EXPLORING THE EFFECTS OF LANGUAGE TRANSITIONING FROM SEPEDI TO ENGLISH IN TEACHING AND LEARNING THE SUBJECT NATURAL SCIENCES AND TECHNOLOGY IN GRADE FOUR CLASSROOMS.

BY

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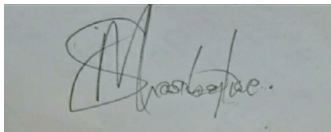
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DECLARATION

I declare that the exploring the effects of language transitioning from sepedi to english in teaching and learning the subject natural sciences and technology in grade four classrooms, dissertation hereby submitted to the University of Limpopo for the degree of Master of Education (Curriculum studies) has not previously been submitted by me for a degree at this or any other university; that it is my own work in design and execution, and that all material contained has been duly acknowledged.

Moabelo , K (Ms)   26 April 2022

Surname , initials (title)   Date

DEDICATIONS

This study is dedicated to the following people:

• To my late daughter Nomusa Onthabisa Hephzibah Shongwe, who inspired me to want to understand language barriers and the effects of language transition on using technology in the academic and workspace. Rest in Heavenly Peace! Lesson learned only scars remain.

• To my two sons Musa Mike-Andre` Epiphoras and Shepherd Samuel Epiphoras Shongwe, who understood the sacrifices this journey would require from them. Thank you for being in my life and to my loving husband Thabiso Mapreme Shongwe, for your emotional and financial support to me on this journey, it is greatly appreciated. Only God can reward your kind heart.

ACKNOWLEDGEMENTS

ABSTRACT

This study intended to investigate the effects of language transition and the educational conduit of language acquisition to learner performance in the academic space, especially in learning Natural sciences and technology. Moreover, refraining from the ideologies of globalization innovation and growth using English as a patriarchal language of choice for transformation.

The study followed the qualitative approach with Interpretivism humanistic paradigmatic assessment of human behavior to achieve the aim. A purposive sampling strategy was used in selecting only schools in rural settings of Mankweng Circuit, where the ideologies of the fourth industrial revolution, are marginally advocated by cultural and curriculum perspective. Data collection was done through semi-structured interviews and conducting field observation notes.

The results analysed with thematic Tech`s coding method indicated the existence of language transition problems for both teachers and grade four learners from a practical perspective of classroom interaction. Also, learners were unable to receive instruction, for the subject natural sciences and technology solely in English.

Therefore, teachers had to device new strategies to curb the problem. The presence of trans-languaging problems in Grade 4 supports the need to review the period and method in which these learners are expected to transit from mother tongue learning to learning solely in English. Moreover, there is a need to review the Natural Sciences and Technology Curriculum Assessment Policy Statement document. Furthermore, prescribed textbook need to be reviewed to ensure inclusivity, eliminating language barriers, because language, forms the core part of learning, communicating and generating new ideas for the fourth industrial revolution.

Key Terms: Translanguaging, Inclusive Education, 4th industrial revolution, Pedagogical shift, Innate abilities, Transformation.

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ACRONYMS AND ABBREVIATIONS

AAR	Annual Assessment Reports
ANA	Annual National Assessment
CAPS	Curriculum and Assessment Policy Statement
CS	Code-switching
DBE	Department of Basic Education
DoE	Department of Education
FAL	First Additional Language
HL	Home Language
IE	Inclusive Education
IL	Indigenous Language
IQMS	Integrated Quality Management System
L1	First language users
L2	Second language users
L3	Third language users
LAD	Language Acquisition Device
LiEP	Language-in-Education Policy
LoLT	Language of Learning and Teaching
LM	Language Magician
MLE	Multi-Lingual Education
MoI	Medium of Instruction
MT	Mother Tongue
NCS	National Curriculum Statement Natural sciences and technology Natural Sciences and Technology
RNCS	Revised National Curriculum Statement
SASA	South African Schools Act
SSA	Statistics South Africa
SMS	Science Made Sensible
SMT	School Management Team
TL	Trans-Languaging

UN	United Nations
UG	Universal Grammar
UNECSO	United Nations Educational Scientific and Cultural Organisation
USA	United States of America
WCED	Western Cape Department of Education.

DEFINITION OF CONCEPTS

Language

The Department of Basic Education (2010) defines language as "a means by which a person learns to organise experiences and thoughts". Moreover, it connotes a synergetic relationship of intellectual, affective, and social factor that shape learning in schools. It is crucial to investigate the effects of language transitioning, and its impact on teaching and learning the subject Natural Sciences and Technology for grade four learners. Especially when Sternberg and Sternberg (2017) indorse its ability to enable the structuring of ideas. Natural Sciences and Technology is a subject focused on producing ideas.

Mother Tongue.

Mother tongue is the language spoken in the immediate environment of a learner and result in abstract thought (Department of Basic Education, 2010). Wepukhulu, Girma and Lee (2019) asserts that children who master the basics of their mother tongue fare better in the development of other languages, especially those common languages (for example English) which is often used for primary, secondary, and tertiary education. The language might be collegial and only spoken within a certain portion of an area.

However, it is the means through which language is acquisitioned and creates concrete abstract thinking (Inge-Marie, 2017). In the event of South Africa where, there are 11 official languages, Sepedi is in the top five most ranking languages spoken in the home (Stats, 2019). Some of the other languages ranking in the top five, according to the report on languages spoken at home (Stats, 2019), are the following: English, Afrikaans, isiXhosa and isizulu. All these languages are the foundation for constructing and effecting ideas as is the principle in studying the subject Natural Sciences and Technology.

Language transition

Language transition is defined as a shift from using one language, which in most cases is the mother tongue, to the second or third language used for teaching and learning.

All the languages may be used simultaneously through the concept called trans-languaging (Serbian, 2019). This concept trans-languaging is in support of the UNESCO vision of gradually engaging in the shift to second language acquisition, through teaching and learning primarily in the first phase of learning in mother tongue. The approach, in the context of South Africa is in the backing of ensuring inclusivity in educational practices for the overall vision and mission of the framework for action 2030 and the United Nations and languages in schools' policy (Department of Basic Education, 2010)

Home language

Home Language (HL) is the language that is spoken predominantly at a learner's immediate surrounding, resulting in deep thought, understanding, analysis and evaluation of content presented within the classroom space (Krause, 2018).

Inclusive education

Inclusive education is a model of responding to each learners' specific needs despite his or her socio-economic status (Department of Education, 2019). It is a concept that advocates that no learner should be left behind, all strategies by varying educational components should be focused on ensuring, equality and equity is implemented in the classroom, where despite a learners physical or cognitive impairments, they are accommodated (Singh, 2016). With South Africa emerging from previously discriminatory educational practices, this concept is intensely promoted by all stakeholders through the white paper six and other legislative frameworks (Department of Basic Education, 2019).

THE 4th INDUSTRIAL REVOLUTION.

The 4th industrial revolution is defined as a trending fast paced movement of systems that is channelling a change not only in the environment but also in the academic field (Schwab, 2017). Technology and trends such as robotics and coding are transforming the way teachers and learners interact in the classroom. It is more than fast connectivity of machinery for example the use of tablet phones and other electronic devices in the classroom, but it fuses also psychological, physiological, and biological fields (Schwab, 2017).

Medium of Instruction (MI) or Language of Teaching and Learning (LOTL).

The Medium of Instruction (MI) is the language spoken by teachers in the classroom (Stein,). Whilst Language of Learning and Teaching (LOLT) is the language through which learning and teaching, including assessment occurs (Department of Basic Education, 2010). These two concepts are loosely linked in their homophobic underpinnings, and they contribute to the overall performance of leaners in learning any subject area, particularly in multilingual societies. Stein (ND) assets that LOLT or language of instruction is the language spoken in classroom consistently.

For example, if the language of instruction is Sepedi, it means the teacher must speak Sepedi, whilst teaching all the subjects, like Natural Sciences and Technology, Social Science and Mathematics and so forth. Therefore, it also means that learners will be assessed on the acquisitioning of the subject and not the understanding of the language when taught the subject.

CHAPTER ONE
CONTEXTUALISING THE STUDY

1.1 INTRODUCTION

Transitioning from mother tongue (for example, Sepedi) to English is a barrier to learning for most learners who are not fluent in a second language (for example English) (Inge-Marie, 2017). Transitioning from one language to another means having the ability to acquire the information conveyed, not just at surface structure but deep structure as well (Mwamwenda, 2004). Deep structure means a learner can conceptualise ideas in a meaningful way. Moreover, for a learner who is in the rural area, for example Mankweng Ga-Thoka or Ga-Mmamotintane the scientific language in the content becomes a disempowering experience to learning the subject.

Natural Sciences and Technology (NST) is a subject with global contents that is not limited to local issues only, but focuses on global issues of transitioning effectively for the 4th industrial revolution (Bantwini, 2017). The terminologies/concepts taught in classrooms through this subject, translate to the global vision of transitioning into the 4th industrial revolution, which is the focus of developed and developing countries (Expressions, 2019).

The 4th industrial revolution is a process where the environment is changed by new technologies, based on the new emerging trends in social space and academic space (Expressions, 2019). The need for trans-languaging in classrooms by teachers should be advocated to mobilise the global vision of education for all through this subject. This is because NST subject will take prominence in the future and therefore no learner should be left behind due to language barrier from not understanding the scientific language (Serbian, 2019).

The policy of inclusivity on classroom is intensely advocated, however, this advocacy seems lacking in addressing the problem at hand, which is language introduced by the subject, and the language that is familiar to learners (Department of Education, 2019). A revaluation of the effects of language transition on learning such a NST subject is significant to ensuring restoration, dignity, equity, and equality for all South Africans

(Department of Education, 1996), especially if we want a smooth transition academically in this subject, particularly in the rural areas.

1.1.1 Background to the study

Globally, transitioning from the foundation phase to the intermediate phase can be an empowering or disempowering process, depending on which language one belong to (Sibanda, 2017). In South Africa, this process of transitioning has proved to be a more disempowering experience for learners. For an example, average of 80% learners in South Africa use African languages in the first phase of learning (Grades R-3) (Sibanda, 2017) and as such 78% of Grade 4 learners cannot read with understanding in any subject, when they transit to the intermediate phase, especially with the introduction of NST and Social Science subjects (Jansen, 2019). The introduction of new concepts/terminologies in NST subject escalate the transition problem, particularly when language acquisition has not yet occurred at deep structural level (Chomsky, 2006).

The Republic of South Africa and the Department of Basic Education (DoE) in particular, recognises and acknowledges the diversity for its citizens, more specifically through the advocacy of inclusive education. In 2010 the DoE, launched the White Paper 6 that outlined barriers and interventions to inclusive education, such as language in schools. This is in line with key proclamations of the Salamanca Declaration in union with the United Nations and UNESCO regarding education for all by 2030 (Serbian, 2019).

The Vice Chancellor of the University of Wits recently commented that the 4th industrial revolution is going to expand the existing gap between learners and people from rural areas and urban areas, because more technological resources will be needed for various reasons that are not limited to only teaching learners (Expressions, 2019). The above claim was true in the academic year of 2020, when schools were forced to either close or go online, whilst adjusting to the Covid-19 pandemic.

The pandemic exposed the schools to more signs of lack of inclusivity through language in teaching not only in schools but also in the alternative media platforms that wanted to assist in the crises brought by the pandemic in the academic settings. Therefore, if we are going to use this subject to ensure inclusivity in schools, the

accommodation and promotion of each learner's intrinsic language must be intensely advocated, thus ensuring concrete understanding during teaching (Expressions, 2019).

1.1.2 Rationale of conducting the study

A look at the approach of other African countries like Tanzania, Uganda, Kenya to the 4th industrial revolution, could assist the Department of Basic Education in South Africa regarding effective transition using Natural Sciences and Technology as a tool. In these countries language transition in teaching and learning subjects like NST is only intensely advocated at the senior phase of learning(Krause, 2018;(Mwamwenda, 2004). Furthermore, these countries allow the innate ability of a learner to develop a concrete language of NST, in their own home language, before transitioning into another language.

Several scholars such as Jensen (2019), Marie (2019) and Bantwini (2017) conducted empirical studies to address the problem in provinces such as the Eastern Cape, Western Cape and Gauteng respectively.The findings of these studies indicated that language transition was a barrier effectively learning of scientific subjects amongst children.

Limpopo Province seem to be lacking behind particularly in Mankweng sub-rural area which has not critiqued this problem of effects of language transition in teaching and learning for the NST subject. However, the province acknowledged the existence of the problem and it has since attempted addressing it topically through teacher workshops and the appointment of subject advisors, to assist the teachers.

Furthermore, the intervention by the Department of Education in Limpopo is limited to focusing on the trans-languaging but on content application by teachers to learners. Therefore, it seems that the neglecting of the period at which learners are supposed to transition from Sepedi to English in learning the NST subject could lead to poor academic performance and also hinder all other attempts that are already in place, to ensure that effective transitioning occurs.

1.2   PROBLEM STATEMENT

Early language transitioning in South Africa is a barrier to teaching and learning the subject Natural Sciences and Technology [NST] (Bantwini, 2017) especially that English as a medium of instruction is highly prioritised in the South African educational curriculum because of its global socio-economic mobility. Jensen (1989) noted that, for most African countries the selection of a medium of instruction in schools is motivated by the following three factors: the political point of view, administrative point of view and ideological and cultural point of view.

Therefore, for the purpose of inclusivity prominence of the above key factors is given to encouraging the individuality and diversity. The support systems in place for NST are meant to mobilise effective early transitioning, thus Trans-languaging is intensely advocated by policies, through teacher workshops and other resource material used in school.

The teaching and learning of Natural `Sciences and Technologyis a problem to learners in grade four that has been escalated by the effects of language transition (Jensen, 2019). This is because most of the learners can only read the words but lacks understanding of the meaning behind the words they are reading. Moreover, understanding of a subject is through understanding the language written for a subject (Marie, 2019).

An estimated 40% of the global population does not receive education in the language they understand (GEM, 2017). In the case of South Africa, this becomes more evident through the time allocated to teaching and learning the NST subject, as indicated in the Curriculum and Assessment Policy Statement (CAPS) document. More hours are awarded to teaching key subjects like the Natural Sciences and Technology in English. These effects of language transition must be investigated, focusing on period at which these scientific terminologies/concepts are introduced through the content, more especially, if learners are fluent in Sepedi and are still transitioning to English and have not yet reached the deep structure that is required participating effectively in the teaching and learning of the subject Natural Sciences and Technology.

A recent conference held in London conceded that early language transition is a barrier for learning of key subjects (for example Natural Sciences and Technology) and as such support systems must be implemented to redress that barrier (Roberts, 2019).

Some of the support systems advocated for, were in context of socio-cultural reformation, through compulsory visits to native speaking countries (for example a visit to Spain for Spanish speaking learners residing in London) and the introduction of the Language Magician (LM) program which allows for deep learning of a language by both teachers and learners. Another strategy was the implementation of linguistics within Modern Foreign Languages (MFL), which rooted in establishing concrete development of foreign language, before transiting to another phase of learning. There exists a deep consensus that for a learner to become innovative in this subject, deep language structure must occur (Bantwini, 2017).

Therefore, the intrinsic ability of each learner to transit from one language to another, should be the focal point of teachers in teaching any subject (Chomsky, 2006). The problem is in South Africa, more especially in the rural areas like Mankweng, the tendency is to ensure learners learn content rather than engaging in the content (NECT, 2013). The focus should be in giving learners additional time to transition at their own pace from a language perspective and less on content material. Consequently, the intrinsic ability of learners is hampered due to this focus of complementing content, instead of following the mandated route of finishing the content (Department of Basic Education, 2019).

1.3   PURPOSE OF THE STUDY

The purpose of this study was to examine the effects of language transition on the performance of the Natural Sciences and Technology subject in grade four, Mankweng circuit, Limpopo province.

1.3.1   Objectives of the study

The study consisted of the following three objectives, which were used in conceptualising the literature view, the theoretical framework, and the methodology and form the three themes that will be discussed in detail in chapter four.

- To demonstrate the influence language transition has on learners transiting from Sepedi to English and their performance on the Natural Sciences and Technology subject in Grade 4.
- To determine strategies in place for teaching the Natural Sciences and Technology subject and its effectiveness for inclusivity in language practice from a classroom perspective by teachers.
- To explore the perceptions of teachers, and subject advisors on the effects transiting from Sepedi to English in teaching Natural Sciences and Technology subject to Grade 4 learners.

1.3.2 Reseach questions

In light of the justification and resolution of this study as labelled above , the primary research question is : To what extent does language transition influence the performance of leaners learning the subject natural sciences and technology in grade 4 classrooms in Mankweng circuit.

In addressing the primary research question the following secondary research questions were considered.

- How does language transition have an influence on learners transiting from Sepedi to English and their performance on the Natural Sciences and Technology subject in Grade 4.
- What are the strategies in place for teaching the Natural Sciences and Technology subject and its effectiveness for inclusivity in language practice from a classroom perspective by teachers.
- What are the perceptions of teachers, and subject advisors on the effects of transiting from Sepedi to English in teaching Natural Sciences and Technology subject to Grade 4 learners in Mankweng circuit.

1.4 THE ROLE OF CONCEPTUAL FRAMEWORK IN THE STUDY.

1.4.1 Background of the author and LAD theory.

Noam Chomsky is the best known and the most influential linguist of the twentieth and twenty first Century. He has made several strong claims about language acquisition for human beings: in particular, he suggests that language is an innate principle governed by psycho linguistic principles embedded within everyone. This means that each person is born with a set of rules about language in their minds. Slobin (2004) asserted that everyone has two psycho-linguistic inherent attributes; firstly, the ability to recognise the physical and social attributes encoded in language.

Secondly, the ability to process, organise and store the information encoded. Mwamwenda (2004) also asserted the sentiment of psycho linguistic learning of language in the surface or deep structure concept. From this, attribute a 'Universal Grammar (UG) concept grows in everyone. According to Chomsky's this Universal Grammar entails that "all the language all over the world has some common language principle and language parameter unvalued, with person's initial state" (Chomsky, 1965). However, the focus is not on the UG, it was significant to be mentioned as it played a pivotal role in the 1980s and 1990s for most linguist -most of the research about second language acquisition was based on the theory structure of Universal Grammar, which formed the backbone of the language acquisition and transition (Gouws, 2015; Slobin, 2004). It was the first time that the researchers combined the linguistic study and second language acquisition study, which became one of the most important fields of second language acquisition. In the 1990's, the researchers began to study the property of trans-languaging.

Chomsky asserted that through the Universal Grammar theory, a systematic basis upon which all human beings build their language is through indigenous language. Therefore, through indigenous language patterns of acoustic and behavioural mimics, each learner develops those patterns for languages purposes; this concept affirms the socio-cultural influence in language development of an individual. Hence, it is said that

learners do not simply duplicate the language that they hear around them, but rather construe rules from it.

Those rules govern the production of concrete sentencing, and the enhancement of other secondary languages heard or introduced, which they can then use to produce sentences that they have never heard before. It is for that reason that he believes that human beings are born with the Universal Grammar wired into their brains. This Universal Grammar concept offers an unlimited number of possibilities of conceptualising new knowledge, for example the word order of a typical sentence can change without being told.

Nevertheless, when it comes to the South Africa context, the distinction in indigenous dialects and linguistic syntaxes that govern each language and that of English become more discernible (Mabitsela, 2008). Sepedi is one of the official languages spoken in the northern region of the country. Moreover, this language has different syntax connotation in the various regions of that province (Mabitsela, 2008). Therefore, it is important that we analyse the language policy in schools from a theoretical dispensation of legislative frameworks and transitional era of the colonial rule, to the Apartheid regime, until the establishment of the new democratic country that came into effect in 1994 (Buttstock, 2018).

1.4.2 LAD theory: implication to the study

The current study use the above theorist and his theory of language acquisition device theory (LAD) to better comprehend the problem of the effects of language transition in teaching Natural Sciences and Technology, moreover, it was used to anchor the study (Ebersohn , 2015; Gouws, 2014). According to the Language Acquisition Device (LAD) is a display of an individual's cognitive and emotional abilities to talk about the world and its complexities (Chomsky, 1982).

The main aim of LAD is to clarify the syntactic structure of language as well as comprehension in addition to syntax structure, therefore the role of language and communication in social interaction should also be considered, when coined with academic objectives presented in a subject like Natural sciences and technology. The following subsection focus on the application of the conceptual framework to the literature review and what role it plays to the title, aim and objectives of the study.

Moreover, in the following chapters the researcher will show the role and application of the chosen theoretical conceptual framework in the methodology, sampling, data collection and data analysis.

1.4.3 Models of language transition in teaching Natural sciences and technology.

The section provides a detailed critique of the model of language transitioning and how it influences the effectiveness of teaching and learning the subject Natural sciences and technology through the Kachru three circle of expansion will be discussed. This model assisted in anchoring the LAD theory in proving that language has an effect on learning a subject.

According to Kachru's Concentric Circle Model (1992), most countries expand their circle using the English language, which is spoken as an additional language (L2). Affording to this model in many countries, educational policies is keen to educate their children to become competent users of English for access to new knowledge and the global market (kotuba, 2015; Patrick, 2015; Pennycook, 2012; Haque, 2012). An estimated 375 million individuals regard themselves as English first users (L1), whilst a billion speak English as a second language (L2) (Costley & Nelson, 2013).

Therefore, Kachru Concentric Circle Model becomes more relevant to the theoretical conception of how knowledge acquisition tactics should be harnessed in the classroom when teaching learners subjects as Natural Sciences and Technology from an L2 to an L1 perspective, because this subject is significant in mobilising a transition into the fourth industrial revolution (Costley & Nelson, 2013).

The Kachru Concentric Circle Model is best illustrated through the following classifications the inner circle, outer circle, and the expanding circle. These three domains represent the type of spread and patterns of acquisition in language inputs and outputs (Kachru, 1985). The input and output hypothesis holds the view that it is indeed necessary for second language users like the teachers and learners of Mankweng primary schools to gain acquisition through comprehensible exposure to output factor (Sepedi) before concrete acquisition can formulate in input factor (English). More especially, when dealing with teaching learners who transition from

Sepedi to understanding the subject Natural Sciences and Technology like the L1 users. Figure 1.1 below summarise Kachru Circle Model.
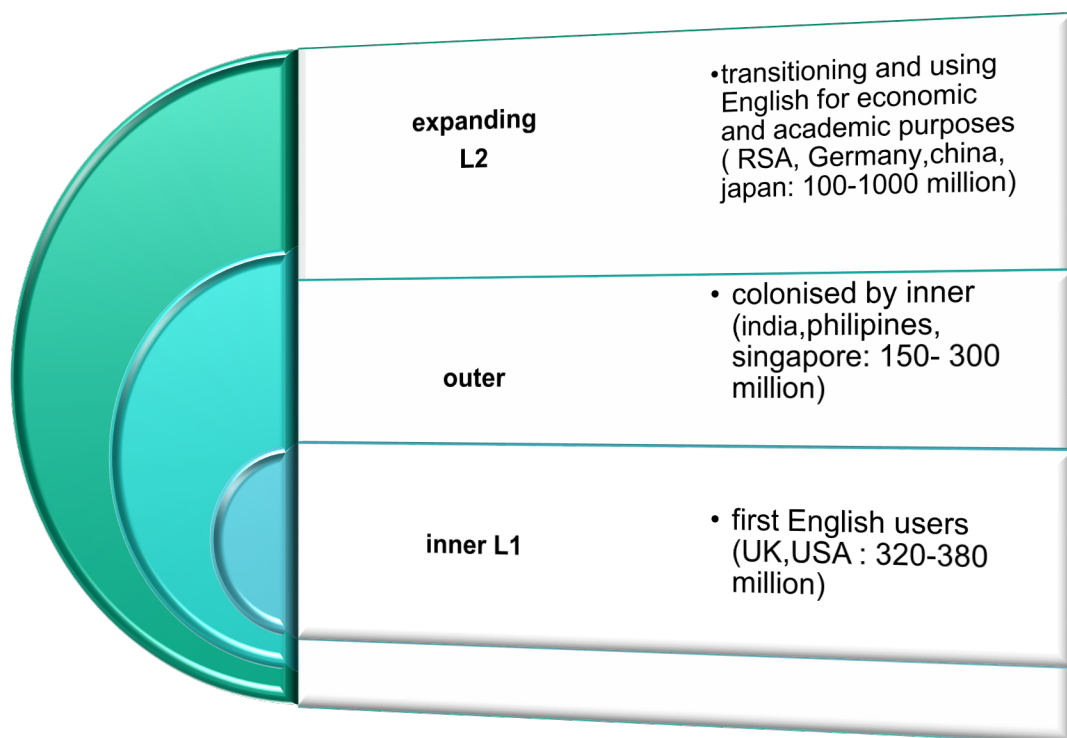
Figure 1.1: Kachru three circle of language acquisition (Adopted from the Kachru three circle model1985)

1.4.3 Application of the conceptual framework in the literature review

Others theorist of language transition like Bandura and Piaget focused from the Cognitive, Imitation and Positive Reinforcement, but the innate theory which is the focus of the study ensured and strengthened the aim of undertaking this study. Below are various language acquisition theories available to the academic spectra. Just like Chomsky other Theorists like Vygotsky, Skinner, Watson, Pavlov, Bandura and Piaget emphasised that language is not just as a tool of thought, but a vehicle for societal transformation (Ebersohn, Gouws, Lewis, & Linda, 2016). For example, through the Zone of Proximal Development (ZPD), teachers as disseminators of curriculum scaffold emerging ideas to learners. This process of scaffolding is evident through the

advocacy of trans-languaging (TL) and Code Switching (CS), which was the motivation of conducting this study (Carl, 2017).

The blending of the LAD theory by Chomsky and the Concentric Three Circle Model by Kachru assisted the researcher in identifying relevant participants. Secondly, the incorporation of this theory assisted in the direction that the literature review took, in chapter two. In this chapter, the researcher reviewed the significance of language for the effective performance of NST subject using a policy perspective.. The researcher also considered prominent writers as well as countries that did not only looked at language but also how it influenced the performance of learners in Natural Sciences and Technology subject.

1.4.4 The application of the conceptual framework in the research methodology.

Effects of language transition on the performance of natural sciences is a complex study (Inge-Marie, 2019). The study intended to evaluate how language transition affect learner performance on the subject Natural Sciences and Technology from a teacher's perspective, to achieve the purpose of the study and its objectives the researcher (Creswell, 2013). Therefore, the researcher through a qualitative study investigated the problem in the natural settings of the schools that these teachers engage in the subject with the learners and interpreted the outcomes as is. This technique of qualitative study helps in addressing the intended research aims and objectives from a humanistic aspect (Kakulu, 2014), hence such methods as a semi-structured interviews with a guide, observation and non-participant observations were used concurrently in the methodological framework.

1.4.5 The application of the conceptual framework in sampling

The conceptual framework provided the researcher with the necessary boundaries to the study. It assisted the researcher in selecting the four schools in the Mankweng circuit. For example, purposive sampling method using the LAD theory, which was scaffolded by Kachru's concentric model, was applied to select the teachers. In chapter three, this sampling technique will be discussed thoroughly focusing on the six stages of conducting sampling in the four schools under the study, the teachers

and the two subject advisors. Figure 1.2 below summarizes the sampling process using the model.

Figure 1.2 flowchart:

Clearly Defining The Target Population
↓
Select the sampling frame
↓
Choosing sampling techniques
↓
Determinining size
↓
Collecting data
↓
Assessing data
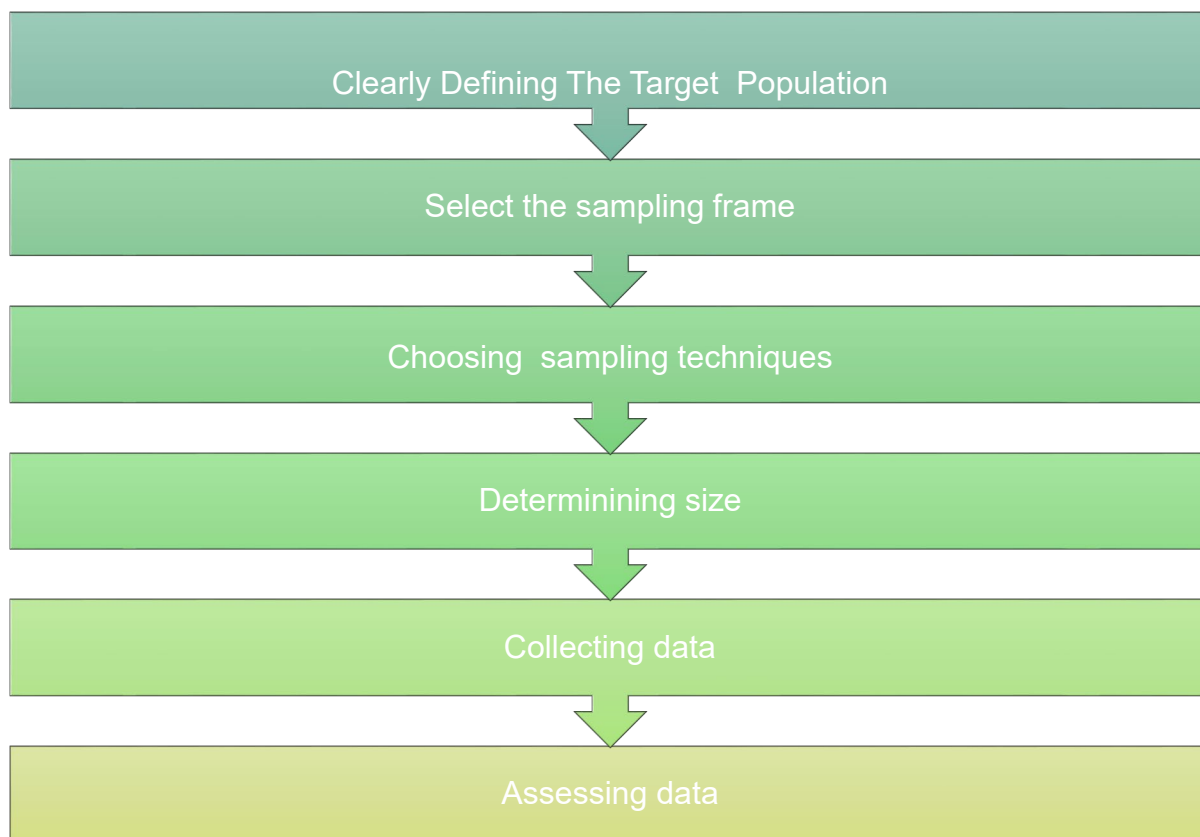
Figure 1.2: Sampling process steps (adopted from Tarhedoost, 2016)

1.4.6 The application of the conceptual framework in the data collection

The data collection process, as explained in Chapter Three was conducted using sem-structured interviews with open-ended questions, and behavioral observation, to engage with the participants in the subject(Bhat, 2020; Creswell, 2014).

1.4.7 The application of the conceptual framework in the data analysis.

The coding and thematic analysis of data as discussed in chapter three and more in detail in Chapter Four. This is because Cohen, et al. (2010) regards this trend as forming themes with the research aim and objective, and formulating rapport questions, that would either support or guide the researcher. Likewise, the conceptual framework and the model of language acquisition enabled the researcher to explore the effects of language transition on teaching and learning of Natural Sciences and

Technology in grade four classrooms, from a teachers perspective as well as subject advisors in Mankweng circuit.

1.5 PARADIGMATIC PERSPECTIVE

For the purpose of this study, an exploratory method of research,with interpretivism and LAD theory in validating the study and its findings was found relevant to the study. This paradigmatic perspective will be further discussed in detail in chapter 3, and the following subsections serve only as an initial brief outline of what will follow in Chapter Three.

1.6 METATHEORETICAL PARADIGM

interpretivism paradigm approach was chosen because it supports the ideology that human beings language acquisition and transition is contingent on understanding individualistic traits (Avis, 2004). Therefore through understanding the innate individualistic traits of each learner, it would influence the understanding of how language transition plays a role in comprehending any subject (Slobin, 2004).

According to Du Plessis (2012) "all human beings have the capacity for growth and creativity" therefore despite a particular background or setting a learners can learn and adapt to new knowledge, however a concrete knowledge of language must exist for this process to occur (Jensen, 2019;UNESCO, 2019). For this reason the researcher, needed data that was naturally humanistic in nature, allowing the taxonomic reality within each participant to emerge without restriction, to determine the factors of language transition affecting teachers and learners, in teaching the subject Natural Sciences and Technology, in the Mankweng circuit.

1.6.1 Research methodology

In the following section, the research methodology, as recommended by (Creswell, 2014; Silverman, 2013; Maree 2011) is introduced for the purpose of the study. The methodological process is a specific procedure used in identifying, selecting, processing and analyzing information about a study. It is critical justifying a study. Therefore, this process will be repeated in Chapter Three, because of its significant to the overall authenticity of the study.

1.6.2 Research Design

According to Cohen (2017), research design is a strategy or blueprint for a study to occur, it guides in collecting information and analysing the information. Therefore, an exploratory research design was applied for the purpose of the study. an exploratory research design is conducted when not much is known about the problem (Maree, 2011). The rationale for choosing this type of design is to better comprehend the nature of the problem since very few studies have been conducted in the area, particularly in Limpopo province. The study unfolded using semi-structured interviews with open-ended questions, and through observation of the participants when engaging in the subject matter.

1.6.3 Selection of participants and sampling size

According to Creswell (2014), a sample is defined as the subsection of the whole population which is investigated by a researcher and whose characteristics may be generalised to the entire population depending on the type of sampling. The participants were purposeful sampled from the identified schools and the teachers for two reasons; convenience, as it was closer to me as the researcher, thus minimizing on the cost of transportation. Secondly, because of the role that the subject advisors were appointed for the purpose of assisting teachers in in ensuring that they taught the subject with more understanding.

1.6.4 Data collection

Data collection is a process of collecting information from all the relevant sources to find answers to the research problem and evaluate the outcomes (Grove, 2019). Data was collected in the form of using semi-structured interviews. It contains selction of interviews strategy such as semi-structured interviews withopen ended questions. The researcher chose this strategy because it allows the interviewer to be prepared and appear able during the interview. Semi-structured interviews also allow informants the freedom to express their views in their own term (Creswell, 2014;Maree, 2011). As previously stated, this section of how the researcher ensured the authenticity of the study will be discussed in chapter three. Nevertheless, a brief process of how the collection and authenticating of information is discussed below.

- **Semi-structured interviews**

Semi-structured interview with a guide consisting of open-ended questions was used to collect data from the participants. This was done to achieve the studies aim and objective. This is because open ended questioners cannot be answered with a simple "yes" or "no" response but require that each response have a reason behind it, or a form of explanation (Maree, 2011). The study collected data from the participants humanistic behaviour (Ebersohn, 2016), through a process of human participants reaction to the participant. The face to face observation made with the participants whilst answering the open-ended questioner, which will be read to them to not just receive just the answer by also analysing the psychological perspective engrossed in the answer.

The study incorporated the use of observation to collect in-depth data (Silverman, 2013; Maree, 2011). Observation is a process of recording the chronological events of the study as they occur in real time. This chronological recording of events assisted in understanding the effects of language transition on the performance of Natural Sciences and Technology, more especially on teachers who are teaching those learners.

1.7   ETHICAL CONSIDERATIONS

The ethical considerations was discussed according to the ethical standards and principles:

1.7.1 Permission to conduct the study

Ethics are moral principles that govern the research conducted. Ethical clearance was acquired from the University of Limpopo Research and Ethics Committee, before undertaking the study. The University of Limpopo required an ethics clearance certificate prior to data collection. After obtaining the clearance letter and a letter from the circuit manager, participants were informed in the selected four schools of the purpose of the study.

1.7.2. Informed consent

Individuals participating in a research study have a reasonable expectation that they will be informed of the nature and purpose of the study (Cohen et al., 2018). hence

the researcher expressly indicated to the participants that any negation to participate or decision to discontinue will not result in any penalties or loss of benefits to which the participant is otherwise entitled to, such as being an employee of that particular school in that circuit.

However, it was made clear how important their participation was to the study being completed. Therefore, before the study commences, all the participants signed a consent form, all the four teachers teaching the subject Natural sciences and technology and their two subject advisors. moreover, each participant was advised that his or her participation in the study was on a voluntary basis, and that they are free to withdraw at any time.

1.7.3 Anonymity

Anonymous data are recorded so that the information can never be linked to the subject who supplied it. According to Lancaster (2017) making data 'anonymous' means eliminating such contributor's as name and other information that can help to identify people, for example: job title, age, gender, length of service Geographical information. Due to the locality of the geographical area, through the mentioning of the circuit in the proposed title, the researcher will need to take more precautions as possible to protect anonymity, and only promise the level of anonymity that will realistically be provided.

1.7.4 Confidentiality

Confidentiality refers to a condition in which the researcher knows the identity of a research subject but takes steps to protect that identity from being discovered by others (Creswell, 2014). Confidential communications, such as papers or grants submitted for publication, personnel records and financial records will be protected (Lancaster, 2017). This is because any individual participating in a research study has a reasonable expectation that information provided to the researcher will be treated in a confidential manner.

1.7.5 No harm

Of all the principles associated with research ethics, the no harm forms the cornerstone of ethical conduct (Creswell, 2014). Therefore, allowing for a reasonable expectation by those participating in a research study that they will not be involved in any situation in which they might be harmed in any way possible. To ensure no harm is experienced by participants the researcher will ensure confidentiality, coded the response in a manner ensuring that, not one of the participants can find themselves jeopardized.

1.8   Data analysis

Qualitative data analysis is the range of processes and procedures whereby the research moves from the qualitative data that have been collected, into some form of understanding or interpretation of the people and situations that are being studied (Bazeley & Jackson, 2013). Therefore, a thematic analysis was employed to analyse the collected data. The researcher sorted and categorised the data according to the identified themes. As noted from Stamatoplos, Neville and Henry (2016), an essential part of the research process is analysing the results of interviews, the following steps were taken to analyse data:

- Organize responses. Develop a system for organizing data, this includes developing a collection and management process, allocating unique identifiers to respondents, developing codes to categorize responses, and writing notes.
- Identify recurring themes. Once the researcher has transcribed the semi-structured interviews, review, and code the data to show recurring themes.
- Present the findings of the research.

1.9 QUALITY CRITERIA

The researcher strived to address the following four fundamental guidelines of quality assurance in a qualitative study; credibility, transferability, dependability, and confirmability as recommended by (Creswell, 2014). The explorative and interpretative method of data collection and analysis was used to ensure that the study was done in a liable way (Silverman, 2016).

1.9.1 Credibility

The researcher has built an honest association with all data collected, by using applicable voice recording devices, and a detailed transcription as attached in chapter four of this dissertation. Stuckey (2014) argues that transcription is far from being objective but rather consist of apprehension of what was said to give meaning to that spoken or written words. The use of supervisor also assisted the researcher to achieve the credibility of the study (Azevedo, 2017).

1.9.2 Transferability

Due to the small sample size of data (for example the researcher has used four teachers from the identified schools and two subject advisors), the data might not be easily transferred (Creswell, 2014; Johnson et al., 2014). However due to its interpretative humanistic and subjective nature such data can be used in other future research study. Moreover, the multiple ways of collecting data has ensured that data can be transferred to other studies. Thus, also accomplishing the aims set in the significance if the study in chapter 1 and the proposal.

1.9.3 Dependability

The research has shown alignment between the title, aim of the research and objectives of the study. The research has also shown dependability through the various sources at which data was collected. For quality checks the researcher has stayed in constant consultation with the supervisor.

1.9.4 Confirmability

Confirmability was strengthened through the triangulation method of collecting data (Johnson, 2014). Firstly, from the semi structured interviews, secondly through observing of teachers in the classroom and lastly through non-participation of the researcher. This method has helped the researcher and the research in maintaining consistent findings that other scholars can interpret and use in their own studies. This was done to enhance the reliability and validity of a qualitative research approach. Moreover, enhance the accuracy of data, ensuring it was not due to chance.

1.10 OUTLINE OF THE CHAPTERS.

1.10.1 Chapter 1

This chapter was an overview of the whole study, indicating the problem at hand and the purpose and objective of the study as well as the theoretical conceptual framework that supports the study .however, as in situations of most overviews to a research report, chapter one of this dissertation will be studied and advanced until the whole dissertation is finished. This is because chapter one gives both an overview and serves as an introduction to the whole study.

However, aspects such as the background and significance to the study will only appear in this chapter. The rest of its contents such as the methodology, will reappear in more detail in later chapters. AS such, in this chapter it has thus entailed the Introduction and Background of the study. The objective of the study and background to inform the reader of the value of this study. The significance or relevance of the proposed study. This was done for the justification of the research study.

1.10.2 Chapter 2

This chapter will entail the literature review, and this is the critical assessment of what has been done previously by other scholars in the given topic and is currently being done concerning the topic at hand. As such this literature review will consist of the elements of exploring the effects of language transitioning from Sepedi to English in teaching and learning Natural Sciences and Technology for grade four classrooms. This will allow the researcher to associate the research findings with the existing knowledge.

1.10.2 Chapter 3

In this chapter the researcher will intently and accurately outline the research methodology. Not withholding on the challenges encountered in conducting the study. The chapter will be outlined in line with the methodology and theoretical framework of chapter two. Moreover, the researcher's justification of how they will achieve the objectives or purpose of the study is clearly delineated. Thus, the research methodology will consist of the research design of the study, study area, population, sampling, and data collection through the questioners and schedules.

1.10.4 Chapter 4

In this chapter a detailed discussion of the research results, moreover, relating to the four themes which formed the structure for the open-ended questioner. A presentation of the findings will be done by means of transcribing and summarizing each participant response and having a researcher's comment at the end.

1.10.5 Chapter 5

In this chapter, the researcher will entreaty the significance of the study to the literature, commissioning recommendations, and outlining limitations of the study as well as their implications to the study, seemingly, those results will be interpreted based on the methodology. The main objective will be on analysing those themes and contextualising them to the aim, and objectives of the study. Should any unforeseen outcome emerge, I will record those outcomes as is. Furthermore, this conclusions, recommendations and limitations will support the aims and objectives of the research report as well as the significance.

1.11 CONCLUSION

Basic barriers to language transitioning exist in most people, especially in countries that are forced by legislative rules, that govern a country, more in particular Limpopo Province which has different dialects of the same grouped language called Sepedi, each dialect dictated by the geographical region in which learners, teachers and even people find themselves. Most legislative and fiscal frameworks relating to acknowledging and incorporating the indigenous diversity into work context, more in particular to technology are still evolving in the country, and the province of Limpopo.

They are remaining fragmented and influenced by culture which ascribes to language differences. Thus, teaching and learning of what is considered key subject face several challenges. For that reason, I felt the was a need to explore the effects of language transitioning from Sepedi to English in teaching and learning Natural Sciences and Technology in grade four, particularly in those selected Mankweng Circuit primary schools.

CHAPTER TWO
LITERATURE REVIEW

2.1. INTRODUCTION

This chapter will outline the literature review about the topic at hand, which involves a critical assessment of what has been done previously by other scholars on the given topic and is currently being done concerning the issue at hand. This literature review will consist of the elements of exploring the effects of language transitioning from Sepedi to English in teaching and learning Natural Sciences and Technology for grade four classrooms. This will allow the researcher to associate the research findings with the existing knowledge. In conclusion, the theoretical framework will be entrenched in the literature review, showing the importance of choosing the role of theory in the literature review and how it enhances the study.

The former Dean of the University of Hong Kong, Paul Morris, at a conference held by UNESCO in 1989 said that there was "a growing importance and impact of science and technology in our everyday lives, and it had the potential to create a new range of problems which will arise for those who are unable to understand and use this modern technology"(Morris, &Adamson, 2010). In South Africa, almost three decades after this claim was made, research focus on teaching and learning the subject of Natural Sciences and Technology is still a new concept in schools (Bantwini, 2017). Therefore, it has left a gap in understanding the issues that may be impeding or enhancing positive results in the learning and teaching of the subject.

Even with the various countries focusing on Science education, South Africa has minimalised that focus, especially in the Intermediate phase level (Jensen, 2019) (Bantwini, 2017;Benson, 2013). Nevertheless, its overall significance to the global vision of transitioning into the fourth industrial revolution cannot be denied. This study aimed to explore the effects of language transitioning in teaching and learning the Natural Sciences and Technology subject in grade four classrooms that are demographically situated in the rural villages of Mankweng.

2.2   LANGUAGE TRANSITION IN SCHOOLS

Language transition in the academic space is defined as moving away from teaching and learning using one language, but rather trans-languaging from one to another (for example, from Sepedi to English) (worldmaking, 2019). Language enables people to communicate, structure and produce ideas (Sternberg & Sternberg, 2017). The acquisition of a language is significant to learners' abilities to make meaning of their surroundings (Inge-Marie, 2017). Transitioning from one language to another for (example Sepedi to English) could negatively affect learner performance (Department of Basic Education, 2019).

An estimated 40% of learners globally are suffering from these effects of language transition because they are not being taught in the innately predisposed language (Gem, 2017). According to UNESCO's (2015) Educational for All Global Monitoring Report, an estimated 130 million children globally still did not achieve the minimum benchmarks in literacy and numeracy despite attending four years of primary schooling.

The director of UNESCO, Azoulay acknowledged that the Covid-19 brought forth more light on the deepened societal inequalities that infringe on quality education, more especially through accessing quality education through languages that accommodate all affected by the pandemic (UNESCO, 2020). In the instance of South Africa, an estimated 78% of grade 4 learners cannot read with understanding in any subject (Jansen, 2019). This means that these learners have not developed a deep structure of any language, and therefore the focus should be on developing that deep structure formed through language. Developing this deep innate structure of one language will ensure that they can read any content presented to them with understanding.

In 2020 the spokesperson of the Department of Basic Education Ilijah Mhlanga issued a statement that due to learners and parents alike fearing the scourge that covid-19, brought on the globe, "learners opting for home schooling should produce sufficient evidence for proper assessment'' the problem with this is the emphasis on the word on assessment either formative or summative (Hardman, 2020). This is because even prior to the scourge of covid-19 an Annual National Assessment bench mark test

indicated that most learners transitioning from grade three to Grade 4, could not read effectively, even when being assessed in their home language (Department of Basic Education, 2019; Jensen, 2019).

The figure below indicates the significant decline in learner performance for mostly African learners who have transitioned to the intermediate phase (Welch, 2012), and therefore, it supports the assumption that language transitioning has a negative impact on teaching and learning subjects like Natural Sciences and Technology for learners.
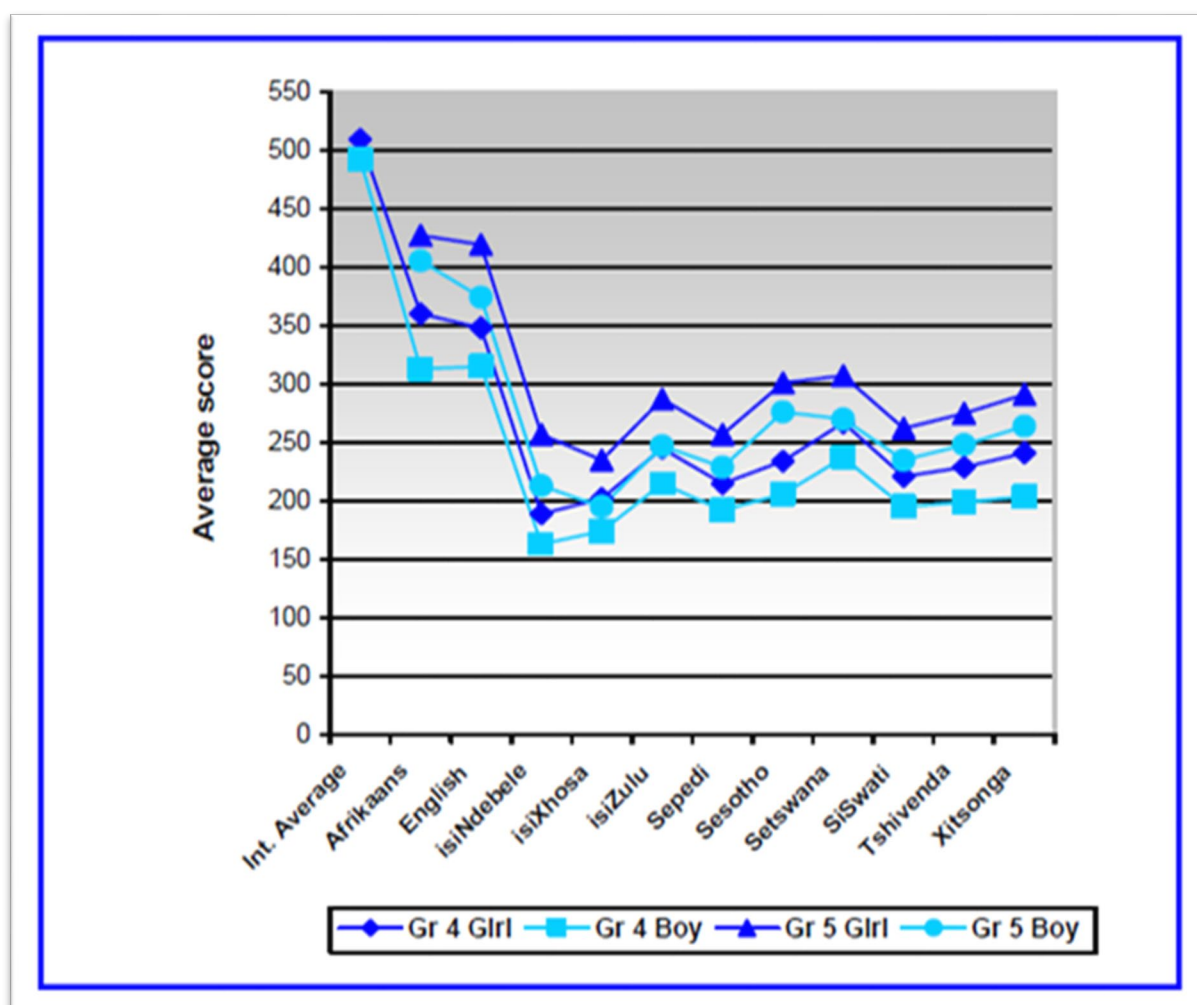
Figure 2.3*: Copied from PIRLS Report (2018): Average achievement according to Test Language and Gender per Grade.

Transitioning is an inevitable process that each learner must encounter for that learner to develop pedagogically and socially. For Natural Sciences and Technology subject,

transitioning is no longer just about content, but the language in the content and terminologies introduced by the subject in the classroom. Therefore, it is significant that we explore the effects of language transition. Moreover, language transition could either impede or improve the overal learning and teaching experience in the classrooms.

2.2.1 Policies of language transition in schools.

South African educational language policy changed amidst late former president Nelson Mandela (Rogan & Aldous, 2005). This new administration eradicated the influence of prior apartheid policies in schools of marginalizing people through language, resources, and content (Dudu & Vhurumuka, 2012). This assertion was supported by a case study conducted by Ramnarain (2011) which also found that despite change in language policies in schools, he also found a gap in the effectiveness of teaching, more especially on the subject Natural sciences and technology in schools that were previously marginalised. This gap arose from the language barrier of teaching Natural Sciences and Technology in rural areas, to the learners' background and the perceptions of the surrounding community members and resources in the school.

Therefore, the reality of a multilingual educational society in primary schools as a right is still a debatable subject for most South African schools (Mkhize & Balfour, 2018). Despite the Constitution and policy frameworks that support multilingual education and the continual advocacy of inclusive education for its citizenry by the Department of Basic Education (2019). Although, language policy became embodied in the Constitution of the country, an exclusion of African languages in the teaching of curriculum of some media houses was indicative of that exclusionary practices (Buttstock, 2018; Mkhize & Balfour, 2018). While Macupe (2020) noted that during the academic year 2020, there were not only margins of inequalities protruded more visible between rural and urban school. These sentiments also supported the assertion made by Jensen (1989) that teaching in English has an appealing socio-economic mobility factor to the global community, and its compliance in reaching the global dynamics.

The awareness of technological globalization and transitioning into the fourth industrial revolution is increasingly growing in academic literature (Hornberg & McCarty, 2012). However, transitioning globally into this 4th industrial revolution should not have a negative impact on learners individual language identities (Hardman, 2020). These sentiments were more correct during the disruption of academic activity due to the pandemic of covid 19, the government and its subsidiaries intently sought to salvage the year to the dismay of many parents as well as academics alike (Hardman, 2020;Sowetan, 2020) more especially on whom should teach using media as a platform, as well as critiquing the effectiveness of the media in teaching learners across all provincial and linguistic differences (Jensen, 2020).

Therefore, Pennycook (2012) intensely argued that the focus of transitioning into the 4th industrial revolution should not force countries to lose focus of the local languages in favour of the " spawned autonomous political, economical language of globalization" and policies that outline how this transition should occur. This is because the local or aboriginal languages form the groundwork of any knowledge comprehension in the academic arena. This sentiments proved true during the crisis of teaching learners, whilst dealing or udjusting to the impacts brought on by the current pandemic (Department of Basic Education, 2020). Nevertheless, in South Africa globalization through the participating in the 4th industrial revolution signifies creating an equal and inclusive society, where each person is afforded equal opportunity to participate in the growth of the country`s economy (Expression, 2019;Benson, 2013).

This means that Inclusive Education as a process of opportuning learners regardless of their socio-economic or lingustic differences an opportunity to be supported with the aim of ensuring equity and equality in education (Serbian, 2019). Consequently, this participation discourage the mobilising of content alone, but stir towards engaging in the content presented from a holistic perspective (Schawb, 2017). Therefore, the holistic perspective presented through inclusive educational practices translates to teaching and learning the Natural Sciences and Technology subject. This means developing the intrinsic ability of each learner to learn the subject, by so doing advocating for and recognising each learner`s individual identity (Pennycook, 2012). Rather than focusing on the globalised movement of transition in isolation of the

learner's immediate environment and identity. Moreover, teachers are key role players in the successful teaching and learning of this subject, hence the studies focal point is on the teacher's use of language and the medium of instruction when teaching Natural sciences and technology.

2.2.2 Conceptualising language transitioning for schools.

Language transitioning in South Africa, in intermediate is a barrier to learning the subject Natural sciences and technology (Bantwini, 2017). English as a medium of instruction is given importance in the South African curriculum due to its socio-economic mobility globally. (Jensen, 1989) argued that, for most African countries the selection of a Medium of Instruction (MI), in schools is motivated by the following three factors: the political point of view, administrative point of view and ideological and cultural point of view. Therefore, in as much as inclusivity, individuality and diversity are encouraged, those key factors, are given prominence by policy makers.

These key factors outlined here, by Jensen (1989) where comprehensively outlined in the previous subtopic on language policies in South Africa. Nevertheless, to support this claim made by Jensen, Walter's 1978 model of hierarchy of goals and aims in education clearly indicates eight steps to designing any curriculum (Carl , 2017). The first being the immediate instructional objectives, followed by the unit objectives, then followed by the curriculum aims, then followed by the course aim, then school aim, then at the last log of the pyramid is the community, national and philosophical aims respectively. Meaning this last, three mentioned aims above are critical to any curriculum development and dissemination.

As such when a comprehensive dialogue is said on schooling, learning and effectively transitioning from one grade to another those aims must be intently advocated by the powers that be, moreover, language should be the focal point of discussions. This is to support systems in place for subjects like Natural Sciences and Technology, which are meant to mobilise effective early transitioning. Hence trans-languaging must be intently advocated by policies through teacher workshops and other resource material used in schools, not just in writing but also in practice (Department of Basic Education, 2020). Therefore, the following cases of African countries could help South African

policy makers review the socio-economic mobility that is viewed by the language in English, as a Medium of Instruction (MI), in the primary schools.

2.2.3 The implication of inclusive education in South Africa and transitional challenges.

Inclusive education is the process of strengthening the capacity of education system to reach out to all learners as a strategy to achieve education for all. (Mugambi, 2017). The South African government has adopted an inclusive education policy in order to address barriers to learning in the education system.one of the adoption is the acknowledgement of all languages spoken for learning purposes. However, the implementation and implications of using this policy is hampered by the lack of teachers' skills and knowledge in differentiating the curriculum to address a wide range of learning, one of which is language transition (Dalton, 2012) (mugambi, 2017).

The provision of language transition for learners of different cultures has been part of that process and the development of an inclusive education system can be traced back to the nation's founding document, the *Constitution of the Republic of South Africa, Act No. 108 of 1996* (Republic of South Africa 1996)(Department of Education , 2020). This framework for an inclusive education system is laid out in Education White Paper 6: Special Needs Education: Building an Inclusive Education and *Training System* (Department of Education 2020) .

This policy framework asserts that in order to make inclusive education a reality, there needs to be a conceptual shift regarding the provision of support for learners who experience barriers to learning either linguistically, cognitively or any other form of barrier that can hamper a learner from actively engaging in their studies(Dalton,2012).

However, there are transitional challenges that hamper this movement. According to Mathew (2015) The whole idea of inclusive education is defeated due to lack of proper attitude and understanding on the part of teachers, parents, community and classmates. Lack of trained teachers, large class size, lack of child centred and relevant curriculum, limited appropriate teaching learning materials, teachers lack

competence and will to modify methodology as per the need, lack of proper in fracture, lack of access to main stream and lack of participatory activities.

This assertion is quite significant when we look at the problem of language transition especially when placing it on a scientific subject such as natural sciences and technology. This is because if the teachers, parents and community have an attitude towards a learner's language then that child will be marginalised and subjected to being taught solely in a language that he or she does not understand.

Therefore, on paper the government has indeed laid the foundation for inclusivity in schools. However, that foundation needs all hands on deck to produce the desired results. In the following section we will be discussing countries and cities impacted by the effects of language transition and how they manouver around the problem.

2.3 CASE STUDIES OF COUNTRIES AND CITIES IMPACTED BY THE EFFECTS OF LANGUAGE TRANSITION.

In this section, cases of cities and countries that have considered the effects of language transition in schools will be discussed.

2.3.1 A case of London

London is a cosmopolitan city, situated in England. Not only does it harbor English-speaking citizens, but also due to its socio-economic mobility, it accommodates multi-diverse ethnic groups. The migration practices to that city see different people seeking to empower themselves financially, resulting in foreign nationals from countries like India, Spain, Russia, and even South Africans, seeking to stay in that city. This migration processes often involve parents moving with their children, who are still of school-going age.

Therefore, the study on the effects of language transitioning is important to the curriculum development and dissemination of that city if they are to maintain the status quo of being first-class innovators and key role players in the 4th industrial revolution. Wilkinson and Pickett (2009) emphasize that the higher the number of educated people within a country, the better the living standards. This is due to each person's contribution to community activities, thus increasing the income index of that country.

A recent conference held in London conceded that early language transition is a barrier for learning of key subjects (for example Natural Sciences and Technology) and as such, support systems must be implemented to redress that barrier (Roberts, 2019). Some of the support systems advocated for, where in context of socio-cultural reformation, through compulsory visits to native speaking countries (for example a visit to Spain for Spanish speaking learners residing in London) and the introduction of the Language Magician (LM) program which allows for deep learning of a language by both teachers and learners. Another strategy was the implementation of linguistics within Modern Foreign Languages (MFL), which also was rooted in establishing concrete development of foreign language, before transitioning to another phase of learning. The exist a deep consensus that for a learner to become innovative in this subject, deep language structure must occur (Bantwini, 2017).
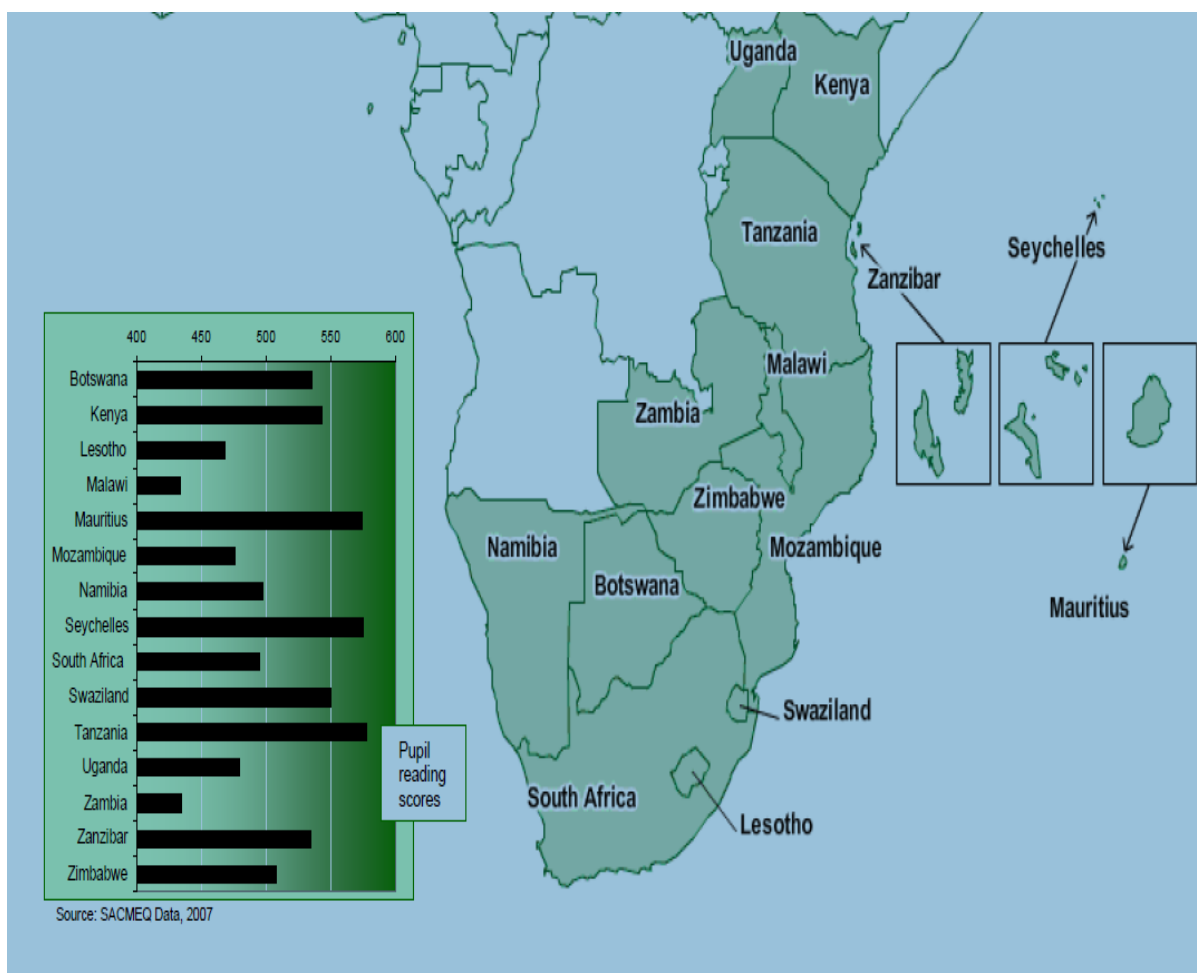
Figure 1.4*: SACMEQ III results (test in 2007, reported on in 2010)

2.3.2 A case of Tanzania and Kenya.

In Tanzania and Kenya, the language spoken or the mother tongue for most people is Swahili. Moreover, Swahili is used as a medium of instruction in primary schools (Mwamwenda, 2014). However, Kenya only opted for the implementation of children being taught in their mother tongue only in the first three grades of schooling (Gacheche, 2010). Gacheche (2010) asserts that in Kenya, an increasing evidence exists that mother tongue-based education could positively impact the educational and learning outcomes of the country.

This claim was made, when retrospection of other developing countries opted for the use of mother tongue and proved effective in teaching and learning in the classroom (Graham, 2010). Moreover, Kenyans factors of promoting the use of Mother Tongue Education (MTE) saw support from the government and non-governmental stakeholders both in societal restructuring and reformed attitude by the Pokomo in establishing an effective MTE programme for their schools (Graham, 2010).

In Tanzania, the opposite was the case, the transition to use English when teaching and learning only occurs in the secondary phase of schooling, meaning they understood the importance of build a concrete knowledge using MTE. Ironically, studies conducted in both counties found that challenges arose in learners' performance during the period of transition from Swahili to English (Mwamwenda, 2014). It was discovered that these learners expressed themselves more effectively when using their mother tongue (Swahili) instead of when using English (Wepukhulu, Girma, & Lee, 2019). This was because English was not innately developed in the learners as viewed by Lenneberg and intensely advocated by Chomsky through the LAD theory (2006).

Significant findings from scholars found that the performance level of any subject is reduced when they transition from their mother tongue to English (Gacheche, 2010). Hence, recommendations were made to continue studying using their mother tongue as a medium of instruction. This was to ensure that all learners are afforded the same opportunities as other industrialized countries. The medium of instruction in school is

the same as the language spoken at home. Moreover, they recommend this move to ensure that all learners can meet the UN and UNESCO goals of alleviating poverty by 2030 (UNESCO, 2014). This goal also supports the vision of all citizens transitioning and engaging positively in the 4th industrial revolution.

As, a result of the efforts and structures implemented in both these countries, Kenya, and Tanzania on the SACMEQ III seem to be performing well. South Africa can emulate some of the structures from the two countries sated above to ensure that they also perform better. This is because they are doing very well in comparison to South Africahowever, Tanzania seems to top the grid, as indicated in figure three (Welch, 2012). The divergent approaches the two countries took on language policies could be the reason behind their differences in performance. Nevertheless, their systems support the statement that mother-tongue development of each learner is important to the overall academic performance.

2.3.3 A case of Mozambique

The section present a case from Mozambique which unlike the previous two African countries, there is only one medium language of instruction academically (Portuguese) despite having different ethnic groups within the country. It is essential to investigate this country as politically and academically. It has similar experiences of being influenced by colonial rulings of the Portuguese colonizers. It has an inter-connected relationship politically with South Africa, which is the focus of the study. Emerging ideas on the interface of language policy and the development of a globalized Mozambique are brewing within this country (Chimbutane, 2017). A shift towards diversity and acknowledgment of different languages in the academic space is becoming more prevalent in political discourse.

Nevertheless, despite this discourse, little is yet to be achieved in transforming the language policy in schools to accommodate all its citizens where inclusive education through language practices will be the norm (UNESCO, 2014). Therefore, in spite gaining independence from their colonizers, little has been done to accommodate all languages in the academic space from a legislative perspective. This is a different approach to its neighbouring country South Africa, where the legislative mandate has

been to transform all educational policies, especially focusing on language. However, South Africa and Mozambique seem lacking in performing academically according to the SACMEQ III results as indicated in figure two (Welch, 2012).

2.3.4 A case of Eastern and Western Cape Province

Wababa (2009) argues that a large gap exists between isiXhosa and English, or between any African and Western languages. Their grammatical and morphological structures lead to learners struggling to conceptualize terminologies in the Natural Sciences and Technology subject. Moreover, Le Grange (2000) suggested the implementation indigenous knowledge system to support learners in comprehending

most of these western terminologies. By introducing the indigenous knowledge system, the challenge of understanding concepts could be minimalized.

According to the IsiXhosa speaking teachers located in the Eastern and Western Cape Province, the challenge of lack of leaner understanding is intensified when teachers must explain, define, or provide equivalent terms for scientific text and terminology that they themselves lack cognizance of (Wababa, 2009). Wababa (2009) asserts that this challenge is an everyday experience in Natural Sciences and Technology classrooms using the isiXhosa language. He, however, links this problem to the inferior education and training received by the teachers during the apartheid regime (PRAESA, 2009). Therefore, the assumption is teachers who must teach this subject are not equipped to cope, with the scientific terminologies, let alone translate the terminologies in a way that learners could comprehend.

Nevertheless, a significant consensus exists that high-quality teaching experience is needed, for learner's enhancement in the subject, not just for school purposes, but for the global vision of mobilizing the fourth industrial revolution (Presidency, 2019). Discoveries from these two provinces revealed that the approach to teaching the Natural sciences and technology subject was lacking in evoking the necessary stimulus to promote deeper learning (Bantwini, 2017). The rural settings of these schools hindered the effectiveness of teaching the subject because it did not align with some of the aim and objectives said in the curriculum and assessment policy.

2.3.5 A case of Gauteng

Gauteng province is a cosmopolitan province that drives the economic, educational, and political stations of South Africans (Presidency, 2019). Most Departments find their headquarters situated in that small landlocked province (Statistics South Africa, 1995). Nevertheless, its influence serves in precedence for all stakeholders involved in the growth of the country. Therefore, it was no surprise when scholars from the University of Miami Florida, in the United States of America, decided to use this province to pilot their new study on effective teaching and learning science in the intermediate phase (De Villiers, Plantan & Gaines, 2016).

What is significant about this study is that the researchers experienced language barriers when interacting with these learners. Therefore, they relied heavily on the translation of teachers to translate the concepts to learner's familiar language. The irony of the study was no differences were found in the content they brought and the content that was present through the curriculum and assessment policy statement. The scholars from the University of Miami found it challenging to investigate the learner's community background, attitudes, and values due to this language barrier. This challenge supports the idea that language influences on the overall performance of learners taught any subject (De Villiers, Plantan &Gaines, 2016).

2.3.6 A case of Limpopo

This study will be localized to the rural area of Mankweng in Limpopo Province. Limpopo Province was formally known as the Northern Transvaal, it was changed during the political transition in 1994. Formerly it included the Lebowa, Venda, and Gazankulu homelands (Statistics South Africa, 2012). According to Mabiletja (2015), studies revealed that officially schools in this province use the provision made in the Language in Education Policy that mother tongue should be used until Grade 3, after which learners shift to English. In this province, a high failure rate and poor performance of subjects like Natural Sciences and Technology might be due to the language in transition theory (Department of Basic Education, 2011).

 Meyer's (1998) study revealed that language is a barrier in teaching and learning subjects like Natural sciences and technology. This was because teachers preferred to use English only for writing purposes. However, for classroom interaction they relied

on the mother tongue which are Sepedi, Tshivenda, and Xitsonga (Mabiletja, 2015). Mabiletja (2015) also confirmed that this Province is z characterized by linguistic diversity. It also follows a transitional bilingual education program using mother tongue in the early years and then shifting to English from Grade 4 onwards.

It was significant to give a brief background on the Language of Teaching and Learning (LoTL) in this Province. The focus point of this study is on exploring the effects of language transitioning in teaching and learning the subject Natural Sciences and Technology. Even though the focal point of each study was on the medium of instruction exclusively, it is essential that the background overview of language practices in the classroom from both teacher's and learner's perspective.

2.4   DISCUSSIONS ON TEACHING TRENDS

From the above discussions about language transition and the effects of using science, to reach UN and UNESCO goals of inclusive education for all (UNESCO, 2014), a consensus exist internationally that the use of a child's mother tongue is necessary, for sufficient conditions of successful learning in any subject is to occur. This applies especially but not only to speakers of aboriginal languages found within a specific place (Benson, 2013).

e this statement of promoting the development of local or aboriginal languages has been intensely advocated (UNESCO, 2014) and the year 2019 being confirmed as acknowledging aboriginal languages as significant and powerful in promoting effective learning (UNESCO, 2019). The acceptance of the bilingual approach (trans-languaging) for governmental and educational unity seem defeating in addressing the problem under study, more so in developing countries or newly emancipated countries like South Africa (Macupe, 2020). This approach of bilingualism is propagated by the philosophical aim of meeting the global vision of conversing in English, as previously stated in Walter's hierarchy of purposes in education and Jensen`s statements of political and administrative influencers to the education.

2.5   METATHEORETICAL PARADIGM

As previously stated in chapter one, the interpretative paradigm approach was used because it supports the ideology that human beings language acquisition and the

transition is contingent on understanding individualistic traits (Avis, 2004). Therefore; because of the use of an interpretative paradigm in this section, the interpretative method was used to understand the problem of language transition on the teaching and learning of the Natural Sciences and Technology subject. Reeves and Hedberg {2003) stress the fact that in an interpretivism paradigm, contextualization is important.

Likewise, Interpretivist believes that reality is multi-layered; therefore, a multifaceted problem statement can have many answers, this statement was true in this study as different aspects by participants were pinpointed while I interviewed them, moreover through field observation, a critique on other contributing factors to the problem statement was done. Additionally, the study was significant when looking into the pillars of UNESCOs, which arguably encourages that no learner should be left behind (UNESCO, 2014). Consequently, this meant that the model of Kachru is compelled to poultice at a certain point and allow smooth symbiosis of the levels, as opposed to placing concrete boundaries between the three types of English users (Kachru, 1985).

2.6   METHODOLOGICAL PARADIGM

The following sub section describe the application of the theoretical, conceptual framework and the LAD theory accompanied by the Kachru Circles of Learning a language to asset the definition that paradigms address and solve problems (Kuhn, 1970). This portion was defined and explained in chapter one. This section will only be used to substantiate the ideology from results coming from the participants.

LAD theory revolutionist how scientist understood the concept of retaining or understanding a language (Dovey, 2015). Chomsky (1965) view point that language is innate and only forms through exposure is what motivated this study. Apart from home learners learn to transition in schools through what Dovey (2015) regards as observation and memorizing of grammatical cues. Therefore, the study needed to understand how teachers these learnersin their transitional phase from learning in Sepedi to learning scientific words in grade four, particularly on the Natural Science ad Technology subject.

This claim is significant because in a study conducted by Poeppel (2015). He found that "learners build abstract, hierarchical constituents of linguistic information". Therefore teachers have to be a vehicle for solving the transitional problem through

trans-languaging to reach the ultimate goal set by the department of basic education that by grade seven each learner must be able to comprehend , construct, and rationalize using English.

2.7   CONCLUSION

In this literature review the researcher, defined, and outlined concepts to teaching the Natural Sciences and Technology subject in the intermediate phase, particularly grade four classrooms. The focus of the chapter was not entrenched in the subject alone, but the effects of language in transition and its implication to learners' overall performance academically. A detailed description of trends addressing the effects of language transition in teaching and learning the subject Natural sciences and technology were described. The researcher perused through European countries like England and the strategies used in that continent to address language transitioning in teaching science as a subject.

This investigation led to other African countries like Tanzania, Kenya, and Mozambique. A consensus discourse emerged that all these countries are experiencing barriers in effectively teaching the science subject due to the language barrier. Studies from scholars in the Western Cape, Eastern Cape, Gauteng, and Limpopo, were outlined. In conclusion, the consensus from this literature review is that langue plays a significant role in the performance of any subject. Though this study was focused on natural science specifically, other scholars who have attempted to understand the problem of a decline or lack of performance in Natural Sciences and Technology also deliberated on the issue. For example, most of the scholars concluded that trans-languaging and the innate ability of learners to learn a new language could be among the contributing factors for the mediocre performance by learners, when treating this subject.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1   INTRODUCTION

The previous chapter outlined the literature review that ground and support the study. This chapter outlines the research methodology applied to achieving the research aim and addressing the problem statement. The chapter will be outlined in line with the methodology and theoretical framework of chapter one. Moreover, the researcher's justification of how they achieved the objectives and purpose of the study is delineated. Thus, the research methodology will consist of the study's research design, study area, population, sampling, and data collection through the open-ended questioners and schedules to each school and participants.

3.2   PARADIGMATIC ASSUMPTION

Research paradigms are defined as the viewpoints that substantiate an ideology (hay, 2005). Kuhn (1970) also assets that paradigms are a set of common beliefs and agreements shared amongst scholars about how problems should be addressed and solved. According to Bazeley and Jackson (2013), there is no base basis for a subsequent choice concerning methodology, methods, literature, or research design without recommending a paradigm as an initial step. paradigms are worldviews and form the base through which theory is learned (Johnson & Christensen, 2014). Kuhn regarded this as a taxonomic or Lexi comic change of events that involves recording, observing, and reordering of various entities within a study, thus a relationship could be established in its natural settings (Johnson & Christensen, 2014).

3.3   RESEARCH METHODOLOGY

Research methodology is defined as the specific techniques and research approaches used to identify, select, process, and analyse information about a topic (Sanders, Lewis, & Thornhill, 2012). There are three categories of research approaches, namely; qualitative, quantitative, and mixed methods research approach. An approach is a plan that consists of steps of assumptions to a detailed descriptive collection, analysis of data collected (Manion & Morrison, 2018; Creswell, 2014). In this study the researcher

applied qualitative research approach to obtain non-numerical data that interpret meaning and understanding of social life through the study of targeted populations at a selected area.

The study used a qualitative research approach because it focuses on collecting data from an open-ended conversation, focusing on why participants think or reason the way they do. A qualitative research approach is a naturalistic way of gathering data that seeks an understanding of the phenomenon, and it relies primarily on collecting real data (Johnson & Christensen, 2014). The approach assists the researcher in detailing how people interpret their world from a humanistic perspective and not focusing on the numeric counts and measures involved in a quantitative design (Creswell, 2014). Moreover, a qualitative approach provided a significant amount of detail instead of a quantitative research design, and it is believed to provide profound and loaded information (Manion & Morrison, 2018).

This is because it involves collecting personal experiences, perceptions, and impressions. Thus, it assisted in uncovering the meaning of a phenomenon. However, it must be said that it has such weaknesses of subjectivity, small sample scale, to minimisea small sample scale, and minimizing cost and time. Such a reduction could be that as the researchers codes, and themes the ideas, they extrapolate repetitive patterns and only give an overview of what the participle ants wanted to say (Johnson & Christensen, 2014).

3.4   RESEARCH DESIGN

 According to Cohen (2018), the research design is an approach or plan for a study to occur, it guides in collecting information and analyzing the information. Therefore, an exploratory research design was employed in the study. This type of design is conducted when not much is known about the problem (Maree, 2011). Furthermore, Denzin and Lincoln (2003) regard this method as a set of flexible guidelines that show the researcher to connect theoretical paradigms to strategizing and collecting real data. Additionally, according to Mouton (1996), research design serves as a strategy to plan, structure, and execute to validate the findings.

The rationale for choosing this type of design is to comprehend the nature of the problemcomprehend better the nature of the problem, and better understand the nature of the problem since very few studies have been conducted in the area, particularly in Limpopo province. The study will unfold using open-ended questioners, and observation of the participants when participating and engaging in the subject matter.

3.4.1 Case study

Case study is also defined as an in-depth explorative plan of studying events, communities, or persons (Cohen et al., 2018). Case study is a research strategy investigating a phenomenon in its real surroundings, thus allowing for an explorative descriptive analysis of the participants' response (Creswell, 2014). This statement is corroborated by Yin (2003) who defines a case study as an empirical inquiry that explores a phenomenon within its natural settings. Moreover, it is useful when contextualizing events are critical, and the researcher has no control over the unfolding results.

Hence, this study opted to use this method because it shed light on the phenomenon under study, providing depth information about the effects of transitioning from Sepedi to English in teaching and learning the Natural sciences and technology subject (Johnson, et al., 2014). The researcher employed a humanistic description of addressing the problem and allowing the participants to answer verbally and through written documentation. Moreover, allowing the researcher to observe as a non-participant observer in the classroom while teaching the subject. A thematic process of analyzing and each respondent interview was used to examine and highlight repeating themes and key facts brought on by the participants.

The advantage was of using this design for the researcher was influenced by time, financial motivation, and easy accessibility of participants since she resided in the region of Mankweng. Moreover, since it was an illustrative native process of shedding light on a phenomenon embedded within the social study.

3.4.2 Study site, Population and Sampling

The section of the population and sampling is described with regard to the study area and participants of the study.

3.4.2.1   Study site

The focus in this study was in Mankweng. The area in question is one of the local townships within the Capricorn District Municipality in Limpopo Province. This are is located 27 km east Polokwane city, and it has such famous areas as the University of Limpopo, and Moria on the R71, moreover it has a rich historical background and public figures such as the late King Mamabolo, Frans Mohlala and Peter Mokaba. The area is pre-dominantly rural and covers 11.97 square kilometre. According to (IDP, 2018/19) the population are rounds to a figure of 33738 mostly, speaking Sepedi as a first language and other minor spoken languages like Xitsonga, Venda, and Afrikaans. All these people attend schools or attended a sample of the schools the study focused on. however, the area occupies the Mankweng Circuit and the Lebopo Circuit and Dimamo Circuit in the same vicinity sharing the same office block and separating the schools accordingly.

Figure 3.1*: Map of area

3.4.2.2   Population

The population of the study was all teachers for Natural Science and Technology and officials in Mankweng Circuit area.

3.4.2.2 Sampling

The researcher has used purposive sampling, this technique will be further discussed in the following subsections. this is because according to Tarhedoost (2016) "in order to answer a research question it is doubtful that researchers should be able to collect data from all cases" hence the need to identify a sample moreover sampling is used to make inference about a theory or even make generalizations about a population (Tarhedoost, 2016; Creswell, 2014). Tarhedoost (2016) emphasizes that the population must be known in the research study; moreover it forms the first step of the six-sampling method tabulated in Chapter 1.

- *Sampling technique*

The non-probability sampling method was used to make the final selection of those who will be participating in the study. This is because nonprobability is often associated with case studies which is what I used for this thesis. The motivation for using case studies, as previously said, is to small sample size; however, an apparent reason as to why those participants are selected must be clearly stated (Yin, 2003). For that reason, only four teachers and two subject advisors, all resulting in equal gender of male and female, were selected for this study, see Table 3.1.

Table 3.1 : Sample of participants

Targeted number of participants	Number of teachers	Number of subject advisors
Six	Four	Two

Gender specification	Two males Two females	One male One female
Total number of schools	Four	
Total number of department officials (Subject advisors)		Two

Fundamentally, the researchers used the purposive sampling method to select the participants for participation in the study. Purposive sampling was driven in identifying a research problem of exploring the effects of language transition from Sepedi to English in teaching and learning the subject Natural Sciences and Technology in grade four classrooms, under Mankweng Circuit. According to Maree (2011) in purposive sampling, people are chosen, as name implies, for a specific purpose. The basis for selecting this type of method is that it will be used to select the respondents to provide information regarding the effects of language transition in teaching Natural Sciences and Technology to grade four learners, in rural schools surrounding Mankweng township. For case studies, Creswell (2014) recommends featuring or interviewing at least two cases. Hence this study was guided by that principle in involving both teachers and subject advisors. The motivation was that they would bring different perspectives to the research study and enhance the study's reliability.

- *Sampling size*

Sampling refers to a method of selecting a representative of a population for a research study (Grove, 2019). According to Creswell (2014), a sample is defined as the subsection of the whole population investigated by a researcher and whose characteristics may be generalized to the entire population depending on the type of

sampling. According to Tarhedoost (2016), a frame forms a representation of the whole population and includes data from actual cases resulting from that area.

Dissimilar to quantitative studies, the sampling size in qualitative studies, size is not mathematically calculated. There is no specific set of rules for deciding on the sample number in such a study (Creswell, 2014), However, it must be sufficient to allow comparison to occur. Sample size often depends on the conceptual approach for example when testing a prior hypothesis, you may be able to get away with a smaller sample size. Which is why I have a small sampling size consisting of only six participants. consequently, due to the above statement you are likely to partake in what Glaser and Strauss 1967(Turner, 2016) call theoretical sampling.

This is because this type of sampling size allows you to specifically choose participants that are well versed in the subject matter being investigated. Inclusion and exclusion criteria set the boundaries for the systematic review in a study (Lancaster, 2017). They are determined after setting the research question usually before the search is conducted, which in this study they were outlined along with the aim and objectives. Other inclusion or exclusion criteria can include the sample size or method of sampling.

- Inclusion and Exclusion criteria

Inclusion criteria are defined as the key structures of the target population that the investigators will use to answer their research question typical inclusion criteria may include but are not limited to demographic and quantifiable characteristics according to Patino & Ferrera (2018). In this study the participants all are demographically and geographically deployed in schools under Mankweng circuit. Moreover, they are all allocated the subject Natural Sciences and Technology for grade 4 classrooms.

In contrast, exclusion criteria are defined as features of the potential study participants who meet the inclusion criteria but present with additional characteristics that could inhibit the success of the study or increase their risk for a favourable outcome. Common exclusion criteria include the following but are also not limited to this characteristics of eligible individuals that make them highly likely to be lost to follow-up, miss scheduled appointments to collect data as by the investigator, have

comorbidities that could put the results of the biasness the results of the study, or increase their risk for adverse events (most relevant in studies testing interventions)(Patino and Ferrera, 2018).

For this study the most prevalent exclusionary criteria were the restriction of movement by the investigator to the various schools. For contact sessions due to the Covid-19 pandemic. However, I as the investigator maneuverer around the hurdle by constructing a survey template to live with the relevant participants. Also I ensured that upon collecting the data feedback I telephonically communicated with them to verify if the sentiments were still the same as when they wrote them down in the comforts of their classrooms. A detailed transcript of what each participant said can be found in annexure j on page 106.

3.5   DATA COLLECTION

Data collection is a process of collecting information from all the relevant sources to find answers to the research problem and evaluate the outcomes (Grove, 2019). Data was collected using semi-structured interviews with open-ended questions. Semi-structured interviews also allow informants the freedom to express their views in their terms (Creswell, 2014; Maree, 2011). The researcher used the following approaches in helping plan for and carrying out the semi-structured interviews.

- The researcher made an appointment with each participant regarding time and venue, and only conducted interviews at the time convenient for each participant.
- Prepared for the questions to be asked by writing down what information is needed to obtain information.
- The researcher introduced and built a rapport by re-iterating the purpose of the study and the participants' right to voluntarily participate and to withdraw at any time and the fact that they would not be penalised for not participating or withdrawing from the study.
- The researcher was mindful of the questions, ensuring that questions were open-ended and avoiding leading questions.

- The semi-structured interviews were designed to meet the research objectives and to provide answers to the research problem statement. To achieve these aims, some of the items that were included in the questions of examining the effects of language transition in teaching that subject.

3.5 ETHICAL CONSIDERATIONS RELATED TO SAMPLING AND DATA COLLECTION.

This section discusses the ethical considerations that were applied in the study to safeguard participant's health. The point of departure for the section will be the ethical standards such as permission for conducting the study.

3.6.1 Permission to conduct the study

Ethics are moral principles that govern the research conducted. Ethical clearance will be acquired from the University of Limpopo Research and Ethics Committee before undertaking the study. The University of Limpopo requires an ethics clearance certificate before data collection. In such instances, the researcher applied and obtained an ethical clearance certificate letter the University of Limpopo, Research Ethics Committee (see Appendix C). After obtaining the clearance letter and a letter from the circuit manager, the researcher formally informed the participants in the selected four schools of the purpose of the study see.

3.6.2. Informed consent

The researcher has an obligation to meet the individuals participants expectation of being informed of the nature and purpose of the research (Cohen et al., 2018). Henceforth the researcher expressly indicated to the participants that any negation to participate or decide to discontinue will not result in any penalties or loss of benefits to which the participant is otherwise entitled to, such as being an employee of that particular school in that circuit. However, it was made clear how meaningful their participation was to the study being completed.

Hence, before the study inaugurates, all the participants signed a consent form, either through a signature or initializing their names, whichever the participant felt

comfortable with. All the four teachers teaching the subject Natural sciences and technology and their two subject advisors. Moreover, each participant was advised that their participation in the study was voluntary basisvoluntary, and free to withdraw at any time.

The participants were individually approached from the 12th of October until the 25th of November. Each participant chose to either sign or initial their names and put a surname, of which some felt better-using synonyms instead of their names. And to those that chose to withdraw, for reasons known to them, such endorsement was given

3.6.3 Anonymity

During this study, participants were assigned pseudonames like codes such as participant one or two to ensure anonymity (Cohen et al., 2018). Anonymous data are recorded so that the information can never be linked to the subject who supplied it. According to Lancaster (2017), making data 'anonymous' means removing such contributors as names and other information that can help identify people, such as job title, age, gender, and length of service Geographical information. A summary of participants profile is given in chapter four.

Additionally, Creswell (2014) noted that the geographical area often influence anonymity, thus, in the current study mentioning of the circuit names and sharing shool names was done more precautions as possible to ensure anonymity. One of the steps taken in that regard was to understand and promise the participants not to provide pictures of the school, department and sometimes changed the gender portion as this were realistic measures to ensure anonymity.

3.6.4 Confidentiality

Confidentiality refers to a condition in which the researcher knows the identity of a research subject but takes steps to protect that identity from being discovered by others (Creswell, 2014). Confidential communications, such as papers or grants submitted for publication, personnel records and financial records will be protected, part of my role as a researcher and a scholar is to provide a safe environment for my

participants, this is because they hold esteemed and represent revered positions within the departments and would therefore not like to put into disrepute those departments.

Therefore, anytime should a third party require the personal information of my participants I would verify their right to access that personal information and moreover make such a third party know that I shall only releases the required documents on the directive of the participant`s themselves, if I`m compelled by law I shall remove all indicators that could identify the participants private details (Lancaster, 2017). This is because any individual participating in a research study has a reasonable expectation that information provided to the researcher will be treated in a confidential manner.

3.6.5 No harm

The principle of no harm forms the cornerstone of ethical conduct associated with research ethics (Creswell, 2014). Therefore, allowing for a reasonable expectation by those participating in a research study that they will not be involved in any situation they might be harmed in any way possible. To ensure no harm is experienced by participants the researcher ensured that discomforting requests or questions were left, and I did not force them to answer if they felt uncomfortable doing so. Afterward, data coded the response to ensure that not one of the participants could find themselves jeopardized and only attached the signed consent forms in the appendices.

3.7   DATA ANALYSIS

Qualitative Data Analysis is the range of processes and procedures whereby the research moves from the qualitative data that have been collected, into some form of understanding or interpretation of the people and situations that are being studied (Bazeley & Jackson, 2013). Consequently, a thematic analysis was employed to analyze the collected data. Thematic analysis is regarded as identify analyzing and reporting patterns found in themes (Silverman, 2013). Therefore, the researcher sorted and categorize the data according to the identified themes. An essential part of the research process is analyzing interviews (Stamatoplos, Neville, & Henry, 2016). The analysis was done according to five phases, which were the result of the raw data from the open ended questioner;

- Categorization and coding of data on the transcriots. The researcher transcribed all the recorded interviews verbatim to assist in the process of categorization and coding.

- Familiarization with the transcripts by reading all transcripts one by one from the recorded interviews.

- identifying patterns that emerged and familiarizing with the data of the open-ended questioner. The was done to find any correlation or miscorrelation between what the participant viewed as problem for language transition in teaching and learning of the Natural Sciences and Technology subject.

- Reviewing of the raw data, from the three themes that will be discussed in detail in chapter four. These themes were identified, extrapolating from the open-ended questioner itself.

- Production of a report finding. The benefits of using this method of thematic coding and analysis of data is the flexibility of interpreting the data (Creswell, 2014). The figure below summarise the steps above;

Figure 3.6*: The five phases of thematic analysis (suggested by Braun, 2006).*

3.8   QUALITY CRITERIA OF THE STUDY

This section shows how the study ensured the quality of findings by discussing four essential elements of trustworthiness in a qualitative study; credibility, transferability, dependability, and confirmability.

3.8.1   Credibility

Credibility is a process of building and representing data correctly and honestly (Mertens, 2010). Therefore, the researcher has built an honest association with all data collected by analyzing each participant's answers and placing a comment were deemed necessary. According to Creswell (2014), credibility is the ability of a researcher to present the data correctly and sufficiently for them to be interpreted by other scholars. Therefore, to ensure that that data was credible, the researcher created a connection with each participant and tried to understand what perspective they were answering the questions.

Moreover, to produce what Silverman (2010) considers as a grounded theory, the problem is on their accounts. I visited the participants during exam preparations, more especially since I was in cognizance that apart from language constrained, other factors such as time would play a role in them partaking in the study, it did add more merit to my study, as they were time-constrained and also dealing with the challenges brought on by the covid 19 pandemic.

3.8.2   Transferability

Transferability refers to the extent in which study findings can be transfer to a different location (Creswell, 2014; Johnson et al., 2014). In the current study, transferability was ensured by providing a thick descriotion of the research methods applied, and this is provided in the current chapter. Furthermore, the use of purposive sampling was used to ensure transeferability. Although Patton (2002) reasons that by having a reduced number of participants, a researcher can provide an in-depth insight into a study, and therefore, due to that interpretative humanistic and subjective nature, it can be used in another future research study (Cohen et al., 2018).

Moreover, the multiple ways of collecting data have ensured that data can be transferred to other studies. This is because Mertens (2010) emphasizes that minimal

participants safeguard the process of highlighting and outlining similarities and differences in response at a convenient time. Thus, also accomplishing the aims set in the significance if the study in Chapter 1 and the proposal.

3.8.3 Dependability

According to Creswell, (2014), dependability is defined as a a process of producing research data that could create alignment in a study. The research has shown alignment between the title, aim of the study and objectives of the study. The research has also demonstrated dependability through collecting data until data saturation was reached. The data analysis method was done with researchers flexibility to assist in consistent themes generation (Silverman, 2010).

3.8.4 Confirmability

In this study, the triangulation method of collecting data through semi-structured interviews with open-ended questions, and field observations, was used to ensure confirmability (Johnson, 2014). This method has helped the researcher and the research maintain consistent findings that other scholars can interpret and use in their studies. This was done to enhance the reliability and validity of a qualitative research approach. Moreover, enhance the accuracy of data, ensuring it was not due to chance.

3.9 CONCLUSION

This chapter discussed the paradigmatic research assumptions, methodology, ethical considerations, and quality criteria employed during the study. The discussion of the research methodology assisted the researcher in addressing the research problem and achieve the study aim. The study used qualitative research approach to achieve the aim and objectives of the study. Data was collected from the teachers and subjectofficials using a semi-structured interviews with a guide and observation. The next chapater focus on the study's results and findings comprising three themes.

CHAPTER FOUR

RESULTS AND DISCUSSION OF THE RESULTS.

4.1   INTRODUCTION

In the previous chapter, the methodological aspects of the study were discussed, contextualising them to the overall study. In this chapter, the researcher provides the study findings generated from the eight participants from two departments. The findings are presented according to the table and narrative format for better understanding by the reader. The researcher will critique the participants' responses to the questions analyzing how they answered the questions, and perhaps observe the context at which they base their rationale to the problem at hand. Therefore, Braun and Clarke (2006) urge for the use of themes in analysing a study as they built the core and flexible approach while providing rich data.

Participant profile is provided to indicate the demographical, physiological, and psychological reasoning of the participants. According to s (), profiling participants ensures easing communication of data and gives the reader a clear picture of the targeted audience. Hence, in this study, only participants who were involved in teaching of the subject Natural Sciences and Technology were chosen with schools located in the rural villages of Mankweng. The section that follows provide a summarised profile for participants who took part in the study.

4.2 DEMOGRAPHIC PROFILE OF PARTICIPANTS

This section gives a profile of the teachers teaching this subject, most significantly because they contributed to the study's overall underpinnings.

Table 4.1: Demographic profile of participants

Participants	Gender	Years of experience	Highest education level	Year obtained	Years in the position
Participant 1	F	30 years	SPTD	1990	2years
Participant 2	M	12 years	Degree	1999	1years
Participant 3	F	2 years	Degree	2018	8 months
Participant 4	M	18 years	Honours degree	1991	2years

| Participant 5 | F | Close to 30 years. | Degree | 1989 | 3years |
| Participant 6 | M | 3 years | Degree | 2017 | 3years |

Table 4.1 shows that four of the participants are above the age of 40 years with a minimum of 10 years working experience and only two teachers aged between 23 and 26 years with at least three years working experience. What was also noteworthy was that none of the participants had more than five years teaching or being involved in the subject. Moreover most of the participants did not receive CAPS training from school but underwent workshops.

Subsequently, as previously reported the transcript discussion, most of the participants were trained as mathematics teachers, and they ended being involved in the subject for one reason or another, helping learners transition is different when we look at them from a language perspective. This is because some of the scientific terms are not readily available in the learner's environment. For example, on a topic on trains, you as a teacher will be forced to create a meaningful image in the learner's mind or the solar system, which was the content that most of the participants were busy during the time the researcher visited the schools. Most of these learners don't know what a planetarium is,but demonstrate basics understanding of such terms as stars, moons, but it requires a seasoned teacher to move from the known to the unknown without losing the learner in the process.

4.3 RESULTS OF THE STUDY

The section that follows below provide results that emerged from semi-structured interviews with open ended questions. The results are presented according to the table and narrative formative.

Table 4.2: Themes and sub-themes of the study

Themes	Sub-themes
1. Challenges experienced when teaching the Natural Sciences and Technology subject	1.1 The language and terms of Natural Science and technology described as a barrier

	1.2. Teachers inabilities towards assisting learners' transition
	1.3 English as a medium language described as a challenge
2. Strategies used to redress those challenges versus required strategies for improvement	2.1 Use of mixed language as code switch
	2.2 Formative teaching to assist in trans-languaging culture
	2.3 Training
3. Description of assistance provided toaddresstranslanguaging challenges	3.1 Workshop
	3.2 Engaging SGB to foster home learning of Natural Science and Technology subject

4.3.1 Theme 1: Challenges experienced when teaching the Natural Sciences and Technology subject

The study findings indicate that participants experience various challenges of trans-languaging for teaching Natural Science and Technology subject in Grade 4. These challenges are interpreted into multiple sub-themes, which are described below;

Sub-theme 1.1: The language and terms of Natural Science and technology described as a barrier

Teachers experience language and terms of Natural Science and technology described as a barrier towards language transition of Natural Science and Technology subject. These findings is supported by the following quotes:

Participant 4: "the main problem is terminologies used in teaching and learning the subject , another problem is lack of resources ,which makes it very difficult for learners to understand , especially in rural schools".

Participant 1: "Language and the terms need more understanding …"

Participant 5: "language transition does play a role because most of these learners answer their questions using their home language, and some have not yet differentiated between language of learning and their home language".

Sub-theme 1.2: Teachers inabilities towards assisting learners' transition

The study findings indicated that teachers have inabilities to properly assist the Grade four learners with language transition from the mother tongue to the scientific language spoken in the content of the Natural Science and Technology subject.

Participant 4: "…the problems is teachers learn the subject while already teaching, through workshops, and that time is not sufficient".

Participant 6: " as teachers we have a challenge to assist the students to transit to Natural Science and Technology".

Sub-theme 1.3: English as a medium language described as a challenge

The study findings indicated English which is a medium language of instruction as a challenge for Grade 4 students in Natural Science and Technology subject. The following quotes support the findings:

Participant 1: "Language (English) is a challenge and the terms need more understanding".

Participant 2: "Language and environmental factors is always a challenge for students".

Participant 6: "Learners in grade four have spelling and writing problems. Another problem is they pay less attention on the lesson. Yes! language transition does play a role because most of these learners answer their questions using their home language, and some have not yet differentiated between language of learning and their home language".

4.3.3 Theme 2: Strategies used to redress those challenges versus required strategies for improvement

The curremt study findings reported on a diverse strategied that could be used to address the challenges, as well as those that could be used as an improvement for the transition of Natural Science and Technology. The following two sub-themes summarises the main themes;

Sub-theme 2.1 Use of mixed language as code switch

Participants in the current study reported that mixing of English as a medium of instruction with the home language could assist the Grade four learner to transit well in the Natural Science and Technology subject. Furthermore, participants indicated that the mixed langauages can be added in the social media such as whatsap. The illustration below support the findings;

Participant 1: "Code switching, start from English then give them everyday examples from home, using mother tongue".

Participant 2: "Mixing home language with English".

Sub-theme 2.2 Formative teaching to assist in trans-languaging culture

The use of formative teaching like drilling glossary and classroom remedial teaching for learnersis described as a positive strategies to enhance transition of Natural Science and Technology subject. The illustration below demonstrate the findings:

Participant 5: "Encourage drilling glossary to strengthen their skills. Modelling and demonstration can create opportunities to make learners to learn using games. Practical tasks also help".

Participant 6: "Classroom remedial for teaching learners on reading and writing skills, teaching lessons with practical activities which bring learners into pay attention to the lesson".

Sub-theme 2.3 Training

Participants reported that they could benefit a lot from training strategy that will assist the Grade four learners to transit well on the Natural Science and Technology subject. The quotes below support the findings:

Participant 1: "I think the aims and objectives are structured fine, but more workshops are required, especially for us who are old t eachers".

Participant 2: "Training because not every teacher teaching the subject is really trained for the subject, but you find yourself allocated a subject that you are not trained for".

Participant 5: "I think if more schools attended workshops organised by subject advisors, they would receive more help".

Theme 3: Description of assistance provided to address translanguaging challenges

The study participants describe the assistance currently provided that assist in the translanguaging challenges of Natural Science and Technology for the Grade four learners. The assistance include the involvement of HOD, SGB and workshop through the media. The sub-themes below described the theme in details:

Sub-theme 3.1: Workshop

The study participants describe workshop as the assistance currently provided to assist in the translanguaging challenges of Natural Science and Technology subject for the Grade four learners. The quotes below support the findings:

Participant 1: "Workshops and consulting with my HoD...".

Participant 3: "Workshops and sometimes using media platforms".

Participant 5: "I think if more schools attended workshops organised by subject advisors, they would receive more help".

Sub-themes 3.2: Engaging SGB to foster home learning of Natural Science and Technology subject

The participant reported that engaging SGB to foster home learning of Natural Science and Technology subject. Participant expressed that the involvement of Grade four learners could further assist with the challenges. The quotes below support the findings;

Participant 5: "Most schools we encourage that the SMT and SGBs address the problem by ensuring that at least learners are 10 years when they reach this grade".

Participant 6: "I wish parents would get involved, moreover the SMTs could support us as teachers with approving more resources".

4.4   DISCUSSIONS OF THE RESULTS OF THE STUDY

 In the previous section, the researcher gave a direct transcription of what the teachers regarded the problem and directly transcribed what the teachers considered the problem by directly quoting them. Also, the researcher summarized what the participants noted in the open-ended questioner, which I provided them with. The section present the three themes   identifiedin the study and the subthemes that emerged from the participants answering the open-ended questions. The findings that support this central theme are the teacher's attitudes towards language transition in teaching the subject Natural Sciences and Technology, moreover, in this subthemes, The researcher will explain the similarities and differences observed from the participants as they engaged in the study about exploring the effects of language transition on teaching a subject like natural sciences and technology.

Language transition plays a significant role in the performance of any subject in school (Jensen 2019). More significantly, language acquisition should be the focus of teachers when teaching any subject (Inge-Marie, 2017). During my interaction with participant one, I began to make field notes because I noticed that she was more vocal on issues during our discussions of the open-ended questioner and only summarised when coming to inputting that information on the actual paper. For instance, participant one commented during our informal conversational interviews that the problem is because most of these learners were taught most of their subjects in their mother tongue and little time was on training them to understand terminologies. She noted that this is because the subjects are lesser in the foundation phase, but the focus and challenges of those teachers are teaching these learners the basics of reading and writing, let alone. Hence when they come into the intermediate phase, the challenges are more weighty because now new subjects are added, and the method of teaching

has substantially shifted from what they are used to. Therefore she does code-switching more intensely in the first term of the year, because the years of experience have shown her that learners feel bombarded by these added subjects, and significant change in both time and manner in which these subjects are taught

I observed that most of the participant who taught the subject also taught mathematics or specialised in mathematics during their schooling days. I recorded this in my field notes during my interaction with each of the participants. What was significant about this was that apart from not being trained to teach the subject at a tertiary level they mostly preferred to cite example from a mathematical perspective.

For example, participant 6 says learners cannot differentiate the language of learning and the one spoken every day

However, contrary to this claim I observed that, this teacher though he was young did not speak Sepedi as a mother tongue fluently, I recorded this in my field notes during our interview. this is because I noticed that mounting factors contributed to the overall problem. A few factors that could have influenced these challenges were lack of support from the school, lack of resources and a defunct language contortion. My observation was that the male participants lamented using trans-languaging in the classroom, even though they mentioned it as a first strategy in curbing the challenge when they filled the open-ended questioner. The participating teachers did indeed identify language as a barrier to effective learning the subject. Moreover, the challenges stated above could possibly influence the motivation of both teachers and learners in their ability to teach or learn the subject.

"it seems that trans-languaging or codeswitching is an effective way of teaching the subject, especially in the first term" ……. "More especially that the new language interest learners" field notes November 2020

My observation was corroborated by the participants overall answers. This is because mostly believed translanguaging improved the performance of learners. The first participant commented that especially in the first term when you teach them about the

seven life processes , they no longer ask to go for break or the toilet , however they use such terms as want to go and excrete or feeding in substituted. However, these factors are also compounded by environmental influences (Park and Abelmann, 2004). The external environment of the learners also had a big contributing factor, for learners whose parents were engaged in their children school work , transitioning was not a problem, but , for most of the leaners who stayed with grandparents who are uneducated this problem of effectively became visibly evident. As I engaged with the participants, I noted the frustrations they encountered, with such learners coming from such environment. This is because the previous history of apartheid in South African is still a factor in the educational sector (Maguvhe et al, 2015) (Mapasela and Hay, 2009).

4.4.2 Theme 2: Strategies used to redress those challenges

This theme focused on the strategies in which the effects of transition were observed within the classroom interaction. All the participants noted strategies that they either employ or advocate for teachers to employ in the classroom. The following subthemes emerged teachers and teaching practices and classroom resources and their effect on learner transition. During my appointment with the teachers and while observing the participants, I observed that the teachers were limited in teaching practices because they were old and were not trained from school in CAPS, but employed training through workshops. However, I also observed that the older participants could translate more of the terms in the prescribed book better than the younger teachers,which I notes in my field notes.

> "seasoned teachers have better classroom practice" field notes November 2020

Moreover, the more experienced participants, even if they were not trained to teach the subject, could structure strategies and elaborate on how those strategies would help in assisting learners in transitioning effectively. One of the participants added that sometimes I work with the foundation phase teachers in the first term, even though it is time-consuming and can often derail you from keeping on point with the pace setters that the department has issued. we understand that their former teachers can help us transition better, making our work going forward easier. Participant one employed

pictures to explain the terms she said "when I teach, I use examples from their local surroundings trough pictures, when they understand that is when I teach using the prescribed book" …. moreover, I find it makes my explaining less tenuous because they know most of this thing is just that maybe they did not know how to pronounce the terminologies in English.

The second subtheme was the lack of resources made available to assist both teachers and learners in effectively conducting a strong classroom interaction. I observed that most of the learners did not know planetariums. Which was the content that most of the teachers were busing revising the learners for in preparation for the final year exam. The schools where I conducted the research were rural even if a teacher where to use such resources as a phone to show them, they either did not have Wi-Fi signals or let alone Wi-Fi poles. this I noted in pictorials attached of the different schools that I visited. A lack of adequate resources such as reading material and technological instrumentations to support and engage learners in engaging in the subject or investigating the practical content is what frustrate most of the participants. Teacher 6 elaborated on this matter and I also noted it down both in the transcription and my own field notes.

"the school and smts should support this subject financially because we can't orate scientific procedures…. these children need visual inspiration to engage in the subject" field notes (November 2020)

Though resources like textbooks are available for the subject what I observed is they either share the textbooks among the learners, moreover in other schools upon accomplishment of learning retrieve the books, meaning the learners themselves don't engage in the subject outside of school. The apparent lack of resources was confirmed by participant one and five. Even though one spoke from a support perspective, I realised that lack of resources such as textbooks was a problem to help learners transition effectively from mother tongue to the scientific language that the subject mandates.

4.4.3 Theme 3: Improving and applying new aims to the curriculum statement policy (CAPS) regarding the Natural Sciences and Technology subject.

The study findings indicated improving and applying new aims to the Curriculum Statement Policy (CAPS) regarding the Natural Sciences and Technology subject.

The researcher's point of departure is the definitions of behavior, attitudes, and beliefs, as defining three terms relating to the theme. According to the Cambridge Dictionary (2020), behavior is how a person behaves in a particular situation or under specific conditions. Beliefs are the feeling of being certain that something exists or is true, while attitudes refer toa feeling or opinion about something in behavioural portrayal (Cambridge, 2020). The sub-theme describes how teachers initially had a negative attitude towards learners transitioning from the foundation to the intermediate phase.

4.5 **CONCLUSION.**

The current chapter, reported on the results obtained through semi-structured interviews with teachers. Thematic analysis of data was applied to assist in themes and sub-themesgeneration. The participant's responses were used to support the themes and sub-themes answered each of the themes and supported with integrative literature that included the use of photographic images. In the following chapter, the researcher provides an interpretation of the study from the context of the existing literature, the conceptual framework, and the three aspects of the significance of the study, which are educational, societal, and theoretical. Furthermore, the following chapter provides a discussion on the limitations and recommendations, and the conclusion of the study.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

The previous chapter gave a transcript and analysis of the responses from participants before concluding on what the thoughts regarding the points that that they had raised. The current chapter commence with the literature control, focusing on the significance of the study. Chapter further discusses the study's aims and objectives from a literature perspective while reviewing the themes proposed in Chapter Four. Furthermore, the limitations experienced in the study and the suggested remedial courses to those limitations.

5.2 SIGNIFICANCE OF THE STUDY

In order to corroborate the current study discoveries, the researcher referred to the literature as summarised and analyzed from Table 5.7 to 5.9. According to Poggenpoel and Myburge (2005), when a researcher conducts a qualitative study, a knowledge base from which preventative can be inferred and the trustworthiness of the study must be assured.

Therefore, the section discusses ideas surrounding the effects of language transition and focuses on the subject Natural Sciences and Technology from theoretical, societal, and educational aspects. According to Creswell (2014) and Hay (2005), these three components form what scholars regard as the significance of the study or the literature control. Hence, while stating the importance of the study through those three components, it is imperative to also broaden it to the overall problem or study topic and the literature itself (Hay, 2005).

5.2.1 Theoretical

The study added to the existing body of knowledge, which is detailed in the literature review below. Th existing integrated literature provide an indication that language transition influences the performance of most scientific subjects, and content overall taught to learners (Onwu & Mosimege, 2004). For example, Glasgow (2014) teaching

any subject reguires having a theoretical backgound of the language either mother tounge to second language or English for communication to using English for pedagogical purposes.

Table 5.7*: Adapted from Du-Plessis (2012).

Language transition in schools	Existing knowledge	Discussion
GEM (2017).	**An estimated 40% of the global population does not receive education in the language they understand**	This statistical number indicate that almost half the population that is school does not receive education in their mother tongue
Inge-Marie (2017)	The acquisition of a language is significant to learners' abilities to make meaning of their surroundings	This author implies that understanding is important for transition to occur.
Department of Basic Education (2019)	Transitioning from one language to another could affect learner performance negatively	This statement suggests an acknowledgement that Language transition could course negative performance for learners
Mwamwenda (2004)	Transitioning from one language to another means having the ability to acquire the information conveyed, not just at surface structure but deep structure as well	This author also suggests that to achieve understanding you must have a concrete source of information

Jansen (2019)	South Africa an estimated 78% of grade 4 learners cannot read with understanding in any subject	In this article the author suggest that the problem is transcends in all other subjects
Chomsky (2006)	Acqusition of knowledge has not yet reached concrete or deep structure that is needed to transition to the next phase of learning content in another language	In this study the author suggests that concrete learning in mother tongue must occur before transitioning to other languages
Policies of language transition in schools	Existing knowledge	Discussion
Ramnarain (2011)	Despite changes in language policies in schools, he also found a gap in the effectiveness of teaching, more especially on the subject Natural sciences and technology in schools that were previously marginalised.	In this study it was found that despite language policies shifting most subjects were still affected by the previous political dispensation
Jensen (1989)	Teaching in English has an appealing socio-economic mobility factor to the global community, and its	This author retains the sentiments that more focus is on teaching in English due to its appeal globally, rather than

	compliance in reaching the global dynamics.	focusing on the appeal of applying the content.
Mkhize and Balfour (2018)	The reality of a multilingual educational society in primary schools as a right is still a debatable subject for most South African schools	In this study the authors concur that multilingualism is still farfetched in schools.
Penn ycook, (2012)	The focus of transitioning into the 4th industrial revolution should not force countries to lose focus of the local languages in favour of the " spawned autonomous political, economical language of globalization" and policies that outline how this transition should occur	In this study the author concurs with the three authors above, moreover, suggests focusing on developing mother tongue as a medium of instruction.
Conceptualising language transitioning for schools	Existing knowledge	Discussion.
Jensen (1989)	Most African countries the selection of a Medium of Instruction (MI), in schools is motivated by the following three factors: the political point of view, administrative	The author outlines three key push factors for selecting a (MI) in schools

Case studies of countries and cities impacted by the effects of language transition.	Awareness	Discussions
point of view and ideological and cultural point of view		

5.2.2 Societal

The study created an awareness about the effects of transitioning from Sepedi to English in teaching the subject of Natural Sciences and Technology in the classrooms and the perceptions held by teachers on this problem from a global to a local context. The figure below summarises the societal significance.

Table 5.8: Adapted from Du-Plessis (2012)

Case studies of countries and cities impacted by the effects of language transition.	Awareness	Discussions
A case of London		
(Roberts, 2019).	A conference held in London conceded that early language transition is a barrier for learning of key subjects and as such support systems must be implemented to redress that barrier	In this study it was found that language transition was a barrier, especially in a cosmopolitan city like London.
A case of Tanzania and Kenya.		
(Gacheche, 2010)	an increasing evidence exist that mother tongue-based education could	

	have a positive impact on educational and learning outcomes of the country.	
A case of Mozambique		
(Chimbutane, 2017)	ideas on the interface of language policy and the development of a globalised Mozambique are brewing within	This study implies thar the country is diverse in languages and wishes to incorporate that diversity in the school`s language policy
(UNESCO, 2014)	despite these ideas little is yet to be achieved in transforming the language policy in schools to accommodate all its citizens	This study suggest that transformation is lacking in this country.
A case of Limpopo		
Mabiletja (2015)	This Province is characterised by linguistic diversity and it also follows a transitional bilingual education programme of using mother tongue in the early years and then	This study suggested that from the intermediate phase onwards learners are taught to transition to using English for most of the subjects.

		shifting to English from Grade 4 onwards.	

5.2.2 Educational

The study will benefit the educationist, in that it will alert curriculum designers, developers, implementers' and transmitters on the effects of transitioning from Sepedi to English, in teaching and learning the subject Natural Sciences and Technology in Grade 4 classrooms.

Table 5.9*: Adapted from Du-Plessis (2012)

	Educational benefit	Discussions
Theme 1	Challenges you have experienced teaching the subject Natural Sciences and Technology for grade 4 learners	
(Bantwini, 2017). (Inge-Marie, 2019).	subject that is global in context, it is not limited to local issues only, but focuses on global issues of transitioning effectively for the 4th industrial revolution. Effects of language transition on the performance of natural	Even though most of the participants' agreed that transition is a problem some viewed the environment as more of a push factor than language as a stand-alone problem Participant one incorporated the two issues and saw them

	sciences is a complex study.	as stemming towards the problem
		Participant four was more vocal on other issues including language that contribute to the problem.
		Overall, I was pleased to find that all the participants agreed that language transition influenced the performance of a subject like natural sciences and technology.
Theme 2 strategies used to redress those challenges		

(Krause, 2018) (Mwamwenda, 2004)	In these countries language transition in teaching and learning subjects like Natural sciences and technology is only intensely advocated at the senior phase of learning.	The participants agree that teaching the learners in home language does curb the problem a bit, however. Even though, the participants agreed on certain strategies, its significant to note that some requested more time
(Hasegawa, 2013)	The current situation of foreign language education other than English at the secondary school level in Japan	This study found that learners who were taught in their mother tongue from foundation phase when they reached high school either deteriorated in performance, and the main factor for the deterioration was due language transition.
Minnaar, R., Naude, F., (2014).	Grade R teachers` awareness of the development of science process skills in children. University of Johannesburg South Africa	This study conducted locally indicated that scientific language must be introduced from grade R, meaning that instead of transitioning they will

		just be upgrading on what they already know
Theme 3.	Improving and applying new, aims goals to the curriculum statement policy (CAPS), regarding the Natural Sciences and Technology subject	
(Expressions, 2019)	The terminologies/concepts taught in classrooms through this subject, translate to the global vision of transitioning into the 4th industrial revolution.	Most of the participants who engaged in this theme agreed that more time should be awarded to teaching educators about this subject, whether from tertiary level or just monthly teacher training and workshops.
(Behme and Deacon,2008).	Language Learning in Infancy, does Empirical Evidence Support a Domain Specific Language Acquisition Device?	

5.2.4 Supporting existing knowledge regarding the effects of language transition on the subject's natural sciences and technology

Like other scholars, the current study has found that language acquisition plays a significant role in the effective transition of learners (Jensen, 2019; Chomsky 2006; Mwamwenda, 2003). This is because the concrete construction of language ensures understanding of what is being taught. It was imperative from the data collected that for an effective transition to occur, teachers have to play an important role and employ different strategies apart from code-switching, considering age and going for continual training themselves was evident from the data. This is because it allows learners to interpret worksheets (Bantwini, 2012). Similar to the conclusion reached by other scholars with regard to language and transition (Jensen, 2019). The findings in this study dispute the assumption that intermediate phase learners have already acquired the necessary skills to transition to using English as a medium of instruction.

As a reading of any language increases the chances of understanding contents for school learners, the current study found that reading declines with grades, contrary to Wingfield, Guthrie, Tonks, and Pererenclevich (2004). In this study, the learners were eager to read, thus increasing their language vocabulary.

The findings of this study showed that grade four learners who have a problem transitioning effectively are unable to read effectually in any subject (Jensen, 2019). moreover, they struggle to comprehend what they are reading (Bharuthram, 2012). This is because apart from the expectation that they must complete mandated subjects curricular, they are also challenged to do so while being introduced on more intensely communicated through the medium of English (Department of Basic Education, 2020; Bantwini, 2012). Furthermore, the current study findings found that lack of adequate resources in schools contribute to transitional problems.

What I also found was that all the participants contributed language as the main factor in affecting the performance of these subject, hence I found that the sentiments around language transition are not important, but the participants wished that the progression of learners from foundation phase to intermediate phase could be influenced by age. This is because most of the participants believed that with age, language acquisition could be smooth. Thus, also resulting in better performance when subjects like natural

sciences and technology are introduced. According to Bharuthram (2012), most teachers lack adequate training for the subject they have been appointed for. In support of this claim, most of the participants relied on the workshops on curriculum assessment policy statement execution in the classroom (Hornberger,2013; Hornberger,1996). Moreover, they were expected to consult prescribed books and make use of provided aids in class. Subsequently, learners cannot transition effectively because the teachers themselves have yet to understand this subject deeply. I noted this concern from participant five who clearly expressed the lack of seamlessness in what these teachers have been trained at colleges and, what is expected of them in the execution of the content.

5.3 HOW THE STUDY ADDRESSED THE AIM AND THE RESEARCH OBJECTIVES.

The aim of this study was to explore the effects of language transitioning from Sepedi to English in teaching and learning the subject Natural Sciences and Technology in grade 4 classrooms under the Mankweng circuit. Using qualitative approaches and using the LAD theory, this study indeed addressed the study's aim as stated above and through the following objectives.

5.3.1 Demonstration of the influence of language

To demonstrate the influence language transition has on learners transitioning from Sepedi to English and their performance on the subject Natural Sciences and Technology in grade 4 an attached prescribed pictorial of a learner's book is. This was done to indicate the severity of language problems from a learner's perspective without compromising on the ethical principles of research of confidentiality, no harm, and anonymity (Creswell, 2014). The only problem with this resource provided was that a learner's actual written book could not corroborate it because that would require consent from the school and the parents as well, and the study was limited to teachers in the classroom. This was significant because these learners were learning on the topic when I visited the school; moreover, it formed part of the exam they were to write at the end of the year.
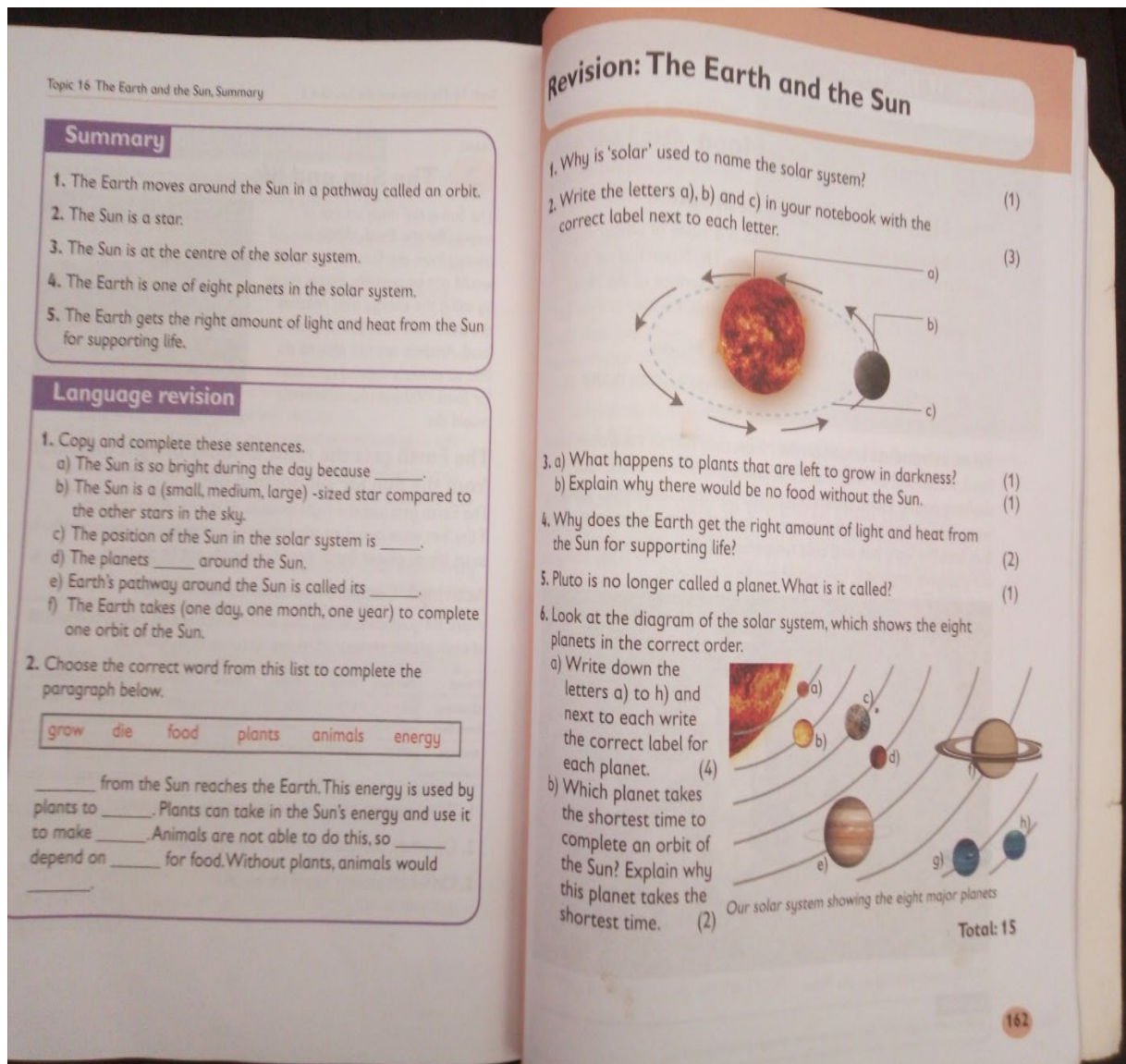
Summary

1. The Earth moves around the Sun in a pathway called an orbit.
2. The Sun is a star.
3. The Sun is at the centre of the solar system.
4. The Earth is one of eight planets in the solar system.
5. The Earth gets the right amount of light and heat from the Sun for supporting life.

Language revision

1. Copy and complete these sentences.
   a) The Sun is so bright during the day because _____.
   b) The Sun is a (small, medium, large) -sized star compared to the other stars in the sky.
   c) The position of the Sun in the solar system is _____.
   d) The planets _____ around the Sun.
   e) Earth's pathway around the Sun is called its _____.
   f) The Earth takes (one day, one month, one year) to complete one orbit of the Sun.

2. Choose the correct word from this list to complete the paragraph below.

   | grow | die | food | plants | animals | energy |

   _____ from the Sun reaches the Earth. This energy is used by plants to _____. Plants can take in the Sun's energy and use it to make _____. Animals are not able to do this, so _____ depend on _____ for food. Without plants, animals would _____.

Revision: The Earth and the Sun

1. Why is 'solar' used to name the solar system? (1)
2. Write the letters a), b) and c) in your notebook with the correct label next to each letter. (3)

   a)
   b)
   c)

3. a) What happens to plants that are left to grow in darkness? (1)
   b) Explain why there would be no food without the Sun. (1)
4. Why does the Earth get the right amount of light and heat from the Sun for supporting life? (2)
5. Pluto is no longer called a planet. What is it called? (1)
6. Look at the diagram of the solar system, which shows the eight planets in the correct order.
   a) Write down the letters a) to h) and next to each write the correct label for each planet. (4)
   b) Which planet takes the shortest time to complete an orbit of the Sun? Explain why this planet takes the shortest time. (2)

   Our solar system showing the eight major planets

   Total: 15

162

Figure 5.9*: Copied from day by day Natural Sciences and Technology*

5.3.2 Strategies in place

To determine strategies in place for teaching the subject Natural Science and Technology and its effectiveness for inclusivity in language practice from a classroom perspective, the following were suggested.

I. Workshop: according to the department of basic education website (Department of Basic Education, 2020) *"teachers play a significant role in the upliftment of our society. They bear the weight and responsibility of teaching and apart from parents are the main source of knowledge and values to*

children" therefore "the department of basic education is working hard to address the multiple and complex challenges that the education sector faces". Hence, teachers are retrained periodically to address such challenges of translanguaging in teaching Natural sciences and technology through this method.

II. According to UNICEF (2020) teacher manuals are intended to support teachers in becoming inclusive practitioners and understanding each school, classroom, and individual level. Therefore, looking at the attached pictorials of the type of schools I researched, each teacher must adapt and conscientious him or herself to that environment.

In the following pictures, it is some of the schools that participated in the study, what I noticed was that one was new and had all the technological resources while the other had buildings that were old and dilapidating, thus supporting the sentiments by participant 1 that the environment plays a significant role on the effects of translanguaging and learning such subjects as Natural sciences and technology. Though I could not conclude and say one was transitioning into the 4th industrial revolution, I could say they were enroute while the other was still marginalised.

Figure 10*: Some schools structures of schools that participated in rural Mankweng.

III. Peer assessment reviews: According to Ayalon and Willkie, they are three forms of assessing if each learner understands a content from a teacher's perspective, firstly through an illustrative rubric such as this.

Table 5.10: Adapted from Schwartz, Kenney, Kelly, Sienkiewicz, Sivan, Steinbok and Yerushalmy (1995)

Assessment criteria	High	Medium	Low	Comment
Sculpting				
Translanguaging				
Deducing				
Communicating				
Creativity				
Understanding				
Scientific thinking				
Imagination				
Representing				
Interpreting				
Analysing				
Communicating and reflecting				

Feedback provision by writing an analysis for a peer through the following steps makes it very significant to note these steps as they fall as part of the duties and responsibilities of any departmental employee (Department of Basic Education, 2020). It might not be in this order, but the sentiments are the same.

- Reading the task, the rubric, the student solutions, and peer assessment in the report
- Giving feedback to your peers
- Offering peers answers, to how you would solve the problem and clarifying and extenuating on those answers.

5.3.3 Exploration of perceptions

To explore teachers' perceptions, subject advisors on the effects of transitioning from Sepedi to English in teaching the subject Natural Sciences and Technology to grade 4 learners, the following excerpts from the questioners is attached in the form of pictures. The third aspect of peer assessment and review falls in line with the exploration of perceptions because aside from workshops, Integrated Quality Management Systems allow for the perceptions of what teachers think of the problem of trans-languaging and how each teacher deals with those problems (IQMS) (Schwartz et, al., 1995)

Table 5.1: Coding Scheming

Coding scheming		Points per IQMS (n=100)	
Cognitive aspect			
C1	Improved familiarity about designing rich task		
C2	Awareness to distinguish levels of retort		
C3	Open minded to learner's views		
C4	Aligning assessment task and goals		
Affective aspects			
A1	Assurance in designing Natural sciences and technology task and assessment criteria		
A2	Assurance in attending to learners' questions		
A3	Less assurance in attending to learner's questions		
A4	Less assurance in designing N.S Tech task and assessment criteria		

A5	Less assurance in interpreting learner's thinking		
A6	Advancement of modesty in retorting to learner's work		

Figure 5.11: Adapted from Schwartz, et, al. (1995)

This third part would have been appropriate if time and covid-19 had not limited me to full access to school documentation due to time constraints. Nevertheless, I was pleased that the participants engaged in the study and some toughed on the subject matter, which I noted in their transcription narration. However, perhaps future studies will add more content to this coding frequency scheme.

5.4   LIMITATIONS OF THE STUDY

As previously stated, the small sampling strategy causes the study sometimes not to be easily transferred, hence in the following section, I will recommend that more studies be conducted in other circuits that are similar in geographical, economic, and societal qualities. This is because I used purposive sampling and it is often open to selection bias and errors (Statistics, 2015). Secondly, the limited time of collecting data because brought by covid 19, requires that future studies be also conducted in this area, either to dispute or validate the findings. The study required a pilot phase that would consequently validate the claims made by the participants. Another limitation in the study was that some of the teachers were not fluent Sepedi-speaking natives of the area. Therefore, they lamented on code-switching or trans-languaging when teaching content, and this hampered the study reliability.

Qualitative studies are subjective and rely on the interpretation of personal beliefs and attitudes. Even though I strived to ensure non- biasness, a researcher is not immune to such, hence, I will recommend a follow-up study to be conducted in the study. Since I relied on personal interpretation of the problem, the study can have roots of personal ideas and beliefs, which will ultimately result in biasness.

5.5   RECOMMENDATIONS

This study revealed the extent to which trans-languaging influences learners' performance using Natural Sciences and Technology as a sample study. Having assessed the themes in chapter four that emerged and in support of the literature that was intensified by not only the rural setting of Mankweng and their teachers. In the following sub section, I recommend possible areas of research and training in other subjects as well. This is because technology is just but one subject that has been identified as key vehicles for the 4th industrial revolution. But also because the participants noted permeating problems of language transition to other problems.

5.5.1   Recommendations for further studies
Therefore, I recommend the following suggestions bearing in mind their significance to the educational and theoretical body of knowledge and the society.

   I.   A follow up study be conducted in other circuits
  II.   More theoretical publications on this problem
 III.   An in-depth study of the applicability of the aims and objectivise of the study.
 IV.   An in-depth study on the nature of assistance learners receive from home.
  V.   Action research to enable parents and teachers to participate in an effective transition phase.

5.5.2   Recommendations for training and practices
The findings in this study have implications for the training and practices, on the subject that was under study. intermediate phase learners have not reached the concrete language acquision phase that is required for learner to transition from one grade to another (Mwamwenda, 2004). Moreover, I found that apart from age environmental factors play a role in the acquisition of language. therefore, learners and parents need to collaborate with teachers in schools to ensure that teaching of content becomes effective.

It was also evident that most participants that contributed to the study only received training from workshops. Therefore, a suitable recommendation would be to provide the teachers with one-year paid service training at an institution that the department will agree in funding. This service training will ensure that these teachers as well come

out without negative attitudes, beliefs and behaviour about learners who are transitioning.

5.6   CONCLUSION

Language transition remains a key factor in the performance of learners in learning the Natural Science and Technology subject. However, other contributory factors play a role in addressing the problem; hence I stated in my recommendations that a follow-up is indeed required on the matter. Furthermore, the support given to these teachers must be a norm, not only through periodical workshops but also at the beginning and end of the term. If this study is anything to go by, this support scaffolds, and allows teachers to better enhance themselves for the teaching of the subject.

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APPENDICES

Appendix A: Approval from the University of Limpopo

University of Limpopo
Department of Research Administration and Development
Private Bag X1106, Sovenga, 0727, South Africa
Tel: (015) 268 3935, Fax: (015) 268 2306, Email: anastasia.ngobe@ul.ac.za

TURFLOOP RESEARCH ETHICS COMMITTEE
ETHICS CLEARANCE CERTIFICATE

MEETING: 16 September 2020

PROJECT NUMBER: TREC/181/2020: PG

PROJECT:

Title: Exploring the effects of language transitioning from Sepedi to English in teaching and learning Natural Sciences and Technology in grade four, Mankweng Circuit.

Researcher: K Moabelo
Supervisor: Prof MJ Themane
Co-Supervisor/s: N/A
School: Education
Degree: Master of Education in Curriculum Studies

PROF P MASOKO
CHAIRPERSON: TURFLOOP RESEARCH ETHICS COMMITTEE
The Turfloop Research Ethics Committee (TREC) is registered with the National Health Research Ethics Council, Registration Number: REC-0310111-031

Note:
i) This Ethics Clearance Certificate will be valid for one (1) year, as from the abovementioned date. Application for annual renewal (or annual review) need to be received by TREC one month before lapse of this period.
ii) Should any departure be contemplated from the research procedure as approved, the researcher(s) must re-submit the protocol to the committee, together with the Application for Amendment form.
iii) PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES.

Finding solutions for Africa

Appendix B: Letter seeking consent from Mankweng Circuit

<div align="right">

Stand no 830: Mmamotintane

Ga-Mamabolo village

Cell:0792445603

Email: Keneilwe.moabelo@yahoo.com

</div>

Attention: Mr MD Magagane

Title: Exploring the effects of language transitioning from Sepedi to English in teaching and learning Natural Sciences and Technology in grade four, Mankweng Circuit.

I Moabelo k, student number 201733504, currently enrolled for a Master's degree in Curriculum Studies at the University of Limpopo under the faculty of Education, I humbly seek permission to undertake the study sampling on these four schools, under your supervision. Mmamahlo, and the teachers involved, in teaching the subject Natural Sciences and Technology in grade 4.

Kind Regards

Moabelo Keneilwe

Appendix C: Letter of approval

CAPRICORN SOUTH
MANKWENG CIRCUIT

Enq: MJ KEKANA
Tel No: 015 2675641
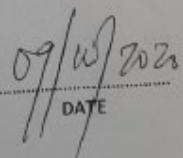
2020/10/09

MOABELO K
UNIVERSITY OF LIMPOPO
SCHOOL OF SOCIAL SCIENCES
PRIVATE BAG X1106
SOVENGA
0272

REQUEST OF PERMISSION TO CONDUCT RESEARCH IN MANKWENG CIRCUIT PRIMARY SCHOOLS.

1. The above matter refers.

2. We acknowledged the receipt of your letter. Requesting to conduct Research Project Titled: "EXPLORING THE EFFECTS OF LANGUAGE TRANSITIONING FROM SEPEDI TO ENGLISH IN TEACHING AND LEARNING NATURAL SCIENCES AND TECHNOLOGY IN GRADE FOUR" at Primary schools in Mankweng Circuit.

3. Permission is hereby granted for the above mention request.

4. Wishing you for the success in your studies.

MAGAGANE M.D.
CIRCUIT MANAGER

09/10/2020
DATE

We belong , We care, We serve

90

Appendix D: letter of consent

Participant 1

Participant **1**

LETTER OF CONSENT

UNIVERSITY OF LIMPOPO

I Mangena M. M., agree to participate in this research study about the effects of language transition from a Natural Sciences and Technology perspective in grade four.

The researcher has clarified the aim and objectives of the study. I completely understand that my participation is on a voluntary basis, and they shall be no reward in any form. furthermore, the issue of ethical code of conduct of ensuring each participant is not harmed by the study, full confidentiality and anonymity have been assured to me.

I understand that every effort will be taken to ensure my privacy. Any personal information I divulge will not be published. It will only be seen by those involved in the study.

My right to withdraw as a participant at any point I deem fit has been notified to me.
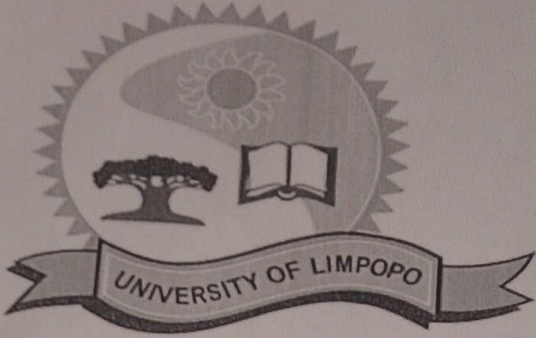
Signature:

Date: 2020/10/12

Participant 2

Participant : 2

UNIVERSITY OF LIMPOPO

I _Freddie M._ , agree to participate in this research about the effects of language transition from a Natural Sciences and Tech perspective in grade four.

The researcher has clarified the aim and objectives of the study. I com understand that my participation is on a voluntary basis, and they shall be no in any form. furthermore, the issue of ethical code of conduct of ensuring participant is not harmed by the study, full confidentiality and anonymity have assured to me.

I understand that every effort will be taken to ensure my privacy. Any pe information I divulge will not be published. It will only be seen by those involved study.

My right to withdraw as a participant at any point I deem fit has been notified to

Signature:
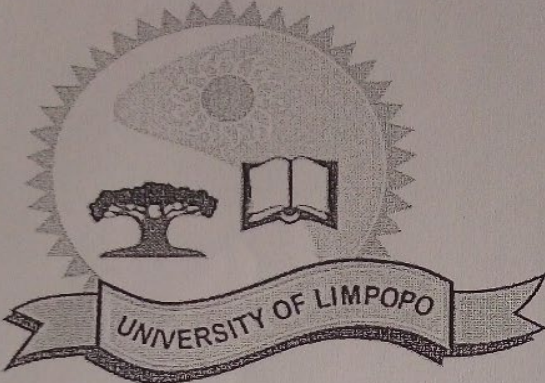
Date: 15/10/2020

Participant 3
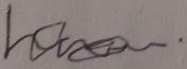
Participant : 3

UNIVERSITY OF LIMPOPO

I Legodi D.m , agree to participate in this research study about the effects of language transition from a Natural Sciences and Technology perspective in grade four.

The researcher has clarified the aim and objectives of the study. I completely understand that my participation is on a voluntary basis, and they shall be no reward in any form. furthermore, the issue of ethical code of conduct of ensuring each participant is not harmed by the study, full confidentiality and anonymity have been assured to me.

I understand that every effort will be taken to ensure my privacy. Any personal information I divulge will not be published. It will only be seen by those involved in the study.
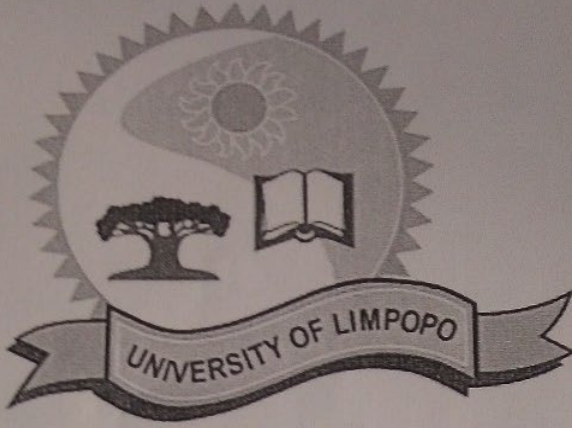
My right to withdraw as a participant at any point I deem fit has been notified to me.
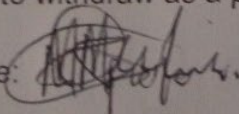
Signature:

Date: 16/10.2020

Participant 4

I M.O Mphahlele , agree to participate in this research study about the effects of language transition from a Natural Sciences and Technology perspective in grade four.

The researcher has clarified the aim and objectives of the study. I completely understand that my participation is on a voluntary basis, and they shall be no reward in any form. furthermore, the issue of ethical code of conduct of ensuring each participant is not harmed by the study, full confidentiality and anonymity have been assured to me.

I understand that every effort will be taken to ensure my privacy. Any personal information I divulge will not be published. It will only be seen by those involved in the study.

My right to withdraw as a participant at any point I deem fit has been notified to me.
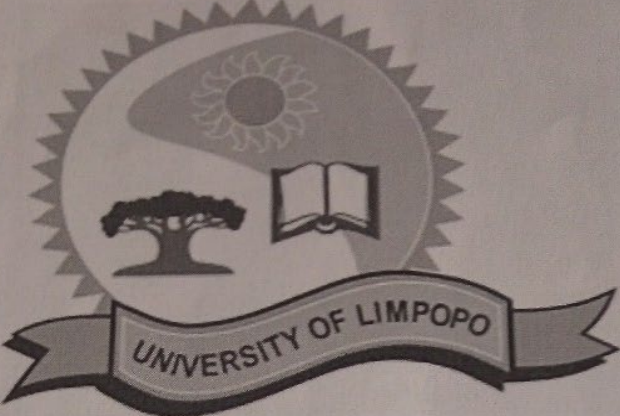
Signature:

Date: 20/11.2020

Participant 5

LETTER OF CONSENT

UNIVERSITY OF LIMPOPO

I __Mantedi R Rakgole__ , agree to participate in this research study about the effects of language transition from a Natural Sciences and Technology perspective in grade four.

The researcher has clarified the aim and objectives of the study. I completely understand that my participation is on a voluntary basis, and they shall be no reward in any form. furthermore, the issue of ethical code of conduct of ensuring each participant is not harmed by the study, full confidentiality and anonymity have been assured to me.

I understand that every effort will be taken to ensure my privacy. Any personal information I divulge will not be published. It will only be seen by those involved in the study.

My right to withdraw as a participant at any point I deem fit has been notified to me

Signature:

Date: 23/11/20

Participant 6

Participant 6

UNIVERSITY OF LIMPOPO

I _Mashapa N.P_____, agree to participate in this research study about the effects of language transition from a Natural Sciences and Technology perspective in grade four.

The researcher has clarified the aim and objectives of the study. I completely understand that my participation is on a voluntary basis, and they shall be no reward in any form. furthermore, the issue of ethical code of conduct of ensuring each participant is not harmed by the study, full confidentiality and anonymity have been assured to me.

I understand that every effort will be taken to ensure my privacy. Any personal information I divulge will not be published. It will only be seen by those involved in the study.

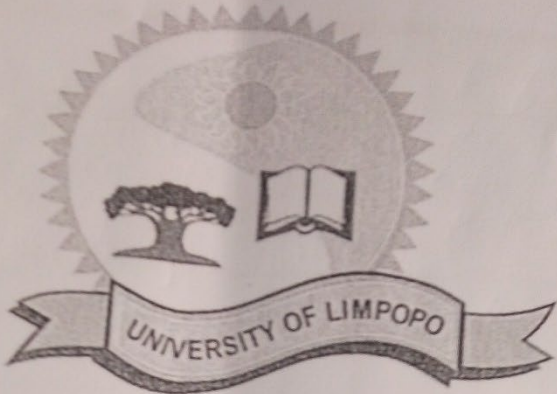y right to withdraw as a participant at any point I deem fit has been notified to me.

gnature:

te 24/11/2020

Appendix E: List of figures and tables

Figure10: copied from day by day natural sciences and technology

Figure 11: some school structures of schools that participated in rural Mankweng.

Appendix F: Record of regular meetings with supervisor

Date/time: April 2019   Duration (hours): 1 hour

Discussion Summary

In the referred meeting the supervisor and I discussed the problem statement, how do I know there is a problem and eventually structuring of the problem statement for the proposal , which was the initial phase of constructing the proposal. The end results were that I produce a draft of the problem statement in our next scheduled appointment.

Date/time: May 2019   Duration (hours): 2 hours

Discussion Summary

I produced a draft of the problem statement, which assisted in the supervisor, moving to the aims and objectives of the study. We structured the aim to coincide with the objectives. moreover, afterwards we transitioned to the methodological aspect. His advice was that the writing should have synergy and the reader must not lose the plot when reading the whole document. The conclusion was for me to go structure the methodological aspect, looking at everything that we did during our contact session.

Date/time: June 2019   Duration (hours): 4 hours

Discussion Summary

The supervisor assisted in improving the methodological structure, and we further linked it to the chosen role of theory. It was significant to have a concrete methodological structure beforehand, this is because the role of theory formed a cement to how the study was to stream. Moreover, in having a concrete role of theory I would be able to structure the literature review, which was the next phase of our contact session.

Date/time: July 2019 Duration (hours): 3 hours

Discussion Summary

The supervisors gave feedback, we proceeded to prepare from the school presentation.

Date/time: August 2019 Duration (hours): 2 hours

Discussion Summary

The supervisor and I incorporated the suggestions made by the school and then prepared to submit at TREC.

Date/time: November 2019 Duration (hours): 2 hours

Discussion Summary

Feedback from the TREC committee came and we implemented the minor editorial concerns which were raised and waited for the next available scheduled time to resubmit the changes.

Date/time: January 2020 Duration (hours): 1 hour

Discussion Summary

The supervisor suggested I start on the chapters which I would submit electronically , for his approval until I got a clearance to collect data, of which then I could contextualise and improve in accordance with the data.

Date/time: 27 October 2020   Duration (hours): 6 hours

Discussion Summary

A seminar was conducted, and the supervisor guided all his students on how to structure the dissertation. From technical editing to academic writing of the thesis. Submission dates were scheduled for each student.

Appendix G: departmental seminars attended or presented at

Type of Seminar (oral paper, progress report, proposal presentation)	Date	Signature of Supervisor	Signature of the HOD

Appendix H: Report at the end of the first year

Report by student

I re- submitted the proposal to my supervisor, he, and the school approved and submitted it to the TREC. I began in constructing the chapters in anticipation from the TREC Committee with the clearance letter.

Signature of Student: Moabelo k   Date Submitted: 29 November 2019

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TO: Prof L T Mabasa

FROM: Prof M.J Themane
DATE: 15 January 2020

SUBJECT: Progress Report 2020: K Moabelo (201733504) M.Ed. (Curriculum Studies)

Dear Prof Mabasa

1. The above matter bears reference.
2. This note serves to indicate that K Moabelo (201733504) is making good progress on her M.Ed. dissertation project. She is writing up the dissertation and could graduate in September 2020.

Regards

Prof M .J Themane
Supervisor

Appendix I: Work plan

	YEAR Planned Date	Actual Date	Date marked drafts returned to the student
Completion of actual research work			
Submission of dissertation / thesis outline			
	First Draft		
Final Draft to the Supervisor			
Submission for Examination			
Oral Examination			

Annexure J: Transcript of participants

This section provide a transcript of what was said and what I observed. According to (Creswell, 2014) transcription is a process of producing spoken words, either from a voice recording or written text. Each participant was given an open-ended questions to fill while others decided to narrates.

Transcriptions of each participant

In the following section, I give a transcription of what the participant wrote on the open ended questioner; moreover I write in in table forms and provide a summary of what the participants said before I go deep into what was said in the next section through themes and sub-themes.

Table 3: What are the challenges you have experienced teaching the subject Natural Sciences and Technology for grade 4 learners? (if subject advisor: state which challenges teachers have been reported to you when you were in consultation with the teachers)

Participant Number 1:	Language and the terms need more understanding
Participant Number 2:	Translanguaging and transitional problems.
Participant Number 3:	Language and environmental factors
Participant Number 4:	The main problem is language through, what I call a miscomprehension of terminologies, langue alone is not a barrier, but the main problem is terminologies used in teaching and learning the subject , another problem is lack of resources ,which makes it very difficult for learners to understand , especially in rural schools. Another one of the problems is teachers learn the subject while already teaching, through workshops, and that time is not sufficient.
Participant Number 5:	

Participant Number 6:	In grade four as a transition class, learners encounter English as a language of teaching and learning for the first time. The problem arises when these learners must express themselves logically and fluently. Some can read but cannot read texts meaningfully. I think learners age also plays a significant role in transition. Learners in grade four have spelling and writing problems. Another problem is they pay less attention on the lesson. Yes! language transition does play a role because most of these learners answer their questions using their home language, and some have not yet differentiated between language of learning and their home language.

Table 4: question 2 Which strategies have you been using to redress those challenges? (Please elaborate)

Participant Number 1:	Code switching, start from English then give them everyday examples from home, using mother tongue
Participant Number 2:	Code switching
Participant Number 3:	Mixing home language with English
Participant Number 4:	

Participant Number 5:	We have WhatsApp groups for teachers to communicate their issues, but like I said before time does not allow us to solve most of the cases presented, especially this year.
Participant Number 6:	Encourage drilling glossary to strengthen their skills. Modelling and demonstration can create opportunities to make learners to learn using games. Practical tasks also help. Scaffolding strategy for example allowing learners to use technological aids. social inclusive teaching strategies. Classroom remedial for teaching learners on reading and writing skills, teaching lessons with practical activities which bring learners into pay attention to the lesson

Table 5: question four: What form of assistance have you received/ offered to redress those challenges?

Participant Number 1:	Workshops and consulting with my HoD.
Participant 2 :	Workshops
Participant Number 3:	Workshops and sometimes using media platforms
Participant Number 4:	What I can say, do not want to sound radical but what I say we are swamped, and we can only do as much as we can.
Participant Number 5:	I think if more schools attended workshops organised by subject advisors, they would receive more help. Also networking with fellow colleagues about NS and technology. Most schools we encourage that the SMT and SGBs address the problem by ensuring that at least learners are 10 years when they reach this grade. Inclusivity all learners should belong. every learner has the right to learn, no matter what their learning barriers are.
Participant Number 6:	I wish parents would get involved, moreover the SMTs could support us as teachers with approving more resources.

Table 5 : Question 4**:** If you were given an opportunity to partake in improving and applying new, aims goals to the curriculum statement policy (CAPS), regarding the Natural Sciences and Technology subject, which key aims would you keep or do away with?

Participant Number 1:	I think the aims and objectives are structured fine, but more workshops are required, especially for us who are old teachers.
Participant Number 2:	Training because not every teacher teaching the subject is really trained for the subject, but you find yourself allocated a subject that you are not trained for. I think I would improve on aim number two, not really change it but add more flesh.
Participant Number 3:	I do not know what to say
Participant Number 4:	The researcher noticed that the current curriculum does not link, what I mean is GET and FET are in parallel in the kind of teachers they produce, so I would not necessarily change but rather advocate for seamlessness. The really is nothing wrong with the aims is just a matter of execution
Participant Number 5:	Key aims to keep doing science and technology. learners should be able to complete investigations, analyse problems and use practical processes and skills in designing, understanding, and connecting ideas. Learners should understand the practical of NS and technology in society and environment.

Participant Number 6	I think if teaching of content was only done in the last two terms. In the first two terms, practical activities and practice of language

Discussion of the transcription summary

This section briefly summarises thearticipants' points; in the following section, lintend on segmenting and discussing these questions as themes and subthemes that emerged while collecting the data in the following section. Moreover, the exclusionary and inclusive categories of exploring the effects of language transition will be discussed

In the first question, most of the participants stated that language plays a significant role in the problem of transition and the performance of subjects. The researcherl wishesfor a permission to have some of the copies of the results or even take pictures of classwork activities of the learners to validate the narration, however, I had to honour the principles of ethical considerations of ensuring that this studyis studyis study does not harm the teachers or learners does not harm the teachers or learners does not harm the teachers or learners, moreover covid 19 restricted access to a lot of the things that would have been readily available such as books and classroom interaction with the participants.

In question two, most of the participants agreed that trans-languaging was the best and most recommended strategy that they . Participants one and three both had extensive years of teaching. Hence, they understood that mother tongue plays a role in how learners engage in a study. Some of the participants elaborated on how they did so, or encouraged that process to occur. Significantly, I noticed that, even though they all tackled in it from different angles, they all came to a common understanding that they need to eventually develop the English language vocabulary in learners.

Question three varied as well when it came to the form of assistance necessary to address the problem. Some encouraged workshops' attendance, whilst others addressed the problem by encouraging parental and SMTs involvement in addressing the problem. However , I wish to capitalise on the age factor because Jensen said this learners are not able to read or write with concrete logic, I liked this because the innate ability of each learner to transition from one language is determined not just by cognitive factors but also the neurological and physiological aspect play a role in effective transitioning. I therefore think , not that I am undermining the other response, but I think this point should be studied further, unfortunately this study was not about that, but as I said before that should I encounter anomalies, I will recommend them as such.

In question four, I was pleased with how each participant tried to answer the question. In the end, what was most common was that there must be a good synergy between content and how its delivered. Though participant one and the diverted from the common thinking of all other participants, I understood and took into cognizance that they were not participating in a robotic study. Hence they had to have their viewpoint or choose not to place any viewpoint, as was the case with participant three.

This last question was most significant in the study because I needed to know if the outlined aims for each strand were accommodative to the problem at hand. And I was pleased to find that most of the participants were open to express themselves and not just give answers in relation to the title of study. Below is are extract from the CAPS document clearly stating the specific aims that the department of basic education require from their teachers and learners combined.

There are three broad subject-specific aims in Natural Science and Technology learning science;

- Specific Aim 1; which relates to the knowing of the subject content (theory)
- Specific Aim 2; which relates to doing science or practical work and investigative practice solutions to everyday problems,
- Specific Aim 3; which relates to understanding the applications of science as well as understanding the history of scientific discoveries and technology between indigineous kbowledge and science and technology.

Specific strand for grade four (adapted from CAPS document)

Grade 4	Matter, materials and structures	Energy, change, and Structures	Life, living and structures	Earth, beyond and mechanisms
	- Properties of materials. - Combination of materials - Strengthening materials - Phases of materials	- Air and Energy - Mechanism that use moving air - Sound - Musical instrument	- Living and non-living things - Features of plants and animals - Requirements for growth - Habitats - Behavior patterns of animals	- Space exploration - Moving on land - Objects in the sky:sun, moon, earth, and stars