg	11:15

14.1	BLF	How long does train A take to travel from Orlando to Johannesburg? Ithatha ixesha elingakanani itreyini A ukusuka eOrlando ukuya eJohasnnesburg?[MiTE 9 Uthatha …, utreyini A , eRhawutini?]	(1)
14.2	BLF SLP	At what time does train B on the Orlando – Johannesburg route will arrive in Johannesburg when it leaves Orlando station at 12:55? Iyakufika nini itreyini B eJohannesburg kwindlela iOrlando – Johannesburg xa iphuma kwisitishi iOrlando ngo 12:55? [English =At what time will train B … route arrive in Johannesburg …] [S=T Uyakufika nini utreyini B eRawutini xa uhambe ngomzila ophakathi kwe Orlando-neRawuti ushiya istishi iOrlando ngo 12:55?]	(1)
15.	BLF	The municipality wants to empty the dam that holds $6kl$ of water to $20l$ tanks. How many tanks can be filled from a dam? UMasipala ufuna ukukhupha amanzi onke kwidama eliginya isi $6kl$ samanzi kumatanki ayi $20l$. Kungagcwaliswa amatanki amangaphi ngedama?[MiTE 10 replace eliginya with … elithwala i 6kl yamanzi kumatanki e ayi 20l	(3)

16.	BLF	A car uses $8l$ of petrol to cover 100 km, what distance will the car travel on $24l$ of petrol? Imoto isebenzisa i$8l$ yepetroli ukuhamba umgama oyi 100km, iyakuhamba umgama ongakanani nge 24l yepetroli?[MjTE 6] incomplete translation.	(2)
17.	BLF	Read the double bar graph below which shows grade 6 learners' favourite fruit and answer the questions that follow. Funda ibha grafu ephindiweyo ngezantsi ebonisa iziqhamo ezithandwayo ngabafundi bebanga 6 uze uphendule imibuzo elandelayo. **FAVOURITE FRUIT OF GRADE 6 MATHEMATICS LEARNERS.** _Bar graph: Number of learners vs Types of fruit (Apples, Strawberries, Grapes, Bananas, Kiwis, Oranges), Girls (black) and Boys (grey)._	
17.1	BLF	How many Mathematics grade 6 learners? Show the number of girls and the number of boys. [SLP=A] Write down the number of girls. Bangaphi abafundi beMathematika kwibanga 6? Bonisa inani lamantombazana namakhwenkwe?[S=T … nenani lamakhwenkwe].	(2)
17.2	LF	Which fruit was the girls' favourite?/Sesiphi isiqhamo esithandwa ngamantombazana?	(2)
17.3	LF SLP	If you were a fruit seller outside the school, which fruit would you not like to bring to sell? Why?[English is too cumbersome] If you were a fruit seller outside the school, which fruit would you not like to sell? Why? Ukuba ungumthengisi weziqhamo ngaphandle kwesikolo, sesiphi isiqhamo ongenakuthanda ukusithengisa? Kutheni?	(2)
18.		Below are Mathematics percentage marks obtained by Thandile and his grade 6 friends. Ngezantsi yipesenti yamanqaku eMathematika afunyenwe nguThandile nabahlobo bakhe be banga 6. 86%; 49%; 52%; 80%; 65%; 73%; 52%	
18.1	BLF	Arrange the marks in ascending order/Cwangcisa amanqaku ngokwemo yonyuko.	(1)
18.2	LF	What mark is the/Ngubani inqaku eliyi:[S=T Leliphi inqaku eliyi]	
		18.2.1	Mode/ Mowudi?	(1)
		18.2.2	Median/Midiyeni?	(1)

Itotali: 75 Amanqaku

Questions within the paper had three main features namely Linguistic features, symbolic features and both linguistic and symbolic features. Only 3 questions had symbolic features and these are question 1, question 3 and question 14. 12 questions had both linguistic and symbolic features, and students seemed to be doing well in these kinds of questions as out of 12 questions in 8 questions the performance was above 53%. In addition, the question paper also had 3 linguistic features questions. This posed challenges as in 66% of the questions with linguistic features students failed to get an average performance that is above 45%.

8.8.1. Average Pass rate per Question Feature

Question Features	Number of Questions	Average Percentage Per Feature
Linguistic Features	3 Questions	50%
Symbolic Features	3 Questions	57%
Both Linguistic and Symbolic Features	12 Questions	57%

Table 8.5: Average Pass rate per Question Feature

The table above gives an indication of the pass rate per question feature, it can be noted that on linguistic questions the average pass rate was 50%, 57% on symbolic questions and another 57% on linguistic and symbolic features. The graph below will illustrate the relationship between features of the question and average performance.
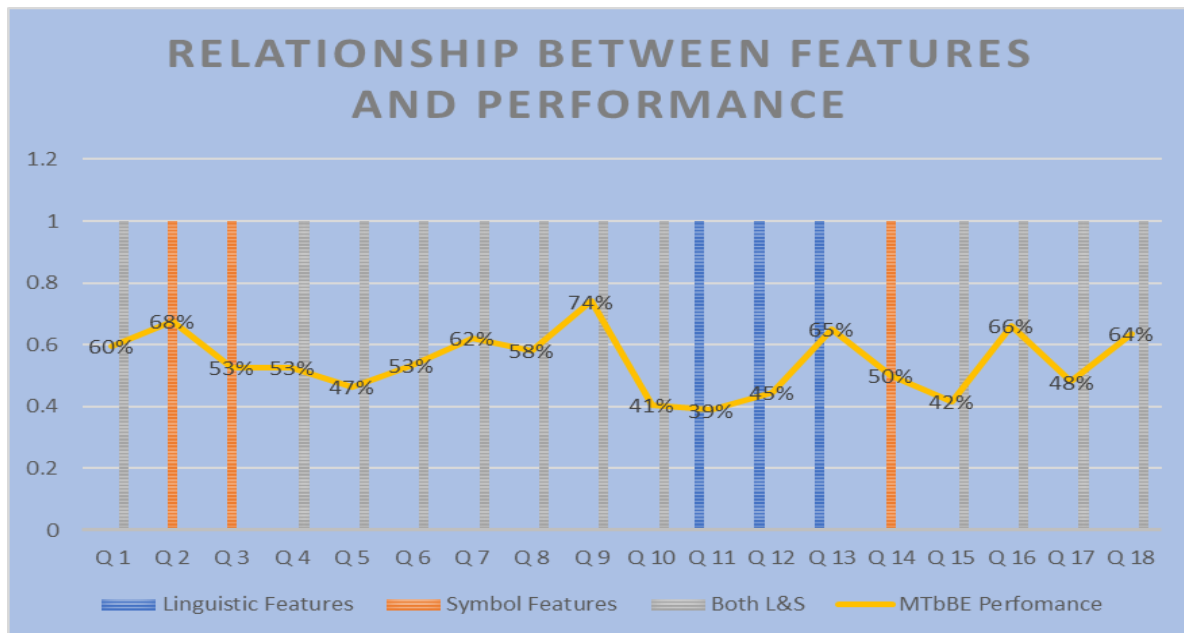
Figure 8.7: Relationship between features and performance

The figure above illustrates how the performance was per each question taking into account the feature of a particular question. 3 questions had a symbolic feature, also another 3 had a linguistic feature and the majority of the questions had both linguistic and symbolic features. The question that had a lowest pass rate was question 11, which had a linguistic feature and the question with the highest pass rate was question 9 which comprised of both linguistic and symbolic features. The graph below will explain on the percentage of errors from a bilingual mathematic question paper.
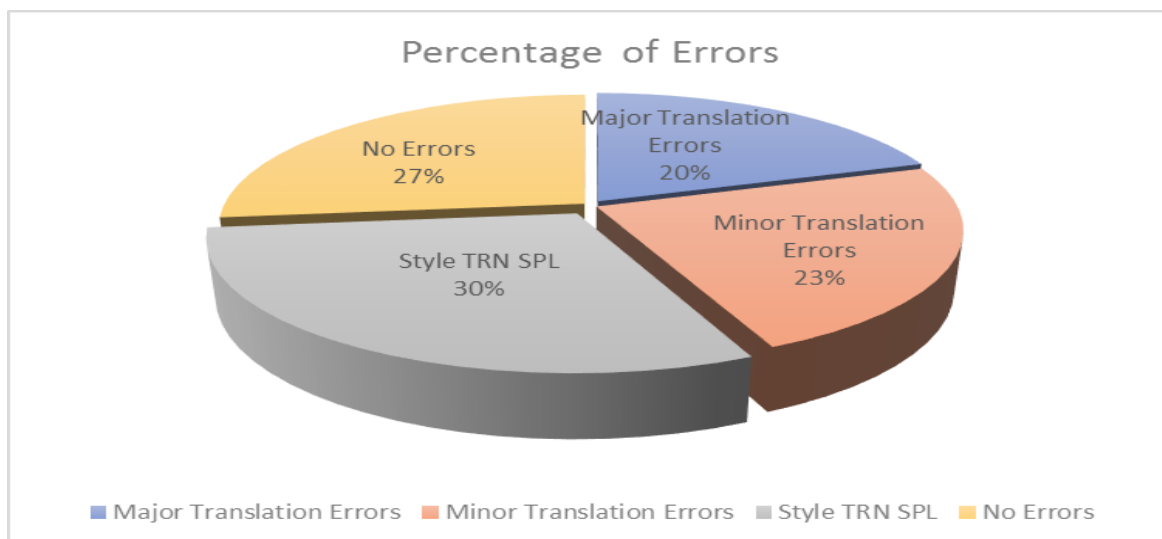
Figure 8.8: Percentage of Errors in the bilingual question paper

8.9. In conclusion

The quality of the Mathematics question paper presented challenges of its own in varying degrees, some minor some major. One was related to context of question; it is difficult to understand what the examiner would choose a train station in Gauteng, when he/she could have used stations in the Eastern Cape. The question on its own demands high order thinking skills; you do not want to complicate it with any further nuances. Style issues in the Bilingual Question paper also both in where the formulation of the question could hve been posed differently errors questions that had errors of varying degrees, which might have had or might not had impact on the performance of the MTbBE group. 20% of the document had major translation errors, which changed the meaning of the question completely; which might have had a negative impact on the final result of the learners, had the English version not been there. while some were minor translation errors. Some errors may seem as insignificant errors but may have a negative bearing on performance of learners. From the above 27% of the questions had no errors, 20% of them had major translation error, 235 had minor errors and 30% had STYLE TRN SPL.
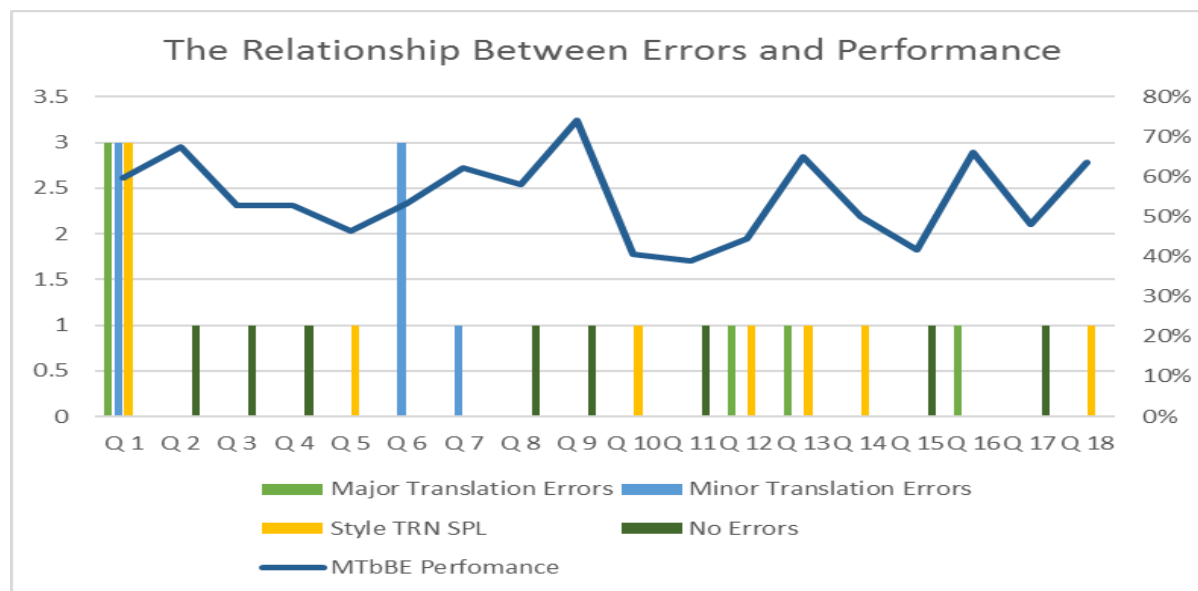
Figure 8.9: Relationship between errors and Performance
In conclusion of this section; MTbBE learners would have scored better on the test if there were insignificant errors on the examination script. Implications for officials are that more care should be exercised when the examinations are set and translated.

8.10. Chapter Summary

This chapter focuced on data analysis and discussion of the findings, it answered the research question and it has noted a number of variable that influence learners performance.The analysis was based on qualitative and quantitative methods, qualitative the themes that were arising from the study were explained in greater depth and Statistical Package for Social Science was utilized when doing quantitative analysis. An indepth analysis was done on on mathematics bilingual question paper and a number of errors were identified. The next chapter will be the final chapter of this study and will provide a summary of the study, a conclusion and recommendations will also be given in that chapter. Future research opportunities will also be presented in Chapter 9.

CHAPTER NINE
9. RECOMMENDATIONS FOR FURTHER RESEARCH AND CONCLUSION

9.1   Introduction

The findings of this study generally show that African languages when used as languages of learning by learners to learn; and when used by teachers to teach and assess in the classroom; widen epistemological access to mathematics and science learning. This study demonstrates that the debate in South Africa post-apartheid of whether African languages must be used for education; has long expired; it can only be stale after 25 years of to-ing and fro-ing menacing and diverting attention of policy makers and government to a culture of 'freeze'. The real debate consideration should be on how to provide quality MTE to all children regardless of race and social class. In South Africa we don't have to look anywhere else, we have good models of mother tongue education working as evidence by English and Afrikaans speakers. These previously advantaged groups continue to benefit from MTE proving the point that if the medium of instruction is a language of a child, he /she easily understands the contents of learning instructions. We do not need any further evidence on this matter it has been proved beyond reasonable doubt. Cummins (2001) posited that evidence out there indicated that the child could associate what he/she learnt in the classroom with the previous knowledge and experiences that he/she accumulated from their local environment. That, isiXhosa and Sesotho in the Eastern Cape; are languages that are familiar to both teachers and learners, lays a necessary foundation to facilitate teaching, learning and assessment. Developing nations refuse to internalise the simple fact that there can be no meaningful development without language. The natural creativity, skills and knowledge that children acquire through language and learning in their societies is taken away when they are forced out-of meaningful learning and initiated into rote learning. It does not come as a surprise that as a result, their social and cognitive development that is so critical to them doing well in school, is then adversely affected. Underachievement in Africa and in South Africa in particular, has a colour; it is black. This holds the continent in a perpetual state of underdevelopment as our youth; whom we have pinned our hopes for a better future; are continuously failed by a system that is not designed to favour their participation as equal citizens. This demonstrates that development in a nation and Africa in particular can be affected by the language factors in education as language, development and education are closely linked (Wolff, 2006).

9.2 Language and Development

The interrelationships that exist between the use of indigenous languages in education and development is never given the due attention and support it deserves in Africa; when African leaders start doing that; they get attacked left right and centre and they retreat back to being maintainers of the status quo for the minority (who have been and still are beneficiaries of mother tongue education) and do not realise that the interventions that government has embarked on for the majority (who are not recipients of MTE) mean very little if they are outside of a framework that puts language at the centre of these intervention activities. In this regard, Magwa and Mutasa (2007) point out that development in Africa can never be achieved without serious considerations of the role of African languages. They go on saying that, language and development are intrinsically interrelated that it is difficult to talk about development without considering the use of local language(s) in education. This means that language could play a pivotal role in the development of a society in aspects of economy, technology and education. In general, the development comes from using communication and effective communication can be facilitated through a familiar language among the various groups for social and individual developments (Wolff, 2006). This development was carefully charted out in post-colonial and dominant languages away from the languages of the people that communication is intended for. The development of African languages was not extended to the so-called controlling domains (CDs) such as education, politics, and commerce and information technology. These domains were, and still are, dominated by English and Afrikaans. Bamgbose (2002) and Alexander (2005) both argue that languages that are not visible in these controlling domains, especially in print form, are viewed negatively by language users, including their mother-tongue speakers. What this means, therefore, for the official indigenous African languages, is that their use will continue to be sentimental, as languages of socio-cultural value at home, and only of primary schooling unless meaningful and deliberate intervention is done, with the purpose of stepping up the process of their intellectualisation, within the context of the national development initiatives. Alexander (2005) notes that it is a fallacy to think languages simply develop naturally as it were. They are resourced and manipulated to serve a motive of a certain people at a specific point in time.

The history of the development of Afrikaans in South Africa is a good example. The apartheid regime invested financial and intellectual resources in Afrikaans to entrench the Afrikaner-heid that was necessary for the political agenda of the Nationalist Party (NP). African languages cannot abuse state resources as done by the NP on such a huge scale; but financing their

development is key; Section 29 (Constitution, 1996) requires the state to embark on activities to redress the imbalances of the past in ensuring multilingualism. In a nutshell, multilingualism as defined by the Constitution of South Africa implies a justifiable bias or discrimination towards addressing the imbalances of the past. That's a starting point.

There needs to be further studies on how much it would cost the government to implement a language transformation plan to phased implementation of an MTbBE strategy for African languages; starting with the cognate ones (isiZulu, isiXhosa, isiNdebele, siSwati) and the Sesotho (North Sotho and South Sotho) group, XiTsonga and TshiVenda. If one major group can be developed one over 2 years it will mean that at the end of an MTEF (five year term) 8 8 indigenous African language will be developed. In the fifth year; phased implementation can begin incrementally with Grades 4, 5 and 6 materials in place and teacher training done. The MTbBE project has demonstrated that language development can happen if systematised as there are now in the market textbooks in isiXhosa And Sesotho for Grades 4 -7 produced by Cambridge University Press, Oxford University Press for Mathematics and NSTech (find cover pages in the appendices section). Dictionaries; Mental maths books and various other e-learning products were also developed as market need was created. The recommendation is that more publishers are encouraged to publish these materials so that we can ensure that schools can have a plethora of choices and the department can capitalise on price comparability with economies of scale.

9.3. Language and Intellectualisation

9.3.1 Intellectualised Language

A simple but apt definition of an intellectualised language is a 'language which can be used for educating a person in any field of knowledge from kindergarten to the university and beyond' (Sibayan 1999). Nolasco (2009) argued in the Philippines, where society has been grappling with the intellectualisation of Tagalog for decades, '…we will never be able to develop our languages for higher thinking unless we begin basic literacy and education in them. It isn't a matter of first intellectualizing a language before using it. We can only intellectualize a language by using it' (cited in Multilingual Philippines 2009). The first condition for the intellectualisation of a language is that it must have a literate social base; it must be written. Literacy is thus a primary condition for intellectualisation (Prah, 2017).

Beyond the primary requirement of literacy, intellectualisation depends on a number of other enabling conditions. The first is availability and access to all knowledge, past, present and future.

In other words, we should know what we have; what exists as knowledge, and where it is to be found. All such information must be captured in retrievable form, i.e., in print, audio visual, the World Wide Web, digital storage, etc. These are all literate forms of storage. Secondly, society and all its constituencies should appropriate and use the intellectualised language; these include government organisations; the education system at all levels; business, commerce, and industry; professions such as engineering, medicine, law, agricultural sciences, etc.; mass communication and creative writing; foreign relations and international business banking, trade and commerce; and information technology (Sibayan, 1999).

The development of discipline-specific terminology is crucial to the intellectualisation of a language. The paucity of such specialised terminology is often cited as the reason why African languages cannot be used as languages of teaching and learning. In South Africa the University of KwaZulu-Natal (UKZN), through the University Language Board (ULB), has devoted considerable resources to the development of terminology in Administration, Architecture, Psychology, and Nursing (to name but a few disciplines). It should be noted, however, that the process of developing terminology is a complex and arduous one, which has to be carefully and competently managed (Khumalo 2016). For the MTbBE project language intellectualised was managed by the department of Education in collaboration with the Pan South African Language Board (Eastern Cape) and its structures; the National Language Units (for isiXhosa and Sesotho) and individual language and science experts.

The development of registers is one of the most taxing features of the intellectualisation of languages. A central or centralised institutional base must exist or be created to serve this purpose. In its absence, different people and institutions might easily and inadvertently work at cross-purposes. A crucial part of the work that needs to be undertaken under the auspices of such a body or bodies is the creation and formulation of terminology for new areas of knowledge and reality. This work must not be done with an overly elitist ethos. When society uses its own creativity to collectively coin a term that becomes part of everyday language, it is disingenuous to attempt to impose unknown and unpopular coinage (Prah, 2017).

9.3.2. Lessons from the MTbBE Terminology Development Process

All terminology developed in the MTbBE project went through these stages:

TERMINOLOGY DEVELOPMENT PROCESS & LESSON LEARNT		
Stage 1-5	Status	Lessons learnt
Set up of Project Plan for Maths panel & a Science Panel for Grades 4-6. Determination of the funding model is done with contracts signed by all.	Project was set up including Pan SALB, language experts, maths experts, science experts, teachers, language activists and content area users.	Never start with the panels. Start with the scope of work then panels later. People who cannot do the work will leave once they see the workload.
Scope of work determined with metadata, terminology lists and concept documents.	Establish style guides and style lists; set work flow structures guided by time frames.	Stick to time frames as pushing them further cause delays in the value chain. Take out individuals who are too busy for the project.
Create documents with the terminology that has been done.	Subject terminology to style guide; reasoning and formatting within a context of a workbook; item banks like question papers or FATs must also be subjected to this process. Substantiate reason for choice.	Each term created, revised or rejuvenated must pass the context test so that the following process will have less return-backs. Be business like. Lengthy discussions derail the process; keep minimal
Prepare documents for trialing.	Documents to be packaged and sent out to schools, Subject Advisors and other users for use within settings.	Have timelines. Data captures to monitor data relating to terminology use in classrooms, workshops.
Prepare final version for publishing.	Effect necessary changes and retain what works.	Rather risk revised versions than wait for consensus.

The process outlined above has important lesson for the intellectualisation process. Projects to develop terminology in African languages have been characterised by projects that are either incomplete, or abandoned due to disagreements or are ill-funded and therefore are

unsustainable. A finding that has implications for policymakers is that there should be no attempt to get people to do the work of terminology development free of charge; like all things free the commitment is less and people do it on their spare time. Governments must fund terminology work and must ensure that strict but flexible timelines are in place.

Finlayson and Madiba (2002) argue that language intellectualisation is a significant facet of endogenous language development. It is a dynamic process distinctive to most of the languages which have acquired a larger and expanded range of functions in their societies. These scholars further argue that this process *has* to occur in relation to our official indigenous languages because all the nine official indigenous languages have been partially developed, that is, they have written forms, literary works, dictionaries and terminology lists, but are lagging far behind in the area of modern terminology as compared to neo-colonial languages (Finlayson & Madiba, 2002).

Garvin (quoted in Finlayson and Madiba, 2002), argues that intellectualising developing languages means that these languages will have in their corpus precise and comprehensive means of communicating matter especially in the realm of modern life, for example, in the areas of science and technology, of government and politics, of senior and higher education, of health sciences, and of commerce. While the process of intellectual development of African languages, or any developing language for that matter, can occur ordinarily in the spheres of life listed above, there is mounting concurrence from language policy makers and planners that there should be a conscious and deliberate effort to accelerate the process and to make it more effective before we can say that say these languages are absolutely intellectualised (Finlayson & Madiba, 2002).

My argument is that nobody has to say anything about whether these languages are fully intellectualised or not; the process of beginning is most important. Beginning basic education and literacy and numeracy then progress through the grades systematically and incrementally; is the best ingredient. Another foresight is that one should anticipate assessment intervals and the necessary tools developed and placed in an item bank for ease of access by anyone in the system. It is a good idea to create a platform for comments; critiques or affirmations of terms.

9. 4. Language and the cost-of underdevelopment

In multilingual and cultural society, it is the will of the political leaders and the society to make things very easy to include the languages of marginalized social groups in educational systems

with a minimum cost or an effective cost. According to Heugh (2006), no scientific evidences demonstrated that mother-tongue education is more costly than the dominant languages. The crux of the view is a misconception intended to exclude the use of mother tongue in education. In a similar way, with reference to the costs of multilingualism, scholars in Africa show that education through mother tongue can have economic and political implications, and it is less expensive. During a Regional Conference on Multilingualism in Southern African Education, in 2005, Gaborone, Botswana, Nyati-Ramahobo remarked that education without mother tongue is expensive. The wastage is massive as the products of such a system lack critical thinking and other skills, and hence are unemployable. It is more cost effective to invest in mother tongue education than to produce mono-cultured semi-illiterate people with low self-esteem [who] cannot compete in the global culture, since they have no experience of dealing with multiculturalism (Nyati-Ramahobo, 2005).

Alexander (2005) made a comment that some of the arguments that are usually wheeled out to discredit the proponents of a policy of promoting multilingualism that fall into place; of these, the most specious is the so-called "costs-of-multilingualism" argument. There is a growing body of evidence that calculated on the basis of either economic or/and social cost, a well planned policy of multilingualism has many more benefits and carries much fewer costs than a unilingual policy in a multilingual society. His core proposition is that we have to initiate a counter- hegemonic trend in the distribution of symbolic power and cultural capital implicit in the prevailing language dispensation in Africa's education systems. And, let us have no illusions, this is a historic challenge, one which we may not be able to meet adequately. Alexander clearly argued that promoting local languages in education was not difficult Alexander clearly argued that promoting local languages in education was not difficult tasks. For him, the most difficult and priciest is producing illiterate, less productive and unskilled nations. Similarly, researches done in African and other continents portray that a successful implementation of the mother-tongue medium in basic education costs less than promoting monolingual or one language policy favours only certain groups within multilingual and multicultural settings. Mother-tongue use in education is cost effective when compared to students taught through unfamiliar language as the use of children's home language in education can reduce students' repetition and dropout rates (Mutasa, 2003, Heugh 2006). This reflection holds the view that mother-tongue education plays a paramount significance in education to bring sustainable development of nations and to produce skilful and knowledgeable citizens who can contribute their knowledge to the development of their

country. Moreover, education through children's home language can reduce massive wastage and unemployment if it is well supported and implemented. However, inability to provide education through mother tongues is more costly to the society since it creates semi-illiterate and low self-esteemed groups in the society. It is the recommendation of this thesis that a study be conducted costing only the number of teachers that the South African government pays on salaries, for research to HEIs, to NGOs and to the private sector each year; to improve the academic achievement of black and poor learners each year in each grade in this ESL system.

9.5 Language and power

It is important to understand how the ways we communicate both influence and are influenced by the structures and forces of contemporary social institutions (Fairclough, 2001). In explaining the concept of language and power, Johannes Weiß & Thomas Schwietring (2019) argue that as always, when "power" is spoken of, the first association is that of the power of man over man, of power as suppression of the free will by "commands" and "obedience". Power can easily appear in this connection as the root of all evil in human societies and as the opposite of freedom as such. Yet the problem of power is in truth more complex. And especially in the case of the "power of language", the problem is multi-layered. The "power of language" not only means language in the service of power; language can also undermine power. And above all, as language, it possesses itself power of a very special kind (Weib & Schwietring, 2019).

This thesis agrees with the notion that the relationship between language and power is ambivalent in that in general, all power must finally use language, be conveyed through it and manifested in it, to command, that is, to speak, where others must only hear and obey. In a more narrow sense, this understanding of the "power of language" is a matter of the instrumentalisation of language for the purpose of exercising power. The command of language itself becomes a means of power: as political rhetoric and demagogy, as ideology and bedazzlement, as seduction through words, as "persuasion". This power of language extends from large political contexts, from the manner of speaking and thus also of thinking that dictatorships and totalitarian orders force upon dominated people, to the small scenes of everyday life, to the arts of seduction of advertising, the sales tricks of telephone marketing, or the menacing undertones at the workplace or in the family (Weib & Schwietring, 2019).

Gobana (2014) argues that in general, the ideology of linguistic homogenisation was not only peculiar to the colonisers, but the ideology was also adopted by some rulers in Africa. The view was adopted and implemented in education and other public sectors based on the assumption that a nation-state needed a common language for national unity, integration and modernisation. In this view, some autocratic rulers had put in place the use of monolingual policy that focused on a national language and foreign language uses in education (Gobana, 2014). He argues that the rulers implemented a monolingual policy that vehemently restricted education through the marginalized local languages as observed in Ethiopia prior to the 1991 Regime (Gobana, 2014). He says, in general, the language policies of Emperor Haile Silalie and Mengistu Hailemariam of Ethiopia excluded the use of other Ethiopian languages in education and public sectors. Instead, both the regimes had favoured the development of Amharic as a sole national language in the country. On the other hand, Afan Oromo, which has the largest number of speakers as a mother tongue in Ethiopia, was discouraged. The language remained everyday communication between relatives, friends and local communities (Gobana, 2014). South Africa had a similar situation pre -1994 to a lesser extent.

Whatever the situation and the peculiarity of a particular country; this study aligns itself with the thesis that an individual speaker or group cannot monopolize the power of language. For ultimately the "power of language" lies not with the speaker, but with language itself. The power of language belongs to language itself. And so this power belongs to everyone who possesses language. Whoever has a command of language has part in its power. Language is not merely an instrument in the hands of power, but also always a counter-power which cannot be restricted and repressed. Power can rest on many factors; for instance, on the possession of weapons or money. These are in short supply; some possess them and others do not. This scarcity establishes the power of man over man. And it shows the ubiquitous social connection of power and inequality. This connection, however, does not obtain for the power of language. As with knowledge generally, so with language and the power that proceeds from it: it is illimitably divisible and multiple. Whoever shares knowledge loses nothing of his own share or possession (Weib & Schweitring, 2019). Everyone can gain knowledge without taking it away from anyone else. Similarly, everyone can attain the power of language without disputing anyone else's right to it. We propose that this be the trajectory that South Africa and the world adopts; there is no need to reduce anyone's language as archaic or backward in an effort to defend your own. The power of language lies in the fact that everybody can use it –if allowed to further their lot without a yes or no from anybody else. The fact that one language is elevated

above every other language as the language of the elites and the powerful, while other languages are relegated to a lower status and discriminated against; can only do harm for generations to come. This is particularly clear in post-colonial Africa, where the problems of de-colonialisation amidst the continuance of colonial power structures may be read off from the linguistic relations. In the new phase of democratic orientation, we may directly observe the complex relation in which political power stands to the conflict over linguistic-cultural hegemony. African language speakers ask for support or time out, to do the work of development that is much needed; so that we can then compare apples to apples.

9.6. Language and education and Language in Education

Another argument advanced for mother-tongue use as a medium of instruction refers to the inclusion of local languages in education to foster equity and to facilitate citizens' involvement in the development processes. It is advocated that it helps citizens to maximize their potential and confidence to take part in the socioeconomic affairs of their nation. In particular, it creates favourable situations for the marginalized groups such as women to participate in education, socio-political and economic situations. As a result, the marginalised get the opportunity to contribute their skills and knowledge to the sustainable development of their country. In the same way, students' drop out and repetition rates are decreasing because of the inclusion of their mother tongue in education (Benson, 2004:4 and 2005:2; Mutasa, 2003 and 2006). Njabulo Ndebele (2001) argues that choices given to parents for MTE are not always free, rather they are "structured in dominance and determined by 'pragmatic necessity' "; hence the widely-held "perception that 'access to English' is what their children need, in order to succeed in society". As discussed in this study; while there is a force of individuals who try to push for a transformative education system that recognises the primacy of the role of language in education; there is also an unwavering opposite force, advanced by habitus monolinguals, in most cases who want to maintain the status quo. The researcher recommends therefore, that because the use of the mother tongue in education has psychological, pedagogical and cognitive advantages to produce such sterling individuals; this movement also requires their voices as testimony that MTE works in education.

A major finding of this study is that isiXhosa is used for teaching and learning mathematics; it has been and was always used in this way. Teachers do not teach in English; they teach in isiXhosa; the only difference is that they assess in English. When EFAL learners do well in

English exams the inclination is to praise the level of proficiency of either the English teacher or the mathematics teacher who was able to move learners from their home language to English. The truth of the matter is that even in the non-MTbBE group very little learning happens in English; the only difference is in the assessment. This practise runs from Grade 1 to Grade 12 in township schools; but happens in a very unsystematic and unstructured way. Any claim that learners learn in English is overrated; introductions are done in English; learning and teaching happens in isiXhosa the lesson summary is in English again including the assessment. If this is normal practice then, why do we not formalise the practice as it is accommodated within the constitutional manadats of South Africa, there is nothing illegal about teaching children in their home language post 1994.

9.6. Language and ignorance

Reasons amongst MTE naysayers range according to level of understanding or misunderstanding of how children learn. Those who argue against the mother tongue use in education claim that since English is used as a medium of instruction from Grade 4 to higher education, teaching children through their language in primary schools may weaken their proficiency in English. For this reason, they maintain that teaching children through English from the start enhances their proficiency in English and hence, they have no difficulty learning through the language in secondary education. In other words, their point of argument is that since English is used as a medium of instruction in higher education, teaching them through mother tongue does not help their learning secondary education and it has drawbacks (Heugh and Skutnabb-Kangas, 2010). They further argue that when students join high schools and higher institution where all subjects are taught in English, they could not cope with English medium and they may fail the national examination due to their precarious or ill-founded English. For this reason, the opponents of the use of mother tongue in education suggest that primary school education should be in English since their first language has no continuation in future education in Ethiopia (Benson and Kosonen, 2010). However, all these arguments are not supported by the current studies done elsewhere and they could be aspiration and assumptions that people have towards English language since it is a global language (Heugh, et al, 2010; Benson and Kosonen, 2010; Mohanty, 2010).

The other argument refers to an ideological view that stated the use of the mother tongue in education creates linguistic competition that leads to national disintegration and ethnic

conflicts (Cohen, 2006). According to the author, the proponents of this notion hold the view that teaching children in their respective local language confined them to opportunities in their local area and they could be restricted to participate in national affairs due to language barrier. The assumption behind the view is that the use of one language as a sole national language could create national unity and integration, while the use of local languages discourages national unity and does not create job opportunity at the national level due to language problems. This suspicion arises from the deep-rooted ideology conceived from the earlier regimes. The impact of this ideology permeates and debilitates the psychological view of the marginalized groups. The negative attitudes towards one's language lead the marginalized to develop negative attitudes towards learning in their own language. In this connection, Alidou, et al (2006) makes the following observation that teaching in mother tongues is still viewed by many Africans, as a second-class occupation compared to teaching in international foreign language. This attitude affects both teachers and students' morale. Moreover, this attitude forces teachers to focus more on teaching second languages than mother tongues. This is the practice in Black schools. More resources are poured into EFAL, more workshops are held for EFAL with no focus on African languages either as Home Language or as FAL. There shouldn't then be a question on why learners are not doing well before the switch to English in Grade 4 while the learning environment is EFAL orientated. The most telling fact is that there is little return on investment in English mainly, very few South African are proficient in English. One would be forgiven for thinking that consumerate to the amount of resources spent on English mainly; the country would have so many more people proficient in English.

The recommendation therefore is that to promote effective teaching practice in bilingual schools, policy-makers should make a serious effort to promote politically the use of African languages in all spheres, including their promotion as languages of instruction within Bi/multilingual educational programs. It is not enough to talk about the advantages of bilingualism from corners away from the vestiges of power; everyone including politicians who have instrumental and political power. From the Alidou (2006) citation, one can note that the linguistic domination created in the community exerts negative impact on education through the mother tongue. It can negatively affect teachers and students' social psychology if the medium of learning and teaching is unfamiliar to them. Careless statement like 'Áfrican language parents want English' should be avoided; if they do not acknowledge the 'why part'. Especially if they are not based on any empirical evidence; learned discourse should inform.

In general, people's pessimistic attitudes that result from the entrenched prejudices, stereotypes, socio-historical and political backgrounds perpetuated problems that hamper mother-tongue education in primary schools. The aforementioned arguments are some of the key factors that inhibit mother-tongue education. They are assumptions not scientifically approved. They are used to underestimate the use of the dominated group's languages in the main domains. Such a view may jeopardize the cultural and linguistic development of a society and affect the distribution of educational opportunities in multilingual settings. The assumptions also result from people's lack of awareness, lack of political wills, poor economic status, historical background, ambition for power, deep-rooted linguistic and cultural hegemony and ideological struggle to maintain linguistic and cultural asymmetry in multilingual nations in which the dominant ruling group implicitly or explicitly design a policy to promote monolingualism. These challenges, in turn, deter the implementation of mother-tongue education in countries that have implicitly been under the burden of the colonial legacy.

A recommendation for further research is around how voices from communities living in areas where MTbBE schools are based could be heard to advocate for the MTbBE program. Now more than ever; we need research around MTE that creates a positive narrative both at the level of the general community and amongst the community of academics who possess instrumental power. I fully agree with Graven (2010) that we need to consider the effects of our research and question whether it contributes to finding ways forward. If our research aims to confirm the extent of the crisis and communicates messages of deficit and inevitability of failure for the poor, then we need to begin to question the ethics of our participation in such research (Graven, 2010). Ignorance is a lack of information; taking part in information sharing reduces the power of ignorance. Researchers must be selective in participating in work that

9.7 Language rights

The discussion in this thesis highlights the fact that as long as African language speaking children do not have access to schooling in their home language like the advantaged groups in South Africa, then the language rights enshrined in the Constitution (1996) and in the Bill of rights are meaningless, symbolical and have no cultural capital to make a material difference in their lives. Therefore, since mother-tongue use in education is useful from the perspectives of culture, identity, power, economy, psychology and pedagogy, educating children through their home language plays a great role until they are able to develop sufficient literacy skills

in the language. From the views of linguistic human rights, education through children's mother tongue plays profoundly significant roles to rejuvenate their language, to preserve their cultural heritages and to participate in the sharing of power and resources of their country (Perera, 2001:711). This is not the situation in South Africa and begs further research as to its impact and influence in modelling violence as a form of protest in our young people. South Africa is bombarded with angry young people who feel excluded in their own country and this escalation of violence has reached a point where nothing is sacrosanct. Further research is needed on how much this degradation and denied linguistic rights contributes to a negative self-image; incubating long term feelings of unworthiness to a breaking point amongst youth.

9.8. Suggestions for further research

9.8.1. ICT and language development

There are issues in this study that could not be addressed and are therefore referred as possible areas for further research in the future. The issue of how ICT can be used to speed up the process of language development in isiXhosa and Sesotho is a pressing one. ICT will be an equaliser in this area and all forms of ICTs have an important role to play whether it is for learners learning mathematics and science in isiXhosa, or it is for teachers teaching and assessing; or whether it is for language engineers deliberately developing terminologies to enhance African languages as languages of science; we need further research very soon. Another issues that could be made part of a the ICT study is how the area of Human Language Technology could contribute to the economy of South Africa on a scale as big as the Language industry of Europe. Incentives to attract language engineers; where young people could be attracted to offer African languages not to teach them; but to deliberately engineer their use from low status domains to high status domains as part of a bigger plan of language planning. The language plan could feature all elements for ICT use aimed at the Status Planning, corpus planning and acquisition planning (Tauli, 1989).

9.9 Recommendations

9.9.1 The need to concretize Language Policy Choices/Options for schools

The findings in this study point to the dire need of government to provide a framework that ordinary citizens will utilise to make language policy choices; varying groups; individuals and surveys indicate what parents want; there is absence of a platform within government to make this choice. The recommendation is for the education department through its Admissions Policy

design a multilingual booklet (in languages of the relevant area) to provide parents with information on the various options to choose from. The booklet must contain information on what pertains at the school currently; what Parents have a right to and which language policy is most supportive of conceptual growth. Without this information; I think of the graphic of condoms strewn in public toilets dumped for those who might need to use them sometime in their life. A responsible government cannot just give forms for parents to sign without giving them the necessary background as to why they must make particular choices. Key to these concrete proposals is the training of officials on LiEP (1997) Officials who are clueless pose a danger to implementation; they must be trained on the policy provisions of the LiEP (1997) and the South African Schools Act (1996). Unskilled officials are unable to assist schools with making apt School Language Policy choices; are also unable to monitor and support schools. Another recommendation stems from the finding that translanguaging was used extensively in both mathematics and science classes; the recommendation would be that further studies on translanguaging and the extent of its usefulness as a teaching, learning and assessment tool be investigated.

9.10. Conclusions

The conclusions that can be drawn from this study is that language is important enough to merit the attention of all citizens as Fairclough (1989) asserts. He makes a further assertion that nobody who has an interest in modern society, and certainly nobody who has an interest in relationships of power in modern society can afford to ignore language, that to some degree many people with precisely such interests have believed they could safely ignore language and its social functions. He argues that the gap between the level of consciousness which the contemporary position of language demands, and the level of inadequate attention it attracts in academic work are reasons to be blamed for the status quo (Fairclough, 1989). South Africa at this point is quite unfortunate as there are very vocal academics whose views dominate the education space and influence public views as to the insignificant role that language plays in education. For them other issues are more significant than language, and propose that there Education sector should rather focus on teacher training, school functionality, time on task e.t.c. They know that language proficiency and exposure to the language of teaching and learning (LoLT) have a significant effect on learner achievement, especially in poor provinces like the Eastern Cape in South Africa. Language Policies that take on a 'blanket approach posture' without any regard for the language proficiencies of learners, set these learners up for

systemic failure. The English as a LoLT blanket approach has not worked for South Africa, especially for poor and rural learners who have no access to English. Therefore designing a system to get teachers more proficient in English is tantamount to a waste of public funds as we have witnessed over the years with little return on investment (Heugh, 2007). We have learnt from this pilot that an approach that a multilingual model like MTbBE would yield better results than the Early Transitional model currently used.

After language; individual and school Socio-economic status (SES) is a strong predictor of leaner achievement in the Eastern Cape like in the rest of South Africa, with poor learners bearing the lifelong burden of disadvantage. A lesson we have learnt from this study is that attempts to change the dire state of mathematics education for poor, rural, African learners must be done within a framework that acknowledges that these learners start school at a disadvantage as they lack the sophisticated language that to acknowledge that as a result of years of colonial subjugation and apartheid in South Africa; we are barely able to significantly change individual SES of the majority of poor children. But overlooking the character of the nature of South Africa as a nation of extremes; will defeat all well-meaning efforts. The National Planning Commission reported in 2000 that South Africa has among the highest levels of income inequity in the world (National Planning Commission, 2011). In terms of education two systems function side by side as evidenced by TIMMS 2008. In the TIMMS South African wealthy schools do well; the performance of children in these functional schools compares favourably to international benchmarks. This predisposes them to a better life in the future. On the other hand, the poverty stricken majority sit on this end having to sink or swim in a mainly dysfunctional system; their performance in TIMMS was among the lowest (Reddy *et al.,* 2015). There is no need to guess how this situation will affect them in the future.

The MTbBE project demonstrates that the reasons given for poor performance in mathematics of the majority of children in the country, are no different for children in the Eastern Cape province, and these relate to poor resourcing, poor teacher preparation and poor teaching practices; these are common reasons offered for poor mathematical achievement in South Africa (Howie, 2003; Louw, Muller & Tredoux, 2008), with pedagogical content knowledge also important in the process of learning and teaching. It would be appreciated if research that describes in detail these reasons also mentions the issue of language as a determinant of achievement in mathematics. No academic or researcher will ever deny that language is key in accumulating pedagogical content knowledge in teaching and learning. Choosing to sidestep the issue and sound warning bells about why there should be no rush to relate language as

having a causal relationship to achievement in mathematics does not do justice to the issue at hand that must be addressed; all other issues squared out leave language as the major determinant of success in the schooling system; teaching and learning happens in a language.

9.11 Overall Chapters Summary

This study was conducted to establish whether there are any lesson to be learnt from the MTbBE project of Cofimvaba and whether these lessons could be used for further extending MTbBE as a viable strategy for teaching mathematics and science beyond Grade 3. The research study involved an analysis of Grade 6 learner scripts for mathematics and NS Tech of the 2018 June Examination. Fourty schools were part of the analysis with 200 learners; one group (100) were from the MTbBE implementing schools and the other 100 were from the non-MTbBE group. Their June examination scripts were analysed for performance answering a question of whether the use of isiXhosa of the MTbBE group yielded any positive results for the experimental group. The data showed that MTbBE learners had an advantage over the non-MTbBE group in all the test questions. The overall average performance for mathematics in the MTbBE group was 53% with this group excelling in Numbers, Operations and Relationships at an average of 60%. The non-MTbBE group's mathematics performance was at an average of 40% with the average of 30% performance in the most important content area of Numbers, Operations and Relationships; scoring higher than the MTbBE group on the content area of Data Handling at 47%.

The NS Technology June examination yielded extraordinary results for the MTbBE group with an average of 78% performance although the exam paper was not versioned or translated. The non-MTbBE Grade 6 group performed at an average of 50% in Natural Sciences and Technology in the June 2018 examinations. Pupil performance in the narrative and expository writing tasks was much better in the Xhosa version, particularly at Grade 4 level. The evidence presented in this study points to the fact that there are valuable lessons to be learnt in the MTbBE project; which are valuable not only for the Cofimvaba district but for South Africa in general.

Graven (2010) posits that Mathematics education research conducted in South Africa almost inevitably touches on issues of equity and redress when engaging with the contextual background of studies. A continually growing area of research with a particular view to understanding inequality in mathematics performance is the complex relationship between

language and mathematics learning. He says this research tends to focus on low SES learners, as this majority of learners mostly learn in a language which they have little access to outside of schooling. The overlap between language of learning with SES and its effect on mathematics achievement is referred to in almost all of the large studies above. The data shows a complex picture that cannot easily be explained in terms of causal relationships (Graven, 2010). He goes on to argue that in terms of providing in-depth insights into the complex nature of this relationship, the work of Setati (e.g. 2005) and colleagues (e.g. Setati and Adler 2000; Setati et al., 2008; Barwell et al.. 2007) has become nationally and internationally influential. They urge that multilingualism should be reconceptualized as a resource rather than a disadvantage, thus shifting the deficit discourse around multilingualism and mathematics performance towards a proficiency discourse. Most language 'factors' in large-scale studies correlate with low mathematics performance but, as suggested earlier, this should not be read as causal. Setati et al. (2008, p.14) write: What does it mean to teach or learn mathematics in a language that is not your home, first or main language? This is the situation in the majority of classrooms in South Africa. In these classrooms the language of learning and teaching (LoLT) is English one of eleven official languages; however, neither the teacher nor the learners have English as their main, home or first language. Research shows that teachers and learners in these classrooms prefer that English be used as the LoLT. Interestingly, English is chosen even while epistemological access is sacrificed and in this respect Setati (2005) argues: for the need to recognize and acknowledge the political role of language when conducting research into the relationship between language and mathematics education in multilingual classrooms.

I am of the opinion that there is no evidence suggesting parental choice in these kinds of statements. Schools have no choice forms indicating any choice of English; there is a tendency to rely on hearsay and opinions as to what parents want and use that as facts. I would caution against use of this statement that parents choose English while sacrificing epistemological access as an accusation on the poor that nobody has tested. There has been no implementation plan on advocating the Language in Education Policy Framework that would ensure that even if parents were made to choose (which they have not), they would make an informed choice. Assuming that they sacrifice epistemological access is unfair and baseless. These are claims of the middle class who know what is better and yet sacrifice that due to aspirations for English; the majority of poor, black and African language parents simply copy the middle class. Poor, black parents want their children to pass so that they can become that ticket out of poverty for the rest of the family and will do anything to make sure this happens. If getting English at all

costs for their children to get out of the poverty trap; they will support anything towards this end. Black, middle class parents want English for different reasons; it is a marker of status; they all rush for middle class wealthy schools to get their children to speak the best English signifying that they have arrived. They can afford private tutors and all things technological to ensure that their children compete on an equal footing with native English speakers. The majority of the poor do not and cannot have these resources; the results of an English mainly system have shown beyond reasonable doubt that the investment that South Africa makes yields very little returns on investment. Graven (2013) also points out that this area is a growing field of research in South Africa and continues to yield key insights into the complex relationship between multilingualism, SES and learning; I would like to point that there is no growing research on language and mathematics for English and Afrikaans speakers; it is taken as a given. I am not sure how long we will research this growing field for black South Africans. I recommend that these research funds are used for strengthening MTbBE as a viable strategy or any other strategy that will base the learning of mathematics and science on the home languages of learners, in the same manner that resources get pumped to ESL learning. We cannot research and research a phenomena that has been settled for one racial group all over the world; unless there is empirical evidence somewhere that has proven beyond reasonable doubt that MTE cannot happen for African language learners.

The conclusion therefore is that the learner's home language plays a significant role in the teaching, learning and assessment of mathematics in Grade 6. Assessment in mathematics using the MTbBE strategy removes the veil that is highly problematic in assessment using EFAL, where any method of assessment relies to some extent on learners' use of and proficiency in English. For once, mathematics tests and examinations stopped being a proxy for tests of English. For the first time in the life of African language children post-apartheid; testing their mathematics knowledge is not tied to anything else but their ability to do the mathematics; with the assumption that all other things are in place. It is a finding of this study that if mother tongue education is carefully supported with adequate human and material resources, its implementation can be successful. It has also a positive impact and enhances pedagogical, psychological and economic development at societal and individual levels (Skutnabb-Kangas and Phillipson, 2001) as in the MTbBE project in Cofimvaba, further supported by the Eastern Cape Department of Education.

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Appendicies

Appendix 1: Approval Letter from the HOD

Province of the
EASTERN CAPE
EDUCATION

OFFICE OF THE SUPERINTENDANT GENERAL
Steve Vukile Tshwete Complex, Zone 6 Zwelitsha, 5608, Private Bag X0032, Bhisho, 5605 REPUBLIC OF SOUTH AFRICA: Website: www.ecdoe.gov.za: Email: nomandla.gobeni@ecdoe.gov.za; Tel: 040-602 7016

Enq: Dr Nuku

Date: 30 Jan 2019

MS NN MBUDE STUDENT NO: 10M5805
PHD RESEARCH CANDIDATE
RHODES UNIVERSITY

SUBJECT: REQUEST TO CONTINUE TO USE CHRIS HANI DISTRICT FOR RESEARCH

Dear Ms Mbude

Your request dated 13 December 2017 to continue conducting your PhD research in Cofimvaba (now Chris Hani East) in the MTbBE schools has been approved. The Eastern Cape Department of Education awaits the results of your MTbBE study with high anticipation. You are required to share your findings and recommendations on completion for us to learn lessons from this pilot. Also point to the weaknesses in the implementation of MTbBE to enable us to strengthen the strategy, the transformation agenda that this program drives is key to the department.

You have my full support

APPROVED/NOT APPROVED

_____
_____

MR T S KOJANA
SUPERINTENDENT-GENERAL

DATE: 30/01/2019

building blocks for growth

Ikamva eliqaqambileyo!

337

Appendix 2: Approval Letter from the Cofimvaba District

Province of the EASTERN CAPE EDUCATION

OFFICE OF THE SUPERINTENDANT GENERAL
Steve Vukile Tshwete Complex, Zone 6 Zwelitsha, 5608, Private Bag X0032, Bhisho, 5605 REPUBLIC OF
SOUTH AFRICA: Website: www.ecdoe.gov.za: Email: nomandla.gobeni@ecdoe.gov.za; Tel: 040-602 7016

TO:	**Ms N MBUDE**
REF:	**Student Number 10M5805**
	RHODES UNIVERSITY PhD CANDIDATE
FROM:	**SG EDUCATION:**
	Mr LM Ngonzo
SUBJECT:	**Approval for PhD Research in Cofimvaba District**

This is a response to your letter requesting to conduct an MTBBE research in Cofimvaba. In 2012 I granted you permission to place 72 schools in the mtbbe pilot; at the time I was the District Director in Cofimvaba. In my capacity as Head Of Department for Education I grant you permission for research. I wish you the best in your endeavour; your dedication to the mtbbe schools will undoubtedly pay good returns to those schools.

Yours in Quality Education

APPROVED/NOT APPROVED

....
....
....

MR LM NGONZO
HEAD OF DEPARTMENT EDUCATION

11-06-16
DATE

PGDP EASTERN CAPE

Ikamva eliqaqambileyo!

building blocks for growth
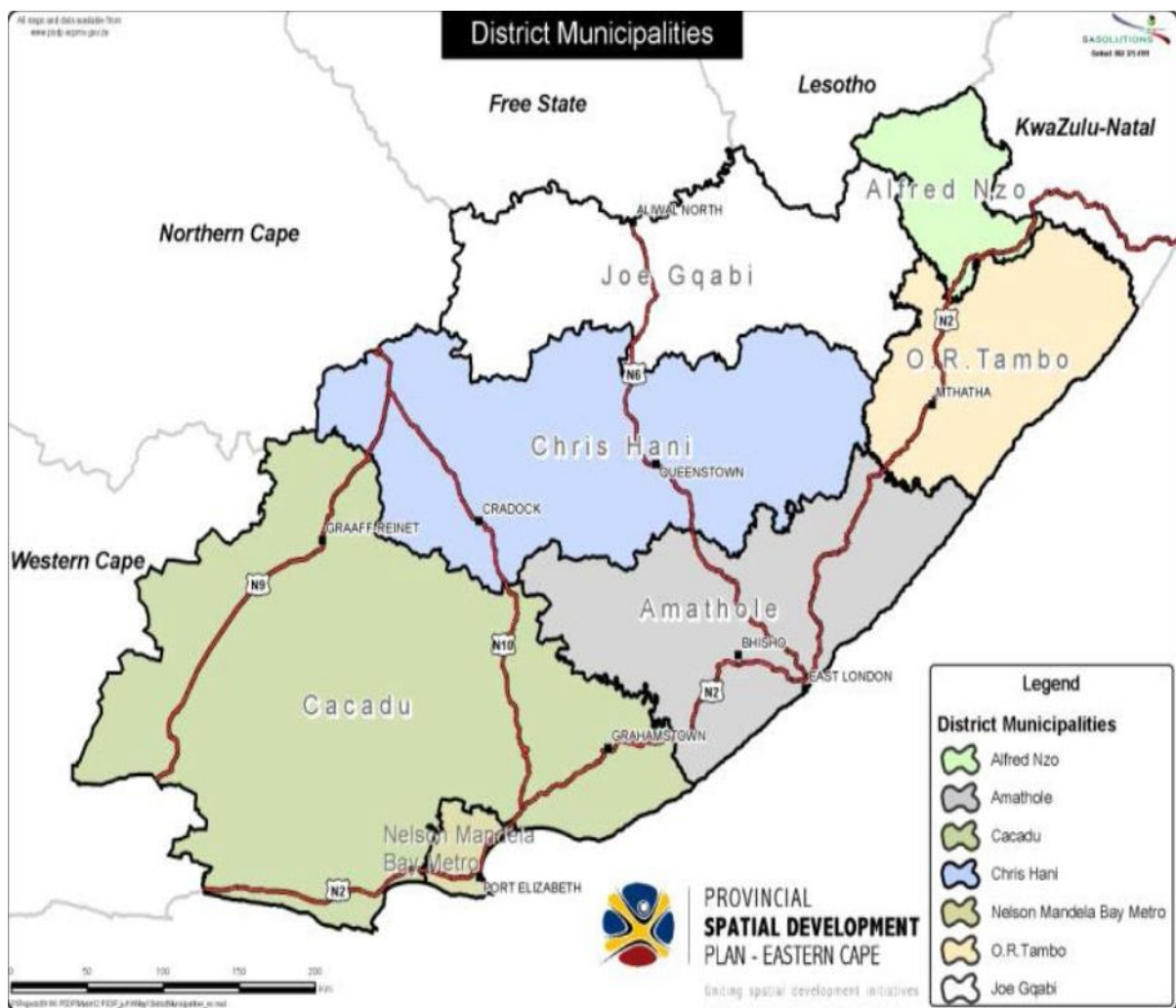
Together we will make a difference   Siyasebenzisana

Appendix 3 :Map of the Eastern Cape Province

Appendix 4: Consent Form for Chief Matanzima

IYA KU: Naledi Mbude

ISUKA: Nkosi Ngangomhlaba Matanzima

USUKU: 23/ 05/2016

INJONGO: Isicelo semvume yophando

IMPENDULO KWISICELO SOKWENZA UPHANDO

Le yimpendulo evela kuSihlalo wendlu yeenkosi uNkosi Ngangomhlaba Matanzima njengoMphathi wenqila yakuCofimvaba.

Ukususela oko sasebenzisana neSebe lezeMfundo ngo 2011, sivuyiswa kukubuyiselwa kwesidima nesithozela kweelwimi zesiNtu. Qhuba nkosazana sinawe. Sicela zonke iindaba ezayamane nezi zifundo zakho wabelane nathi ngazo.

Enkosi nkosazana

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Nkosi Ngangomhlaba Matanzima
USihlalo weNdlu yeeNkosi

23/ 05/2 16