Exploring teachers' experiences of the teaching of Mathematics in the Intermediate Phase in (Grade 4-6) Nongoma Circuit).

By

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This dissertation is submitted in partial fulfilment of the requirement for the Master of Education Degree in the Discipline of Education and Curriculum Studies

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Date submitted: 12 December 2018

Declaration

I, Thokozani Andreas Biyela declare that this Dissertation contains my own work. All sources that were used or quoted have been dully referenced accordingly. This research has not been previously accepted for any degree to any and is not being currently considered for any other degree at any other university.

Signature____ 

Date__12 December 2018

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As the candidates' supervisor I agree/~~do not agree~~ to the submission of this Dissertation

Signature_____ 

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Dedication

This study is dedicated to my wife Sphiwe Biyela for her support, love and encouraging me to continue and complete this study, to my mother Mildred Ninini (Madubs) Biyela for your support and prayers may the Omnipotent bless you. Thank you to my children, Siyabonga '*Pro'*, Luyanda '*Kind'*, Noluvo *'Voh*,'Nomvuselelo '*Mavura*,' Alwande, Zotuso*'Ndzen* 'and Nasisipho Biyela for their encouragement they provided. Friends, colleagues and Ulundi Legends team, who wished me well through this lonely peregrination, I thank you.

List of abbreviations

KZN: KwaZulu-Natal

CAPS: Curriculum and Assessment Policy Statement

HOD: Head of Department

SMT: School Management Team

SIP: School Improvement Plan

DOE: Department of Education

HW: Hardware

SW: Software

DBE: Department of Basic Education

ID: Ideological ware

OBE: Outcome Based Education

C 2005: Curriculum 2005

SACE: South African Council for Educators

RQV: Relative Education Qualification Value

RNCS: Revised National Curriculum Statement

NCS: National Curriculum Statement

RSA: Republic of South Africa

SASA: South African Schools Act

MS: Microsoft

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DECLARATION - PLAGIARISM

I, ***Thokozani Andreas Biyela of*** **Student Number:** ***207522305*** declare that

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

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Abstract

This dissertation presents the qualitative case study of three teachers teaching Mathematics in the Intermediate Phase. The study seeks to understand and describe what can be done to assist the teachers teaching Mathematics in the Intermediate Phase since some teachers have qualifications for teaching Mathematics while others are teaching Mathematics without having qualifications. Further to this, this study was conducted with an aim of exploring the teachers' experiences of the teaching of Mathematics in the Intermediate Phase. Thus, the focus group interviews, one-on-one semi-structured interviews and document analysis were used to generate the data in order to explore the teachers' experiences teaching Mathematics in the Intermediate Phase. In addition to this, convenience and purposive sampling were used to select the three teacher case studies because they were specifically teaching Mathematics in the Intermediate Phase. As a result, I conducted the interviews without any manipulation. The study was framed by the concept of curriculum spider-web to explore the teachers' experiences.

Furthermore, the literature reviewed teachers' experiences in their teaching process. Moreover, the findings from the literature suggested three levels of experiences namely; attitude, skill, and knowledge experiences. In addition to the above, findings from the literature revealed that each curricular spider-web concept had three levels as per proposition of experiences. Further to this, findings from the data analysis revealed that most teachers were driven by both personal and societal rationale to teach Mathematics in the Intermediate Phase.

Moreover, this dissertation finally recommends that the Department of Education should review the method used to appoint and allocate duties to Mathematics teachers and the school governing bodies and school management teams should support Mathematics teachers with software resources by using norms and standards for learners to procure and Department of Education organise and conduct workshops for equipping teachers about the expected roles to play during teaching and learning practice.

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CHAPTER ONE

THE OVERVIEW, CONTEXT, AND OBJECTIVES

1.1 Introduction

In the South African context, the Minister of the Department of Basic Education (DBE), Angie Motshega, introduced the Curriculum and Assessment Policy Statement (CAPS) as new curriculum to be implemented from January 2012 and is intended to improve on the preceding National Curriculum Statement (NCS). Further to this, curriculum implementation has been a major aspect of South Africa's education reform discussions since our transformation to a democratic government in 1994 (Katiya, Mtonjeni, & Sefalane-Nkohla, 2015). As a result, Khoza and Mpungose (2018) asserts that the implementation of a curriculum varies at the national (macro) and classroom (micro) levels, making teachers responsible for teaching/implementing the intended curriculum (such as Mathematics in the Intermediate Phase). Thus, this study seeks to explore the teachers' experiences teaching Mathematics in the Intermediate Phase. In a nutshell, this chapter aims to present the focus of the study, rationale, literature review summary, the research questions and objectives, data generation methods, data analysis, research design and methodology, limitations, delimitations, sampling, and ethical issues.

1.2 Project title

Exploring teachers' experiences of the teaching of Mathematics in the Intermediate Phase in (Grade 4-6) Nongoma Circuit.

1.3 Focus of the study

The purpose of the study is to explore teachers' experiences in the teaching of Mathematics in the Intermediate Phase in Nongoma Circuit.

1.4 Location of the study (delimitation)

The study was conducted at a Primary school under Nongoma Circuit and it was a three teacher case studies teaching Mathematics in the Intermediate Phase. In addition to that, the teachers were renamed as follows to protect their identities: Participant 1, Participant 2, and Participant 3. Finally, the study only focused on the teachers' experiences teaching Mathematics in the Intermediate Phase.

1.5 Rationale of the study

I opted to conduct this study because I wanted to explore teachers' experiences on the teaching of Mathematics in the Intermediate Phase. I also wanted to understand and describe what can be done to assist the teachers teaching Mathematics, particularly on space and shapes (geometry), data handling, and measurements in the Intermediate Phase. I have been a principal (the curriculum manager) for many years; I taught Mathematics for two years, and I have attended numerous principals' meetings where we used to strongly discuss issues pertaining curriculum management, my colleagues have expressed their concerns regarding the teaching of Mathematics in the Intermediate Phase, for instance some teachers did not have qualifications for teaching Mathematics but they were teaching Mathematics in the Intermediate Phase. The Head of Department (HOD), as my colleague reporting to me at school, also indicated that some Mathematics teachers in the Intermediate Phase also lacked teaching strategies or methodologies and assessment strategies, which might result in the poor implementation of Curriculum and Assessment Policy Statement (CAPS). Similarly, learners' results might also become poor. Furthermore, this made me notice that it seemed as if the purpose of the designed curriculum was not achieved and there was no sound relationship between planned curriculum and enacted curriculum observed. This had stimulated and motivated me to conduct this study in order to explore teachers' experiences on the teaching of Mathematics in the Intermediate Phase as well as to understand and describe their experiences in the teaching of Mathematics particularly in the Intermediate Phase.

According to Merriam-Webster (2002), experience is defined as the process of doing and seeing things and of having things happen to you. The study conducted by Nkosi (2015), focused on the teachers' experiences in the implementation of CAPS in primary schools in Pinetown. Nkosi (2015) stated that when a new curriculum is introduced in schools, one should

not fail to notice the experiences of teachers because they are the ones concerned with implementation of the curriculum. These studies asserted that there are three levels of experiences namely; formal, informal, and non-informal experiences. These studies further outlined that formal experiences are the experiences drawn from using or reading written documents such as policy documents (CAPS), articles, and others. Informal experiences relate to the experiences drawn from learning that is received from daily life experiences such as from friends, peer groups, the media, and other influences in a working environment. Non-formal experiences is about personal experiences normally drawn from habitual actions influenced by habits done from each individual in order to find personal identity and it is greatly influenced from related actions. Furthermore, teachers' experiences greatly influence the curriculum. As Janson (2009) defines curriculum as a plan for achieving goals, and describes three main levels of curriculum which includes written curriculum, taught curriculum, and assessed curriculum.

Studies outlined that there is lack of teachers' experiences in the teaching of CAPS Mathematics particularly in the Intermediate Phase; as a result they are barriers when it comes to the achievement of CAPS goals (Janson, 2009; Khoza, 2016) . Reports and articles have been written in connection with learner performance in Mathematics from Grade 4-6 in particular. De Clercq and Shalem (2014) outlined that results of the standardised Mathematics tests, the average score achieved by Grade 5 learners on the standardised test was 23.5%. This signals a very poor overall result. Counting is the skill where the highest average score was attained (50.6%) while division and rounding off to the nearest 100 was the poorest (8% and 8.2% respectively). This suggests that most of the learners are not performing well as required by CAPS. Thus, this study takes the initiative to understand and describe teachers' experiences that led to the poor implementation of CAPS. Consequently, findings will benefit the learners who are become taught by competent educators, and parents who become proud of teachers teaching their children. School Management Teams (SMTs) by being aware about the status of their subordinates, educators (their needs and views will be taken into consideration), subject advisors by planning relevant subject Improvement plan (SIP) workshops.

1.6 Review of Literature

The study conducted by Brijlall and Maharaj (2013) examines the teacher's experiences of the implication of the Curriculum and Assessment Policy Statement (CAPS) (Context). The qualitative research design was employed to gather the data, using three primary schools in KwaZulu-Natal (KZN) with the main aim or objective of exploring the teachers' experiences

of the implementation of CAPS. Convenience sampling was used in relation to the samples. The study conclusion agrees with the study conducted by Koti (2016) that teachers should be driven by a certain rationale for efficient and effective implementation of CAPS. Further to this, the study conducted by Moyo, Sibanda, and Beushausen (2012) asserts that teachers may be driven by professional rationale (reason from profession), societal rationale (reason from the society) and personal rationale (reason from the individual) in the teaching of subjects. The various studies have been conducted and have articulated the reasons why teachers are teaching (rationale) like the study conducted Khoza (2016) indicates that most teachers teaching CAPS subjects are driven by professional rationale because they teach and follow what is prescribed from the policy. Furthermore, the qualitative case study conducted by Khan (2016) revealed that Mathematics teachers can experience the benefits and challenges in the teaching of Mathematics in the Intermediate Phase. Further to this, a qualitative study conducted on teachers' experiences by Saltzman et al. (2015) revealed that there is a lack of support from management, policy implementation, teacher training, and professional development and the lack of resources and findings also showed that teachers tap into, map out individual resources in order to manage overcrowded classrooms.

Joke Voogt (2008) asserted that any teaching of a subject/curriculum should be guided by specific components and that experiences should prevail. The study further stated these components are in the form of questions. The questions are as follows: Why are they teaching? **(Rationale)**; towards which goals are they teaching? **(Aims, objectives, and learning outcomes)**; what are they teaching? **(Content)**; how are they teaching? **(Learning activities)**; How is the teacher facilitating their learning? **(Teacher's role)**; with what are they teaching **(Material and resources);** with whom are they teaching **(Grouping)**; Where are they teaching **(Location)** When are they teaching **(Time)**; and How is their teaching assessed**? (Assessment)**. Thus, these components seek teachers' experiences so that teaching and learning process can be effective.

1.7 Objectives of the study

The purpose of the study is:

- To explore teachers' experiences of teaching of Mathematics in the Intermediate Phase,

- To understand the reasons of teachers' experiences of teaching of Mathematics in the Intermediate Phase.

1.8 Questions to be asked

The questions asked in the study are:

- What are the teachers' experiences of teaching Mathematics in the Intermediate Phase?
- Why teachers' experiences of teaching Mathematics in the Intermediate Phase are in particular way?

1.9 Research design and Methodology

1.9.1 Paradigm

Avenier and Thomas (2015) define paradigm as a set of assumptions or beliefs about fundamental aspects of reality which gives rise to a particular world view. Gibson (2016) concurs with Thomas (1962) that paradigms are the ways of looking at the world, different assumptions about what the world is like and how we can understand or know about it. In addition to this, this study adopted the interpretive paradigm, since I wanted to understand and explore teachers' experiences teaching Mathematics in the Intermediate Phase and use the research techniques that would enable me to understand how teachers teaching Mathematics, interpret and implement the intended curriculum in classrooms. In addition to that, I also wanted to understand assumptions why teachers were not executing duties as expected of. I would subjectively explore their experiences on the basis of their knowledge, skills, and attitudes in teaching of Mathematics in the Intermediate Phase. Findings from this study would enable me to draw conclusions in connection with teachers' experiences teaching Mathematics in the Intermediate Phase because the success of my study would depend on my participants (teachers teaching Mathematics in the Intermediate Phase). Smith- (2014) describes interpretivism as an approach that looks for meaning and motives behind people's actions like experiences, behaviour, and interactions with others in society and culture. Confait (2018) describes the importance of the interpretive paradigm as an approach which opens a space for sharing the vigour of the natural sciences and the concern of social science to describe and explain human behaviour, with an emphasis on how people differ from inanimate natural phenomenon and, indeed, from each other. As a result I chose the interpretive approach because I wanted to share the rigor of the natural sciences and the concern of social science, described,

and explained in the human experiences for the teachers teaching Mathematics in the Intermediate Phase. Watkiss, Hunt, Blyth, and Dyszynski (2015) further outline how the shortages of resources might influence the methodology used adversely. Thus, I might be tempted to lead participants to respond in a particular way, but I did overcome that because I understood the strength of a qualitative approach which is to gain the richness and in-depth exploration of the phenomenon (experiences).

1.9.2 Research approach/style

The study adopted the qualitative research approach with an intention of seeking knowledge, exploring, and understanding the experiences of teachers teaching Mathematics in the Intermediate Phase. Further to this, Creswell (1994) concurs with Fathony and Fithriyah (2017) in defining qualitative approach as an inquiry process of understanding where a researcher develops a complex, holistic picture, analyses words, reports detailed views of informants, and conducts the study in a natural setting. Moreover, Ndoziya (2014) outlines the strength of qualitative research as an approach that provides an in-depth, intricate, and detailed understanding of meanings, actions, non-observable as well as observable phenomenon, attitudes, intentions and behaviours, and these are well served by naturalistic enquiry. In addition to the above, the rationale of this study to choose qualitative approach was to explore the experiences (non-observable phenomenon) of the teachers teaching Mathematics in the Intermediate Phase. In line with this, Warrington (2017) identifies the following strengths for the qualitative research, namely eliciting deeper insights into designing, administering, and interpreting assessment and testing, and exploring test taker's behaviour, perceptions, feelings, and understanding. Thus, I interacted with teachers by observing teachers when teaching Mathematics in the Intermediate Phase to check how they imparted knowledge and skills to students, and how they introduced their lessons in their Mathematics classrooms. Further to this, Baskarada (2014) identifies the weaknesses of qualitative research. For example, it produces findings not arrived at by statistical procedures or other means of quantification. In overcoming this weakness I used guided analysis to analyse data/text directly from participants because Padgett (2016) outlines that qualitative research is interested in analysing subjective meaning. In other words, qualitative research will assist me to produces thick (detailed) description of participants' feelings, opinions, and experiences, and interpret the meanings of their actions.

1.9.3 RESEARCH STYLE: CASE STUDY

This study adopted a case study as research style. Yin (2017) defines case study as a single instance of a bounded system. Abiddin (2007) concurs with Ormston, Spencer, Barnard, and Snape (2014) by highlighting that a case study allows the exploration and understanding of complex issues. Kohlbacher (2006a) outlines three types of case studies namely; intrinsic, instrumental, and collective. This study adopted an instrumental case study because I wanted to gain an in-depth understanding about the experiences of teachers teaching Mathematics in the Intermediate Phase. Wellington (2015) asserts the strengths of a case study in that they are illustrative and illuminating, accessible, and easily disseminated, and hold the reader's attention with vivid accounts which are grounded in reality and its limitation is that they are not replicable, may not be representative, typical or generalisable. Moreover, Denscombe (2014) notes difficulties in choosing, knowing, and setting boundaries to the case study, gaining access to case study settings, and ensuring, where relevant, that case studies move beyond description to analysis and evaluation. I chose a case study of 3 teachers because they were accessible, and this might hold the reader's attention since teachers teaching Mathematics in the Intermediate Phase might bring vivid accounts on their teaching experience which were grounded on reality. The case study was appropriate for this study because the findings were not generalised because the population sample was too small.

1.10 Data Generation

Garrott (1986) defines data as a type of information, collected, observed, or created, for the purpose of analysis to produce original research results. Yin (2017) demands a researcher to have an ability to handle and synthesise many kinds of data simultaneously, and the diverse data provides the evidence needed for the researcher to draw conclusions, the evidential chain of evidence that gives credibility, reliability, and validity to the case study. The data were generated through unstructured observation. I started with one –on -one semi- structured interviews followed by focus group interviews and end with document analysis to generate the data.

1.10.1 Focus group interview

Maree (2015) defines the focus group interview as the strategy based on the assumptions that group interaction will be productive in widening the range of responses, activating forgotten details of experiences and releasing inhibitions that may otherwise discourage participants from

disclosing information. However, Du Plessis (2013) defines focus groups as a form of group interview in which reliance is placed on the interaction within the group, which discusses a topic supplied by the researcher and yielding a collective rather than an individual view. As a results, I organised a meeting for teachers teaching Mathematics in the Intermediate Phase in my school where I informed them about my study and its purpose. I requested them to participate in a focus group discussion. I informed them about the venue, time, and the date. Further to this, I encouraged them to participate fully during the discussion. I also told the participants not to treat me as their supervisor at work but as a researcher and that discussions were not for judgmental purposes.

1.10.2 One-on-one semi-structured interviews

According to Bruhjell (2016), semi-structured interviews are viewed as the appropriate data generation method for this study because it gives freedom to participants and also allows the participants to ask for clarity when necessary. Mac Kay (2004) outline that semi-structured interviews empower the participants, allow free interaction between interviewer and interviewee, allow opportunities for clarifications so that relevant data is captured, offers researchers access to people's ideas, thoughts, and memories in their own words, rather than in the words of the researcher and maximise description and discovery. Hofisi, Hofisi, and Mago (2014) asserts that in a semi-structured interview the researcher has a list of questions or fairly specific topics to be covered, often referred to as an interview guide, but the interviewee has a great deal of leeway in how to reply. Hofisi et al. (2014) opines that one-on-one interviews offer the possibility of modifying responses and investigating underlying responses. Thus, I was friendly and approachable and created a welcoming and relaxed atmosphere during the interview process. Further to this, I encouraged the teachers to talk and drive the discussion/interview towards their experiences on the teaching of Mathematics in the Intermediate Phase. The questions were well planned in order to save time. The interviews were conducted, depending on participant's availability, during lunch time or after school in order to avoid disruption of classes. Each participant was afforded 40 minutes to respond and their responses were recorded through cell phone and later transcribed into text. The data was analysed later. Luce et al. (2016) declare the weakness of one-on-one semi-structured interview is that it could potentially invade privacy. In line with this, Anaraki-Ardakani (2017) outlines the weaknesses of one-on-one semi-structured interviews as follows: interviewing skills are required; need to meet a sufficient number of teachers in order to make general comparisons; preparation must be carefully planned so as not to make the questions prescriptive or leading;

time-consuming and resource intensive; and the interviewer must be able to ensure confidentiality. Therefore, to overcome these challenges I was punctual in order to save time, observed confidentiality during and after the interview session, and used my interview expertise during the interview.

1.10.3 Document analysis

Gavin and Harris (2014) defines document analysis as a strict and systematic set of procedures for the rigorous analysis, examination, replication, inferences, and verification of the content of written data. Thus, content analysis was adopted in this study because the participant's documents were analysed in order to generate data regarding the experiences of teachers teaching Mathematics in the Intermediate Phase and is of great relevance to this study. In addition to this, Gaborone (2006) further states that documents are produced by teachers in the course of their everyday practices and are geared exclusively for their own immediate practical needs. As a result, in conducting document analysis. I requested teachers' files pertaining to their teaching of Mathematics in the Intermediate Phase in order to analyse their contents. Grix (2010) asserts the strength of the documents in that they are written with a purpose and are based on particular assumptions and presented in a certain way or style. Ahmed (2009) declares the weakness of documents as version available is derived from a dubious, suspicious or unreliable source and document does not make sense or has obvious errors. I surmounted such challenges by scrutinising students' exercise books and teachers' files by checking the Head of Department or Principal's signature and the school stamp. Thereafter that document was regarded as authentic and was analysed for data generation. The sense of transparency was also observed in terms of data generation to ensure the validity of the findings.

1.11 Sampling

Benestan et al. (2015b) define sampling as the process used to select a portion of the population for study. Silverman (2015) categorises non-probability sampling into two groups namely; purposive and convenience sampling. Silverman (2015) defines purposive sampling as when participants are selected because of defining characteristic that makes them holders of data needed for the study. Convenience sampling is when population elements are selected based on facts that are easily and conveniently available. Silverman (2015) identifies the strength of convenient sampling as that it is usually quick and inexpensive, but does not result in a representative samples, thus this study will employ both purposive and convenient sampling

because I purposively wanted to explore the experiences of teachers teaching Mathematics in the Intermediate Phase and teachers were easily accessible to generate the data because they taught in the same school where I am also working. The environment in which this study took place was specifically in Nongoma circuit. For this study, the sample consisted of 3 teachers teaching Mathematics in the Intermediate Phase.

1.12 Data Analysis

Brown, Barbieri, Ventura, Kass, and Frank (2002) define data analysis as a stage that incorporates several elements. It might be taken to mean the application of statistical techniques to the data that have been generated. Schwandt (2014) concurs with Bryman and Bell (2015) when defining data analysis as an activity of making sense of interpreting and theorising data that signifies a search for general statements among categories of data. Rahman, Akhtar, Jamil, Banik, and Asaduzzaman (2015) describe inductive reasoning as that which entails the use of existing knowledge or observations to make predictions about novel cases. Delcroix et al. (2016) define deductive reasoning as a theory testing process which commences with an established theory or generalisation and seeks to see if the theory applies to specific instances. I will use the data obtained from focus discussion and one on one semi-structured interview to classify participants' responses into themes and draw conclusions. The study adopted the guided analysis because its analysis arises from both the theory and the data. Sober and Brainard (2009) assert that guided analysis is adaptable regarding the modification of principles of theories by the researchers and to allow for the resolution of significant issues that emanate from the data. Thus, in the study some categories emerged from data (deductive reasoning) to form themes while others were themes formulated through the curriculum concept.

1.13 Trustworthiness

Rolfe (2006) describes trustworthiness in a qualitative research as a matter of persuasion whereby the researcher is viewed as having made those practices visible and therefore auditable. Guba and Lincoln (1989) define how researchers can persuade their audience (including themselves) that the findings of an enquiry are worth paying attention to/worth taking account of. Guba and Lincoln (1989) define trustworthiness as the way in which the researcher is able to persuade the audience that the findings in the study are worth paying attention to and that research is of a high quality. Furthermore, paying attention to the following dimensions will increase trustworthiness in a qualitative study, namely credibility, transferability, dependability, and conformability (Guba & Lincoln, 1989). I ensured the

trustworthiness of study by ensuring that the above-mentioned dimensions are observed. According to Brenner (2009) dependability refers to the degree to which the reader can be convinced that the findings did indeed occur as the researcher says they did. The data generated in connection with the exploration of teachers' experiences teaching Mathematics in the Intermediate Phase were generated with the aid of face-to-face interviews and focus group discussion were recorded through cell phone or tape recorder. In addition, I was free of bias in terms of the findings and observed fairness in terms of time allocated for the interviewees to respond. Questions asked were based on the teaching of Mathematics in the Intermediate Phase in order to gain relevant responses regarding teachers' experiences. Brenner (2009) and Mayan (2016) describe credibility as the accurate presentation of a particular context or event as described by the researcher. Brenner (2009) refers to credibility as the assurance that the researcher's conclusions stems the data. I made sure that the data generated is believable and credible to the reader by providing the evidence and data analysis. I also involved my supervisor to assess my interview question and listened carefully when the interviewees were responding for validity purposes. Moreover, transferability is defined by Brenner (2009) as the degree to which generalisation can be made from the data and context of the research study to the wider population and settings. In addition, it is regarded as the way in which the reader is able to take the findings and transfer them to other contexts. Thus, in this study, I enriched transferability by ensuring that the precise findings of the study (exploration of teachers' experiences teaching Mathematics in the Intermediate Phase) are a benefit or practicable to other teachers who were not the part or included but teaching Mathematics in the Intermediate Phase. According to Shenton (2004) and Creswell (2014), conformability is the extent to which the research findings reflect the experiences and ideas of participants. Oyugi (2015) Frenkel and Smit (2001) suggest that for the data to suit conformability there must be evidence after the data have been generated, categorised, reconstructed, and interpreted. I ensured that research questions were relevant and well phrased to answer the significant research questions.

1.14 ANTICIPATED PROBLEMS/LIMITATIONS

Due to the fact that I am the supervisor of the participants, I was not judgmental and ensured that I did not have any personal interest during the interview session. Hence, I did not express my opinions or experiences during the course of the study. Thus, I allowed them to respond the way they wished without any interference. One of the limitations of the qualitative research, is

that it is hard to generalise from a small number of case studies. Thus, the findings of this study can be used only for the sake of transferability instead of generalisation.

1.15 Ethics

According to Martin and White (2003), ethics is defined as matters of principled sensitivity to the rights of others. Educational researchers must take into account the effects of the research to the participants; they have a responsibility to participants to act in such a way as to preserve their dignity as human beings. I applied for a clearance certificate/letter from the UKZN Ethics Committee and the KwaZulu-Natal Department of Education, Nongoma circuit to conduct my study and ensured that I followed and abided with the ethical guidelines. After receiving the permission to conduct research from the Nongoma Circuit Management Centre, I wrote letters to participants and contacted them telephonically to ask their permission to partake in the research study. Thus, after the participants agreed to partake in the study I concisely outlined the rationale for the study which was to explore the teachers' experiences for teaching Mathematics in the Intermediate Phase. I informed the participants in writing and verbally of their rights to confidentiality, anonymity, and voluntary participation. I ensured they were aware that they were free to withdraw consent and their participation forms at any time. I ensured their right to privacy by using numbers such as participant 1, 2 and 3 instead of their actual names. Küng (2006) states that according to Section 9 (3) of the Bill of Rights, no person may be discriminated against, directly or indirectly, on one or more grounds, including race, gender, sex, pregnancy, marital status, ethnic or social origin, colour, sexual orientation, age, disability, religion, conscience, belief, culture, language, and birth. Therefore I made sure that the rights of the teachers (participants) were not infringed upon during the research process. J. Kheswa (2015) asserts that the researcher should ensure that participants are not exposed to any undue physical or psychological harm. Fain (2017) alludes that both researcher and participant must have a clear understanding regarding the confidentiality of the results and findings of the study. Weeks (2014) reports that ethical codes and regulation may require individuals to sign forms but in some cultures it is not an individual but the family head or its leaders who should give consent. Thus, I ensured that the consent forms were signed by participants voluntarily. I endeavoured to respect and honour the participants.

1.16 SUMMARY OF CHAPTERS

1.16.1 CHAPTER ONE

The first chapter outlined the general background of the proposed study. Further to this, Chapter One presents the project title (Exploring the teachers' experiences of the teaching of Mathematics in the Intermediate Phase in (Grade 4-6) Nongoma Circuit). Further to this, Chapter One outlines the rationale for the study, location, and research method and design.

1.16.2 CHAPTER TWO

This chapter provided the reviewed literature regarding the teachers' experiences, the three propositions of the curriculum, curriculum levels and the ten concepts of the curricular spider-web (conceptual framework).

1.16.3 CHAPTER THREE

This chapter presented the research design and methodology employed in this study, data generation methods, and the key findings from the data within the conceptual framework.

1.16.4 CHAPTER FOUR

This chapter provided the generated data and analysed data and discussed these in accordance with the established themes.

1.16.5 CHAPTER FIVE

This chapter presented the addressed research questions and objectives, summarised research findings, the provision of the conclusions according to research findings, and data analysis from the previous chapter.

CHAPTER TWO

Literature review

2.1 Introduction

The previous chapter has unpacked the rationale, literature review, conceptual framework, location, objectives, questions, research paradigm, methodology approach, research style, data generation methods, sampling, validity, reliability and rigour, work plan, cost estimate, limitations, and ethics of the study. As a result, this chapter presents the reviewed literature and articulates different studies conducted in relation with teachers' experiences teaching Mathematics and the implantation of Curriculum and Assessment Policy Statement (CAPS) in the Intermediate Phase (4-6). This study seeks to explore the teachers' experiences teaching Mathematics in the Intermediate Phase. Sollenberger et al. (2002) define literature review as a systematic, explicit, and reproducible method for identifying, evaluating, and interpreting the existing body of recorded work produced by researchers. In addition, it articulates that it gives evidence to the research audience that the researcher is aware of the work already done on the subject. Creswell (2014) and Wellington (2015) assert that it establishes and justifies the need for the research to be conducted and establishes its importance and originality. The purpose of the literature review is to compare both national and international curriculum studies in order to identify the gaps that resulted during the conduct of this study.

In addition to the above, Du Plessis (2013) asserts that results of the standardised Mathematics were poor since the average score achieved by Grade 5 learners was 23, 5%. This suggests a very poor overall result. In division and rounding off to the nearest 100 was the poorest (8% and 8.2%) respectively. This suggests that most of the learners are not performing well as required by CAPS. This suggests that this study is of paramount importance in order to fill the gaps left by the previous studies so as to achieve positive results and to achieve the CAPS goals.

2.2 Phenomenon (Teachers' experiences)

Experience plays a crucial role in the implementation of the intended curriculum. As Carl (2012) indicates, experiences stress the role of teachers and their co-operative curriculum decisions and are regarded as necessary curriculum content, and the teachers teach what has meaning for them personally and they create their own teaching through selective perception. In addition to that, experiences aimed at the retention of the unique human worthiness of the individual by means of sensitivity to or an appreciation of each teachers' intellectual qualities, but also and especially, his or her emotional, social, physical, aesthetic, and spiritual qualities(Carl, 2012). Moreover, Denac (2014), Carl (2012), Dewey (1897) as well Killion (2017) stated that the social activities of the teacher are the important factors in connecting all school subject. This suggests that teachers teaching Mathematics in the Intermediate Phase should be driven by their social life experience when implementing the intended curriculum.

Moreover, Webster, Thompson, and Mayou (2002) define experiences as the practical knowledge, skill, and attitude derived from observation of participation in events or in a particular activity. Dewey (1938) and Khoza (2018) assert the three (3) categories of experiences at which a teacher can undergo namely; informal (skill), non-formal (attitude), and formal (knowledge). This indicates that teachers' experiences in the teaching of Mathematics are of vital importance and can be drawn from the level of knowledge experience, skill experience, and attitude experience. Roscoe (2012) and Steyn (2014) issued a report focusing on the research outcomes of the learners' experience research in relation to learners' perception of their learning and teaching. The research was carried out by a triangulation of primary data arising from online surveys, a series of national focus groups, and an online discussion forum. The data collection period ran from November to December 2011. This report revealed that for high quality teaching, students confirmed that skill experience was seen as the most important feature of a good quality for learning and teaching Mathematics in particular. Roscoe (2012) and Steyn (2014) asserted that teachers make greater gains in their effectiveness when they teach in a supportive and collegial working environment, or accumulative skill environment in Mathematics and skill experience and attitude experience also provide additional benefits to school community. Dewey (1938) as well as Achkovska-Leshkovska and Spaseva (2016) were of the view that teaching should be seen as a continuing reconstruction of experience and are the process of achieving goal for teaching. This suggests that the teachers may practice all

levels of experiences in order to implement the curriculum and attain the maximal curriculum goals.

In addition to that, knowledge experience is the experience typically provided by an education or training institution. It is structured in terms of learning objectives, learning time, or leaning support, leading to certification. Formal learning addresses the subject need (Dewey, 1938). This suggests that teachers teaching Mathematics in the Intermediate Phase should be provided with formal school knowledge (intended curriculum) which is content stipulated in CAPS that is to be taught by applying the skill experience received from the tertiary institution. Du Plessis (2013) conducted a case study that describes the activities and effects of these activities for connecting theory and practice. The study's main objective was to outline the recommendations of major stakeholders concerning the activities in the teaching and learning literacy and teaching and learning numeracy courses in the elementary teacher education programme at the University of Washington, Seattle. Participants included 11 instructors, 6 cooperating teachers, and 60 teacher candidates who provided the data for this study. The research method for data generation included document analysis, unstructured interviews with the participants, and observation in the partner schools. The results revealed that teachers should connect theory with practice by drawing from the planned curriculum documents. In other words that teaching of Mathematics in the Intermediate Phase should be influenced by the teacher's knowledge experience and teachers should rely on the prescribed documents such as CAPS document, Annual Teaching Plan (ATP), and assessment policy in order to achieve the curriculum goals. This also seeks teachers to use learners' social experiences from their societies in their teaching and learning through skills experiences.

In addition to the above, Radakovic and Antonijevic (2013) as well as Scott, Yeld, and Hendry (2007), concur that skill experience is considered a life-long process in which we acquire skills through shared information from the society. The experience can be intentional and unintentional; it can be encouraged by the change of curriculum (Janson, 2009). This suggests that teachers teaching Mathematics in the Intermediate Phase should be flexible to use their skill experiences consult the retired Mathematics teachers, subject advisors, and media and attend organised workshops in order to benefit new skill experiences.

Moreover, Dewey (1938) and Ramdhani and Muhammadiyah (2015) argued that first-hand experience in schools is critical to the education of teachers. Further to this, these studies also argued that not all experiences are necessarily beneficial, but attitude experience is of vital importance since it addresses the personal need. Guskey (1986) concurs with Dewey (1938) as well as Nosek et al. (2015) that attitude experience is the most instrumental in reconsidering beliefs and habits. In other words, attitude experience is obtained through actions or observations drawn from personal habits, from family or home, this allows teachers to adopt teaching methods that work for themselves. Both Radakovic and Antonijevic (2013) as well as Cohen et al. (2015) share the same sentiment that attitude experience is aimed at capacitating individual teacher and brings personal development. Thus, these scholars allude that non-formal experience as a necessity to the teachers teaching Mathematics in the Intermediate Phase because it develops teachers personally and assists towards the curriculum implementation.

In addition to the above, Nordhaus (2010) concurs with Muszynska and Bently (1989) as well as O'Reilly (2016) in asserting that experience, gained over time enhances the knowledge and skills needed to implement the curriculum effectively. These studies further assert that teachers' experience is probably the key factor in curriculum policies that affect teachers and it drives teachers to implement the curriculum and the teachers' experience promotes effectiveness of the curriculum implementation. This suggests that teachers' experiences play an important role in the teaching of Mathematics in the Intermediate Phase. Studies conducted in the field of curriculum studies assert that if a teacher overlooks experience, curriculum implementation will be poor (Clotfelter, Ladd, and Vigdor (2007); Ladd, Sass, and Harris (2007); Sass (2008); (Ladd, 2008); Tshiredo (2013); Abudu and Mensah (2016); Chotai and Payne (1998). In line with this, Kini and Podolsky (2016) affirmed that more experienced teachers confer benefit to their Mathematics learners and to the school as a whole. This connotes that teachers teaching Mathematics in the Intermediate Phase should attend workshops and upgrade themselves with some skills which will assist them to implement the curriculum (CAPS) effectively. Teachers should not deviate from the prescribed curriculum (CAPS) when teaching Mathematics in the Intermediate Phase.

2.3 What is curriculum?

According to Stigendal (2013) as well as Smith and Joyce (2004), curriculum is described as course of study and includes the whole study programme to be followed to reach certain goals. Further to this, both Manqele (2017) as well as Ebert, Ebert, and Bentley (2013) define the curriculum as the means and material which students will interact with for the purpose of achieving identified educational outcomes. Van Den Akker (2004) further defines curriculum as a plan for, of, and as learning. These definitions seek teachers to be driven by skill, knowledge and attitude experiences during the teaching and learning process so that they will use their attitude and skills to teach the stipulated content from the policy document like CAPS. Khoza (2015) outlines that the curriculum is categorised into three levels namely intended curriculum (curriculum-as-plan), enacted curriculum (curriculum-in-practice), and assessed curriculum (curriculum-as-achieved).

In addition to the above, L. Porter and Smithson (2001) as well as Hoadley and Jansen (2009) refer to intended curriculum as a policy tool for curriculum standards, frameworks, or guidelines that outline the curriculum that teachers are expected to deliver. A study conducted by Khoza (2016) on teachers' reflections on the teaching of CAPS subjects asserted that intended curriculum is referred to as written policy of ideas that are framed by educational vision with goal(s) and intentions of the teaching/learning curriculum. This suggests that the teachers teaching Mathematics in the Intermediate Phase must adhere their knowledge experiences acquired from the policy document in order to attain the CAPS objectives. In other words, the knowledge experience is vital because it seeks teachers know the teaching periods to be taught per week, more especially the content to be learned by learners as well as how assessment should be conducted. This requires teachers control the sequence of teaching and learning that will lead to the enacted curriculum (Bernstein (2006)

In addition to the above, enacted curriculum is defined by Van den Akker (2013) as a curriculum interpreted by its users (especially teachers). Further to this, L. Porter and Smithson (2001) define it as the actual curricular content that teachers teach in class. This suggests that teachers teaching Mathematics in the Intermediate Phase should apply skill experiences to teach Mathematics by sharing information in order to attain CAPS specific objectives. Moreover, skill experiences enhance teachers to be responsible for the interpretation of the

enacted curriculum with the aid of the expertise acquired from other colleagues such as retired teachers (Dewey, 1938); (Joke Voogt, Pieters, & Handelzalts, 2016). This suggests that teachers teaching Mathematics in the Intermediate Phase should employ both knowledge and skill experiences in order to implement the assessed curriculum as well as to achieve its goals.

Further to this, assessed curriculum, according to Khoza (2016) as well as Manqele (2017), is the learning experiences perceived by learners as measured through their achievements of learning outcomes (belong to learners). Assessed curriculum is evaluated through formal measures ((Jerome & Lalor, 2016); (Craig & Porter, 2006). This suggests that teachers teaching Mathematics in the Intermediate Phase should be driven by attitude experience in order to evaluate whether the planned curriculum is achieved, or whether the learners benefited in the Mathematics classroom (learning outcomes). In other words, attitude experience helps teachers to choose their own different ways of assessing learners in order to evaluate if learners understand what is taught, for instance giving them an assignment or a classwork. Moreov

these teachers must be intrinsically motivated to teach Mathematics in the Intermediate Phase in order attain learners needs (Sehlapelo, 2015). Teachers should
Understand and consider all the levels and of curriculum when teaching Mathematics in order to the curriculum goals.

2.4 Levels of curriculum

Van Den Akker (2004) asserts that curriculum development occurs at five different levels and presented it in pyramid form which was designed by the researcher to clarify the levels. Figure 2.1 below depicts the hierarchical representation of the curriculum levels.

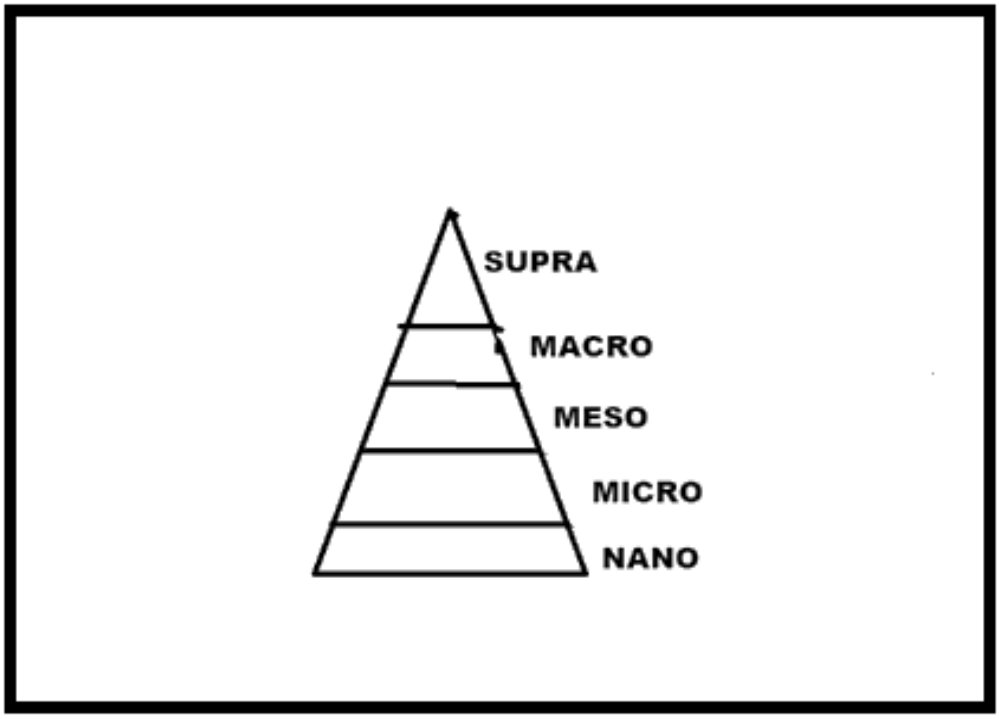


Figure 2.1 levels of curriculum

According to van den Akker, Gravemeijer, McKenney, and Nieveen (2006), as well as Mpungose (2016), the curriculum levels are categorised into five levels namely; Supra, Macro, Meso, Micro, and Nano. In figure 2.1 above, Supra level represents the curriculum at an international level, for example common Mathematics curriculum in African countries. In other words, the Supra level, at being positioned on top indicates that the curriculum designed at the international level and should be adopted by all African countries in order to achieve the common goals. These studies further alludes that the Macro level is the curriculum designed

by the country such as CAPS in South Africa whereas Meso level is designed at school level whereby the individual school makes its own programmes, for example talk shows, debates and others in order to achieve the English goals. These studies further assert that Micro levels are the programmes constituted by a subject teacher such as classroom rules, subject policy which are in line with Meso level whereby the teacher can design his or her own activities that will enhance the teaching and learning of Mathematics in the Intermediate Phase. Nano level refers to how each learner learns during teaching (van den Akker, Gravemeijer, McKenney, et al., 2006); (Plomp & Nieveen, 2009). For example, a learner writes his or her own notes during the lesson presentation or a learner does extra homework exercises and submits them in order to gain feedback. It is highlighted that they are extremely useful; distinction appears to be a specification of the curriculum and curriculum development so that the curriculum implementation in schools complies with the principles and goals of what the curriculum seeks to address and achieve (van den Akker, Gravemeijer, McKenney, et al., 2006); (Plomp & Nieveen, 2009). This suggests that teachers teaching Mathematics in the Intermediate Phase should adhere to Macro level (intended) curriculum and that teachers should be driven by knowledge experience in order to achieve the curriculum goals. In addition to the above, Mathematics teachers should also understand how the South African Mathematics curriculum has changed and been developed, as well as its background.

2.5 The South African Mathematics curriculum

These studies Douglas et al. (2015), Ziegler, Ziegler, and Biersack (2010) define Mathematics in their studies conducted in relation with experiences of teaching Mathematics curriculum as language that makes use of symbols and notations to describe numerical, geometric, and graphical relationship. These studies further assert that Mathematics helps to develop mental processes that enhance logical and critical thinking, accuracy and problem-solving skills that will help to contribute in decision making. In other words, teaching and learning process should be influenced by attitude, skills, and knowledge experiences in order to enhance smooth teaching and learning process.

Furthermore, before 1994 the apartheid curriculum (school syllabus) of racially offensive and outdated content was introduced and the emphasis was on the content coverage (Jansen (1999); (Rakometsi, 2008). This suggests that teachers teaching Mathematics were driven by knowledge experience since their teaching were controlled by what is prescribed. Jansen (2010) and Maluleka (2015), assert that to understand South African History'' curriculum change in

Democracy, the most ambitious curriculum policy since the installation of the Government of National Unity has been driven by outcome-based education (OBE) approach. In addition to that, outcomes make explicit what learners should attend and outcomes direct assessment towards specified goals. This suggests that OBE was driven by meeting the social needs of stakeholders involved in education, such as learners. Further to this, OBE as curriculum failed because the language of innovation associated with OBE was too complex, confusing and at times contradictory (Jansen, 2010); (Amstrong & Allason, 2014). Thus Mathematics curriculum was also driven by OBE approach which draws much from outcomes and in this case most subjects including Mathematics were known as learning area statements and Mathematics was known as mathematical literacy and numeracy (Ma & Zhou, 2010). Moreover, OBE strives to enable all learners to achieve curriculum goals to their maximum ability. This suggests that teachers teaching OBE Mathematics in the Intermediate Phase were driven by skill experience to ensure that teaching and learning was learner centred so that learners achieved the desired outcomes.

In addition to the above, Curriculum 2005 (C2005) is regarded as a key project in the transformation of South African society (Scott et al., 2007); as well as (Maimela, 2015). Furthermore, Mathematics C2005 was directed towards achieving prosperous, truly united, democratic and internationally competitive country with literate, creative, and critical citizens leading productive, self-fulfilled lives in a country, free of violence, discrimination and prejudice (Scott et al., 2007); (Maimela, 2015). It was not a curriculum designed to fill up learners' heads with knowledge and skills but rather to develop learners with the disposition of lifelong learning and educated teachers to be facilitators, not just deliverers of information (Dillard & Siktberg, 2013); (Fullan & Langworthy, 2014). For instance, teachers were expected to organise learners to sit in groups so that it would allow them to brainstorm ideas during Mathematics lessons rather sitting passively and waiting the teacher to be the centre of learning. This suggests that teachers teaching Mathematics in the Intermediate Phase were driven by both knowledge and skill experiences when teaching in order to achieve the curriculum goals.

Moreover, three years after the introduction of C2005, OBE was reviewed and revised in light of recommendations made by a Ministerial Review Committee appointed in 2000 (Marais et al., 2004); (Van de Loosdrecht et al., 2013). These studies further assert that the Review Committee was requested to investigate the perceived implementation crisis particularly in Mathematics and to propose measures to deal with it. The committee reported that OBE and

C2005 have been confounded by a skewed curriculum structure and design. For example the complexity of language such as specific outcomes, the lack of alignment between the curriculum and the assessment policy, and adequate teacher training. This suggests that teachers teaching Mathematics in the Intermediate Phase did fail to practice knowledge experience when teaching and as a result Mathematics goals were not achieved.

In addition to the above, to improve implementation, the National Curriculum Statement was amended, with the amendments coming into effect in January 2012. A single comprehensive Curriculum and Assessment Policy document was developed for each subject to replace Subject Statements, and Learning Programme Guidelines in Grades R-12 (Olver, Lozier, Boisvert, & Clark, 2010). In other words, teachers had to move from being driven by skill experience (OBE) to attitude and knowledge experience (CAPS). This then further requires teachers to master the Mathematics curriculum components during the teaching and learning process (Van den Akker, 2013).

2.6 Conceptual framework (curriculum spiders' web)

Khoza and Mpungose (2018) concur with Creswell (2014) that a conceptual framework is the set of component ideas or concepts that guide conduction of a research study in order to have a particular area of focus. In line with this conceptual framework, the study will be surrounded by certain key ideas or concepts. Further to this, Casanave and Li (2015) asserted that the conceptual framework helps to explain or justify how the study is being done, lets readers know what the study is, and is not, and helps researchers support and interpret the findings and connect them to other words.

Consequently, this study is guided by curricular spider-web concepts adapted from (van den Akker, Gravemeijer, McKenney, et al., 2006). Table 2.1 below depicts the curricular concept, questions, and its propositions guiding this study.

Table 2.1 curricular concept, questions, and propositions

CONCEPT	**QUESTION**	**PROPOSITION**
RATIONALE	Why are you teaching?	1.Personal reason (Pedagogical)

		2.Social reason(beneficial) 3.Content reason (studies)
RESOURCE	With what are you teaching?	1.Hardware resources 2.Software resources 3.Idiologicalware resources
ASSESSMENT	How do you assess teaching?	1.Summative assessment 2.Formative assessment 3.Peer assessment
CONTENT	What are you teaching?	1.Geometry 2.Data and handling 3.Measurement
ACCESSIBILITY	With whom are you teaching?	1.Culture accessibility 2.Physical accessibility 3.Financial accessibility
TEACHER'S ROLE	How do you facilitate teaching?	1.Moderator 2.Leader 3.Facilitator
ENVIROMENT	Where are you teaching?	1.Face to face environment 2.Online environment 3.Blendend environment
TIME	When are you teaching?	1.School time 2.Extra time 3.Instrumental time
ACTIVITIES	How are you teaching?	1.Teacher centered activities 2.Content centered activities 3.Learner centered activities
GOALS	Toward which goals are you teaching?	1.Aims 2.Objectives 3.Outcomes

2.6.1 Why are they teaching Mathematics (Rationale?)

The study conducted by Brijlall and Maharaj (2013) examines teacher's experiences of the implementation of the Curriculum and Assessment Policy Statement (CAPS). Further to this, the qualitative research design was employed to gather the data, using three primary schools in KwaZulu-Natal (KZN). Eventually, the study conclusion agrees with the study conducted by Koti (2016) that teachers should be driven by a certain rationale for efficient and effective implementation of CAPS. This is in line with studies conducted by Mantyi-Ncube, Ndlovu, Moyo, and Sibanda (2012) and Wilmore and Papa (2016) which assert that teachers may be driven by professional rationale (reason from profession), societal rationale (reason from the society), and personal rationale (reason from the individual) in the teaching of subjects.

Moreover, various studies have been conducted and have articulated the rationale behind why teachers teach (rationale). The study conducted by Khoza (2016) indicates that most teachers teaching CAPS subjects are driven by professional rationale because they teach and follow what is prescribed from the policy. Thus, Reid and Hawley (2013) and Mpungose (2016) describes professional rationale as a statement of what the teacher believes is the purpose of teaching Mathematics. Furthermore, in a subject like Mathematics, a rationale addresses what is supposed to be accomplished and what learners will know, be able to do, and value as a result of time spent in Mathematics class. Further to this, a professional rationale situates teachers' work in the broad professional context of schooling (Chen et al., 2017); (Husu, 2004). Moreover, Anderson and Whitcomb (2016) articulates that a teacher must be in possession of a recognised minimum three-year qualification (RQV 13) which includes professional teacher education and South African Council for Educators (SACE). In addition to the above, Anderson and Whitcomb (2016) and Spaull (2013) assert that a teacher must have a basic knowledge of Mathematics in a particular phase as provided in professional qualification and be able to teach and assess learners as well as to perform the administrative duties such as controlling the learners attendance registers. This further, suggests that the teachers teaching Mathematics in the Intermediate Phase may be driven by knowledge experiences in their teaching and learning process by following what is strictly prescribed from the CAPS document and also draw from their qualifications. In other words, Mathematics teachers should consider society during the teaching process.

Furthermore, the survey and the interpretive paradigm study conducted by Ahlstrom et al. (2013) and Duchesne and McMaugh (2018) on Mathematics syllabus and teachers' personal epistemologies and pedagogical beliefs adopted the semi-structured interviews and the online survey to collect and generate the data and the study reveals that it is significant to consider the teachers' beliefs in developing and implementing the Mathematics curriculum. In addition to the above, Khoza (2016) concurs with Tasca et al. (2015) that teaching is mostly influenced by opinions, local every day, general knowledge, and oral conversation. In addition to that, on assessment, students are sometimes compared to one another for achievement so that those who achieve more outcomes than others will be praised in a classroom context. In addition to the above, Anderson and Whitcomb (2016) concurs with Spaull (2013) that teachers must be able to interact with stakeholders and must be in possession of good communication skills. This may, suggest that teachers teaching Mathematics in the Intermediate Phase should be driven by skill experience in order to enhance societal rationale in their teaching. Thus, the personal rationale plays a pivotal role in the teaching of Mathematics in the Intermediate Phase (Lopez, 2009; Snoek et al., 2015).

In addition to the above, Khoza (2016) and Spiegelman et al. (2013) describe personal rationale as the vision for teaching Mathematics that puts individual teachers at the centre of the teaching environment and that makes up knowledge that is unique to each individual that possesses it, holds personal significance to each person since the particular environmental context in which it is assimilated or constructed, is result of experience in a particular teaching environment at a particular time. This may suggest that teachers teaching Mathematics in the Intermediate Phase should be driven by attitude experience in order to attain the intended curriculum goals. Thus, teachers should understand the goals for Mathematics before it is taught (Spiegelman et al., 2013). Further to this, Goudas, Dermitzaki, Leondari, and Danish (2006) concur with Mhlongo et al. (2015) that Mathematics is intended to impart, to learners, a sense of self control, certainty about their lives in future, so that they make informed choices in life and at the end of the day become better citizens.

According to Motshekga (2009), teachers should teach learners Mathematics as according to the stipulated content. This further, suggests that teachers teaching Mathematics in the Intermediate Phase should be driven by knowledge experience in order to use the professional

rationale to teach the prescribed content. In other words, teachers should be guided by professional rationale in order to cover the content per term which is stated from the policy document like annual teaching plan (ATP). For instance, Motshekga (2009) asserts that numbers and patterns should be covered on the third term. In other words, CAPS seeks teachers to cover the content within a specified period of time and this draws much from their knowledge experience of the content. Furthermore, teachers should also understand that there are goals for teaching Mathematics in the Intermediate Phase (Khan, 2016); (Louws, van Veen, Meirink, & van Driel, 2017).

2.6.2 The teaching goals (To which goals are they teaching?)

Khoza and Mpungose (2018) concurs with Ornstein and Hunkin (2004) that goals are an important aspect of the planning of teaching and learning practice and are the desired outcomes for learners as a result of experiencing the curriculum and they are the targets that teachers set out and achieve during teaching and learning. Moreover, Carl (2012) as well as Chorley, Dunn, and Beckinsale (2009) assert that Mathematics teachers in the Intermediate Phase should take note of the Mathematics goals with a view to supplying a balanced education to learners. Moreover, Reddy, Zuma, Shisana, Jonas, and Sewpaul (2015) and Khoza (2016) outline that goals are divided into aims, objectives, and outcomes. This further suggests that teachers teaching Mathematics in the Intermediate Phase should be driven by a particular experience to fulfil the goals of the curriculum.

In addition to the above, aims are what teachers intend to cover in a block of learning (Kennedy, Hyland, & Ryan, 2006; Khoza, 2016). Further to this, Khoza and Mpungose (2018) as well as Mqadi (2015) place an emphasis on the importance of aims in the implementation of the curriculum and also give a direction towards goals that serve as a yard stick for measuring progress in a subject like Mathematics. As a result, this suggests that teachers teaching Mathematics in the Intermediate Phase should be driven and guided by attitude experience in order to achieve the aims of the curriculum. For example, the teacher should develop passion for measurements particularly, when teaching learners to be able to distinguish between metres and kilometres when measuring the distance during the Mathematics lesson. As a result, teachers teaching Mathematics may identify the specific objectives when planning their

lessons. Consequently, teachers teaching Mathematics must identify the specific objectives when planning their lessons (Choi et al., 2016).

In addition to the above, objective is the specific statements of teaching intention and it indicates one of the specific areas that the teacher intends to cover in a block of learning (Mqadi, 2015). Further to this, objectives help teachers to design the content, method, and assessment and to communicate the educational intent of the course to learners and the teachers and to help identify the resources needed to undertake the teaching ((Yule & Paterson-Brown, 2012) (Brockwell & Davis, 2016). For instance, learners will identify the equivalent of one (1) hour as 60 minutes and 1 day as 24 hours, at the end of the lesson. As a result, this suggests that teachers teaching Mathematics in the Intermediate Phase should apply their knowledge experience as a yardstick to check whether the lesson objectives have been are attained or not.

Furthermore, Day et al. (1999) concurs with Moon (2013) as well as Marisaldi et al. (2010) that a learning outcome is a statement of what a learner is expected to know, understand, and be able to do at the end of a period of learning and how that learning is to be demonstrated. In addition to the above, learning outcomes are concerned with the achievements of the learner rather than the intentions of the teacher, and learning outcomes are elements of the curriculum since they are prescribed priori, before the beginning of the learning and teaching process and are to be achieved by the learner (intended learning outcomes) and might differ from the actually achieved learning outcomes, which might encompass unintended learning outcomes (Cole et al., 2006; Marisaldi et al., 2010; Munisi, 2017).

In addition to the above, Olver et al. (2010) is in line with studies conducted by Lin et al. (2004), Reynek, Meyer, and Nel (2010), Remillard and Heck (2014), as well as Guo and Lakshmikantham (2014) in declaring that learning outcomes are outlined in the CAPS document and are referred to as specific skills. For instance, the CAPS document at Intermediate Phase outlines specific aims, "to develop the correct use of the mathematical language, develop number vocabulary, number concept and calculation and application skills and to learn to investigate, analyse, represent and interpret information"(DBE, 2011, p. 9). This suggests that teachers teaching Mathematics in the Intermediate Phase should be driven by

knowledge and skill experiences when planning and teaching their lessons. The CAPS document is vocal in that teachers should teach Mathematics in the Intermediate Phase with specific aims "to develop a spirit of curiosity and a love for Mathematics, to develop an appreciation for the beauty and elegance of Mathematics, and to develop recognition that Mathematics is a creative part of human activity"(DBE, 2011, p. 8). This further, suggests that teachers teaching Mathematics in the Intermediate Phase should be driven and be guided by knowledge and attitude experience in order to achieve aims of the curriculum when teaching Mathematics. For example, to teach learners to be able distinguish between metres and kilometres when measuring distance must draw from their knowledge and passion to teach the content. Moreover, teachers teaching Mathematics in the Intermediate Phase may play a major role during the teaching and learning process.

2.6.3 How are they teaching? (Teachers' Role)

Malik and Ghazi (2011) assert that a teacher is the backbone of any educational system because knowledge is transferred from the teacher to the taught (learner) and sometimes shared among themselves stated that secrete of quality education lies in the quality of teachers. Moreover, Fomunyam (2014) concurs with Senge (2000) as well as (Khoza, 2014) that a teacher is an expert who is capable of imparting knowledge that will help learners build, identify, and acquire skills that will be used to face the challenges in life and provides knowledge, skills, and values to the learners that enhance development. Further to this, in support of this, Khoza (2014) concurs with a study conducted by Fomunyam (2014) into eight teachers and sixteen groups of students exploring whether insight gained in studies about critical features can be shared by other teachers and used to improve the learning of other students. Consequently, the study reveals that the characteristics of excellent teachers are knowledge of how to identify, represent, and explain key concepts in Mathematics. This further, suggests that teachers teaching Mathematics in the Intermediate Phase should be driven by skill experience in order to understand and know their role in delivering the content that they are supposed to teach and learners master what are supposed to master (Coe, 2014; Loewenberg Ball, Thames, & Phelps, 2008).

Moreover, Fomunyam (2014) concurs with Khoza (2014) that the teacher uses their experience to construct and reconstruct their teaching experiences over time because meaningful teaching

only builds upon previous knowledge. As a result, this suggests that teachers teaching Mathematics in the Intermediate Phase should be in possession of skill experience in order to impart knowledge and utilise potential and to facilitate the teaching and learning process. Moreover, Kudryashova, Gorbatova, Rybushkina, and Ivanova (2016) indicated three levels of teachers' roles namely; facilitator, moderator, and leader.

Moreover, Kudryashova et al. (2016) outlines that the teacher acts as a facilitator when they facilitate and use previously acquired knowledge in a new situation. The teachers' role is determined by the approach that the teachers adopts (Khoza, 2015).In addition to the above, this is supported by a study conducted by Sormunen, Alamettälä, and Heinström (2013) who analysed how the design and implementation of group assignments affect learners' learning experience. Furthermore, the data was collected in two secondary school classes where learners wrote a Wikipedia article in groups of three to five members. Thus, in literature class, learners reported stronger on learning experience, while in the history class, learners reported fewer and weaker on learning experience. Eventually, the analysis of data revealed that particular activities designed by literature teachers brought learners' attention to relevant areas of learning. Subsequently, the findings suggest that the particular designs of the assignments and the ways of guiding learners strengthen their learning experiences. This suggests that teachers teaching Mathematics in the Intermediate Phase should act as facilitators, be innovative, guide learners, and afford learners an opportunity to display their abilities in understanding the mathematical concepts and its application when learning Mathematics by practicing the skill experience. In other words, teachers teaching Mathematics in the Intermediate Phase should ensure that learners' activities are moderated during the learning and teaching process (Adelman-McCarthy et al., 2008).

In addition to the above, Kudryashova et al. (2016) asserts that teachers become moderators when they moderate learners' activities by creating the necessary conditions for them to analyse, reflect, and reconceive the current knowledge in a co-operative manner. Moreover, the teacher organises and observes learners' interactions in groups where they conduct joint activities, predict and form hypotheses or collect evidence to support generalisations, share ideas and suspend judgments, record observations, and discuss tentative alternatives (Florian, Rouse, & Black-Hawkins, 2016; Powell, Jacob, & Chapman, 2012). This further, suggests that

teachers teaching Mathematics in the Intermediate Phase should be driven by the knowledge experiences to play their roles effectively in order to attain the desired goals for the intended curriculum. Furthermore, teachers should act as leaders during the teaching and learning process (Powell et al., 2012).

In addition to the above, according to Brigman (2011), teachers as leaders seek, teachers to take control of learners' learning –using the best practices and research-based strategies out there. This may suggest that the Intermediate Phase Mathematics teachers should use attitude experiences to ensure that the goals of the intended curriculum are achieved. Brigman (2011), with the support of the Teachers Network, undertook a national survey of 1,210 teacher leaders, to better understand the role that participating in teacher leadership networks plays in supporting and retaining effective teachers in high needs urban schools. The study reveals that teachers' leadership and collective expertise are tightly linked to students' achievement, teachers search for innovative strategies as instructional and school leaders but are often stifled by prescriptive policies that drive them from the profession and teachers identify missing supports for leadership in their Mathematics classrooms as barriers to their empowerment and effectiveness. As a result, this suggests that teachers teaching Mathematics in the intermediate are regarded as the custodians of the intended curriculum and are in the position of trust and to lead learners achieve the CAPS goals, thus skill experience and knowledge experience should be employed efficiently. Consequently, teachers may personal understand the Mathematics content before because it is a reason for being assigned to teach Mathematics in the Intermediate Phase.

In addition to the above, the CAPS document is silent about the role of a teacher as a facilitator because CAPS came to replace the old curricula namely; OBE, RNCS, and NCS (Motshekga, 2009). Furthermore, the roles of teachers as facilitators changed into transmitters of knowledge, to achieve the desired goals, and the classroom activities mainly focused on teacher-centred activities (Kudryashova et al., 2016). Moreover, Motshekga (2009) is very vocal about moderation of activities by Mathematics teachers as the document articulates that School-Based Assessment (SBA) comprises forms of assessment which are conducted by the teacher at the school level. This includes assignments, projects, homework pieces, classwork pieces, tests, and listening exercises etc. Moreover, CAPS documents assert that all assessment tasks

for subjects such as Mathematics must be moderated by the Head of Department (HOD) or specialist senior teacher at the school, prior to the administration of the assessment tasks (Motshekga, 2009). Thus, this suggests that teachers teaching Mathematics in the Intermediate Phase should be driven by knowledge experience during the moderation process of activities. Further to this, the CAPS document asserts that teachers will lead, manage, and act as administrators whereby, they make decisions appropriate to the level of learning, lead learning in the classroom and participate in school leadership as well as to provide support through interpretation of CAPS (DBE, 2010a).

2.6.4 What content are they teaching?

Ball (2008) concurs with Zwerver, Bredeweg, and van den Akker-Scheek (2011) in defining content as knowledge, skills, attitudes, and values culminating in learning activities that learners experience in and outside the school. Moreover, the manner in which a teacher teaches the content of Mathematics can encourage learners' interest and confidence to flourish, or conversely in a manner that slowly chips away at the interest until the learner eventually despises the subject (Gibb, 2013). Thus, this suggests that teachers teaching Mathematics may be driven by attitude experience in order to develop passion and self-confidence for learning Mathematics. Furthermore, the CAPS document for Mathematics states clearly what content should be taught in the Intermediate Phase. In addition to the above, according to Zwerver et al. (2011), teachers should act as role models and work towards extending skills education to all aspects of school life. Furthermore, L. Shulman (1987) concurs with Olfos, Goldrine, and Estrella (2014) that content knowledge of the subject and its structures or part where as curricular knowledge characterised certain programmes for the teaching subject. Moreover, the content in the Mathematics subject in the Intermediate Phase has three propositions namely space and shapes (geometry), data and handling, and measurements (Motshekga, 2009). Therefore, this suggests that the teachers teaching Mathematics in the Intermediate Phase should use the three levels of experiences in order to achieve the CAPS goals.

In addition to the above, Olver et al. (2010), the study of Space and Shapes improves understanding and appreciation of patterns, precision, achievement and beauty in natural and cultural forms. Moreover it focuses on the properties, relationships, orientations, positions, and

transformations of two-dimensional shapes and three-dimensional objects. For instance, refer to the figure 2.3 below which indicate the three-dimensional shapes.

With three dimensional shapes, the teacher will teach the learners the formulae for calculating the volume of the rectangular prism, of which it is equal to the area of the base times the height. Learners will be given the activity to investigate nets of the cube and a rectangular prism as a 2D and the 3D shape and investigate the properties of these shapes with regard to the surface area of a 3D shape. Furthermore, the learners will be expected to provide answers such as to draw and then cut out the net for the cube, ensure that all the lengths are the same (4cm), all faces are equal, and all faces should be the same colour. After this, the teacher will then assess the learners work and give correct feedback.

This is a rectangular prism. It has 6 faces, 8 edges and 12 vertices.

Figure 2.2 3D rectangular

This suggests that teachers teaching Mathematics in the Intermediate Phase should be driven by attitude experience before attempting to teach space and shapes because the passion and the attitude showed by the teachers towards the content will enhance the self-confidence of the learners toward that particular content (space and shapes). Data handling plays an important role within Mathematics education since it assists in developing critical thinking in learners (Naidoo & Mkhabela, 2017).

In addition to the above, data handling involves asking questions and finding answers in order to describe events and the social, technological, and economic environment (Olver et al., 2010). Furthermore through the study of data handling, learners develop the skills to collect, organise, represent, analyse, interpret, and report data (Motshekga, 2009). For instance: The table below shows the number of learners in 6 Grade 5 classes.

Table 2.2: Learners in 6 Grade 5 classes

Class	A	B	C	D	E	F
Number of learners	28	34	29	34	30	34

Here are the numbers which needs to be ordered from the smallest to biggest. In addition to the above, learners should find the median, mean, and the mode from the numbers in the table.

Thus, this suggests that teachers teaching Mathematics in the Intermediate Phase should be guided by knowledge experience in order to teach this content because it will assist learners to begin to seek more order, while still manifesting spontaneity and creativity (Ramsden, 2003). Moreover, teachers teaching Mathematics may use relevant resources like rulers, metres etc when teaching measurements in the Intermediate Phase.

Moreover, measurement focuses on the selection and the use of appropriate units, instruments, and formulae to quantify characteristics of events, shapes, objects, and the environment (Olver et al., 2010). In addition to the above, measurement relates directly to the learners' scientific, technological, and economic worlds, enabling the learners to make sensible estimates and be alert to the reasonableness of instruments and results. For instance, if you calculate the perimeter of a rectangle you need to know the formulae for calculating the perimeter of a rectangle namely P= (2length + 2breadth), which means you need to calculate the sizes of the sides in that rectangle you are calculating. This suggests that teachers teaching Mathematics in the Intermediate Phase should be driven by skill experience in order to equip learners with mathematical skills.

Moreover, the CAPS document is outspoken on the content, for instance it is stated that policy that progression in measurement is achieved by the selection of shapes and objects in each grade for which the formulae for finding area, perimeter, surface area and volume become more

complex and the use of formulae in the intermediate provides a useful context to practice solving equations(Motshekga, 2009). Thus, this suggests that teachers teaching Mathematics in the Intermediate Phase should be driven more by knowledge experience than attitude and skills experience when teaching content from the CAPS document. Consequently, teachers should be very sensitive to the time allocated for teaching Mathematics and use it effectively.

2.6.5 When are they teaching? (Time)

In addition to the above, according to Porcu, Alegría, and Furrer (2017), time is a dimension and measure in which events can be ordered from the past through the present, and into the future. It is also the measure of the duration of events and the intervals between them. Further to this, Kaplan, Chan, Farbman, and Novoryta (2015) state that an individual cannot simply advance in any given area of study without committing a certain amount of time to grasping a new content, practicing and honing skills, and then harnessing knowledge and skills to realise specific aims. In line with this, Cotton and Wikelund (1990) categorise time into three levels namely school time, extra time, and instructional time.

Moreover, school time refers to the time spent by learners and teachers at school. For example the school starts at 07h20 and ends at 14h20 therefore the school time is seven (7) hours a day (Chisholm & Hoadley, 2005). Further to this, these studies reveal that teachers spend more than they should on administration-related issues. For instance, management and supervision, assessment and evaluation, as well as on reports and record keeping. Moreover, the other time is spent on core activities such as teaching and preparation and planning for Mathematics. Thus, this suggests that teachers teaching Mathematics in the Intermediate Phase should use and observe knowledge experience in order to spend seven hours at school. Creating extra time for teaching and learning Mathematics allows broader and deeper coverage of curricular, as well as more individualised learning support (McGarry et al., 2017).

Furthermore, Kolbe, Partridge, and O'Reilly (2012) define extra time as the additional time to the school or daytime that may be used as strategic initiative to boost learning and achievement in school for example over weekends, morning classes and holiday classes. Kalaivani, Sathish, Janakiraman, and Johnson (2012) agree that maximising time requires the use of transition,

such as movement from one class to another and the gathering of Mathematics resources. Consequently, the research findings indicate that additional classes can improve performance in learning and it is extended by the learners' excellence in tests. Thus, this suggests that teachers teaching Mathematics in Intermediate Phase should be driven by their attitude experience because they opt to make their own extra time in order to assist in delivering the content. Instructional time is allocated for depositing knowledge, skills mathematical concepts, and also assessing learners (Rosell et al., 2012).

In addition to the above, according to Du Plessis (2013), the instructional time for Mathematics in the Intermediate Phase is six (6) hours a week, which means that one (1) hour twelve minutes is allocated for teaching Mathematics a day. Hetem, Bootsma, and Bonten (2015) concur with Mahendra, Bahagia, Nugraha, and Komariyah (2008) that teachers teaching Mathematics must manage and utilise instructional time effectively. The instructional time in the Intermediate Phase is six (6) hours per week, ten (10) weeks per term (Motshekga, 2009). This suggests that teachers teaching Mathematics in the Intermediate Phase may use time efficiently and effectively to teach Mathematics and knowledge experience is required to underpin the teaching of Mathematics in the Intermediate Phase such as creation of a time-table that will serve as guide on when to teach Mathematics. In addition to the above, Facione (1990) & Dunlosky, Rawson, Marsh, Nathan, and Willingham (2013) state that, in order to gain high grades learners one should consider doing work on time and consider their participation and effort as the most important thing through gaining higher grades. Furthermore, this promotes the utilisation of skill experience in order to attain the Mathematics Intermediate Phase learning outcomes. Thus, this suggests that skill experience is dominant in the teaching of Mathematics in the Intermediate Phase and attitude experiences are also practiced by the teachers by showing ideas on how to teach Mathematics in the cluster meeting and workshops, they brainstorm ideas regarding challenges experienced by Intermediate Phase Mathematics ideas and they also utilise their skill experiences to capacitate each other in order to address challenges and the classroom (Location) is the conducive or convenient place to teach Mathematics in the Intermediate Phase, to attain the curriculum goals.

In addition to the above, CAPS is silent about school time in the CAPS policy document however, the policy handbook for educators articulates that school time is seven (7) hours per

day including breaks and the periods in which learners are not at school (Pillay, 2007). This suggests that teachers teaching Mathematics in the Intermediate Phase should be driven by knowledge experience in order to adhere to the stipulated time for school time. In addition to the above, CAPS is silent in the CAPS document about the extra for teaching and learning Mathematics. However, the revised national curriculum statement Grades R-9 states that learners who experience barriers to learning must be accommodated through flexibility in terms of time allocated to complete activities, thus additional time may be given or alternatively learners may be allowed to complete their tasks at a later stage (Ramsden, 2003). Thus, this suggests that teachers teaching Mathematics in the Intermediate Phase should be driven by knowledge experience in order to observe both formal and informal assessment. Moreover, teachers teaching Mathematics in the Intermediate Phase should understand that assessment is an essential feature of the teaching and learning process and know how to integrate into this process (Ramsden, 2003).

2.6.6 How do you assess teaching? (Assessment)

In addition to the above, Goyal et al. (2015) concurs with Macri (2015) that assessment is simply defined as the process to establish what students know and are able to do. In addition to the above, these studies further categorised assessment into three categories namely; summative assessment, formative assessment, and peer assessment. In addition to the above, summative assessment in a Mathematics classroom level is an accountability measure that is generally used as part of the grading process. Summative assessment in an Intermediate Phase may be conducted as end-of-term or semester exams, end-of-unit or chapter test, and state assessment. Furthermore, Macri (2015) and Aken et al. (2016) further outline that the key is to think of summative assessment as a means to gauge, at a particular point in time, learners learning relative to content standards. The summative assessments are tools to help evaluate the effectiveness programmes, Mathematics improvement goals, alignment of curriculum, or learner placement in specific programmes. This suggests that teachers teaching Mathematics in the Intermediate Phase should be driven by knowledge experience, accompanied by skill experience to teach and assess Mathematics learners in order to check whether Mathematics goals are attained or not. For instance tests, examinations, projects, assignments, and investigators are recommended for Mathematics (Motshekga, 2009). Moreover, teachers

teaching Mathematics in the Intermediate Phase may encourage learners to assess themselves (peer assessment).

In addition to the above, peer assessment is defined by Topping (2009) and Scoboria et al. (2017) as an arrangement for learners to consider and specify the level, value or quality of product or competence of other status learners. In other words, learners work in teams to construct knowledge and accomplish tasks through collaborative interaction. Moreover, T. Callaghan et al. (2011) concurs with Sedio (2013) that working in groups to implement the intended curriculum, particularly for Mathematics in the Intermediate Phase, allows learners to be in an interactive environment. Furthermore, the study is underpinned by Sajedi (2014) and Hattie (2009a) who outlined that during group work, learners are engaging with the task, increasing their confidence, and becoming responsible for their own learning. Moreover, Greenfield (2011) and Choi et al. (2016) remind us that it's now well established that the environment we place children in strongly influences the behaviour and learning that occurs there and a child's sense of self. Thus, this suggests that teachers teaching Mathematics teaching Mathematics in the Intermediate Phase may use skill experience to assess learners. In addition to the above, the study conducted by Foley and Lewin (2013) exploring students' attitudes and perceptions relating to peer assessment, as observed at the International School of Lausanne, where the case study was restricted to students in the International Baccalaureate (IB) diploma Economics course of the programme. Eventually, the findings indicate that a significant number of academics and students resist peer assessment using grades and that majority reports that students never or rarely grade each other in assessment activities and recommend some strategies for promoting peer feedback, through engaging students with criteria and for embedding peer involvement within normal course processes. This further, suggests that teachers teaching Mathematics in the Intermediate Phase should use their skill experience to conduct peer assessment and also check that feedback is given to learners. Further to this, teachers teaching Mathematics in the Intermediate Phase may be aware that formative assessment plays a significant role during the teaching and learning practice.

Moreover, Bayless et al. (1998) concur with Howard (2016) in defining formative assessment as all the activities undertaken by teachers and their learners in assessing themselves that provide information to be used as feedback to modify teaching and learning activities.

Furthermore, Motshekga (2009) in the CAPS document articulates that learners must be assessed through homework, tests, and assignments. Formative assessment informs both Mathematics teachers about learners' understanding at a point when timely adjustment can be made in order to address personal needs (Macri, 2015). Further to this, these adjustments help teachers to assist learners in ensuring they achieve targeted standards-based learning goals within a set time frame. In addition to the above, teachers are fully involved in the formative assessment and learners should be provided with descriptive feedback as they learn. This further suggests that teachers teaching Mathematics in the Intermediate Phase should be driven by knowledge experiences and skill experiences to apply formative assessment to assess learners so as to move learners forward in their learning and to make learners aware and understand what they are doing well.

Motshekga (2009) is vocal about assessment on the policy document that is a continuous planned process of identifying, gathering, and interpreting information regarding the performance of learners, using various forms of assessment. Moreover, Motshekga (2009) further states that assessment involves four steps: generating and collecting evidence of achievement; evaluating this evidence; recording the findings; and using this information to understand and thereby both formal and informal. Thus, this suggests that teachers teaching Mathematics in the Intermediate Phase may be driven by knowledge experience when planning to conduct assessment. In addition to the above, Motshekga (2009) articulates on the CAPS policy document regarding the conduction of summative assessment that summative assessment is carried out after the completion of a Mathematics topic or a cluster of related topics. Thus, the results of summative assessment are recorded and used for promotion purposes (Motshekga, 2009). This suggests that teachers teaching Mathematics in the Intermediate Phase may be driven by knowledge experience when assessing learners for progression purposes. Furthermore, Motshekga (2009) articulates in a policy document that formative assessment is used to aid the teaching and learning processes, hence assessment for learning. Moreover, it is the most commonly used type of assessment because it can be used in different forms at any time during a Mathematics lesson e.g. short class works during or at the end of each lesson, verbal questioning during the lesson. It is mainly informal and should not be used for promotion purposes (Motshekga, 2009). Finally, the information provided by formative assessment can also be used by teachers to inform their methods of teaching (Motshekga, 2009). Further to this, Motshekga (2009) articulates that peer assessment actively involves learners in assessment and it is important as it allows learners to learn from and also

reflect on their own performance. Thus, this suggests that attitude experience is essential as well as the better understanding for formative assessment in order to drive teachers teaching Mathematics in the Intermediate Phase. Moreover, teachers teaching Mathematics in the Intermediate Phase may use relevant resources for the content they teach.

2.6.7 With what are they teaching?

Moreover, a critical action research conducted by Khoza (2016) on three curriculum managers who used Moodle (free and open –source learning management system) to manage their school curriculum at a Durban, South Africa. In addition to the above, the purpose of the study was to explore the managers' reflections on their use of visions of Moodle for curriculum management. Moreover, one-on-one semi-structured interviews and focus group discussion were used for data generation. In addition to the above, purposive and convenience samplings were used to select the three most easily accessible participants. Consequently, the study reveals that managers' reflections on curriculum through Moodle suggest new strategies for curriculum management (habitual, opinion, and factual). Furthermore, the study concluded that the managers understood/learned new strategies of managing curriculum through their use of visions for the Moodle. Finally, this article recommends the effective use of new strategies only when there is availability of resources. This further suggests that teachers teaching Mathematics in the Intermediate Phase may employ new strategies so that they are able to use a variety of resources that will enhance the achievement of curriculum goals.

Furthermore, resources are defined as objects and people that communicate learning (Khoza (2012); Irvin and Trimble (2003). Further to this, Khoza (2012) defined resources as anything that facilitates/initiates learning or any person or thing that communicates learning. Further to this, the study by Khoza (2014) further reveals the three levels of resources namely; hard-ware (machine that drive Moodle soft-ware such as computers, laptop, smartphones, and other digital machines), soft-ware (soft-ware that displays information from the hard-ware) and ideological-ware (education/curriculum approaches/theories or visions). This further, suggests that teachers teaching Mathematics in the Intermediate Phase should be knowledgeable and understand the levels of resources that will be effective for the implementation of the intended curriculum and also employ the skill experience in each available level of soft-ware and hard-ware resources at school, because teaching is not only about technology but it is also about

understanding the knowledge experiences. Furthermore, a case study conducted by Shabiralyani, Hasan, Hamad, and Iqbal (2015) using a closed ended questionnaire to collect the required data from the staff and students of the private and public educational institutions of District Dera Ghazi through the SPSS soft-ware, the study revealed that teachers' use of teaching resources of diverse kinds in a classroom make the teaching and learning process more productive. According to McKenney, Nieveen, and van den Akker (2006), during Meso planning (school), teachers make their own collection from the range of accessible educational resources which support day-to-day teaching, like textbooks. In line with this, Joke Voogt, Tilya, and van den Akker (2009) assert that learning resources can be viewed as the carries of the curriculum. Thus, this suggests that teachers teaching Mathematics in the Intermediate Phase should use their skill experience to have ideas of using any available soft-ware, hard-ware, and ideological-ware resources at school.

Moreover, soft-ware resources are defined as those resources that assist hard-ware resources to display information (Khoza, 2013); (Mpungose, 2016). According Fargher (2017) soft-ware resources can be programs written in particular programming languages. The study further asserts that soft-ware resources serve many purposes other than teaching. Instructional soft-ware packages are developed for the sole purpose of supporting instruction and learning. For example, they allow learners to work mathematical problems or answer questions and gain feedback on correctness. This assertion suggests that teachers teaching Mathematics in the Intermediate Phase should apply skill experiences when teaching Mathematics content through soft-ware resources so that they allow learners to use user-friendly tools when learning Mathematics. For instance, PowerPoint slides, calculators, overhead projectors as well as laptops to teach and record tasks. Recording is a process in which the teachers document the level of a learner's competence in specific learning or assessment tasks of Mathematics (Motshekga, 2009). In addition to the above, hard-ware resources may assist teachers to achieve intended curriculum goals when they are used accordingly.

In addition to the above, hard-ware resources are any tools or machines/objects used in education (Khoza, 2013). Howe and Abedin (2013) concur with Kuhn (2015), and Snow (2010) as well as Perry, VandeKamp, Mercer, and Nordby (2002) that learners who are taught skills using hard-ware resources perform better in critical thinking, collaborative problem-solving

and reading comprehension. In line with this, there is robust evidence that demonstrates that the quality of classroom teaching using hard-ware resources has a measurable impact on standards of attainment in Mathematics (Perry et al., 2002). Further to this, the quality of using hard-ware resources in classroom teaching is an important predictor of learners' success (Murphy, 2009). This suggests that teachers teaching Mathematics in the Intermediate Phase should be driven by knowledge experience when using hard-ware resources to teach some Mathematics content. In addition, Mathematics teachers for the Intermediate Phase should be aware that ideological-ware resources should drive any lesson/curriculum in education, because learning is not about technology, but is instead about the ideology behind the learning (ideological-ware) (Amory, 2010).

Furthermore, ideological resources are defined by Mpungose (2015) as the resources that we cannot see and touch in education but still controls our teaching, such as teaching methods (approaches) (teacher-centred, content-centred, and learner-centred). Further to this, ideological-ware resources should be understood as the teachers' internal ideologies that tell the teachers' what to do or not to do in their teaching (Khoza, 2016); (Amory, 2010). This indicates that teachers teaching Mathematics in the Intermediate Phase should be driven by knowledge experience when planning and teaching their lessons in order to accommodate all learners.

In addition to the above, Motshekga (2009) is vocal on the CAPS document about the resources to be used during the Mathematics learning and teaching process. Further to this, Motshekga (2009) states that every learner must have his/her own textbook and schools must make every effort to ensure that the essential equipment is provided such as calculators. In addition to the above, "teachers should ensure that a system is in place for recovering textbooks at the end of every year" (Motshekga, 2009). This suggests that teachers teaching Mathematics in the Intermediate Phase should be driven by knowledge experience to procure and manage the resources for teaching and learning Mathematics, such as resources used to teach measurement (content) and weight, numbers (counting) like 5-6 measuring tapes and good examples of a sphere (ball), rectangular prism (box), cube, core, pyramid and cylinder (Motshekga, 2009).

Furthermore, teachers may make sure that the teaching and learning for Mathematics is accessible to all learners in the Intermediate Phase.

2.6.8 With whom are you teaching? (Accessibility)

Teachers teach learners at school, a learner is described as any person receiving education at school (Mpungose, 2016). Thus, Sebbane (2015), and Berkhemer et al. (2015) as well as Kebande and Venter (2015), describe Mathematics education as one of the national priorities in South Africa. In addition to that, this fact is also highlighted in the number of learners achieving above 50% in Mathematics, respectively (National Planning Commission, Department of the Presidency, Republic of South Africa, 2012). Further to this, in the recently released results of the Trend in International Mathematics study in 2011, South Africa was, as in case of similar studies in the past, placed among the poorest performing countries (Spaull, 2013). Spaull (2013) and Stoll et al. (2015) further assert that some of the current critical challenges faced by teachers in South Africa and many other countries with emerging and developing economies relates to their own lack of accessibility to mathematical knowledge and skills experience required to apply what they know in the classroom. According to Rowland and Ruthven (2011), Coe, Aloisi, Higgins, and Major (2014) as well (Shulman, 1986), it is generally agreed that the quality of teaching depends on the knowledge experience of the teachers in the classroom. This suggests that teachers teaching Mathematics in the Intermediate Phase should be driven by knowledge experience in order to ensure that the mathematical content/lesson are accessed by learners coming from different communities.

Moreover, according to the Phillipson (1996), education for all (accessibility) was proclaimed and education for all means ensuring that all children have access to basic education of good quality. In addition to the above, this is also asserted by Khoza (2016) that creating an environment in school and basic education programmes in which children are both able to and enabled to learn is quite important for teaching and learning. Moreover, Hoadley (2008) issued a framework policy document known as White Paper Six (6) which stresses inclusive education. These studies assert that inclusion is seen as a process of addressing and responding

to the diversity of needs of all learners through increasing access in learning, cultures, and communities, and reducing exclusions within and from education. This suggests that teachers teaching Mathematics in the Intermediate Phase should adhere to their experiences in order to accommodate all learners learning Mathematics in the Intermediate Phase. Moreover, Mishra and Mishra (2013), Bishop (1991), as well as Hogarth and Hilgert (2002) assert that there are three levels of accessibility namely; culture, physical, and financial accessibility.

Furthermore, culture accessibility is defined by Mishra and Mishra (2013) as collective programming of the mind which distinguishes members of one group from another, which is passed from generation to generation. Thus, culture is understood as a product teachers can offer learners and treated as a number of static entities or facts that may be collected, put into proper order and presented to learners one-by-one (Marchetti et al., 2013). In line with this, it is fair to state that the predominant approach to the teaching and learning of culture in the Mathematics classroom is mostly information-oriented (Kumaravadivelu, 2008); (Ahmad, Rajapaksha, Zhang, et al., 2014). Thus, culture includes issues of race, language, religion that affects teaching and learning, and this requires teachers to be aware of their learners' culture (Wegrzyniak, Hedderly, Chaudry, & Bollu, 2018). In other words teachers teaching Mathematics in the Intermediate Phase should be driven by attitude experience to choose the language of teaching and learning Mathematics in the classroom. Steen, Costantino, Shapiro, and Medsger (1990), Loos and Yeo (2014) as well as Ziegler et al. (2010) describe Mathematics as the language and science of patterns which requires teachers to allow learners to bring in their culture during teaching and learning. This suggests that teachers teaching Mathematics in the Intermediate Phase should use attitude experiences in order to maintain and accommodate learners of different cultures during the teaching of Mathematics in the Intermediate Phase. Further to this, parents and the state should ensure that learners access education by providing transport to learners to and from school.

Moreover, Hogarth (2002) defines financial accessibility as a basic money management that includes budgeting, saving, investing, and insurance. Furthermore, financial accessibility is a skill of understanding the financial concepts and risks, motivation, and confidence to apply such skill and understanding in order to make effective decisions across a range of financial context, to improve the well-being of the school community, and to enable participation in

economic life. This suggests that teachers teaching Mathematics in the Intermediate Phase should use their skill experiences in order to assist learners in financial accessibility. Moreover, a qualitative case study conducted by Mokoena (2013) on the implementation of no fee School Policy. The study analysed how schools in the Bolabedu cluster circuit of Mopani District implemented the No Fee Policy regarding the use and management of school finances. Furthermore, four schools (two primary and two secondary schools) were sampled. Further to this, three methods of data collection were used: interviews, document analysis, and observation. Interviews were conducted with school principals, teachers, parents, and learners. Consequently, the study reveals that the government used multi-strategies to provide services to the people, which included consultation with communities for adequate provision of and access to services and resources. In addition to the above, amongst other strategies, it is developed by the South African Schools Act (Act No 84 of 1996) (SASA), National Norms and Standards for Schools Funding (1998), Amended National Norms and Standards for School Funding (2006), School Fee Exemption Policy and No-Fee School Policy (1998) (Karlsson, 2002). Moreover, one of the findings indicates that the school has the potential to improve its capacity to execute its financial responsibility if provided with support. This suggests that teachers teaching Mathematics should be driven by knowledge experience when providing resources to learners doing Mathematics Intermediate Phase and no learners may be suspended from school due to parents failing to pay school fees. In addition to the above, Mathematics teachers may allow learners to have physical accessibility to the school in order to achieve the curriculum goals.

Moreover, Kolbe et al. (2012) concurs with Hannah (2013) when defining physical accessibility as the amount of time students spend in school and impacts students learning and teaching time as well as students achievements. Furthermore, teachers and students should use various modes of transport or walking to school and spend a minimum of seven hours a day from Monday to Friday. Moreover, teachers are expected to provide a quality education for all learners while overcoming challenges such as transportation barriers and a lack of access to needed services such as clinics (Haegel et al., 2017). In addition, learners spend two or more hours a day getting to and from school. In line with this, the time required to go to and from school can reduce opportunities for learners to engage in extra Mathematics lessons. The National Learner Transport Policy was developed in collaboration with the Department of Basic Education (DBE) and other stakeholders and aims to address the challenges of

accessibility and the safety of learners (Peters, 2015). This suggests that teachers teaching Mathematics in the Intermediate Phase may be driven by knowledge experiences to access learners for teaching and learning. In addition to the above, the environment where Mathematics lessons are taking place plays major role when it comes to the accomplishment of the goals of the intended curriculum.

Furthermore, CAPS is vocal about the environment where learners should access education. Further to this, "To address barriers in the classroom, teachers should use various curriculum differentiation strategies"(DBE, 2011, p. 5). This suggests that teachers teaching Mathematics in the Intermediate Phase should be driven by knowledge experience pertaining to the learner accessibility for teaching and learning processes. In addition to the above, CAPS is silent about the cultural accessibility regarding teachers teaching Mathematics in the Intermediate Phase. Thus, this suggests that teachers teaching Mathematics in the Intermediate Phase should bring their attitude experience in order to observe and accommodate different languages, race, and religion for learners. CAPS in the policy document is silent about the financial accessibility. However, the National Norms and Standards for School Funding policy is vocal about the funding of schools (Sayed & Soudien, 2005). Moreover, schools were ranked according to quintiles, poor schools ranked quintile 1, 2, and 3 are declared no-fee schools and are allocated a higher state subsidy than the affluent schools that are declared quintile 4 and 5 (Nkhama, Ndhlovu, Dvonch, Siziya, & Voyi, 2015). This suggests that teachers teaching Mathematics in the Intermediate Phase should be driven by knowledge experience so that all learners will freely access Mathematics education. In addition to the above, the environment where the Mathematics teaching and learning process may play a major role comes to the accomplishment of goals of the intended curriculum.

2.6.9 Location (Where are they teaching?)

Environment is defined by Shellard and Moyer (2002) as the place where learners feel safe when trying to answer questions, make presentations and do experiments. Both Shellard and Moyer (2002) as well as Tofade, Elsner, and Haines (2013) stress that teachers should project a positive attitude about Mathematics, using questioning techniques to facilitate learning, and encouraging learners to develop divergent solutions and inventive ideas that are presented to the whole group. Further to this, these studies emphasised that it is very important to realise

the degree to which teacher behaviours can influence learners' motivation to learn Mathematics. According to Watterston (2012) there are three levels of environment where teachers are able to motivate learners during teaching and learning: online learning, blended learning, and face-to-face learning.

Furthermore, online learning has evolved from web-based, distance learning programs and has come to represent the leading edge in rethinking course design and personalised instruction using content and innovative tools for instructional delivery (Bakia, Shear, Toyama, & Lasseter, 2012). Azevedo, Nguyen, and Sanfelice (2012) conducted a study with the main purpose of examining the evidence of the effectiveness of the online learning by organising and summarising the findings and challenges of online learning into positive, negative, mixed and null findings. Patterson et al. (2016), Roddy et al. (2017) as well as Bhoi, Kumar, and Murthy (2016) asserted that particular attention to the learners' learning and the endogenous issue of learning environment choice, and it is outlined that there is robust evidence to suggest online learning is generally at least as effective as the traditional format. Moreover, the body of literature by Nguyen, Nguyen, Nguyen, Komatsu, and Michiels (2016), Humberg et al. (2017), as well as Bhoi et al. (2016) suggests that researchers should move beyond the no significant difference phenomenon and consider the next stage of online learning. This suggests that teachers teaching Mathematics in the Intermediate Phase should practice skill experience to encourage learners to use the internet to learn Mathematics. Moreover, schools without modern teaching facilities may use face-to-face method to teach Mathematics in the Intermediate Phase.

Moreover, face-to-face learning teachers are able to introduce a significant degree of local interpretation for imported educational material. Moreover, Miliszewska (2007) and Solak and Cakir (2014) declare that being in close contact with learners, they are in a position to know how much local contextualisation these materials may require and can achieve a balance in the use of various types of material according to student's level, interest, language skill, and so on. Further to this, Miliszewska (2007) states that the relationship between learners and face-to-face teachers is crucial in making foreign materials relevant to learners. Moreover, Machaba (2013) and Mupa and Chinooneka (2015) outline that teachers should conduct teaching of Mathematics in Intermediate Phase in a limited areas like the classrooms (face-to-face)

environment. This suggests that teachers teaching Mathematics in the Intermediate Phase should be driven by knowledge experiences when unpacking the maths content in the classroom in order to allow learners gain clarity where they do not understand. Furthermore, teachers teaching Mathematics in the Intermediate Phase should design the activities that will lead to the accomplishment of the curriculum goals. In addition to the above, teachers teaching Mathematics in the Intermediate Phase should integrate face-to-face and online learning when teaching Mathematics in order improve their teaching and to attain curriculum goals (Gill & Scharff, 2013).

In addition to the above, blended learning combines teaching and learning methods from face-to-face, mobile, and online learning and it includes elements of both synchronous and asynchronous online learning options (Watterson, Kobe, & Young, 2012); (Kristanto, Mariono, & Nuryati, 2018). Furthermore, blended learning should be viewed as a pedagogical approach that combines the effectiveness and socialisation opportunities of the classroom with the technologically enhanced active learning possibilities of the online environment, rather than a ratio of delivery modalities (Moskal, Dziuban, & Hartman, 2013). This suggests that teachers teaching Mathematics in the Intermediate Phase should use skill experience to apply different teaching strategies in Mathematics.

Moreover, Motshekga (2009) articulates that teachers have a responsibility to make sure that they make the learning environment as conducive to learning and teaching as possible. Further to this, the learning environment promotes interpersonal cooperation, classroom and school culture, protection against harassment and mental harm, and effective communication (Motshekga, 2009). Thus, this suggests that teachers teaching Mathematics in the Intermediate Phase should consider the environment where the teaching and learning process is taking place and should ensure that the environment is enhancing and promoting quality teaching and learning of Mathematics. Finally, teachers may design the activities that may stimulate the passion for Mathematics and lead to the accomplishment of the aims and objectives for the designed curriculum.

2.6.10 How are you teaching? (Activities)

Allen and Hoekstra (2015) concurs with Willms, Friesen, and Milton (2009) in describing learning activities as the experiences that learners need in order to have particular behavioural competences and articulating that effective teaching practices centre on the importance of learning opportunities that are thoughtfully and intentionally designed to engage learners both academically and intellectually. There are three levels of learning activities namely teacher-based, content-based, and learner-based activities (Mpungose, 2016); (Li, Liu, & Zhao, 2016).

Furthermore, Small and Pai (2010) as well as Cenoz (2015) define a content-based activity as a teaching and learning activity in which teaching is organised around the content or information that learners are made to focus on learning. For instance, learners learn about the topic using the content (Mathematics) they are trying to learn, rather than their native language, as a tool for developing knowledge and content ability in the target content. Further to this, this teaching and learning activity is thought to be a more natural way of developing content ability and one that corresponds more to the way we originally learn the mathematical language (Baya'a & Daher, 2009). Moreover, content-based activities are considered an umbrella term for activities that combine language and content learning aims even though there are differences in the emphasis placed on the language and content and there are also alternative forms of content-based activities for teaching and learning depending on the educational level, and the organisation of the curriculum and the emphasis placed on Mathematics (Genesee & Lindholm-Leary, 2013; Stoller, 2008).

Furthermore, Puderbaugh (2015) concurs with Lak, Soleimani, and Parvaneh (2017) in describing teacher-based activities as a style of instruction that is formal, controlled, and autocratic in which the instructor (teacher) directs how, what, and when learners learn and the emphasis is on the acquisition of knowledge. This suggests that teachers teaching Mathematics in the Intermediate Phase should be driven by attitude experience when practicing this style of instruction/approach. In other words, teachers should design and choose their own activities at Meso level (school) for curriculum implementation (Van den Akker, Gravemeijer, & McKenney, 2006). The teachers teaching Mathematics should also design activities that will be learner-based so as to provoke critical thinking, innovation, and creativity and encourage learner autonomy (Chow et al., 2011).

In addition to the above, Froyd and Simpson (2008) concur with Tan and Barton (2010) that learner-based activities are taken as an instructional approach in which learners influence the content activities, material, and pace of learning. Moreover, learners are expected to strive to make sense of what they are learning by relating it to prior knowledge and by discussing it with others. In line with this, learners play a significant role in designing their own curriculum. This suggests that teachers teaching Mathematics in the Intermediate Phase should be driven by skill experience to allow learners to demonstrate their competency and to accommodate those who are struggling by giving them individual attention or support.

Furthermore, CAPS is vocal a about the activities to be performed by teachers during teaching and learning process in order to comply with the mission of the intended curriculum. Further to this, "each content area contributes towards the acquisition of specific skills" (Motshekga, 2009). Further to this, Motshekga (2009) articulates that the activities should be learner-based since will enable learners to become competent, confident and critical readers. Thus, suggests teachers teaching Mathematics in the Intermediate Phase should be driven by skill experience when teaching and designing their activities. Consequently, their activities should be content-based and learner-based and should emanate from the textbooks in order to improve the curriculum implementation.

CHAPTER THREE

Research design and methodology

3.1 Introduction

The previous chapter, the reviewed literature, indicated the studies conducted in connection with teachers' experiences of teaching of Mathematics in the Intermediate Phase. The literature review (Chapter 2) outlined the issues connected to the curriculum such as enacted curriculum, assessed curriculum and the intended curriculum, levels of curriculum, and ten concepts of the curricular spider-web as the conceptual framework, South African Mathematics curriculum since 1994 to date and the position of CAPS in relation with its implementation.

Thus, this study aims to explore the teachers' experiences of teaching Mathematics in the Intermediate Phase through the following objectives:

- To explore teachers' experiences of teaching Mathematics in the Intermediate Phase.
- To understand the reasons of teachers' experiences of teaching Mathematics in the Intermediate Phase.

The study seeks to attain the above objectives by answering the following questions:

- What are the teachers' experiences of teaching Mathematics in the Intermediate Phase?
- Why teachers' experiences of teaching Mathematics in the Intermediate Phase are in a particular way?

Furthermore, this chapter outlines and discusses the procedures to be followed in designing the study and the methodology (qualitative research approach). These procedures consist of research paradigm (interpretive paradigm), research style (case study), sampling (convenience and purposive), data generation methods (one-on-one semi-structured interviews, focus group interview, and document analysis), trustworthiness/authenticity (credibility, dependability, transferability, conformability), data analysis (guided analysis), ethical issues, and study limitations. Further to this, research design is defined as plan or strategy which moves from the underlying philosophical assumptions to specifying the selection of respondents, the data

gathering techniques to be used and the data analysis to be done (Maree, 2015). Additionally to the above, this definition concurs with Parker-Jenkins (2018) that research design is a plan for, and foundation of, approaching, operationalising, and investigating the research problem or issue, setting out the approach, theory/ies and methodology/ies to be employed, the type of data required, how they will be generated (instrumentation), and from whom (the population and/or sample), how the data will be analysed, interpreted and reported, the warrants to be adduced to defend the conclusions drawn and the degree of trust that can be placed in the validity and reliability of each element of the research and the sequence of the research. Headey, Scott, and De Vaus (1999) contend that the research design functions is to ensure that the evidence that research obtains, enables them to answer the initial question as unambiguously as possible and to indicate the kind of evidence required to answer the research questions. Hence, this chapter seeks to describe the logical details of the research strategies employed to address the research objectives and questions mentioned above. See figure 3.1 overleaf /below which summarises the research design and methodology

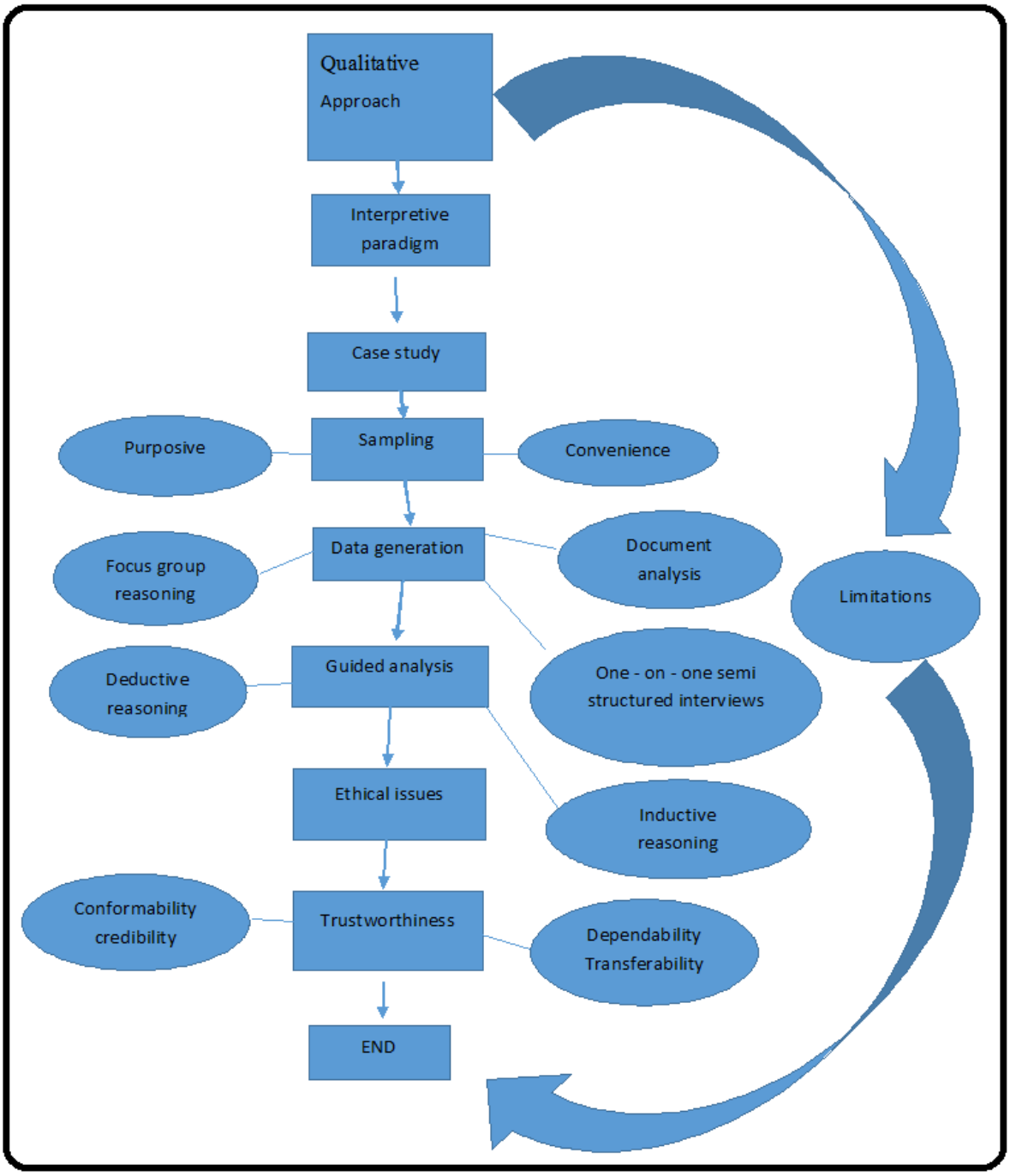


Figure 3.1 summary of a research design and methodology

3.2 Research paradigm

Avenier and Thomas (2015) define paradigm as a set of assumptions or beliefs about fundamental aspects of reality which gives rise to a particular world view. This description of paradigm is in line with the definition by Parker-Jenkins (2018) that a paradigm is a way of looking at or researching phenomena, a world view, a view of what counts as accepted or correct scientific knowledge or way of working, an accepted model or pattern. Thus, this suggests that a paradigm is a determined avenue used to generate and interprets the findings. Moreover, Maree (2015) further asserts that paradigm addresses fundamental assumptions taken on faith, such as beliefs about the nature of reality (ontology) the relationship between knower and known (epistemology) and assumptions about methodologies. Further to this, Lincoln and Guba (1985) point out that paradigms represent what we think about the world (but cannot prove), our actions in the world, including the actions we take as inquiries cannot occur without reference to those paradigms. Thus, this suggests that paradigms serve as the lens or organising principles by which reality is interpreted (Maree, 2015).

In addition to the above, Lather (2004) sets out four paradigms: positivism, interpretive, critical, and deconstruction. These different paradigms drive the research on their own since research is driven by the purposes of the research (Parker-Jenkins, 2018). Furthermore, in positivism only objective, observable facts can be the basis of science; in the interpretive paradigm people are deliberate and creative in their actions, they act intentionally and make meanings in and through their activities; critical paradigm is concerned with the critical meanings of experiences as they relate to gender, race, class and other kinds of social oppression; and deconstruction is mainly applied in the field of languages and linguistic (a relative of postmodernism).

Furthermore, this study employed the interpretive paradigm because I wanted to understand and explore the teachers' experiences of teaching Mathematics in the Intermediate Phase and use the research paradigm (technique) which would enable me to understand how teachers teaching Mathematics interpreted and implemented the intended curriculum in classrooms. In addition to that, also understood assumptions why they were not executing their duties that were expected. I would subjectively explore their experiences on the basis of their knowledge, skills, and attitudes in the teaching of Mathematics in the Intermediate Phase. The findings for

this study enabled me to draw conclusions in connection with teachers' experiences of teaching Mathematics in the Intermediate Phase since the success of my study depended on my participants.

According to Draper and Smith (2014), interpretivism is defined as an approach that looks for meaning and motives behind peoples' actions like experiences. Further to this, interpretive paradigm is a view of social science, a lens through which you examine the practice of research (Parker-Jenkins, 2018). Moreover, Confait (2018) describes the importance of interpretive paradigm as an approach which opens a space for sharing the rigour of the natural sciences and the concern of social sciences to describe and explain human behaviour, as it emphasises how people differ from inanimate natural phenomenon and indeed, from each other. As a result, I chose interpretive approach because I wanted to share the rigour of the natural sciences, the concern of social science, and describe and explain the human experiences for the teachers teaching Mathematics in the Intermediate Phase. I used this paradigm because it gave me richest and in-depth of the exploration of the phenomenon (experiences). Moreover, one of the limitations of the interpretive paradigm is that findings are not generalised to a wider population. Thus, I managed to overcome this limitation by ensuring transferability in this study. As a result, interpretive paradigm seeks the importance of the methodological approach.

3.3 Methodological approach (qualitative approach)

Furthermore, this study adopted a qualitative approach with an intention of seeking knowledge, exploring, and understanding the experiences of teachers teaching Mathematics in the Intermediate Phase. In addition to the above, Hammersley (2013) concurs with Maree (2015) in defining qualitative approach as a form of social inquiry that tends to adopt a flexible and data-driven approach, to use relatively unstructured data, to emphasise the essential role of subjectivity in the research process, to study a number of naturally occurring cases in detail, and to use verbal rather than statistical forms of approach. Moreover, the main goal of qualitative approach is to explore and understand central phenomenon, which is the concept or process explored in a qualitative approach study (Maree, 2015). Furthermore, Ndoziya (2014) outlines the strength of a qualitative approach that provides an in-depth, intricate, and detailed understanding of meanings, actions; non-observable as well as observable phenomenon, attitudes, intentions, and behaviours, and these are well served by naturalistic enquiry. Thus,

the rationale for choosing this approach was to explore the experiences (non-observable phenomenon) of the teachers teaching experiences in the Intermediate Phase in order to gain an in-depth understanding of their experiences that influence their teaching.

Moreover, I distributed the copies of an interview questions to the participants and asked the questions sequentially but what was common to participants was that were not driven by the professional and personal rationale instead were driven by societal rationale. Furthermore, in question two the participants were knowledgeable about the three propositions of resources after unpacking the concept of ideological resource which they did not understand. I further gave clarity on question three which they did not understand. Furthermore, they did not understand online and blended learning then I supposed to clarify, but it was transpired that were not aware about it. However, in some questions were responding with confidence.

Moreover, Zheng et al. (2017) concurs with Queirós, Faria, and Almeida (2017) when outlining the strengths of the qualitative approach as eliciting deeper insights into designing, administering, and interpreting assessment and testing, and exploring test-takers behaviour, perceptions, feelings, and understanding. Thus, I interacted with teachers by interviewing them about how they impart knowledge and skills to learners as well as how they implement CAPS in their Mathematics classrooms, their rationale for teaching Mathematics, resources used for teaching, how they conduct assessment, their roles when teaching Mathematics, the content they teach, time they use to teach, how are they teaching, where are they teaching (location), and towards which goals are they teaching Mathematics in the Intermediate Phase? Moreover, this assisted me to have a deeper insight of their experiences during teaching and learning of Mathematics in Grade 4-6. Further to this, Weiss (2018), and Creswell and Clark (2017) in identifying the weakness of the qualitative approach such that it produces findings not arrived at by statistical procedures or other means of quantification. Additionally to the above, I overcame this weakness by using the guided analysis to analyse data generated from the participants because Padgett (2016) and Creswell and Clark (2017) outline that qualitative approach is interested in analysing subjective meaning. In other words, qualitative approach helped me to produce the thick (detailed) description of participants' feelings, opinions, and experiences, and interpreted the meanings of their actions. I employed the research style that provided me with a unique example of real people in real situations, enabling readers to

understand ideas more clearly than simply by presenting them with abstract theories or principles (Yin, 2009).

3.4 Research style (case study)

Furthermore, this study adopted the case study as a research style. Further to this, (Yin, 2017) defines case study as a single instance of a bounded system. In addition, Abidin and Pasquire (2007) concurs with Sartory (2014) in defining case study as an in-depth exploration from multi-perspective of the complexity and uniqueness of a particular project, policy, institution, programme or system in a real life. Moreover, Kohlbacher (2006b) and Parker-Jenkins (2018) outline three types of case studies namely intrinsic, instrumental, and collective case study. Moreover, intrinsic case study is the study that is undertaken in order to understand the particular case in question, instrumental case study is the study that is examining a particular case in order to gain insight into an issue or a theory, and a collective case studies are the group of individual studies that are undertaken to gain a fuller or more general picture.

Thus, this study employed an instrumental case study because I wanted to gain an in-depth understanding about the experiences of teachers teaching Mathematics in the Intermediate Phase. Additionally to the above, Wellington (2015) asserts the strength of a case study in that they are illustrative and illuminating, accessible, and easily disseminated, hold the reader's attention, and provide vivid accounts that are based on reality. This is in line with Yin (2009) when stating the strength of a case study in that it helps to generalise to a broader theory which can be tested in one or more empirical cases and can be shown not to support rival, even if applausabe theories.

Furthermore, both Wellington (2015) and Queirós et al. (2017) state that one of the case study's limitations is that it is not replicable, may not be a representative, typical, or generalisable. As a result, I chose a case study of three teachers teaching Mathematics in the Intermediate Phase in my school because they were easily accessible and convenient, and they drew the readers' attention since the participants brought with them vivid accounts on their teaching experiences

which were strong on reality. Thus, the case study was the most appropriate for this study because the findings were not generalised since the population sample was too small but the teachers may refer to the findings for their own context. Finally, the successfulness of my study was characterised by fruitful data generation methods.

3.5 Data generation method

Data generation is a process whereby the researcher applies the research methods and techniques to generate the necessary information (Guthrie, 2010; Ritchie, Lewis, Nicholls, & Ormston, 2013). This study adopted three data generation methods namely; one-on-one semi-structured interviews, focus group interviews, and document analysis. In addition to the above, (Gandomi & Haider, 2015; Peersman & Wagner, 2014; Yin, 2017) demand a researcher have the ability to handle and synthesise many kinds of data simultaneously, and the diverse data provide the evidence needed for the researcher to draw conclusions, the evidential chain of evidence that gives credibility, reliability, and validity to the case study. Moreover, the data were generated through the use of the above-mentioned data generation methods. Thus, some data generated through focus group interviews help researchers to generate useful and usable data (Parker-Jenkins, 2018).

3.5.1 One-on-one semi-structured interviews

One-on-one semi-structured interviews are viewed as the appropriate data generation method for this study because they give freedom to participants to respond freely without intimidation and also allow the participants to ask for clarity when there is necessity (Bruhjell, 2016). Further to this, Brandenberg, Kay, Maxwell, and Cotter (2004) outline that semi-structured interviews empower the participants, allow free interaction between interviewer and interviewee, allow opportunities for clarifications so that relevant data is captured, offers researchers access to people's ideas, thoughts, and memories in their own words, rather than in the words of the researcher, and maximise description and discovery. Hofisi et al. (2014), and Creswell and Clark (2017) assert that in a semi-structured interview the researcher has list of question or fairly specific topics to be covered, often referred to as an interview guide, but the interviewee has a great deal of leeway in how to reply. As a result, I used the list of questions and used sub-questions as displayed on the table 3.1 below and its expected experiences.

Table 3.1: concepts, questions and expected responses.

	Concepts	**Questions**	**Teachers are expected to reflect based on:**
1.	Rationale	Why are you teaching mathematics CAPS?	Question one expected to generate the teachers answers on why they were teaching mathematics CAPS as framed by the three propositions as personal, social and content rationale
2.	Accessibility	Who is teaching mathematics in the intermediate phase?	Question two teachers were expected to respond on accessibility which was divided into physical, financial and cultural access as proposed.
3.	Goals	Towards which goals are you teaching mathematics in the intermediate phase?	Question three teachers were expected to respond on goals reflecting on aims, learners' outcomes and objectives.
4.	Content	What content are you teaching mathematics in the intermediate phase?	Question four teachers were expected to provide responses on the basis geometry, data handling and measurements.
5.	Teaching Activities	Which activities are you using to teach mathematics in the intermediate phase?	Question five teachers were expected to respond on teaching activities which were divided into teacher – centred, content- centred and learner – centred.
6.	Teaching role	How do you perceive your role as a mathematics CAPS teacher in the intermediate phase?	Question six teachers were expected to respond on the basis of three propositions classified into moderator, leader and facilitator.

7.	Resources	What material are you using to teach mathematics in the intermediate phase?	Question seven teachers were expected to respond on hardware, software and ideological resources.
8.	Time	When are you teaching mathematics in the intermediate phase?	Question eight teacher were expected to respond on three levels of time namely school time, extra time and instructional time.
9.	Environment (LOCATION)	Where are you teaching CAPS Mathematics in intermediate phase?	Question nine teachers were expected to respond on the basis of three propositions of environment (location) which are face to face, online and blended learning.
10.	Assessment	How are you assessing learners in Mathematics CAPS in the intermediate phase?	Question ten teachers were expected to provide responses on the basis of three propositions of assessment which are summative, formative and, peer assessment.

In addition to the above, Hofisi et al. (2014) opines that one-on-one interviews offer the possibility of modifying responses and investigating underlying responses. Thus, I was friendly and approachable and created a welcoming and a relaxed atmosphere during the interview process. Further to this, I encouraged teachers to talk freely and drove the discussion/interview towards their experiences on the teaching of Mathematics in the Intermediate Phase. In addition to the above, the questions were well planned in order to save time. Furthermore, the interviews were conducted, depending on participants' availability, during lunch time and after school in order to avoid the disruption of classes.

Moreover, each participant was afforded forty (40) minutes to respond and their responses were recorded through cell phone and later transcribed into text for later analysis. Refreshments were served, such as cakes and juice, in order to create a friendly climate. I was mindful of the potential weaknesses indicated by Gueguen et al. (2016) and Anaraki-Ardakani (2017) assert the weaknesses of the one-on-one semi-structured interviews as follow: interviewing skills are

required, need to meet sufficient teachers in order to make general comparisons, preparation must be carefully planned so as not to make the questions prescriptive or leading, time consuming and resource intensive, and the interviewer must be able to ensure confidentiality, and it invades privacy. Thus, I surmounted these challenges by being punctual in order to save time, observed the sense of confidentiality during and after the interview process.

3.5.2 Focus group interview

Furthermore, Maree (2015) defines the focus group interview as a strategy based on the assumptions that group interaction will be productive in widening the range of responses, activating forgotten details of experiences, and navigating inhibitions that may otherwise discourage participants from disclosing information. Further to this, the description of Smithson (2000) and Hydén and Bülow (2003) is in line with the one of Du Plessis (2013) in that focus group interview is a form of group interview in which reliance is placed on the interaction within the group, which discusses a topic supplied by the researcher and yielding a collective rather than an individual view. As a result, I organised a meeting for teachers teaching Mathematics in the Intermediate Phase (the ones participated in one-on –one semi-structured interviews) where I informed them about my study and its purpose. I requested that they participate in a focus group interview. In addition to the above, I informed them about the venue, time, and the date. I encouraged them to participate fully during the discussion session. Moreover, I asked the participants to treat me as a researcher not as their supervisor at work and our discussion was not for judgmental purposes.

I was so mindful about the disadvantages of focus group interview asserted by, Kruger (1994) and Du Plessis (2013) as it allows to explore topics (experiences) and to generate data, it is comparatively easier to drive or conduct and it takes effort to assembly the group and the researcher has less control over the data that are generated. As a result, I did manage to overcome such challenges as I was present during the discussion session and guided the group. I kept them to the focus of the exploration of teachers' experiences of teaching Mathematics in the Intermediate Phase. Thus, the discussion was fruitful as all participants understood the questions and were co-operative in producing the evidence on the content of their files to be analysed.

3.5.3 Document analysis

Furthermore, document analysis is a strict and systematic set of procedures for the rigorous analysis, examination, replication, inferences, and verification of the content of written data (Brown, 2013; Souto-Manning, 2012). Moreover, I evaluated and checked their lesson plans using their files and the Mathematics CAPS policy document that are they in line with the content they are teaching, the forms of assessment they are using to assess their teaching, and whether goals are in line with CAPS. However, the learning outcomes are stated as skills and aims are not appearing, the duration for each lesson is stated, the lesson plan is emanating from annual teaching plan and the CAPS document was available. Finally, the resources used for teaching and learning were mentioned in each lesson. In fact, most documents touching on the curricular spider-web concepts were attached and consulted during lesson preparations. In addition to that, Ahmed (2010) and Bowen (2009) define document analysis as a strict and systematic set of procedures for the rigorous analysis, examination, replication, inferences, and verification of the content of written data. Further to this, both Gaborone (2006) and Maree (2015) state that the documents are produced by the teachers in the course of their everyday practices and are geared exclusively for their own immediate practical needs. As a result, in conducting document analysis, I requested the teachers' files in order to analyse their content.

Moreover, Ahmed (2010) and Maree (2015) assert the weakness of documents as the version available is derived from a dubious, suspicious, or unreliable source and document does not make sense or has obvious errors and tries to illuminate ways in which the dominant forces in society construct versions of reality that favour their interests. Eventually, I overcame such challenge by scrutinising teachers' files by checking the Head of Department or Principal's signature and the school stamp, thereafter that document was regarded as authentic and was analysed for data generation and the sense of transparency was observed in terms of data generation in ensuring the validity of the findings. Further to this, the correct sampling methods were applied.

3.6 Sampling

Both Benestan et al. (2015a) and (Cohen, 2011) describe sampling as the process used to select a portion of the population of the study. In addition to the above, Cohen (2011) and Silverman

(2015) categorise non-probability sampling into two, namely purposive and convenience sampling. Purposive sampling is described as those participants who are selected because of defining characteristics that make them the holders of data needed for the study (Silverman, 2015; Teddlie & Yu, 2007). Further to this, purposive sampling uses the judgment of an expert in selecting cases or it selects cases with a specific purpose in mind (Neuman & Simmons, 2000).

Thus, three participants were selected because of their defining characteristics, specifically, teaching Mathematics in the Intermediate Phase in our school and the study is about experiences of the teachers teaching Mathematics in the Intermediate Phase. In addition to the above, they were purposively selected because they are the only three educators teaching Mathematics in the Intermediate Phase. Further to this, the participants were purposively selected because they have five years and above experience in teaching Mathematics in the Intermediate Phase.

Convenience sampling is described as the method when population elements are selected based on those who are easily and conveniently available (Parker-Jenkins, 2018; Silverman, 2015). Thus, this study adopted and employed convenience sampling methods because I wanted to explore the experiences of teachers teaching Mathematics in the Intermediate Phase and they were the nearest participants to serve in this study and they were easily accessible for data generation. In addition to this, I conveniently selected participants because it was inexpensive and quick to access them. Moreover, the environment in which this study took place was specifically at a primary school in Nongoma. Finally, the sample was constituted by three teachers teaching Mathematics in the Intermediate Phase.

3.7 Data analysis

Furthermore, Schwandt (2014) and Padgett (2016) define data analysis as an activity of making sense of interpreting and theorising data that signifies a search for general statements among categories of data. However, the common criticism of a qualitative research was that data analysis was not made explicit or open to inspection (Neuman & Simmons, 2000). Further to this, this study adopted the guided analysis because its analysis arises from both the theory and

the data. Both, Rahman et al. (2015) and Delcroix et al. (2016) categorise qualitative data analysis into two approaches namely; deductive and inductive reasoning. Moreover, deductive reasoning is a theory testing process which commences with an established theory or generalisation and seeks to see if the theory applies to specific instances (Delcroix et al., 2016; Godfray et al., 2010). However, inductive reasoning is described as the theory that entails the use of existing knowledge or observations to make predictions about novel cases (Rahman et al., 2015).

Parker-Jenkins (2018) describe deductive reasoning as theory based on syllogism consists of a major premise pro-priori or self-evident proposition, a minor premise providing a particular instance, and a conclusion. Further to this, inductive reasoning was used to analyse the data generated through one-on-one semi-structured interviews, focus group interview as well as from document analysis in order to draw the conclusions. Categories were established and outlined for the data required by inductive reasoning. Further to this, I employed the guided analysis approach by applying the concepts of the curricular spider-web as the conceptual framework in order to categorise the generated data. In addition to the above, open coding was established and utilised to categorise, and searching the relationships and patterns in the data became relevant.

Furthermore, Parker-Jenkins (2018) describes open coding as simply a new label that the researcher attaches to a piece of text to describe and categorise that piece of text and it generates categories and defines their phenomenon (experiences) and dimensions. As a result, guided analysis was employed to code participants' responses that helped me draw the final outcomes for this study. Thus, conclusions were drawn after the reduction of data was practiced (Christiansen, Paulsen, Bruun, Pedersen, & Richelsen, 2010). Eventually, the data generated from one-on-one semi-structured interviews, focus group interviews, and data analysis was then read, the notes were taken, and the new themes were established to assist to constitute categories of data into topics. Thus, I was able to draw the conclusions based on the evidence and the empirical information. I ensured that the copies for ethical clearance were given to the participants in order to give them an assurance that their rights were protected.

3.8 Ethical issues

Furthermore, Martin and White (2003) concur with Cohen and Levinthal (2000) that ethics are defined as a matter of principled sensitivity to the rights of others. Further to this, I considered and prioritised the Participants' rights and preserved their dignity as human beings. I applied for and was granted a clearance certificate by the UKZN Ethics Committee and the KwaZulu-Natal Department of Education to conduct my study. Moreover, I followed the stated ethical guidelines, I wrote letters to the participants and contacted them telephonically to ask the teachers teaching Mathematics in the Intermediate Phase to participate in my research study. In addition to the above, participants agreed, and I outlined the rationale for my study, informed them in writing and by the word of mouth of their rights and to confidentiality, anonymity, and about their voluntary participation.

Finally, I made them aware that they were free to withdraw consent and their participation forms at any time and their right to privacy was guaranteed by using pseudonyms instead of their actual names. Furthermore, in Section 9 (3) of the bill of Rights, Kung, Schmidt, Ebling, and Hu (2007) state that no person may be discriminated against, therefore I made sure that the participants' rights were not infringed upon during the research process. Moreover, Kheswa (2015) asserts that the researcher should ensure that participants are not exposed to any undue physical or psychological harm. However, Fain (2017) indicates that both researcher and participants must have a clear understanding regarding the confidentiality of the results and findings of the study. Thus, participants were told that they were at liberty to phone the UKZN research office to find out about my study and could sue me if the generated data would be used for any reasons other than this study. They were also informed that the audio recordings would be kept in a safe place and would not be disclosed to anybody.

3.9 Trustworthiness

Furthermore, Rolfe (2006) describes trustworthiness in a qualitative research as a matter of persuasion whereby the researcher is viewed as having made those practices visible and therefore auditable. However, Lincoln and Guba (1985) defines trustworthiness as a way in which the researcher is able to persuade the audience that the findings in the study are worth

paying attention to and that research is of a high quality. Further to this, paying attention to the following dimensions will increase trustworthiness in a qualitative study such as credibility, transferability, dependability, and conformability (Lincoln & Guba, 1985). Thus, I ensured trustworthiness of this study by observing the afore-mentioned dimensions without fail.

Moreover Brenner (2009) describes dependability as the degree to which the reader can be convinced that the findings did indeed occur as the researcher says they did. Nevertheless, Cohen (2011) describes dependability as the consistency of research findings. In addition to the above, I used a cell phone to record the participants during the one-on-one semi-structured interviews and focus group discussion that served as evidence that interviews did take place and I was bias free in terms of the findings and time allocation respond to questions, all participants were afforded forty minutes to answer questions. Eventually, the questions asked were CAPS-based on the teaching of Mathematics in the Intermediate phase. After that, credibility as a trustworthiness dimension was ensured.

Furthermore, Mayan (2016) defines credibility as an accurate presentation of a particular context or event as described by the researcher. However, Brenner (2009) describes credibility as the assurance that the researcher's conclusions stem from the data. Further to this, I made sure that the generated data is believable and receive credibility to the reader by providing the evidence and data analysis in order to confirm that there were no distinctions in findings. In addition to the above, I also involved my supervisor to assess my interview questions and listened carefully to interviewees when they were responding to questions for validity purposes. Thus, I used more than one method to generate the data. Moreover, Brenner (2009) defines transferability as the degree to which generalisation can be made from the data and context of the research study to the wider population and settings. In addition to the above, it is regarded as the way in which the reader is able to take the findings and transfer them to other contexts (Cohen, 2011). Thus, I enriched transferability by ensuring that the precise findings of the study are beneficial or practicable to other teachers who were not included but also teach Mathematics in the Intermediate Phase. Moreover, Shenton (2004) concurs with Creswell (2014) that conformability is the extent to which the research findings reflect the experiences and the ideas of participants. Further to this, Chukwuma and Adebisi-Fagbohungbe (2015), and Smith and Frenkel (2005), suggest that for the data to suit conformability there must be

evidence after the data have been generated, categorised, reconstructed, and interpreted. Thus, I ensured that research questions for participants were relevant and well phrased to answer significant research questions.

3.10 Limitations and possible problems

Due to the fact that I am the supervisor of the participants at work that caused the participants to feel uncomfortable during the interview process because they thought it was done for evaluation, developmental, and judgmental purposes. I humbled myself to the participants. Further to this, I tried to relax the atmosphere by humbly welcoming them before the interview process commenced. Further to this, like most of the qualitative research studies the sample size is too small. Thus, its findings could not be generalised to the broader context. Further to this, findings were subjective and personal. Therefore, I conquered this challenge by recording the interviews and transcribing audio into text in order to have essential information pertaining to this study ready at all times.

3.11 Conclusion

This chapter (Research design and methodology) has unfolded the main aspects of this study namely; research paradigm, methodological approach, research style, data generation methods, sampling data analysis, ethical issues, trustworthiness, limitations, and possible problems.

Thus, the following chapter will focus on the data analysis of the generated data through the described research method. Further to this, the main focus of the following chapter is to address the research findings through discussions that follow the data analysis outlined at the beginning of this chapter.

CHAPTER FOUR

Research Findings and Discussions

4.1 Introduction

Chapter Four focuses on the analysis of data obtained by using data generation methods described in Chapter Three, namely; one-on-one semi-structured interviews, document analysis, and focus group discussion. It also represents the key findings from the data within the conceptual framework. Further to this, the purpose is to expedite presentation and discussion to be further discussed on the next chapter and the data was coded. Furthermore, the data were generated from the three teachers teaching Mathematics in the Intermediate Phase from the same school. Further to this, this chapter will enable me to interpret the findings and delineate the teachers' experiences of the teachers teaching Mathematics in the Intermediate Phase and from the three levels of curriculum which are regarded as intended curriculum (curriculum as a plan), enacted curriculum (curriculum in practice) and assessed curriculum (curriculum as achieved). This chapter is still guided by the following research objectives and questions:

- To explore teachers' experiences of teaching Mathematics in the Intermediate Phase.
- To understand the reasons of teachers' experiences of teaching Mathematics in the Intermediate Phase.

Moreover, data generated were based on the research questions below:

- What are the teachers' experiences of teaching Mathematics in the Intermediate Phase?
- Why teachers' experiences of teaching Mathematics in the Intermediate Phase are in a particular way?

The data generated from the three Participants were classified into themes. Further to this, the ten themes as well as three categories for each theme were developed according to teachers' experiences teaching Mathematics in the Intermediate Phase:

Theme One: Rationale (Why are you teaching Mathematics?)

Theme Two: Resources (With what are you teaching?)

Theme Three: Assessment (How do you assess teaching?)

Theme Four: Content (What are you teaching?)

Theme Five: Accessibility (With whom are you teaching?)

Theme Six: Teachers' role (How do you facilitate teaching?)

Theme Seven: Environment (Where are teaching?)

Theme Eight: Time (When are you teaching?)

Theme Nine: Activities (How are you teaching?)

Theme Ten: Goals (To which goals are you teaching?)

4.2 Findings and discussions

4.2.1 Theme: 1 Rationale

Why are you teaching Mathematics?

The Participants had to respond to the above asked question in order to reflect on the three levels of rationale namely; personal, societal, and professional. The following are direct quotes from the three Participants, all from the same school (Holinyoka primary). Further to this, the Participants are Participant 1, Participant 2, and Participant 3.

Participant 1 said: "*I have passion for Mathematics particularly when I am teaching young children, the community members are praising and preaching the good gospel about the way I teach Mathematics because learners are not struggling in counting the change when are buying and selling (the parents acknowledge the skills demonstrated and applied by learners in the community) and I am not qualified to teach to teach Mathematics but there are Mathematics modules in my academic record that accredit me to teach Mathematics."*

However, Participant 2 stated: "*I teach Mathematics because it teaches me to listen, communicate and think reasonably by applying the Mathematical knowledge… the society enjoys the teaching of Mathematics because the learners apply the Mathematical skills at homes when doing homework like digging holes for the fence and I am not qualified to teach Mathematics but I am teaching it because there is no one who can teach and I do have a standard eight Mathematics background."*

Whereas, Participant 3 asserted: "*I have an interest and passion for Mathematics since I do not want Mathematics to evaporate in my head, Mathematics talks about real life things in the society like road signs and addresses society problems such drawing and measuring their sport fields accurately and I do not have a qualification to teach Mathematic but I did learn Mathematics in matric and passed it with symbol D."*

Personal rationale

The data generated from Participants 1 and 3 suggest that Mathematics teachers were driven by a great passion for the subject (Mathematics) especially for teaching young learners and of which may also instil that passion to the learners because teachers have also displayed the positive attitude towards the subject. For instance, all Participants agreed with Participant 1 who said: "*I have a passion (intrinsically motivated because I prepare myself in time and record are always up to date) for Mathematics particularly when I am teaching young children…"* This suggests that all teachers were driven by the personal rationale; the love of teaching Mathematics. These findings are in line with what is asserted by Lopez (2009) and Snoek et al. (2015) who assert that the personal rationale plays an important role in the teaching of Mathematics because it establishes lifelong learning habits, encompassing continuing professional development, and provides a mechanism for monitoring career-related capabilities to prepare for seeking professional practice and also builds self-confidence. Further to this, teachers that are driven by the personal rationale are committed to creating an effective learning environment and increase learners' learning potential. Personal rationale contributes to creativity, thus teachers are committed to the schools they work for and good educational achievement is a good result of this commitment (Serin, Serin, Horzum, & Celik, 2005). This suggests that teachers were much more informed by personal experience since they were teaching in order to address their own needs which were driven by love and passion.

CAPS is vocal about the personal rationale for teaching Mathematics in the Intermediate Phase because it affirms that teachers should develop the self-confidence and competence to deal with any Mathematical situation without being hindered by a fear of Mathematics and develop the spirit of curiosity and a love for Mathematics (Motshekga, 2009). This suggests that CAPS promotes that teachers should develop and be driven by the personal rationale for teaching Mathematics because the personal rationale establishes the recognition that Mathematics is a creative component of human activity. Furthermore, (Motshekga, 2009) helps to develop mental processes that enhance logical and critical thinking, accuracy and problem-solving that will contribute in decision making. According to the data generated during the document analysis process, it was noted that files were well organised and neat. In other words, teachers teaching Mathematics were dominated by attitude experiences because they demonstrated the passion for their work.

Societal rationale

Participant 1, 2, and 3's accounts suggest that they taught Mathematics because they acquired the Mathematical skills which were implemented on a daily basis. It acquainted them with the knowledge for living and they did not regard Mathematics as a subject but as the tool used to conquer the challenges for the world. Further to this, teachers taught Mathematics because they were applauded by the society and that response motivated them to teach Mathematics. For instance, Participant 3 said: "I *teach Mathematics because it talks about real life things in the society like road signs and addresses the society problems such as drawing and measuring their sport fields accurately."* Thus, community members were praising and preaching the good gospel in terms of the teaching of Mathematics because their children were helpful and Mathematical skills were applied at homes. This indicates that parents may be assisted by children to do accurate measurements and children became assets in society by assisting community members to interpret the road signs in order to avoid accidents.

In addition to the above, the studies reveal that teachers should be influenced by societal rationale (reason from the society) to teach Mathematics in the Intermediate Phase (Mantyi-Ncube et al., 2012; Wilmore & Papa, 2016). In other words, teachers should teach Mathematics in order to give learners skills that can be utilised even in their future life. In line with that, Khoza (2016) concurs with Kiefer and Alley (2015) that teaching is mostly effected by views,

common understanding, general knowledge, and verbal discussion. For that reason, teachers must be able to communicate constructively with stakeholders and must be in possession of sound communication skills (Nel, Engelbrecht, Nel, & Tlale, 2014). Further to this, Goudas et al. (2006) concur with Mhlongo (2005) that Mathematics aims to empower learners with a sense of control, a certainty about their lives in future, so that they make justified choices in life and at the end of the day become independent citizens.

Further to this, Motshekga (2009) states that teaching intends to develop the acquisition of specific knowledge and skills necessary for the application of Mathematics to physical, social, and Mathematics problem. For instance, learners are making the straight line for the camp fence and same size of the holes for the poles and to develop a critical awareness of how Mathematical relationships are used in social, environmental, cultural and economic relations such as calculations of change when selling and buying. In other words, the CAPS policy document seeks teachers to be driven by social experiences in their teaching which is informed by societal rationale of teaching Mathematics. Furthermore, during the document analysis, the particulars for learners' parents and guardians (such attendance registers for subject meetings) were noted on the teachers' files. As a result, teachers are always influenced by the professional rationale.

Professional rationale (reason from the profession)

Participants' accounts reveal that they are all unqualified to teach Mathematics because they do not have qualifications (specialisation) in Mathematics. For instance, both Participant 1 and Participant 2 agreed with Participant 3 when asserting, "*I am not having a qualification for teaching Mathematics."* The findings seem to differ with the departments of education policies. As a result, Nel et al. (2014) articulates that a teacher must be in possession of a recognised minimum of three-year qualification (RQV 13) which includes professional teacher education. Further to this, Nel et al. (2014) asserts that a teacher must have a basic knowledge of Mathematics in a particular phase as provided by professional qualifications and be able to teach and assess learners as well as to perform administrative duties such as controlling the learners attendance registers. This suggests that when teachers do not have the relevant qualifications for teaching Mathematics, there may be high chances for low learners' performance. Further to this, the importance of qualifications is to equip teachers with relevant

skills and enable them to always be driven by professional rationale since it situates teachers' work in the broad professional context of schooling (Husu, 2004; Snyders & Chaudhary, 1996). In addition to that, Rusznyak and Bertram (2015) as well as Nzimande (2015) assert that a teacher must have content knowledge of Mathematics in a particular phase as provided in professional qualification and be able to teach and assess learners as well as to perform the administrative duties such as compiling learners' marks for the purpose of reporting and the admission of learners.

Furthermore, Motshekga (2009) is vocal about professional rationale as it states that teachers should teach learners Mathematics as according to the stipulated content. For instance, Motshekga (2009) asserts that numbers and patterns should be covered during the third term. In other words, CAPS seeks teachers to cover the content within a specified period of time and this draws much from their knowledge of the profession and of the content. Furthermore, on the side of Steyn (2014), perspective asserts that CAPS is based on conflicting assumptions about teacher expertise, and the overt assumptions are that teachers cannot, or should not have to, develop their own teaching plans and thus they are provided with these plans. In addition to that, the findings transpired during the document analysis session revealed that teachers were driven by knowledge experience because the policy documents, lesson plans, were available on the teachers' files. This is in line with vertical curriculum where teachers should teach according to the plan that is prescribed from the policy document. Further to this, Motshekga (2009) outlines that teachers should have a sound understanding of how to recognise and address barriers to learning, and how to plan tor diversity in order to ensure that inclusivity is a central part of the organisation, planning, and teaching at each school. This can only happen if teachers are professionally qualified to teach Mathematics.

4.2.2 Theme 2: Resources

What resources do you use to teach Mathematics?

The Participants had to respond to the above-named question on the basis of three levels of resources which are hard-ware, ideological-ware and soft-ware resources. Thus, resources are defined as objects and people that communicate learning (Irvin & Trimble, 2003; Khoza, 2012). Participant 1 note, "*It depends on the lesson of the day about the apparatus I use. For*

instance, I use the scale to measure the weight if I am teaching about the weight in data handling I usually use the text books… I use the teaching and answer method to stimulate the learners' participation…"

Whereas Participant 2 stated: "*I use calculators so that learners will be able to calculate the square roots correctly, sometimes I use meter stick, ruler, and tape measure when teaching about the measurements. I also use the chalkboard and the hand-outs generated from photo copier so that learners will do their work individually".* Similarly, Participant 3 asserted: *"Sometimes I use textbooks, rulers, meter stick, boxes, tape measures and different containers when teaching about rectangles, calculators, chalkboard and a narrative method whereby I explain the formulae to the learners and discussions to allow learners to air their views about the lesson and participate actively."*

Soft-ware resources

The data generated from Participant 1, 2, and 3 indicated that Mathematics teachers were not using soft-ware resources. They used calculators, photocopiers and the scale to teach Mathematics in the Intermediate Phase. Both Participants 2 and 3 stated: "*I use calculators to teach Mathematics*." Participant 3 asserted that, "I *use the scale to measure the weight if I am teaching about the weight."* This suggests that teachers were exposing and equipping learners with calculating skills and resources in order to fast-track the teaching and learning process and also ensuring that Mathematics is a practical subject. For instance, when they calculate the square root of 64, they will just type 64 and the square root sign on their calculators. Immediately calculators will provide 8 as an answer. The scale will provide a mass in terms of grams or kilograms depending on the mass put on it and the photocopier assists to improve teaching and learning such that they generate copies for assessments and homework. This suggests that Mathematics teachers were driven by written experiences when executing their duties.

Furthermore, the above findings are in line with Doering, Veletsianos, Scharber, and Miller (2009) who assert that soft-ware resources can be the programs written in a programming languages. For example, teachers use soft-ware installed inside calculators which are programmed to display signs and figures in common numerical figures such as the square root

sign and eight (8) as an answer. In addition to that, the study conducted by Doering et al. (2009) reveals that soft-ware resources play multi-purposes other than teaching. Instructional soft-ware packages are only designed for the sole purpose of reinforcing teaching and learning of Mathematics. These include Mathematics soft-ware like preparing slides for presentation and interpreting data through bar and pie graphs. For example, they allow learners to work Mathematical problems or answer questions and gain feedback on their correctness. However, findings indicated that teachers were not using soft-ware resources in their teaching but only used the calculators' soft-ware. Further to this, soft-ware resources are used to enhance teaching and learning because they provide a foundation for developing teachers' professional skills as a teacher in the clinical setting (Harrisson, Smith, Lambert, & Midwinter, 2008). Additionally, to that, soft-ware resources can reinforce efforts towards more learner-centred teaching because teachers now have an opportunity to implement the use of a wide range of soft-ware resources in a variety of formats which can enhance the quality and diversity of the curriculum (Sergiou, Antoniou, & Vassiliou, 2014). As a result, Mathematics teachers were informed by knowledge experience during the teaching and learning process. Moreover, CAPS is vocal that soft-ware resources be used during the teaching and learning process such as calculators, PowerPoint slides, and Excel, and further stressed that schools must make every effort to ensure that these essential tools are provided and the systems for recovery are in place at the end of every year. In line with that, the soft-ware teaching aids were missing on the lesson plans for teachers during the document analysis sessions.

Hard-ware resource

The data from Participants 1, 2, and 3 indicates that the Participants were using the hard-ware resources when teaching Mathematics as Participant 1 and 3 said: "I *use the textbooks when teaching."* Whereas Participant 2 asserted that, "*I use a meter stick, ruler, and measuring tape when teaching."* This suggests that teachers believe hard-ware resources over other resources when teaching Mathematics because they mentioned a great number of hard-ware resources they used. In addition, all Participants mentioned the textbooks and rulers as a hard-ware resource they used, which suggests that they rely on hard-ware resources that are only supplied by the Department of Education to schools and are also driven by written experiences when they are performing their core duties.

In line with the above findings, hard-ware resources are important teaching aids or machines /objects used in education (Khoza, 2013). As a result, teachers had to use different teaching aids for teaching of Mathematics for the purpose of communicating learning. Further to this, N. Mercer and Dawes (2014) concur with Kuhn (2015) and Lawrence, White, and Snow (2010) that learners who are taught skills through the use of hard-ware resources perform better in critical thinking, collaborative problem-solving and reading word sums. In line with this, there is sound evidence that indicates that the quality of classroom teaching using hard-ware resources has a noticeable impact on the levels of achievement in Mathematics (Mercer, 2012). In addition to the above, Murphy (2013) asserts that the quality of using hard-ware resources in the classroom promotes the learners' concentration and the effectiveness towards learning (for example, the use of chalkboard encourages learners to look at the board when the teacher is teaching, thus, the teacher holds the learners' attention).

In line with the above findings, CAPS is vocal on the Motshekga (2009) about the hard-ware resources to be used during the teaching and learning process as it articulates that every learner must have his or her own textbook. Further to this, the school must make every effort to ensure that the essential resource is provided and should ensure that a system is in place for recovering textbooks at the end of the year. Additionally, DBE (2011) states that learners should use a protractor to measure angles as well as a compass and ruler for geometric constructions. As a result, Mathematics teachers are informed by a knowledge experience when teaching Mathematics and may be assisted by ideological resources to ensure the effective teaching and learning of Mathematics. Additionally, to that, during the document analysis period the hard-ware resources were listed on teachers' lesson plans.

Ideological-ware resources

The data generated from both Participant 1 and 3 suggests that the Mathematics teachers are assisted by ideological-ware resources to materialise their teaching of Mathematics in particular, since they were quoted saying "*I use the question and answer when teaching and I use the narrative and discussion method.*" Although Participant 2 said nothing in connection with ideological resources. This suggests that Participant 2 was only driven by written and skill experience with an exclusion of attitude experience when teaching Mathematics in the Intermediate Phase. However, the practices for Participant 1 and 3 were influenced by all

experiences including attitude experiences when they are teaching Mathematics in the Intermediate Phase.

In line with the above findings, ideological-ware resources are defined by Mpungose (2016) as the resources that we cannot see and touch but play an essential role in education as they control our teaching through aspects such as our teaching methods (approaches). As a result, findings were in line with this assertion because teachers were having different methods (ideological-ware resources) of teaching and learning such as narrative and group work. Further to this, ideological-ware resources should be understood as teachers' internal ideologies that control what teachers do or don't do during teaching and learning (Amory, Huel, Bilić, Loreille, & Parsons, 2012; Khoza, 2016). This suggests that teachers teaching Mathematics should be driven by attitude experience when planning and teaching their lessons so that all learners will be accommodated in Mathematics classrooms.

In line with the above findings, the CAPS document is vocal about the ideological-ware resources. For instance, Motshekga (2009) asserts that during data handling the teacher should pose questions relating to social, economic, and environmental issues. Thus, this requires teachers to possess different teaching methods in their teaching and learning process. Further to this, the policy document states clearly that the teacher should allow learners to describe, name and compare the 5 Platonic solids in terms of the shape and number faces, the number of vertices and the number of edges. This suggests that Mathematics teachers should be driven by knowledge experience when performing their core duties so that they will have different methods in teaching. Further to this, it was transpired during the document analysis session that teachers are using different approaches to teach Mathematics in the Intermediate Phase.

4.2.3 Theme 3: Accessibility

With whom are you teaching?

The Participants had to respond to the above question by referring to the three categories of accessibility, namely; physical, cultural, and financial accessibility.

Participant 1 stated: "*the government provides the learners with resources such workbooks, stationery and textbooks. I try to preach that learners should use the Mathematical language like sum when adding numbers and I am instilling the culture of Mathematical language. Learners use to walk depending on the weather when they come to school if it is raining they use the public transport and teachers use their own transport"*

Whereas Participant 2 said: "*The department provides us with the stationery and buy learners calculators for Mathematics since our school is a No-Fee school and ranked as quintile two, most learners are Zulu speaking, but I teach Mathematics in English. Further to this, learners walk to school and some use the transport to come to school."*

While Participant 3 responded: *Learners are given resources like exercise books, pens, rulers but parents help them with the scientific calculators… furthermore, "I teach different learners, some have problem like poor eyesight and are allowed to seat in front and some have hearing problem so I try to be audible enough and Mathematics is taught in English and I observe their culture like Umhlanga (reed dance) when learners have to attend it and I teach my learners in class..."*

Cultural accessibility

The data generated from Participant 1 and 2 suggest that Mathematics teachers were trying, by all means, to instil Mathematical culture in learners. In other words, teachers were promoting and adopting Mathematical language because they teach Mathematics in English and use Mathematical terminology when teaching, whereas the learners were all Zulu speakers in the classroom: "*I preach that learners should use the Mathematical language; like sum when adding numbers. I am instilling the culture of Mathematics and most learners are Zulu-speaking but I teach Mathematics in English.:* However, Participant 3 asserted that: "I *teach different learners, some have problems like poor eye sight and are allowed to seat in front and some have hearing problem so I try to be audible enough and Mathematics is taught in English and [others are released to] observe their culture like Umhlanga (reed dance) when learners have to attend it."* This suggests that Mathematics teachers do respect the cultures of learners without hesitation and learner's differences were catered during Mathematics lessons and were informed by attitude experiences. As a results, learners are released to go and attend cultural activities without problems or punishment inflicted upon them.

In line with the above findings, Mishra and Mishra (2013) defines cultural accessibility as a collective programming of the mind which distinguishes members of one group from another, which is passed from generation to generation. Thus, culture is understood as a product teachers can offer learners and treated as a number of static entities or facts that may be collected, put into proper order and presented to learners (Marchetti et al., 2013). In line with this, it is fair to state that the predominant approach to the teaching and learning of culture in the Mathematics classroom has been mostly information-oriented (Ahmad, Rajapaksha, Lim, et al., 2014; Kumaravadivelu, 2008). According to Wegrzyniak et al. (2018), culture involves issues of race, language, and religion that affect teaching and learning and this requires teachers to be aware of their learners' cultural needs and experiences. For example, to release learners to go and participate at the reed dance (Umhlanga) because it starts on Thursday afternoon. As a result, Loos and Yeo (2014) as well as Zheng et al. (2017) describe Mathematics as the language and science of pattern which requires teachers to allow learners to bring in their culture during teaching and learning. This suggests that teachers should be driven by their attitude experience in order to accommodate learner's diversity in terms of cultural observation.

Furthermore, the CAPS document is silent about cultural accessibility in connection with the teaching of Mathematics in the Intermediate Phase. This further indicates that teachers should be driven by their attitude experience in order to ensure that learners are not disadvantaged in terms of cultural accessibility. Finally, physical accessibility may play a pivotal role towards the implementation of CAPS. Furthermore, during data analysis it transpired that learner diversity was catered for because it was outlined in their lesson plans.

Physical Accessibility

The data generated from Participant 1 and 2 suggest that teachers and learners used private and public transport to provide and access education. However, some learners did not use transport but just walked to school regardless of the distance to and from school and home because, as Participant 1 and 2 affirmed, "*Learners use to walk depending on the weather when come to school, if it is raining they use the public transport and teachers use their own transport.*" Further to this, Participant 2 said: '*Learners walk to school and some use the transport to come*

to school." Nevertheless, Participant 3 stated that, *"I teach my learners in the class."* This indicates that the teaching and learning process took place within the classroom. As a result, Mathematics teachers are influenced by knowledge experience when teaching Mathematics in order to create a conducive environment for teaching Mathematics efficiently and effectively. For instance, during rainy, windy, and hot days, the teaching and learning processes are not hindered, and this leads to the successful implementation of the intended curriculum.

In connection with the above findings, Kolbe et al. (2012) concur with Hannah (2013) to define physical accessibility as the amount of time learners spend in school and the impact on learning and teaching time as well as on learners achievements. Furthermore, teachers are expected to deliver high quality education for all learners while overcoming challenges such as transportation barriers and lack of access to needed services such as clinics (Gedera & Williams, 2015). In line with this, the National Learner Transport Policy was developed in collaboration with the Department of Basic Education (DBE) and other stakeholders and aims to address the challenges of accessibility and the safety of learners (Peters, 2015). This further, suggests that Mathematics teachers should be informed by knowledge experience to access learners for teaching and learning Mathematics.

In line with the above findings, (Motshekga, 2009) is vocal about the environment where learners can access Mathematics education. Further to this, Motshekga (2009) articulates that teachers should use various curriculum differentiations strategies to address barriers in the classroom. This suggests that teachers should be influenced by knowledge experience because whatever concerns the teaching and learning of Mathematics should happen inside the classroom. Thus, all education stakeholders (parents, department officials, local leaders) may play a crucial role in providing the financial support (accessibility) needed for learners to access Mathematics lessons. Moreover, the teachers' documents were available at school during document analysis session.

Financial accessibility

Participants' comments suggest that the Provincial Department of Basic Education was taking full responsibility for the learners' education because it was providing all the basic learning resources. In line with this, Participant 1 said: 'the *government provides the learners with*

resources such as workbooks, stationery and textbooks.: Participant 2 asserted that: "The *Department provides us with the stationery and buy learners the calculators…*" However Participant 3 stated: "*Learners are given resources like exercise books, pens rulers…"* This suggests that teachers should negotiate with the parents to supplement the resources furnished by the Department as Participant 3 said: "*parents help learners with the scientific calculators…*" This further suggests that teachers should be driven by skill experience so they will gain and utilise all the resources that will promote and supplement a high quality education in general and for Mathematics in particular.

In connection with the above findings, Hogarth (2002) defines financial accessibility as a basic money management that includes budgeting, saving, investing, and insurance. Further to this, Wambugu and Mokoena (2013) reveals, in the qualitative case study he conducted regarding the implementation of No-Fee School Policy, that the government used multi-strategies to provide services to the people who included consultation with communities for adequate provision of and access to services and resources. In addition to the above, the following policies were developed to improve its capacity to execute its financial responsibility: South African Schools Act (Act of 84 of 1996); National Norms and Standards for School Funding (2006); School Fee Exemption Policy; and No-Fee School Policy (1998). In other words, Mathematics teachers should be driven by and to knowledge experience because if they deviate from these policies, the learners' rights will be violated and learners should not be compelled to provide the supplementary resources.

In line with the above findings, CAPS is silent on financial accessibility. However, some Department of Education policies speak about financial accessibility, such as those mentioned previously. Furthermore, during the document analysis session, the budget copies for their phase were available on their files as well as the textbooks allocation for each phase. This suggests that the Mathematics teachers should be informed by knowledge experiences for ensuring that that all learners do access financial support from the Department of Education.

4.2.4 Theme Four: The teaching goals

To which goals are you teaching?

Participants had to respond to the above-asked question in order to reflect on the three levels of goals which are: objectives, learning outcomes, and aims.

Participant 1 said: "*I surely want to lay a good foundation or a good Mathematical background and produce the doctors of the future. I want learners understand Mathematics not as a subject but as a way of life because everything is Mathematics, I want to equip them with Mathematics skills such as counting and classifying".* Further to this, Participant 2 stated: *"I want my learners to be doctors or engineers of tomorrow I want my learners understand the Mathematical signs and to be accurate on measurements, I want my learners to be best architects."* Similarly, Participant 3 affirmed: "*I want my learners to understand Mathematics contents such as geometry and measurements. I teach learners Mathematics so that will be critical thinkers, I want my learners to choose Mathematical careers like Mathematics teachers, graphic designers and mechanical engineering at the university level."*

Objectives

The data generated from Participant 1, 2, and 3 indicated that Mathematics teachers had set the objectives they wanted to attain at the end of the day. Participant 1 asserted: "*I want to equip my learners with Mathematics skills such as counting and classifying.*" In addition, Participant 2 stated: "*I want my learners understand the Mathematical signs and to be accurate on measurement.*" However, Participant 3 was silent about the objectives for teaching Mathematics. This suggests that both Participant 1 and 2 were driven by knowledge experience whereas Participant 3 was going astray with the policy document because she failed to outline the objectives of the lesson. Thus, her teaching was not driven by objectives, and this suggests that she lacked knowledge experience in her teaching of Mathematics.

In line with the above findings, Mqadi (2015) Kennedy et al. (2006) as well as Khoza (2013) describe objectives as the specific statements that are measurable, attainable and have a stipulated completion date. Further to this, objectives help teachers to focus on the content,

method, and assessment, as well as to accomplish the educational purposes of the course to learners and the teachers and to help identify the resources or relevant teaching aids needed to undertake the teaching (Yule & Paterson-Brown, 2012). In other words, Mathematics teachers should be informed by written experiences when planning their lessons for teaching and learning of their lessons.

In connection with the above findings, Motshekga (2009) is vocal about the objectives for teaching Mathematics in the Intermediate Phase. For example, when the teacher is teaching geometry of 2D shapes, the CAPS document states that the learners should be able to describe, sort, name, and compare triangles according to their sides and angles, focusing on equilateral triangles, isosceles triangles, and right-angled triangles. Further to this, it was noted that objectives were outlined during the document analysis session. This suggests that the Mathematics teachers should be guided by objectives when teaching, which seeks teachers' knowledge experience from Mathematics content when designing their Mathematics lessons.

Learning outcomes

The data generated from Participant 1 and 3 indicated that the Mathematics teachers were teaching along the learning outcomes, because Participant 1 said: "*I surely want to lay a good foundation or good Mathematical background"* and Participant 3 affirmed that "*I teach learners Mathematics so that will be critical thinkers".* Nevertheless, Participant 2 said nothing about the learning outcomes. The above findings suggest that both Participants 1 and 3 were driven by skill experience towards their Mathematics teaching because they were keen and worried about helping learners to meet the societal needs. In other words, they wanted to see successful and useful learners for the future. Contrary to that, Participant 3 did not consult the written document when teaching learners Mathematics.

In line with the above findings, Day et al. (1999) concur with Moon (2013) as well as Giuliani et al. (2010) that learning outcomes are statements of what a learner will be able know, understand, and be able to do as a result of engaging in the learning process. For example, learners should learn to listen, communicate, think, reason logically, and apply the Mathematical skills gained. Further to this, to learn to investigate, analyse, represent and

interpret information. In addition to the above, learning outcomes bare concern with the achievement of the learner rather than the intentions of the teacher, and learning outcomes are the elements of the curriculum since they are prescribed priori, before the beginning of the learning and teaching process (Giuliani et al., 2010). Further to this, teachers teaching Mathematics in the Intermediate Phase should be driven by skill experiences.

In connection with the above findings, Motshekga (2009) is vocal about the learning outcomes and it articulates that learners will develop the correct use of the Mathematical language, develop number vocabulary, number concept and calculation and application skills and to learn to investigate, analyse, represent and interpret information. Moreover, it was noted that the learning outcomes for teaching Mathematics were outlined during the document analysis session. This indicates that Mathematics teachers should consult the policy document so that they will understand the specific learning outcomes for Mathematics Grade 4.

Aims

The data generated from both Participant 2 and 3 indicates that Mathematics teachers had aims to teach Mathematics and their visions would be accomplished. Participant 2 affirmed that: "*I want my learners to be doctors or engineers."* Participant 3 said: "*I want my learners to choose Mathematical careers like Mathematics teachers, graphic designers, and mechanical engineering…"* This suggests that both Mathematics teachers had been driven by skill experience when pursuing their core duties because learners will be equipped with necessary skills at the end of the lesson. However, Participant 1 was silent about aims for teaching Mathematics.

In line with the above findings, aims are what teachers plan to achieve in a specific period of learning (Kennedy et al., 2006; Khoza, 2016). Further to this, Mpungose (2016) and Mqadi (2015) place an emphasis on the significance of aims towards the implementation of the curriculum and also provide guidance towards goals that serve as a gauge that determines the progress in a subject like Mathematics. As a results, this suggests that Mathematics teachers should be driven and guided by attitude experience in order to achieve the aims of the curriculum. For example, when teachers are teaching algebra, learners could be introduced to

the quadratic equation so that learners would be able to set up equations to describe problem solutions and also solve equations by inspection.

In connection with the above findings, Motshekga (2009) speaks louder about the aims for teaching Mathematics in the Intermediate Phase. Further to this, the CAPS document states that, "to develop a spirit of curiosity and a love for Mathematics, to develop an appreciation for the beauty and elegance of Mathematics and to develop recognition that Mathematics is a creative part of human activity" (DBE, 2011, p. 8). Further to this, it was noted that aims were articulated during the document analysis session on the teachers' lesson plans. Thus, this indicates that Mathematics teachers should be informed by attitude experiences in order to attain the aims of the curriculum

4.2.5 Theme Five: Content

What content are you teaching?

The respondents had to respond to the above question by referring to the three types of content namely; measurements, data handling, and geometry.

Participant 1 said: "*I teach geometry, measurements and data handling in the Intermediate Phase… I teach geometry of a straight line, teach measurements sometimes using 30cm ruler when we measure the small amount of sizes of lengths and the volume may be of the class…"* Participant 2 stated: "*In the Intermediate Phase we have measurements, space and shapes and data handling to teach… In addition to the above, I allow learners to discuss, work in pairs to make the conclusions about their observations and do activities…"* Similarly, Participant 3 said: "*In the Intermediate Phase we have geometry, data handling, and measurements… In measurement I use squares, learners use rulers and chalkboard to measure different objects in class, when they are doing data handling we use questionnaire, bar graph to collect a data they have drawn…"*

Space and shapes (geometry)

The data generated from Participant 1 and 2 concurred with the data generated from Participant 3 who said: "*I teach geometry, in the Intermediate Phase... In the intermediate we have space and shapes to teach…"* But Participant 3 asserted that "*we have geometry…"* In other words, Mathematics teachers were teaching the content that is prescribed in the policy document because they indicated the teaching of geometry in their daily teaching of Mathematics. Thus, this suggests that Mathematics teachers seemed to be informed by the knowledge experience in order to accomplish the curriculum content.

In line with the above findings, Olver et al. (2010) describes the study of space and shapes as one that improves understanding and appreciation of patterns, precision, achievement, and beauty in natural and cultural forms. Further to this, it focusses on the properties, relationships, orientation, positions, and transformation of two-dimensional shapes and three-dimensional objects. For instance, in three-dimensional shapes, the teacher will teach the learners the formulae for calculating the volume of the rectangular prism. Thus, this suggests that the Mathematics teachers should be driven by both the written and attitude when teaching geometry.

In connection with the above findings, Motshekga (2009) articulates more on geometry in such a way that it is outlined from the document that properties of 3-D objects should be taught in order for learners to recognise, visualise and name 3-D objects in the environment. Learners should be able to recognise geometric settings, focusing on rectangular prism, spheres, cylinders, and pyramids. In addition to the above, to describe, sort, and compare 3-D objects in terms of shapes of faces, flat, and curved surfaces.

Data handling

The data generated from Participant 1, 2, and 3 suggested that the Mathematics teachers were teaching the prescribed content (data handling). Participant 1 stated: "*I teach data handling in the Intermediate Phase."* Similarly, both Participant 2 and 3 said: *"we have data handling to teach…"* This suggested that all Mathematics teachers were driven by knowledge experience

when teaching content (data handling) in the Intermediate Phase. As a result, the aims, objectives, as well as learning outcomes for teaching data handling were attained.

In line with the above findings, Olver et al. (2010) asserts that data handling involves asking questions and finding answers in order to describe events as well as the social, technological, and economic environment. Further to this, data handling enables learners to develop the skills to read and analyse data represented in words. As a result, learners are exposed to a variety of contexts for collecting and interpreting data with a range of questions that are posed and answered related to the data (Olver et al., 2010). Thus, this suggests that teachers teaching Mathematics should be informed by skill experience in order to comply with curriculum demands. Motshekga (2009) further asserts that data handling will enable learners to draw a variety of graphs to display and interpret data including pictographs (one-to-one representation) and bar graphs.

Measurements

The data generated from Participants 1, 2, and 3 suggested that teachers teaching Mathematics were in line with prescribed content (measurements) because Participant 1 stated: "*I teach measurement*." Participant 2 affirmed that, "*In the Intermediate Phase we have measurements to teach.*" Participant 3 said: "*In the Intermediate Phase we have measurements…"* In other words, Mathematics teachers were driven by knowledge experience when teaching Mathematics because they were teaching the content that was prescribed from the policy document.

In line with the above findings, measurements focus on the selection and use of appropriate units, instruments, and formulae to quantify characteristics of events, shapes, objects, and the environment (Olver et al., 2010). In addition, measurements make sure that learners know that the height of a triangle is a line segment drawn from any vertex perpendicular to the opposite side (Olver et al., 2010). Further to this, Tossell (2013) asserts that measurement is an important Mathematical topic because it helps us to quantify the world around us, because of its connections with other subject areas and because it can serve as the basis of content areas in Mathematics. This suggests that Mathematics teachers should be influenced by both skill and

knowledge experience in order to teach measurement because to measure requires a skill acquired from tertiary level and the prescribed curriculum document is also required for effective curriculum implementation.

In connection with the above findings, Motshekga (2009) is vocal about the teaching of measurements since it articulates that surface area and the volume of a 3D objects must be taught and the learners should use and know the formulae which is: the volume of a prism = the area of the base x the height; the surface of an area of a prism = the sum of the area of all its faces; the volume of a cube = l; and the volume of a rectangular prism =l x b x h. This requires teachers to draw from attitude experience when teaching this part so that they can have love and passion of improvising for teaching and learning. Further to this, it transpired during the document analysis session in their lesson plans that measurement as a content was taught during the second term.

4.2.6 Theme Six: Teacher' activities

How are you teaching?

Participants had to respond to the above-mentioned questions by referring to teacher-based, learner-based and content-based activities.

Participant 1 asserted: "*It depends on the lesson of the day, sometimes I verbally present the lesson to the learners, use a big screen or television so that learners view polygons, allow learners to find solutions for themselves and also afford learners the opportunity to ask questions or clarity".* Participant 2 stated: "I *bring the real objects like jug or litres in order for them to know that this is a litre… and I even ask them to bring containers from their homes and facilitate learning in order to save time."* Participant 3 responded: *"I introduce the lesson to the learners, give learners classwork and give learners the feedback and allow learners to present their findings after solving the Mathematical problems."*

4.2.6.1 Teacher-based activities

Participant 1, 2, and 3's accounts suggest that the activities for teaching Mathematics in the intermediate were teacher-based because Participant 1 asserted that, "*I verbally present the lesson to the learners*." Participant 2 stated: "*I bring the real objects like jug or liters in order for them to know that this is a litre*." Further to this, Participant 3 said: "*I introduce the lesson to the learners."* Therefore, this suggests that Mathematics teachers were driven by skill experience during the teaching and learning process because the learners were not afforded an opportunity to explore Mathematical problems during the introduction of the lesson.

In line with the above findings, Puderbaugh (2015) concur with Zohrabi, Torabi, and Baybourdiani (2012) in describing teacher-based activities as a style of instruction that is formal. The teacher, as a sole leader, takes responsibility for all paperwork and organisation in which the instructor (teacher) directs how, what, and when learners learn, and the main concern is on the acquisition of knowledge. As a result, teachers were the only sources of information and the classroom atmosphere was tense since the learners had to sit, listen, and take instructions from the instructor. Further to this, teachers designed and develop their own activities for Mathematics at Meso-level in order to achieve the desired goals (Van den Akker, Gravemeijer, & McKenney, 2006). As a result, Mathematics teachers were driven by attitude experience when performing their professional duties.

In connection with above findings, Motshekga (2009) is vocal about the activities to be performed by Mathematics teachers: "To address barriers in the classroom, teachers should use various curriculum differentiation strategies" (DBE, 2011). Furthermore, during the document analysis session the Mathematics teachers did indicate, on their lesson plans, teachers' roles

4.2.6.2 Content-based activities

The data generated from Participant 1 and 2 suggested that the activities that were undertaken by Mathematics teachers in the Mathematics classroom were content-based because Participant 1 affirmed that: "*I use a big screen or television so that learners view the polygons."* Further

to this Participant 2 asserted that, *"I bring the real objects like jug or litres in order for them to know that this is a litre… and I even ask them to bring containers from homes."* This suggests that Mathematics teachers were too practical when teaching Mathematics because they looked at the content they are teaching at that particular time then they organise the teaching aids that would be relevant to the content to be taught in order to simplify the teaching during the teaching and learning process. This suggests that Participant 1 and 2 were informed by both knowledge and skill experiences when teaching Mathematics. However, Participant 3 failed to answer the question accordingly. Therefore, this suggests that Participant 3 was driven by attitude experience when teaching Mathematics.

In line with the above findings, Dueñas Mendoza (2017) as well as Cenoz, Genesee, and Gorter (2014) in defining the content-based activities as a teaching and learning activity in which learning is planned and arranged around the content or information that learners should focus on learning such as triangles. For example, learners learn about this topic using the content they are trying to learn, rather than their native language, as a tool for developing knowledge and content ability in the target content. Moreover, content-based activities are considered to be essential because they are preparing our learners to be lifelong learners (Genesee & Lindholm-Leary, 2013; Stoller, 2008). This suggests that teachers are driven by knowledge experiences when performing their core business.

In line with above findings, Motshekga (2009) speaks louder about the content-based activities and asserts that, in geometry when you are teaching the construction of geometric figures the teacher should accurately construct geometric figures appropriately using compass, ruler, and protractor, including circles, parallel lines or perpendicular lines. Further to this, it transpired during document analysis session on their lesson plans for Mathematics that the activities designed and planned were content-based. This suggests that Mathematics teachers should be informed by knowledge experiences in order to select the teachers' activities.

4.2.6.3 Learner-based activities

The data generated from Participants 1 and 3 suggested that their teaching activities were learner-based because Participant 1 stated: "*I allow learners to find solutions themselves and*

also afford learners the opportunity to ask questions or clarity." Participant 3 said: "*I give learners classwork and allow learners to present their findings after solving the Mathematical problems."* This suggested that the Mathematics teachers in the Intermediate Phase were driven by both skill and knowledge experience during the teaching and learning process because teachers should consult the written documents for Mathematics and also apply the skills acquired at tertiary level when performing their core business. However, Participant 2 was silent about the learner-based activities. This suggested that Participant 2 was informed by attitude experience because she did not consult the prescribed document for teaching Mathematics.

In connection with the above findings, Froyd and Simpson (2008) concur with (Brophy, 2013) as well as Tan and Barton (2010) that learner-based activities are taken as van instructional approach in which the learners playing a leading role in the content activities, material, and pace of learning is determined by the learners. Further to this, learners are expected to strive to make sense of what they are learning by relating it to prior knowledge and by discussing it with others. This suggests that Mathematics teachers should be driven by skill experience because learners are allowed to demonstrate their competency, to accommodate those who are struggling by giving them individual support, and learners can play a significant role in designing their own curriculum. In addition to that, during the document analysis stage the lesson plans on their files did indicate that some activities were learner-based activities. In line with the above findings, Motshekga (2009) asserts that the activities should be learner-based since they will enable learners to become competent, confident, and critical readers. In other words, Mathematics teaching should be dominated by knowledge experience so that learners will gain self-confidence by leading the lesson. For instance, learners will be asked to interpret pictures of a container filled with cubes/rectangular prisms so that they are able to state the volume in terms of the number of cubes/rectangular prisms.

4.2.7 Theme seven: Teachers' role

How do you facilitate learning?

Participants had to respond to the above question by referring to the three types of the teachers' role, which are moderator, leader, and facilitator.

Participant 1 stated: *"I give learners examples after clarifying and defining the Mathematical terms, after that instruct the learners to do the assignments, give learners suitable classwork, and make sure that learners do exercises that are on the workbook such as homework, give learners work that will challenge their minds… and I make them understand by unpacking the certain topics."* Participant 2 asserted: *"I introduce and summarise the lesson, give learners the homework, monitor learners while doing their work in groups, individually, mark the learners' work thereafter the feedback is given for corrections."* Participant 3 said: *"Sometimes I guide learners when they do not understand … I assist learners with learning challenges, give learners feedback… give learners homework and I go around and help those who have problems and clarify the content as well as questions."*

4.2.7.1 Moderator

The data generated from Participant 1, 2, and 3 suggested that the Mathematics teachers were acting as moderators during the teaching and learning process because Participant 1 affirmed that, "*I give learners suitable classwork and make sure that learners do exercises that are on the workbook such as homework."* Moreover, Participant 2 said: *"I mark the learners' work thereafter the feedback is given for corrections."* Further to this, Participant 3 said: *"I give learners homework and feedback.*" This suggested that Mathematics teachers were playing a role of being the moderators during the teaching and learning process because they moderate the learners' activities such as classwork and homework. This suggests that the Mathematics teachers were driven by knowledge experience because the prescribed document states clearly what the teacher should do during the teaching and learning process.

In line with the above findings, Kudryashova et al. (2016) asserts that teachers become moderators when they moderate learners activities by establishing the new standards that will enable the learners to improve their academic performance in order for them to analyse, reflect, and reconceive the current knowledge in a collaborative manner. In line with the above, the teachers organise and observe learners' interactions in groups where they conduct joint activities, predict, and form hypothesis or collect evidence to support generalisation, share ideas, and suspend judgements, record observations, and discuss tentative alternatives (Florian

et al., 2016). As result, teachers teaching Mathematics in the Intermediate Phase should be influenced by the knowledge experience in order to play roles more effectively.

In connection with the above findings, Motshekga (2009) speaks louder about the moderation of activities by Mathematics teachers since the document asserts that the school-based assessment comprises forms of assessment which are conducted by the teacher at school level. For instance, assignments, projects, homework pieces, classwork pieces, tests, listening exercises etc. In addition to the above, Motshekga (2009) further articulates that all assessment tasks for Mathematics must be moderated by the head of the department or a specialist, or a senior teacher at the school, prior to the administration of the assessment tasks. In line with this, it was noted that the learners' activities were moderated by Mathematics teachers because the teachers' signature was endorsed on the learners' activity books. Further to this, this suggests that Mathematics teachers in the Intermediate Phase should be driven by knowledge experience when undertaking this activity.

4.2.7.2 Leader

The data generated from both Participant 1 and 2 suggested the Mathematics teachers were acting as leaders during the teaching and learning operation because Participant stated: "*I give learners examples after clarifying and defining the Mathematical terms after that instruct the learners to do assignments… and unpack certain topics*." Participant 2 said: *"I introduce and summarise the lesson."* This suggested that the Mathematics teachers were playing the leading role during the teaching and learning operation because they were the ones who were driving the learners towards the achievements of the curriculum goals. This further suggested that the teachers teaching Mathematics in the Intermediate Phase were influenced by the written experience in order to play their roles profitable. However, Participant 3 was silent about the leading role, which suggested that she was driven by the attitude experience to play her role as a teacher.

Referring to the above findings, Berry, Daughtrey, and Wieder (2010) reveal that a teachers' self-efficacy as a leader is strongly and positively associated with soliciting parent involvement, communicating positive expectations for learners' learning, improving

instructional practice and being willing (and able) to innovate successfully in the classroom. In other words, teachers teaching Mathematics in the intermediate should be driven by a skill experience in order to communicate effectively with all the stakeholders involved in teaching and learning

Referring to the above findings, CAPS document asserts that teachers will lead, manage, and act as administrators whereby they make decisions appropriate to the level of learning, lead learning in the classroom, and participate in school leadership as well as to provide support though interpretation of (DBE, 2010b). Further to this, it was noted during document analysis session when I was examining the teachers' files that teachers were acting as leaders because on their lesson plans they indicated how lessons were to be introduced and the approach used during the teaching and learning process. As a result, teachers should be influenced by knowledge experience in order to play the leadership role during the teaching and learning process.

4.2.7.3 Facilitator

The data generated from both Participant 2 and 3 suggested that the teachers teaching Mathematics in the Intermediate Phase were acting as facilitators during the teaching and learning process because Participant 2 said: "*I monitor learners while doing their works in groups or individually*." Whereas, Participant 3 stated: "*I guide learners when they do not understand… I assist learners with learning challenges… I go around and help and help those who have problems and clarify the content as well as questions."* This suggested that both Participant 2 and 3 were acting as facilitators because they were not leading or instructing the learners but they guided, empowered, and allowed the learners to probe the Mathematical solutions during the teaching and learning process. This further suggested that the teachers developed the sense autonomy to the learners and by doing that indicated that they were influenced by the both skill and knowledge experience because to assist and guide learners towards the desired outcomes requires the skill obtained from the tertiary. However, Participant 1 was silent about the facilitation role and this suggested that he was driven by the attitude experience since he did not consult the written document for Mathematics.

Referring to the above findings, Kudryashova et al. (2016) outlines that the teacher acts as a facilitator when they assist and apply the previously acquired knowledge in a new situation. Further to this, Khoza (2015) asserts that the teachers' role is determined by the teaching style that the teachers employ. In addition to that, it is supported by the study conducted by Sormunen et al. (2013) which revealed that particular activities designed by Mathematics teachers drew learners' attention towards the direction of learning. Thus, this suggests that teachers teaching Mathematics in the Intermediate Phase should act as facilitators, be innovative, guide learners, and afford learners an opportunity to display their abilities in understanding the Mathematical concept and its application when learning Mathematics and this should be done through the influence of skill experience.

In line with the above findings, the CAPS document is silent about the role of a teacher as a facilitator because CAPS came to replace the old curricula namely OBE, RNCS, and NCS (Motshekga, 2009). Further to this, the role of a teacher as facilitator changed into transmitters of knowledge, to achieve the desired goals, and the classroom activities mainly focused on teacher-centred approach (Kudryashova et al., 2016). In line with the above, it transpired during the document analysis session on their files that the teachers play roles of being facilitators when teaching because it is articulated that they move around the classroom assisting learners when learning. This further suggests that teachers teaching Mathematics in the Intermediate Phase should be driven by knowledge experience before they play their teaching roles.

4.2.8 Theme Eight: environment (Location)

Where are they teaching?

The respondents were expected to respond on the afore-mentioned question on the basis of three categories of environment namely; face-to-face, online environment, and blended environment

Participant 1 said: *"I teach Mathematics inside the classroom so that the environment will be conducive for teaching and learning practice, Unfortunately, there is no internet available in our school but I give learners projects that will force learners to visit the library in town or*

use the smart phones at home to search some information and project, classwork, homework and tests a manually or physically submitted." Further to this, Participant 2 said: *"I teach Mathematics in the classroom in order to promote and deliver the quality education, I encourage my learners go to the library in town to search for information and I use the chalkboard and other teaching aids in class to teach Mathematics."* Whereas, Participant 3 stated: *"I teach Mathematics in proper classroom using the word of mouth… I do not use online teaching and I do not have internet in school therefore the other environments are impossible for teaching Mathematics."*

4.2.8.1 Face-to-face environment

The data generated from Participant 1, 2, and 3 indicated that the teachers teaching Mathematics in the Intermediate Phase were using the classroom as a conducive environment for teaching and learning Mathematics and this was done through face-to-face teaching because Participant 1 asserted: "*I teach Mathematics in the classroom*.' Further to this, Participant 2 affirmed, "*I teach Mathematics in the classroom."* And Participant 3 also said: "*I teach Mathematics in the proper classroom using the word of mouth*." This suggested that Mathematics teachers were driven by knowledge experience to choose an appropriate environment for teaching and learning Mathematics in order to achieve the curriculum goals.

In line with the above findings, Miliszewska and Tan (2007) and Bencheva (2010) declare that being in close contact with learners, they are in position to know how much local contextualisation these materials may require and can achieve a balance in the use of various types of material according to learners' level, interest, language skill, and so on. In line with this, Miliszewska and Tan (2007) states that the correlation between learners and face-to-face teachers is crucial in making foreign materials relevant to learners because they receive the information first-hand and gain the chance to seek clarity when the need arises. Moreover, Machaka, Ganesh, and Mapfumo (2013) as well as Mupa and Chinooneka (2015) outline that teaching Mathematics in the Intermediate Phase should be practiced in a conducive area like classrooms (face-to-face environment). Thus, this suggests that Mathematics teachers should be driven by knowledge experience when unpacking the Mathematics content in the classroom in order to allow learners to gain clarity where they do not understand.

In line with the above findings, according to Motshekga (2009), the document asserts that teachers have a responsibility to make sure that they make the learning environment conducive to learning and teaching as much as possible. Further to this, the learning environment (face-to-face) promotes interpersonal co-operation, classroom and school culture, protection against harassment and mental harm, and effective communication (Motshekga, 2009). Moreover, during the document analysis session it was noted that all tools (lesson plan) were indicating class, name of the school which indicating the environment where teaching and learning process will take place. As a result, teachers teaching Mathematics in the Intermediate Phase should be driven by knowledge experience in order to choose the conducive environment for teaching Mathematics in the Intermediate Phase in order to enhance and promote a high quality of teaching Mathematics.

4.2.8.2 Online environment

The data generated from both Participant 1 and 2 suggested that the Mathematics teachers use on-line teaching in Mathematics because Participant 2 affirmed, "*I encourage my learners to go the library in town to search for information."* And Participant 1 conveyed, "*I give learners projects that will force them to visit the library in town or to use the smart phones at homes in order to search some information."* This suggests that Mathematics teachers were driven by skill experiences when teaching Mathematics because they were equipping their learners with computer literacy skills, information searching skills, and classifying skills. However, Participant 3 did not use on-line learning.

In connection with the above findings, Gilbert (2015) defines online learning as a learning that takes place partially or entirely over the internet. Further to this, online learning appeals to a diverse population of learners with ranging academic needs that traditional teaching classes are deficient or incapable of meeting. Moreover, Gedera and Williams (2015) assert that online learning can offer learners an opportunity for flexibility, interaction, and collaboration. This suggests that Mathematics teachers are driven by skill experiences because they encourage learners to be familiar with the internet in learning Mathematics.

In line with the above findings, Motshekga (2009) is silent about the online learning environment in the teaching of Mathematics. This suggests that Mathematics teachers were driven by attitude experiences because they denied learners an opportunity to acquire computer literacy skills.

4.2.8.3 Blended learning

The data generated from both Participant 1 and 2 suggested that teachers were using a blended learning strategy when teaching Mathematics since they use both face-to-face and online learning when teaching. Participant 1 stated: "*I teach learners inside the classroom and give learners projects that will force them to visit the library in town or use their smart phones at home to search some information."* Participant 2 said: "*I teach Mathematics in the classroom and encourage my learners to go to the library in town to search for information."* However, Participant 3 declared that, "*I do not use online teaching and I do not have internet in school…"* This suggests that both Participant 1 and 2 practice blended teaching when teaching Mathematics in order to transfer the Mathematical knowledge and skills to learners because learners will benefit. For example, learners will be computer literate at the end of the day. This suggests that the teachers are driven by an attitude experience to teach Mathematics. Nevertheless, Participant 3 is driven by an attitude experience to teach Mathematics because she did not want to expose her learners to the internet.

In line with the above findings, according to Watterston (2012) and Furchová (2016), blended learning is emerging in teaching and learning methods from face-to-face mobile and online learning and that includes elements of both synchronous and asynchronous online learning options. In line with this, blended learning should be viewed as a pedagogical approach that combines the effectiveness and socialisation opportunities of the classroom with the technologically enhanced active learning possibilities of the online environment, rather than a ratio of delivery modalities (Dziuban, Moskal, & Hartman, 2005). This suggests that Mathematics teachers should be driven by skill experience in order to use this different teaching strategy in Mathematics.

In line with the above findings, Motshekga (2009) is silent about blended learning regarding the teaching of Mathematics. This suggests that teachers teaching Mathematics should be influenced by attitude experiences so that teachers they choose for themselves as to which environment to use in teaching Mathematics. As a result, teachers seek to teach in a classroom context and also allow learners to explore the internet.

4.2.9 Theme Nine: Time

When are you teaching?

Participant 1 asserted: "*Mathematics is allocated six hours a week and each lesson is allocated for one hour a day. I find time like morning and afternoon classes to assist learners to catch up in Mathematics… and normal time stipulated for each employee to spend in school is the minimum of seven hours a day and the school starts at 07h20 and closes at 14h20 from Monday to Friday. But*, Participant 2 said: "*Mathematics has six hours per week but it varies according to the topic, I prepare time to teach learners either early in the morning or afternoon to assist learners that are struggling in Mathematics and the school starts at 7h20 and knock off 14h20 from Monday to Friday."* Although Participant 3 said: "*I teach Mathematics according to the timetable and also organise extra classes in the morning and afternoon or during holidays so that I catch up… I spend seven hours a day since the school starts at 7h20 and ends at 14h20."*

4.2.9.1 School time

The data generated from both Participant 1 and 2 as well as Participant 3 suggested that Mathematics teachers spend seven hours a day at work because Participant 1 stated: "*The school starts at 07h20 and closes at 14h20 from Monday to Friday."* Participant 2 said: "*the school starts at 07h20 and knocks off at 14h20 from Monday to Friday."* Participant 3 asserted: "*The school starts at 07h20 and ends at 14h20."* Thus, this suggests that the Mathematics teachers are driven by knowledge experience because they all start and end at the same time. In other words, they are guided by a specific policy regarding the starting and closing of school for performing their core business.

In line with the above findings, school time refers to the time spent by learners and teachers at school (Chisholm & Hoadley, 2005). Further to this, these studies reveal that teachers spend more time than they should on administration-related issues. For instance, management and supervision, assessment and evaluation, as well as on reports and record keeping. Thus, this suggests that Mathematics teachers are driven by knowledge experience about the time they spend at school. For instance, the school starts at 07h20 and closes at 14h20. As a result, they spend seven hours a day at work (school).

In line with the above findings, Motshekga (2009) is silent about school time. However, the policy handbook for educators articulates that school time is seven hours per day including breaks and the periods in which learners are not at school (Pillay, 2007). In line with above, it was noted that that teachers stipulated the instructional time on their time tables during the document analysis session for teaching Mathematics for each day. This suggests that Mathematics teachers in the Intermediate Phase should be driven by the knowledge experience in order to adhere to the stipulated time for school time which was 01h12 minutes.

4.2.9.2 Extra time

The data generated from both Participant 1 and 2 as well as Participant 3 indicated that Mathematics teachers did organise extra time for teaching Mathematics in the Intermediate Phase in order to assist learners or for catch up, because Participant 1 affirmed, "*I find time morning and afternoon classes to assist learner to catch up in Mathematics."* Whereas Participant 2 stated: "*I prepare time to teach learners either early in the morning or afternoon to assist learners that are struggling in Mathematics*." Yet, Participant 3 conveyed, "*I organise extra classes in the morning and afternoon or during holidays so that I catch up."* This further suggests that Mathematics teachers are driven by attitude experience since this dedication and determination emerges from their hearts to teach learners during holidays, afternoon, or early in the morning before school time.

In line with the above findings, Kolbe et al. (2012) defines extra time as the additional time to the school or daytime that may be used as supplementary time for revision or catch ups in order to enhance and deliver the quality education and attain the quality result in school. For example,

over weekends, morning classes, and holiday classes. Further to this, Kalaivani et al. (2012) agrees that maximising time requires the use of sacrifice and dedication, such as movement from one class to another, and the gathering of Mathematics resources. This suggests that Mathematics teachers were driven by attitude experience because they choose work extra-time in order to assist learners in Mathematics content.

In line with the above findings, Motshekga (2009) is silent about extra time for teaching Mathematics in the Intermediate Phase. However, the Revised National Statement Grades R-9 states that learners who experience barriers to learning must be accommodated through flexibility in terms of time allocated to complete activities, thus additional time may be given or alternatively learners may be allowed to complete their tasks at a later stage. Thus, this suggest that Mathematics teachers should be driven by the attitude experience in order to conduct extra classes since it's optional because it emanates from the passion of each individual teacher to sacrifice his/her time to work over-time.

4.2.9.3 Instructional time

The data generated from both Participant I and 2 indicated that they teach Mathematics six hour a week. However, Participant 3 did not specify time allocation for teaching Mathematics in the Intermediate Phase. In other words, both Participant 1 and 2 were driven by the knowledge experience when it comes to honouring the prescribed time for teaching Mathematics in the Intermediate Phase because they were teaching according to the written document which will enable them to cover all the Mathematics content on the stipulated times.

In line with the above findings, Du Plessis (2013) describes instructional time for Mathematics in the Intermediate Phase as six hours a week, which means that one hour twelve minutes is allocated for teaching Mathematics a day. Further to this, Hetem et al. (2015) concur with Mahendra et al. (2008) that teachers teaching Mathematics must use instructional time effectively. In addition to the above, Facione (1990) and Dunlosky et al. (2013) state that in order to achieve high grades, learners should observe a sense of punctuality, be considerate, and prioritise time. Thus, this suggests that the knowledge experience is dominant in the teaching of Mathematics in the Intermediate Phase and skill experiences are also practiced by

the teachers by showing ideas on how to teach Mathematics in the cluster meetings and workshops, they brainstorm ideas regarding challenges experienced by Mathematics teachers and they also utilize their skill experience to capacitate each other in order to address challenges and the classroom is the conducive or convenient place to teach Mathematics in order to attain the curriculum goals.

In line with the above findings, Motshekga (2009) is vocal about the instructional time needed for Mathematics in the Intermediate Phase as it articulates the guidance regarding the time needed to adequately address the content within each content area guidance on the spread of content in the examination. Further to this, the weighting of the content areas is the same for each grade in this phase. Content Area: Data handling 10%; Measurement 15%; Geometry 15%; Pattern, Functions, and Algebra 10%; Numbers, Operations and Relationships 50%. It was noted on the teachers' personal time-tables that the school starts at 07h20 and closes at 14h20 during the document analysis session. This suggests that Mathematics teachers should be dominated by the knowledge experience in order to address the Mathematics content effectively.

4.2.10 Theme Ten: assessment

How do you assess teaching?

The respondents responded to the above question in order to address the three types of assessment namely; peer, summative, and formative assessment.

Participant 1 stated: "I *assess learners by giving them classwork in order to check the learners' level of understanding for the lesson taught. I assess learners by giving them a formal assessment such as writing examination for progression purposes and also allowing learners to assess themselves…"* Participant 2 affirmed that, "*I use assignments, tests to assess learners in order to diagnose whether the desired outcomes are achieved or not, and ask the class prefect to monitor and assist learners to answer some Mathematical work when committed or attending staff meeting, I used to do conduct formal assessment such as test for reporting*

purposes." Participant 3 affirmed, *"I assess learners by using classwork, examination, and I give learners time to assess themselves…"*

4.2.10.1 Formative assessment

The data generated from Participant 1, 2, and 3 suggested that Mathematics teachers were using formative assessment to assess their teaching because Participant 1 assessed, "*to diagnose whether the desired outcomes are achieved or not.*" Participant 3 affirmed that, "*I assess learners by giving them classwork in order to check their level of understanding."* Participant 2 said: *"I use assignments and tests to assess learners"* Thus, this suggests that the Mathematics teachers were driven by knowledge experience when planning to conduct the assessment in the Intermediate Phase.

In line with above findings, Bayless et al. (1998) concur with Aberle (1959) that formative assessment is all the activities that are undertaken by teachers and their learners that provide information to be used as feedback to modify teaching and learning activities. Further to this, formative assessment informs Mathematics teacher about learners' understanding at a point when timely adjustment can be made in order to address personal needs (Garrison & Ehringhaus, 2007). In line with this, these adjustments assist teachers to aid learners to achieve targeted standards-based learning goals within the specified time and learners should be afforded with a descriptive feedback as they learn (Garrison & Ehringhaus, 2007). Thus, this further suggests that the Mathematics teachers should be driven by knowledge experience in order to ensure that learners move forward in their learning and to make them aware and understand what they are doing well.

In connection with the above findings, Motshekga (2009) articulates that formative assessment should be used to aid the teaching and learning process, hence assessment for learning. Further to this, the information provided by formative assessment can also be used by teachers to inform their methods of teaching. Furthermore, the evidence of formative assessment was noted during the document analysis period. In other words, Mathematics teachers were driven by their knowledge experience in order to impart different forms of assessment that were good for Mathematics in the Intermediate Phase.

4.2.10.2 Peer assessment

The data generated from Participant 1, 2, and 3 indicated that Mathematics teachers used peer assessment at times to assess their teaching because Participant 1 said: "*I allow learners to assess themselves.*" However, Participant 2 affirmed, *"I ask the class prefect to monitor and assist learners to answer some Mathematical work…"* Yet, Participant 3 conveyed, *"I give learners time to assess themselves…"* This suggests that Mathematics teachers were driven by knowledge experience to afford learners an opportunity to assess themselves during the teaching and learning process in order to improve their academic performance.

In line with the above findings, Topping (2009) and Mollah, Azad, and Vasilakos (2017) define peer assessment as an arrangement for learners to consider and specify the level, value, or quality of product or competence of other status learners. In other words, learners work in teams to construct knowledge and accomplish tasks through collaborative interaction. Moreover, Callaghan (2011) concurs with Sedio (2013) that working to implement the intended curriculum, specifically for Mathematics in the Intermediate Phase in groups, allows learners to interact with each other in a classroom environment. However, the study underpinned by Sajedi (2014) and Hattie (2009b) outlined that during the group work, learners are engaging with the task, increasing their confidence, and becoming responsible for their own learning. Thus, this suggests that Mathematics teachers are influenced by skill experienced when conducting peer assessment and should make sure that regular feedback is given to learners.

In line with the above findings, Motshekga (2009) is outspoken about peer assessment as it articulates that peer assessment is actively involving learners in assessment and it is important as it allows learners to learn from and also reflect on their performance. Thus, this suggests that Mathematics teachers should be driven by knowledge experience in order to allow learners at the top to take responsibility and improve their academic performance through peer assessment.

4.2.10.3 Summative assessment

The data generated from both Participant 1 and 2 concur with the data generated from Participant 3 that indicated that Mathematics teachers were conducting summative assessment to assess learners during the learning and teaching operation because Participant 1 conveyed that, "*I give learners formal assessment such writing examination for progression purposes.*" Further to this, Participant 2 said: *"I used to conduct formal assessment such as tests for reporting purposes."* However, Participant 3 stated: "*I assess learners by using examination*." This further suggests that Mathematics teachers were guided by knowledge experience when assessing the learners.

In connection with above findings, Hill and Barber (2014) reveal that summative assessment in Mathematics classroom level is an accountability measure that is generally used as part of the grading process and that summative assessment in an Intermediate Phase may be conducted as end-of-term or semester exam, end-of-unit or chapter test, and state assessment. In addition to the above, Garrison and Ehringhaus (2007) and Howe and Abedin (2013) further outline that the key is to think of summative assessment as a means of gauging, at a particular point in time, learners learning relative to content standards and summative assessments are tools to help evaluate the effectiveness programs, Mathematics improvement goals, alignment of curriculum, or learner placement in a specific programme.

In line with the above findings, Motshekga (2009) is vocal about summative assessment as it articulates that summative assessment is carried out after the completion of a Mathematics topic or a cluster of related topics. As a result, the results of the summative assessment are recorded and used for promotion purposes (Motshekga, 2009). Further to this, the evidence for summative assessment was noted during the document analysis session. Thus, this suggests that Mathematics teachers are driven by written experience when assessing learners for promotion and progression purposes.

Moreover, the following chapter will focus on the summary of findings emanated from chapter four, conclusion and the suggested recommendation.

CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Introduction

The study seeks to explore the teachers' experiences of teaching Mathematics in the Intermediate Phase.

The specific research questions were as follows:

- What are the teachers' experiences of teaching Mathematics in the Intermediate Phase?
- Why teachers' experiences of teaching Mathematics in the Intermediate Phase are in a particular way?

Moreover, the specific research objectives are as follows:

- To explore the teachers' experiences of teaching Mathematics in the Intermediate Phase
- To understand the reasons of teachers' experiences of teaching Mathematics in the Intermediate Phase.

This chapter addresses the research questions mentioned and objectives above, summarises the research findings, and provides conclusions on the basis of research findings, data analysis, and discussions presented in the previous chapter (Chapter Four). As a result, recommendations are presented for future research. Further to this, the conclusions give the clear picture for the teachers' experiences whether they were driven by knowledge, skill or attitude experience. In addition to the above, conclusions are made on the basis of themes that emanated from the data discussed on the previous chapter. Thus, this chapter will also reveal how the above research questions are addressed by the findings.

5.2 Summary of chapters

The study focused at exploring teachers' experiences of teaching Mathematics in the Intermediate Phase in Nongoma circuit. Moreover, the study tried to understand and describe the teachers' experiences and what influenced these experiences and what can be done in order

to enhance the delivery of quality education in Mathematics in the Intermediate Phase in particular. As a result, the research questions that assisted to delimit the research problem were also delineated in Chapter 1 which are: the rationale of the study, literature review, conceptual framework, location of the study, research method and design, paradigm, methodological approach, research style, data generation method, sampling, data analysis, validity, reliability and rigour, proposed work plan cost estimates, limitation ethical issues, and references.

Moreover, Chapter Two offered literature in connection with the teachers' experiences teaching Mathematics in the Intermediate Phase. Further to this, the literature studied brought to light that there have been arguments about the Mathematics CAPS implementation in the Intermediate Phase. In line with this, Chapter Two also reviewed the literature on teachers' experiences, intended curriculum, assessed curriculum, enacted curriculum, curriculum levels, ten concepts of the curricular spider-web as conceptual framework, South African Mathematics curriculum from 1994 to date, as well as the position of CAPS in relation with its implementation.

Furthermore, Chapter Three presented the data generation methods, namely; one-on-one semi-structured interviews, focus group discussion and document analysis, and the key findings from the data within the conceptual framework, and trustworthiness was perfected with an aid of credibility, transferability, conformability and dependability. Further to this, convenience sampling and purposive sampling were adopted in this study. As a result, limitations and ethical issues were addressed too.

Moreover, Chapter Four dealt with the analysis data which were generated and analysed according to themes. In line with this, this was done through guided analysis following the conceptual framework. And the data generated from the teachers' experiences on the teaching of Mathematics in the Intermediate Phase were explored in order for teachers to change their teaching exercises.

5.3 Summary of findings and conclusions

Experiences from the teachers teaching Mathematics in the Intermediate Phase disclosed that knowledge and attitude experiences were the most dominant influences driving teachers' experiences on the teaching of Mathematics in the Intermediate Phase. Furthermore, the three methods of data generation underpinning the ten concepts of the curricular spider-web, as conceptual framework, explored in-depth the teachers' experiences on the teaching of Mathematics in the Intermediate Phase and has addressed both the first research question and research objective of the study. In addition to the above, professional rationale was not the main reason that drove teachers' experiences, and findings revealed that you can teach Mathematics in the Intermediate Phase without being in possession of a Mathematics qualification. Further to this, the findings also reveal that attitude (personal) and skill (societal) experience can influence teachers to teach Mathematics in the Intermediate Phase and be resilient to ever-changing curriculum development. As a result, the second research question and research objectives of the study have been addressed and teachers' experiences have been understood and described why are in this particular way especially in the Intermediate Phase. In other words, Mathematics teachers lack skill experiences because they are teaching Mathematics without qualifications regardless of the outcomes for the implementation of the curriculum. In line with the above, teachers were not aware of the detriment they are causing by being driven by interest, beliefs, and feelings about teaching Mathematics driven by the societal rationale since they do not use all relevant resources to teach Mathematics. Furthermore, it was noted that Mathematics teachers lack support from departmental officials in connection with proper implementation of CAPS because the teachers' are not monitored and sometimes teachers are not driven by written documents when executing their professional duties. Further to this, the teachers' experiences revealed that practices were not up to standard because some crucial information/content in their files was missing. This suggests that close monitoring and supervision was inadequate. The following is the summary of themes.

5.3.1 Rationale

According to the studies from the reviewed literature, rationale plays an important role for the proper and effective implementation of the intended curriculum (Brijlall & Maharaj, 2014). Further to this, Mantyi-Ncube et al. (2012) as well as Wilmore and Papa (2016) declared that

rationale is categorised into three levels namely professional rationale (reason from profession), societal rationale (reason from society), and personal rationale (reason from the individual) in the teaching of a subject. In other words, the clear understanding of the three reasons for teaching may lead to the delivering of high-quality teaching and improve teaching and learning practice. Further to this, Adendorff, Mason, Modiba, Faragher, and Kunene (2010) concur with Mpungose (2016) that personal rationale is the most dominant rationale for teachers teaching Mathematics since it seeks their attitude experience to prevail. In other words, personal rationale comes first, followed by societal rationale. However, teachers' academic advancement and professional upgrading activities contribute to an enjoyable and productive teaching (Lomibao, 2016). This suggests that a qualified teacher plays an integral part in the rationale for curriculum implementation.

Furthermore, findings revealed that there was a great need for teachers to understand the prerequisite for teaching Mathematics in the Intermediate Phase. Thus, the professional rationale should be given more attention in order to equip learners with desired and necessary skills acquired from learning and teaching Mathematics. In addition to the above, the findings further revealed that teachers had much love for teaching the subject and were also getting the recognition from parents due to the behaviour demonstrated by their children in the community. Further to this, Guerriero and Brodsky (2012) declares that higher general pedagogical knowledge enhances higher quality of instruction according to learners' perception. For example, higher cognitive activation, ensures better instructional pacing and from there better learner-teacher relationship is developed. Further to this, the literature reveals that the most effective teachers have deep knowledge of the subject they teach, and when teachers' knowledge falls below a certain level it is a significant impediment to learners' progress as well as a strong understanding of the material being taught, teachers must also understand the ways learners think about the content, be able to evaluate the thinking behind learners' own methods, and identify learners' common misconceptions (Coe, 2014). In line with this, a qualitative case study conducted by Orne-Gliemann et al. (2015) indicates that teachers are being equipped in order to be competent in all teaching subjects, such as Mathematics, in a primary school, regardless of whether or not that they have a specialisation. Thus, Msibi and Mchunu (2013) assert that professional teachers should be qualified and continue to upgrade themselves with regard to teaching and learning in order to impart knowledge to learners. As a result, teachers should be driven by skills experiences in order to employ the teaching strategies effectively

and efficiently. However, the personal and societal rationale were dominant reasons for teachers to teach Mathematics since they were driven by the passion and the praises from the society (attitude experience). Moreover, these findings addressed the second research question which says: Why are teachers' experiences of teaching Mathematics in the Intermediate Phase in a particular way? And the first research objective which says: To explore the teachers' experiences of teaching Mathematics in the Intermediate Phase.

In addition to the above, Motshekga (2009) is vocal about the personal rationale regarding the teaching of Mathematics. In line with the above, Motshekga (2009) asserts that teachers should establish self-confidence and competence to deal with any Mathematical situation without being hindered by fear of Mathematics and develop the sense of curiosity and passion for Mathematics. Furthermore, Mathematics teachers are influenced by the content to teach Mathematics in the Intermediate Phase. For instance, CAPS articulates the focus of content areas to be taught namely: data handling, space and shapes (geometry), and measurements. In other words, CAPS encourages teachers to be influenced by knowledge experience when teaching Mathematics because teachers should follow what is prescribed on the CAPS document.

5.3.2 Resources

In line with the findings from the reviewed literature, resources are any object or people that facilitate teaching and learning (Khoza, 2012; Mqadi, 2015). As a results, the successful and the effective implementation of the curriculum is determined by the resources used by teachers during the teaching and learning process. Furthermore, Khoza (2014) asserts that there are three propositions of resources namely, hard-ware resources (such as books and pens), soft-ware resources (that display information from the hard-ware such as slides and laptops) and ideological-ware resources (such as curriculum approaches). Further to this, the reviewed literature reveals that Mathematics teachers mostly rely on the hard-ware resources to teach Mathematics which seeks them to be driven by knowledge experience (Long & Dunne, 2014; Mntunjani, 2016). In line with this, Stols et al. (2015) assert that despite mobile phones and computers being increasingly available in emerging economics, teachers often do not make optimal use of technology for teaching and learning purposes. In addition to the above, teachers are hesitant to utilise soft-ware resources in their teaching, even though they realise its potential

value (Stols et al., 2015). Moreover, Mathematics teachers use ideological-ware resources to supplement hard-ware resources although they seem to be more comfortable using a single approach in teaching Mathematics content than using multi-methods (Umugiraneza, Bansilal, & North, 2017).

In line with the findings, it was revealed that Mathematics teachers were not using soft-ware resources because these were often lacking within the school. For instance, teachers sent learners to the community library and to search information using internet through parents' cell phones at home. Moreover, the findings indicated that Mathematics teachers adhered to hard-ware resources when teaching Mathematics because there was no time whereby they engage learners in soft-ware resources within the school such as the use of MS Word, MS Excel amongst. Furthermore, teachers were driven by knowledge experience when teaching Mathematics because they were referring to the written policy document which mostly outline the hard-ware resources as relevant resources for teaching Mathematics. Moreover, the ideological-ware resources were used by two Mathematics teachers out of three. This indicates that the majority of teachers were influenced by attitude experience. But, the other one was driven by the attitude experience. Thus, the first research question that says: What are the teachers' experiences of teaching Mathematics in the Intermediate Phase?; and, the second research objective which says: To understand the reasons of teachers' experiences of teaching Mathematics in the Intermediate Phase are addressed.

In connection with the above findings, Motshekga (2009) is vocal about soft-ware and hard-ware resources used during teaching and learning process such as PowerPoint slides and MS Excel and further puts an emphasis on its management and retrieval. Further to this, Motshekga (2009) is vocal about the ideological-ware resources when stating that when the teacher is teaching data handling he/she must pose questions for investigation (DBE, 2011, p. 10). In other words, the Mathematics teachers should use the question and answer (Socratic) method in order for learners "to develop skills to collect, organise, represent, interpret, analyse and report." (DBE, 2011, p. 10). This indicates that Mathematics teachers should be driven by both attitude and knowledge experience when it comes to the utilisation of resources when teaching Mathematics in the Intermediate Phase.

5.3.3 Goals

According to the literature review, goals are the essential elements for planning, controlling, and coordinating teaching and learning practice towards the achievement of the desired outcomes ((Huskin, Viesca, & Anadón, 2004; Khoza & Mpungose, 2018). Further to this, goals are divided into three levels namely aims, learning outcomes, and objectives (Khoza, 2016; Orne-Gliemann et al., 2015). In addition to the above, the understanding of the levels can assist: on what teachers intend to teach or what it is hoped learners will learn; help teachers design the content; the method and the assessment; and help to identify the resources needed to undertake the teaching (Campus, 2017). Furthermore, the action research study conducted by Mpungose (2015) concurs with the qualitative study conducted by Mqadi (2015) that teachers fail to distinguish between the aims and objectives. The action research conducted by Nkohla (2016) reveals that learning outcomes came last when teachers reflected on goals for teaching Mathematics. Furthermore, the study reveals that the experiences on objectives were aligned with the ones indicated in the CAPS document and literature. This suggests that teachers should be driven by knowledge experience when setting the goals for Mathematics because their teaching may not yield the expected result.

In line with the above, findings revealed that the majority of Mathematics teachers did set and understand the Mathematics objectives they wanted to achieve, whereas the minority had no objectives set for teaching Mathematics. Thus, this indicates that the minority of teachers were driven by knowledge experience because the Mathematics objectives were outlined in the Mathematics policy document. As a result, the research second objective (To understand the reasons of teachers' experiences of teaching Mathematics in the Intermediate Phase) and second question (Why teachers' experiences of teaching Mathematics in the intermediate are in a particular way?) are also addressed.

Furthermore, findings revealed that the majority of Mathematics teachers did not understand the learning outcomes for Mathematics which suggests that teachers were not dominated by skill experience because the Mathematics teachers did not teach learners toward the set learning

outcomes and they used different teaching strategies in order to achieve the Mathematical learning outcomes.

Moreover, Aims should give a broad purpose or general teaching intention of the content (Kennedy et al., 2006). For example, the aim for teaching measurement is to enable learners to distinguish centimetres from millimetres. Further to this, the aim may also serve as statement of introduction to a content and help potential learners to decide if the content is understood by them or if the remedial teaching is required. In line with the findings, the research revealed that the majority of teachers did understand the aim for teaching Mathematics. This indicates that teachers were influenced by attitude experience. Thus, the research questions (Why are teachers' experiences of teaching Mathematics teaching in the Intermediate Phase) and objectives (To explore the teachers' experiences of teaching Mathematics in the Intermediate Phase) have been answered and attended.

In connection with the above findings, Motshekga (2009) is vocal about Mathematics learning outcomes, aims, and objectives when it articulates that at the end of the day learners will be able to learn to "investigate, interpret, represent, and analyse the information, the aim for teaching Mathematics content is to ensure that learners acquire and apply knowledge and skills in ways that are meaningful to their own lives and learners should develop the correct use of the language of Mathematics" (DBE, 2011, pp. 8-9)). Further to this, Motshekga (2009) states that objectives should be mastered by the learners after Mathematics learners, In other words, teachers should be driven by knowledge experience before any other, during designing of Mathematics content and in order to achieve its goals.

5.3.4 Assessment

In connection with the findings, Motshekga (2009) is vocal about assessment as it articulates that peer assessment actively involve learners in assessment and allows learners to learn from and also reflect on their performance. Furthermore, Motshekga (2009) emphasises that summative assessment must be recorded and be used for promotion purposes. Yet, formative assessment must be used to assist teachers and keep them informed about methods they are using when teaching. Thus, this suggests that teachers should be driven by both attitude and

knowledge experiences because the assessment serves different purposes. For example, learners will be given a range of exercises such as fractions and division of up to 3-digit numbers by 2-digit numbers.

According to the literature review, assessment is a general term which includes all methods used to gather information about the learners' knowledge, ability, understanding, attitudes and motivation (Wiesnerová, 2012). Further to this, assessment allows learners to see his or her progress; it enables learners to see how their performances stand in comparison with other learners' performances. As a result, Hill and Barber (2014) categorise assessment into three levels namely summative, formative, and peer assessment. The reviewed literature reveals that the most common level used to assess learners' work is summative assessment and the teachers pointed out that recently they are using the group work in which the teachers divides the class in to groups and assign a task to every member of the group (peer assessment) (Azuka, 2013). Further to this, the qualitative case study conducted by Azuka (2013) reveals that 15% left daily work assessed at home and in class (formative assessment). This suggest that the majority of the teachers were driven by knowledge experience because the Mathematics policy document states clearly that formal assessment (summative) comprises School-based Assessment and end of the year Examination and are marked and formally recorded by the teacher for promotion purposes.

In connection with the findings, the data generated revealed that the majority of the Mathematics teachers used summative assessment to assess their learners. In other words, the Mathematics teachers were influenced by knowledge experience since they practiced assessment only for progression purposes. Further to this, it was transpired that few teachers used peer assessment to assess the learners which also confirms that there were few who were influenced by the skill experience when it came to learner assessment where as Motshekga (2009) does mention that peer assessment is one of the levels of assessment to be used for assessing learners. Moreover, the minority used formative assessment to assess learners which indicates that the minority was driven by the attitude experience because she overlooked the written document that speaks of all levels of assessment.

5.3.5 Content

According to the reviewed literature, the content refers to a wide range of aspects of subject matter knowledge and teaching of subject matter (Orne-Gliemann et al., 2015). Motshekga (2009) outlines three levels of the Mathematics content namely space and shapes (geometry), measurements, and data handling. This suggests that teachers should be influenced by knowledge experience when teaching the Mathematical content. Further to this, pedagogical the content knowledge of the teacher plays an integral part; pedagogical content knowledge includes the knowledge on how best to represent and formulate the subject to make it comprehensible to others, as well as knowledge of learners' subject specific conception and misconceptions (Krauss et al., 2008). Moreover, the qualitative study conducted by Naidoo and Mkhabela (2017) reveals that learners actively participate, socially construct meaning, and demonstrate understanding of data handling concepts; furthermore learners worked collaboratively on tasks. This suggests that teachers teaching Mathematics are driven by skill experience because they apply the pedagogical content knowledge acquired at the tertiary institution to impart knowledge to learners by using different teaching strategies. Further to this, Luneta (2014) asserts that the majority of teachers have a limited knowledge of basic knowledge of geometry and require not remedial, but re-learning of these basic concept. This indicates that Mathematics are driven by attitude experience since they are teaching Mathematics through passion instead of having skills acquired from university. Eventually, the study conducted by Casa, Firmender, Gavin, and Carroll (2017) reveal that learners have been performed disappointingly low in international assessment regarding the learners' understanding of measurements concepts which is of concern. In other words, Mathematics teachers need to be driven by attitude experience when teaching the measurements concepts in order to demystify them to learners. Further to this, the first research question (what are the teachers' experiences of teaching Mathematics in the Intermediate Phase? As well as second objective of the research study (to understand the reasons of teachers' experiences of teaching Mathematics in the Intermediate Phase) are addressed.

In connections with the findings, the data generated revealed that Mathematics teachers are teaching the space and shapes (geometry), data handling and measurements in the Intermediate Phase. This suggests that teachers were influenced by knowledge experience because teachers

were adhering to the policy document which prescribed the Mathematics content to be taught in the Intermediate Phase.

In line with the above, Motshekga (2009) is vocal about the Mathematics content to be taught in the Intermediate Phase as it articulates that space and shapes (geometry), data handling, and measurements should be taught in the Intermediate Phase because "each content area contributes towards the acquisition of specific skill" (DBE, 2011, p. 9). Thus, this suggests that Mathematics teachers should be influenced by both skill and knowledge experience when they want to accomplish the Mathematics learning outcomes. In line with the findings from the generated data, this revealed that the Mathematics teachers did teach data handling, measurements, and geometry in the Intermediate Phase. As a result, teachers were driven by knowledge experience when practicing their core duties that would lead to the attainment of the curriculum goals.

5.3.6 Teachers' role

In line with the findings generated from the data, the dominant role performed by teachers during the teaching and learning practice is that teachers acted as leaders and moderators. Further to this, the majority of teachers were driven by the knowledge experiences because for a successful teaching and learning process Mathematics teachers should provide leadership and moderate learners' work. Furthermore, this addresses the second research question and the first objectives of the study which are: Why teachers' experiences of teaching Mathematics in the Intermediate Phase are in a particular way?; and To explore teachers' experiences of teaching Mathematics in the Intermediate Phase. Furthermore, the role of a teacher as a facilitator needs more attention because the teacher was driven by an attitude experience. In view of this (Motshekga, 2009) is vocal about the teachers' role, and declares that teachers should lead, manage, and act as administrators learning and moderate the learners' activities. Further to this, the findings revealed that the majority of teachers played the leading role during the teaching and learning process. Whereas, the minority of teachers acted as facilitators and moderators during the teaching and learning practice. Thus, this suggests that Mathematics teachers were driven by knowledge experience during both the leading and facilitation of the teaching and learning process in order to give direction towards the attainment of the intended curriculum goals.

According to the reviewed literature, the teachers' role is very essential in planning, supporting, and guiding learners in learning about Mathematics concepts moderation and leading and providing feedback and cognitive structuring in an environment that encourages learning through social relationships (Bose & Seetso, 2016). In line with this, Kudryashova et al. (2016) declare the three propositions of teachers' role namely facilitator, moderator, and leader. Further to this, a teacher facilitator should help learners find solutions to problems (Goodyear & Dudley, 2015). Furthermore, teachers as leaders do create a conducive environment for teaching and learning to take place in pursuit of the academic and social school goals as well as in monitoring learners progress (Hompashe, 2018). Moreover, Kudryashova et al. (2016) declare that a teacher is a moderator when performing the following duties to (Bose & Seetso, 2016). Further to this, teachers can use various teaching experiences in their roles as facilitating the learners namely; creating the necessary conditions for them to analyse, reflect, and reconceive the current knowledge in a cooperative manner. As a result, Cranley, Cummings, Profetto-McGrath, Toth, and Estabrooks (2017) further indicate that most teachers in the teaching of Mathematics are driven by skill experience since they are required to facilitate the teaching and learning process so that learners can easily grab the content.

5.3.7 Accessibility

In the reviewed literature, Mishra and Mishra (2013) defines accessibility as a collective programming of the mind which distinguishes members of one group from another, which is passed from generation to generation. Further to this, Hogarth and Hilgert (2002) concurs with Mishra and Mishra (2013) that accessibility is categorised into three levels namely physical, financial, and cultural accessibility. In other words, the understanding of the three levels of accessibility may assist, lead, and ensure that all learners receive high quality education without any segregation. Furthermore, studies reveal that in the ideal flow chain, 100 percent of funds leaving the central government would reach the intended beneficiaries (schools) but in the absence of proper checks and balances or sound public financial management, money is leaked at various levels (for instance, at the Provincial Department of Education or the District Education Offices) (Boateng & Quan Liu, 2014). In addition to this, Boateng and Quan Liu (2014) further asserts that the remainder reaches the schools, many of which are not aware of the amount they are supposed to receive in the first place. This suggests that the Mathematics

teachers could not access the relevant resources for teaching Mathematics. Thus, this suggests that teachers teaching Mathematics in the Intermediate Phase should be driven by skill experience in order to improvise resources that will enable learners' access to Mathematics lessons. For example, coordinating fund raising for transport so that learners will be able to attend Mathematics workshops or seminars. Furthermore, the reviewed literature reveals that schools are no longer legally or culturally able to segregate learners, but patterns of cultural separatism among races continue to exist in the education system (Porter & Bratter, 2015). In addition to this, studies reveal that the most recommended religion in schools is Christianity because it has encouraged children to learn from religion and also helps learners to mature personally and socially as well as refining their psychological judgement and decisions on religious, moral and social issues, preparing them for life in a secular society (Itulua-Abumere, 2013). Moreover, Memari, Ahmad, Rahim, and Hassan (2017) reveal that the school environment has an effect on learners' academic achievement and affections because of infrastructure and material such as classrooms. Further to this, teachers provide a conducive classroom for active social interaction and cooperation amongst learners. The reviewed literature further reveals that learners have the best cooperation and teacher support and involvement when teaching practice is taking place in the classroom (Memari et al., 2017). In other words, Mathematics teachers should be driven by knowledge experience in order to positively influence the learning and academic performance of the learners.

In line with the above, Motshekga (2009) speaks louder regarding the environment where learners should receive the Mathematics lessons as it firmly articulates that the barriers and the used various curriculum strategies should be specifically addressed in the classroom. This indicates that teachers should be influenced by knowledge experience in order to ensure that there are no gaps that will hinder the achievement of curriculum goals. As a result, the second research objective and first research question were addressed to understand the reasons of teachers' experiences of teaching Mathematics in the Intermediate Phase and what are the teachers' experiences of teaching Mathematics in the Intermediate Phase? Moreover, Motshekga (2009) asserts that will serve the purpose of "equipping learners, irrespective of their socio-economic background, race, gender, physical ability or intellectual ability, with the knowledge, skills, and values necessary for self-fulfilment and meaningful participation in society as citizens of a free country" (DBE, 2011, p. 4). Thus, this suggests that Mathematics

teachers should be influenced by knowledge experience in order to observe the sense of equality and non-discrimination amongst the learners.

In line with the generated data, the findings revealed that most of the resources such as stationery were furnished by the Department of Education so that all learners will access education freely, the Mathematical language is implemented in the classroom (physical environment) by the majority of Mathematics teachers. Teachers revealed that the majority of learners are Zulu-speakers (cultural accessibility); the majority of learners use the public transport (physical accessibility) to go to school; and that cultural activities and diversity are observed and honoured in schools by Mathematics teachers. Thus, this suggests that Mathematics teachers seek to be influenced by skill attitude and knowledge experiences because the department policies state clearly that quintile 1 and 2 must access education freely and concession must be granted to the qualifying learners.

5.3.8 Location

Motshekga (2009) states clearly that it is the teachers' responsibility to ensure that the learning and teaching environment is conducive for teaching and learning practices at all times because the learning environment promotes inter-personal cooperation, classroom and school culture, protection against harassment and mental harm, and effective communication. Thus, this suggests that Mathematics teachers should be driven by knowledge experience when deciding the location for teaching Mathematics. For instance, a classroom is a conducive environment for teaching and learning Mathematics because of the availability of the chalkboard, security guard within the school that ensures the safety of the learners, and the appropriate furniture for learners to learn.

In line with the findings, the generated data reveals that the majority of Mathematics teachers were performing their duties inside the classroom using word-of-mouth (face-to-face environment). This propounds that teachers teaching Mathematics in the Intermediate Phase were driven by knowledge experience in order to allow learners to ask, share views, take notes when the teacher explains, and discuss the content in the presence of the teacher in a classroom. However, there were few teachers who articulated on an online and blended environment, this

suggests that the minority of teachers sought to be driven by both attitude and skill experiences in their teaching. In other words, the teachers teaching Mathematics in the Intermediate Phase were not good at using internet, videos, and application soft-ware amongst others. Thus, the first research question what are the teachers' experiences of teaching Mathematics in the Intermediate Phase? And the first research objective (to explore the teachers' experiences of teaching Mathematics in the Intermediate Phase) are addressed.

Moreover, the reviewed literature asserts that the location (environment) is a place where learners feel safe when they are trying to answer questions, make presentations and doing experiments (Shellard & Moyer, 2002). Further to this, Watson (2002) affirms that there are three levels of environment namely; online learning, face-to-face learning (environment), and blended learning. The studies reveals that the most dominant mode of teaching (learning environment) is face-to-face because learners are able to discuss in class, ask questions for clarification of doubts, and interact with the teacher (Devi & Deedi, 2015). Moreover, online learning offers the promise, through artificial intelligence of providing the optimal course pacing and content to fit each learners' needs and thereby improve educational quality and learning (Bettinger & Loeb, 2017). Studies further outline that most teachers are reluctant to use online learning whereas learners are very active (Chaqmaqchee, 2015). Thus, this suggests that teachers teaching Mathematics in the Intermediate Phase should be driven by different experiences in order to maintain order in their classrooms and promote positive teacher-learner interaction.

5.3.9 Time

According to the studies from the reviewed literature, time is a dimension and measure in which events can be ordered from the past through the present into the future and also the measure of duration of events and intervals between them (Beamish & McFarlane, 1983). Further to this, Cotton and Wikelund (1990) classify time into three levels namely school time, extra time, and instructional time. The studies reveal that instructional time is an actual learning time whereby learners are focused on academic material of relevant difficulty that allows them to experience success (Gromada & Shewbridge, 2016). Further to this, the studies also reveal that the time allocated for instruction time is lost via teacher absenteeism but has a spill over effect on lost instructional time due to weaker disciplinary climates. The studies also reveal that Mathematics

teachers lost valuable instructional time through disruptions (Gromada & Shewbridge, 2016). In addition to the above, Mupa and Chinooneka (2015) reveal that primary Mathematics teachers don't provide extra lessons for their learners. As a result, the Mathematics teachers teaching in the Intermediate Phase are driven by attitude experience because they do not employ different turn around strategies in order to contribute to effective teaching and learning. Furthermore, Elliot and Dweck (2013) asserts that school time spent by teachers is an average of 2388 hours per annum. However, Richwine and Biggs (2013) declares that teachers spend an average of 782 hours per annum. Thus, this indicates that teachers are influenced by skill experience when doing school work within and outside the school premises because this time involves preparations, planning, marking assessment and extra mural activities undertaken by learners.

Moreover, Motshekga (2009) is vocal about instructional time for Mathematics in the Intermediate Phase as it articulates that "10 weeks per term, with 6 hours for Mathematics per week, between 3 and 6 hours have been allocated for revision and 6 hours have been allocated for summative assessment for all subjects including Mathematics in Terms 2 and 4" (DBE, 2011, p. 32). This suggests that Mathematics should be driven by knowledge experience in order to manage and utilise time for teaching Mathematics effectively and yield the desired outcomes. Furthermore, the findings revealed that all of the Mathematics teachers spent 6 hours a week teaching Mathematics, allocated time for extra lesson in order to catch up and assist learners by clarifying some contents to learners, and spent 7 hours in school for executing other activities for the school. Thus, this suggests that the Mathematics teachers were influenced by knowledge experiences when allocating time for teaching and Mathematics. As a result, the second research question, why are teachers' experiences of teaching Mathematics in the Intermediate Phase in a particular way? And the second research objective (to understand the reasons of teachers' experiences of teaching Mathematics in the Intermediate Phase) are covered.

5.3.10 Teachers' activity

Motshekga (2009) is vocal about the activities to be carried out by Mathematics teachers during the teaching and learning practice since it states clearly that activities should be: learner-based "learners should become sensitised to bias in the collection of data, as well as misrepresentation

of data through the use of different scales and different measures of central tendency" (DBE, 2011, p. 33); teacher-based "learners have to be shown how to place the protractor on the arm of the angle to be measured" (DBE, 2011, p. 45); and content-based "learners should recognise that enlargement and reduction change the size of figures by increasing or decreasing the length of the size, but keeping the angles the same, producing similar rather than congruent figures" (DBE, 2011, p. 65). Therefore, this suggests that teachers should be driven by all levels of experience in order to design and prepare the activities that will lead to the accomplishment of the curriculum objectives.

Furthermore, the findings revealed that the majority of the activities prepared by Mathematics teachers were teacher-based because teachers were the centre of learning (leading the learning). Learners were not often given an opportunity to explore and identify the Mathematics problems (learner-based) and few activities were content-based because teachers made the practical examples using real objects during the teaching and learning process. Thus, suggest that teachers were influenced by knowledge experience rather than attitude and skill experience when planning their lessons in order to make their lessons stimulate/seek learners' attention.

According to studies from the reviewed literature, teachers' activities help teachers to observe the learners' outcomes from the beginning of the process and experience the new pedagogical approaches as learners themselves before adapting and implementing them in their own classrooms (Girvan, Conneely, & Tangney, 2016). Furthermore, Li et al. (2016) concurs with Mpungose (2016) that teacher activities are categorised into three namely; teacher-based, content-based, and learner-based activities. Further to this, Baig and Urbancic (2010) asserts that teachers prefer the teacher-based activities when delivering the knowledge to learners, because it is always remained a part of all other teacher activities. In addition to the above, learner-based activities are administered by teachers because it allows learners to proceed from known to unknown, from specific to general and from example to rule or formula. Further to this, the study conducted by Maasum, Maarof, Zakaria, and Yamat (2012) revealed that there are many challenges faced by teachers teaching Mathematics when implementing the content-based activities in the learners' second language, this more so when the learners have varying levels of English language proficiency. Since, English is used as a medium of instruction in this context, these teachers should have certain levels of effective English language proficiency

in order to deliver the content subject matter, Mathematics (Maasum et al., 2012). Thus, this suggests that teachers should be driven by skill experience when delivering content through content-based activities because they should possess proficient English skills. As a result, the first research question (what are the teachers' experiences of teaching Mathematics in the Intermediate Phase? And the second research objective (to understand the reasons of teachers' experiences of teaching Mathematics in the Intermediate Phase) are addressed.

5.4 Suggestion for further research

The following recommendations are suggested for further research

Further research must be made on the teaching of Mathematics in the Intermediate Phase. Further to this, the conceptual framework in the form of a spider-web should be considered in order to revamp and remodel the teaching process in order to accomplish the enacted curriculum goal. The reviewed literature revealed that there are a couple of studies on teachers' experiences of teaching Mathematics in the Intermediate Phase. Thus, in order to close this gap, it would be helpful for further studies in other circuits in the Zululand District. The importance of teachers' experiences in the teaching of Mathematics in the Intermediate Phase. Another potential study that is evoked from the findings are the driving forces of attitude experience as compared to skill and knowledge experiences in the teaching of Mathematics in the Intermediate Phase.

5.5 Recommendations

5.5.1 Recommendation 1

It is recommended for the Department of Education to review the way the teacher appointments and the allocation of duty load particularly, for Mathematics in the Intermediate Phase, are made. Thus, this will enable the teachers to implement the intended curriculum effectively and enable learners to acquire the necessary skills and knowledge. In addition to the above, teachers should possess the minimum prerequisites (qualifications) Diploma with specialisation in Mathematics for teaching Mathematics before is appointed to teach Mathematics in the Intermediate Phase in order to be relevant to the subject teaching rationale. In line with this, it is recommended that the professional unqualified teachers teaching Mathematics should be

granted bursaries by the Department of Education for developmental purposes and be qualified to teach Mathematics in the Intermediate Phase.

5.5.2 Recommendation 2

It is stated that the most overlooked teaching resources are soft-ware resources. Thus, it is recommended that the school governing bodies and the school management teams provide Mathematics teachers with soft-ware resources with an aid of norms and standards for learners because in the use soft-ware resources learners can use instructional programs without the direct supervision by teacher and in finding out information about a wide range of educational Mathematics content for reducing the coordination costs of group projects (Bulman & Fairlie, 2016).

5.5.3 Recommendation 3

Curriculum coverage and management workshops are recommended to be organised by the Department in order to address Mathematics learning outcomes and objectives because teachers fail to differentiate between objectives and learning outcomes and how to address them in order to achieve them. Further to this, the confusion of the goals may hinder the achievement of the curriculum goals. As a result, it is recommended that the goals of Mathematics teaching should be unpacked, and policy document copies be distributed to teachers for reference purposes.

5.5.4 Recommendation 4

It is then recommended to develop teachers teaching Mathematics in the Intermediate Phase on peer assessment because peer assessment enhances learning as an effective way to increase motivation for learners by engaging them in the evaluation process. Peer assessment has received attention in recent years from a number of international institutions in that it is designed to encourage peers to help each other to master and mitigate difficulties that are expected to occur (Alzaid et al., 2017). Furthermore, the formative assessment workshops is recommended to be conducted because teachers are not aware about its impact during the teaching and learning session as it can help teachers to anticipate in advance treating gaps of

learners and changing this methods, if necessary, in the learning process (Tridane, Belaaouad, Benmokhtar, Gourja, & Radid, 2015). In addition, it is recommended that Department officials and school management teams closely monitor and control the work of Mathematics teachers, like continuous assessment, since it contributes to learners' progression.

5.5.5 Recommendation 5

The findings revealed that the minority of teachers do not play their roles (such as being facilitators). Thus, it is recommended that the Department of Education organise workshops whereby they will equip Mathematics teachers about their roles to perform during the teaching and learning process as they play an integral part in curriculum implementation and teachers should be familiarised with the CAPS document in order to understand their roles.

5.5.6 Recommendation 6

The findings revealed that the majority of teachers depend on face-to-face learning to deliver content to learners. Thus, it is recommended that the Department of Education organise workshops whereby they will equip Mathematics teachers with computer skills during holidays or weekends and encourage the school governing bodies to allocate a budget for infrastructure in order to procure soft-ware resources so that teachers will use both online and face-to-face to communication with learners with an intention to deliver content to learners. As a result, the learners' queries will be addressed easily during and after school hours.

5.5.7 Recommendation 7

It is recommended that the Department of Education should organise a workshop for empowering Mathematics teachers about the importance of learner-based activities since Van Wyk, Davis, and Davies (2016) assert that learners are playing an active role in response to teachers' instructions and direction during the lesson, but take sole responsibility for their own learning process. Further to this, Mathematics teachers may benefit from this workshop by understanding, how, and when to design and conduct such activities as well as understanding its positive impact on their teaching.

5.6 Study limitations

Due to the fact that I am the Principal of the Participants where the study was taking place (Holinyoka Primary), I was very careful to be free of bias and not push my personal agenda while conducting my study. Hence, I did not have any influence, or air my point of views I had about the study. As a result, I let the Participants responded freely without any interference during the interview session. In addition to the above, there was only one well-known limitation that the qualitative research possesses, which is that the study findings can be generalised to the larger context because of the small sample size and the results are subjective. Therefore, the findings of this study can be used only for the sake of transferability rather than generalisation.

5.7 Conclusion

The main purpose of this study was to explore the teachers' experiences of teachers teaching Mathematics in the Intermediate Phase in Nongoma Circuit. In informing this research, questions and objectives were asked: What are the teachers' experiences of teaching Mathematics in the Intermediate Phase?; and Why teachers' experiences of teaching Mathematics in the Intermediate Phased are in a particular way? The main response for the first question, according to the findings from the reviewed literature is that teachers' experiences can be knowledge, skill, and attitude (Dewey, 1938; Webster et al., 2002). Furthermore, these experiences can be influenced by formal, non-informal, and informal experiences (Dewey, 1938; Khoza & Mpungose, 2018). Moreover, based on the second question, the teachers' teaching background is based either on personal or on society and/or written documents, this causes their experiences to be influenced in this particular way.

Furthermore, in this chapter a summary of this study has been provided. The findings from the literature, CAPS document, and from data analysis were compared. Further to this, recommendations articulated from each conceptual framework or curricular spider-web concept have also been made. In addition to the above, each concept of the curricular spider-

web is important, but all other concepts emanate from the rationale concept in the teaching and learning process.

Furthermore, the shortage of soft-ware resources limits both learners and teachers to acquire technological skills and hampers online and blended learning environments which are crucial to learning since they are repeatable as the content is stored and each time the learner accesses it, the same content can be repeated. Online learning reduces the need to travel longer distances or be away from home to gain the desired education (Guragain et al., 2016).

References

Aberle, D. F. (1959). The Prophet Dance and reactions to white contact. *Southwestern Journal of Anthropology, 15*(1), 74-83.

Abiddin, N. Z. (2007). Postgraduate students' perception on effective supervision: A case study at one public university in Malaysia. *The Journal of International Social Research, 1*(1), 7-19.

Abidin, N. Z., & Pasquire, C. L. (2007). Revolutionize value management: A mode towards sustainability. *International Journal of Project Management, 25*(3), 275-282.

Abudu, A. M., & Mensah, M. A. (2016). Basic School Teachers' Perceptions about Curriculum Design in Ghana. *Journal of Education and Practice, 7*(19), 21-29.

Achkovska-Leshkovska, E., & Spaseva, M. S. (2016). John Dewey's educational theory and educational implications of Howard Gardner's multiple intelligences theory. *International Journal of Cognitive Research in Science, Engineering and Education/IJCRSEE, 4*(2), 57-66.

Adelman-McCarthy, J. K., Agüeros, M. A., Allam, S. S., Prieto, C. A., Anderson, K. S., Anderson, S. F., . . . Baldry, I. K. (2008). The sixth data release of the sloan digital sky survey. *The Astrophysical Journal Supplement Series, 175*(2), 297.

Adendorff, M., Mason, M., Modiba, M., Faragher, L., & Kunene, Z. (2010). Being a Teacher.

Ahlstrom, M., Bartlett, D., Collier, C., Duchesne, J., Edelson, D., Gesino, A., . . . Möhrlen, C. (2013). Knowledge is power: Efficiently integrating wind energy and wind forecasts. *IEEE Power and Energy Magazine, 11*(6), 45-52.

Ahmad, Rajapaksha, Lim, Zhang, Bolan, Mohan, . . . Ok, S. (2014). Biochar as a sorbent for contaminant management in soil and water: a review. *Chemosphere, 99*, 19-33.

Ahmad, Rajapaksha, A., Zhang, Bolan, Mohan, Vithanage, . . . Ok, S. (2014). Biochar as a sorbent for contaminant management in soil and water: a review. *Chemosphere, 99*, 19-33.

Ahmed. (2009). Promoting access and enhancing education opportunities? The case of 'no-fees schools' in South Africa. *Compare, 39*(2), 203-218.

Ahmed. (2010). *The promise of happiness*: Duke University Press.

Aken, B. L., Ayling, S., Barrell, D., Clarke, L., Curwen, V., Fairley, S., . . . Hourlier, T. (2016). The Ensembl gene annotation system. *Database, 2016*.

Allen, T. F., & Hoekstra, T. W. (2015). *Toward a unified ecology*: Columbia University Press.

Alzaid, M., Roth, J., Wang, Y., Almutairi, E., Brown, S. L., Dumitrica, T., & Hobbie, E. K. (2017). Enhancing the elasticity of ultrathin single-wall carbon nanotube films with colloidal nanocrystals. *Langmuir, 33*(32), 7889-7895.

Amory. (2010). Learning to play games or playing games to learn? A health education case study with Soweto teenagers. *Australasian Journal of Educational Technology, 26*(6).

Amory, Huel, Bilić, Loreille, & Parsons, T. (2012). Automatable full demineralization DNA extraction procedure from degraded skeletal remains. *Forensic Science International: Genetics, 6*(3), 398-406.

Amstrong, K., & Allason, D. (2014). 2" NB shocktube releases of dense phase CO2. In: Report.

Anaraki-Ardakani, H. (2017). A computational study on the application of AlN nanotubes in Li-ion batteries. *Physics Letters A, 381*(11), 1041-1046.

Anderson, M. J., & Whitcomb, P. J. (2016). *DOE simplified: practical tools for effective experimentation*: Productivity press.

Avenier, M.-J., & Thomas, C. (2015). Finding one's way around various methodological guidelines for doing rigorous case studies: A comparison of four epistemological frameworks. *Systèmes d'information & management, 20*(1), 61-98.

Azevedo, J. P., Nguyen, M., & Sanfelice, V. (2012). ADECOMP: Stata module to estimate Shapley Decomposition by Components of a Welfare Measure.

Azuka, B. F. (2013). ASSESSMENT IN PRIMARY SCHOOL MATHEMATICS CLASSROOMS IN NIGERIA.

Baig, A., & Urbancic, T. (2010). Microseismic moment tensors: A path to understanding frac growth. *The Leading Edge, 29*(3), 320-324.

Bakia, M., Shear, L., Toyama, Y., & Lasseter, A. (2012). Understanding the Implications of Online Learning for Educational Productivity. *Office of Educational Technology, US Department of Education*.

Ball, P. (2008). Water as an active constituent in cell biology. *Chemical reviews, 108*(1), 74-108.

Baskarada, S. (2014). Qualitative case study guidelines.

Baya'a, N. F., & Daher, W. M. (2009). Learning mathematics in an authentic mobile environment: the Perceptions of Students. *International Journal of Interactive Mobile Technologies (iJIM), 3*, 6-14.

Bayless, J. A., Black, W. B., Brannick, G. L., Lee, G. W., Lloyd, L. M., Mason, L. P., . . . Young, G. C. (1998). Computer telephone system. In: Google Patents.

Beamish, & McFarlane. (1983). The forgotten requirement for age validation in fisheries biology. *Transactions of the American Fisheries Society, 112*(6), 735-743.

Bencheva, N. (2010). Learning styles and e-learning face-to-face to the traditional learning. *Научни Трудове На Русенския Университет, 49*, 63-67.

Benestan, L., Gosselin, T., Perrier, C., Sainte-Marie, B., Rochette, R., & Bernatchez, L. (2015a). RAD genotyping reveals fine-scale genetic structuring and provides powerful population assignment in a widely distributed marine species, the A merican lobster (H omarus americanus). *Molecular ecology, 24*(13), 3299-3315.

Benestan, L., Gosselin, T., Perrier, C., Sainte-Marie, B., Rochette, R., & Bernatchez, L. (2015b). RAD genotyping reveals fine-scale genetic structuring and provides powerful population assignment in a widely distributed marine species, the American lobster (Homarus americanus). *Molecular ecology, 24*(13), 3299-3315.

Berkhemer, O. A., Fransen, P. S., Beumer, D., Van Den Berg, L. A., Lingsma, H. F., Yoo, A. J., . . . Wermer, M. J. (2015). A randomized trial of intraarterial treatment for acute ischemic stroke. *New England Journal of Medicine, 372*(1), 11-20.

Bernstein, B. (2006). Vertical and horizontal discourse: An essay. In *Education and Society* (pp. 53-73): Routledge.

Berry, B., Daughtrey, A., & Wieder, A. (2010). Teacher Leadership: Leading the Way to Effective Teaching and Learning. *Center for Teaching Quality*.

Bettinger, E., & Loeb, S. (2017). Promises and pitfalls of online education. *Washington, DC: Brookings Institution*.

Bhoi, V. I., Kumar, S., & Murthy, C. N. (2016). Cyclodextrin encapsulated monometallic and inverted core–shell bimetallic nanoparticles as efficient free radical scavengers. *New Journal of Chemistry, 40*(2), 1396-1402.

Bishop, A. (1991). *Mathematical enculturation: A cultural perspective on mathematics education* (Vol. 6): Springer Science & Business Media.

Boateng, F., & Quan Liu, Y. (2014). Web 2.0 applications' usage and trends in top US academic libraries. *Library Hi Tech, 32*(1), 120-138.

Bose, K., & Seetso, G. (2016). Science and mathematics teaching through local games in preschools of Botswana. *South African Journal of Childhood Education, 6*(2), 1-9.

Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative research journal, 9*(2), 27-40.

Brandenberg, C. B., Kay, R. L., Maxwell, K. J., & Cotter, R. B. (2004). Method and apparatus for scheduling presentation of digital content on a personal communication device. In: Google Patents.

Brenner. (2009). Epidemiology of stomach cancer. In *Cancer Epidemiology* (pp. 467-477): Springer.

Brigman, M. J. (2011). *A sense of preparation: Perceptions of alternative licensure teacher candidates.* Doctoral dissertation). The University of North Carolina at Charlotte. ProQuest Dissertations and Theses, Retrieved from http://search. proquest. com/docview/897939034,

Brijlall, D., & Maharaj, A. (2013). Pre-service teachers' understanding of continuity of functions in the context of assessment items. *South African Journal of Higher Education, 27*(4), 797-814.

Brijlall, D., & Maharaj, A. (2014). Exploring support strategies for high school mathematics teachers from underachieving schools. *International Journal of Educational Sciences, 7*(1), 99-107.

Brockwell, P. J., & Davis, R. A. (2016). *Introduction to time series and forecasting*: springer.

Brophy, J. (2013). *Motivating students to learn*: Routledge.

Brown. (2013). *Augustine of Hippo: a biography*: Univ of California Press.

Brown, Barbieri, Ventura, Kass, & Frank. (2002). The time-rescaling theorem and its application to neural spike train data analysis. *Neural computation, 14*(2), 325-346.

Bruhjell, C. A. (2016). *A qualitative study of nursing faculty experiences of spirituality in nursing education.* Capella University,

Bryman, A., & Bell, E. (2015). *Business research methods*: Oxford University Press, USA.

Bulman, & Fairlie. (2016). Technology and education: Computers, software, and the internet. In *Handbook of the Economics of Education* (Vol. 5, pp. 239-280): Elsevier.

Callaghan. (2011). *Translational dynamics and magnetic resonance: principles of pulsed gradient spin echo NMR*: Oxford University Press.

Callaghan, T., Moll, H., Rakoczy, H., Warneken, F., Liszkowski, U., Behne, T., . . . Collins, W. A. (2011). Early social cognition in three cultural contexts. *Monographs of the Society for Research in Child Development*, i-142.

Campus, S. (2017). The 2nd Announcement of the 68th Annual Meeting of the Japan Wood Research Society in Kyoto. *J Wood Sci, 63*, 548-549.

Carl, M. (2012). *The CRITT TPR-DB 1.0: A database for empirical human translation process research.* Paper presented at the AMTA 2012 Workshop on Post-Editing Technology and Practice (WPTP-2012).

Casa, T. M., Firmender, J. M., Gavin, M. K., & Carroll, S. R. (2017). Kindergarteners' achievement on geometry and measurement units that incorporate a gifted education approach. *Gifted Child Quarterly, 61*(1), 52-72.

Casanave, C. P., & Li, Y. (2015). Novices' struggles with conceptual and theoretical framing in writing dissertations and papers for publication. *Publications, 3*(2), 104-119.

Cenoz, J. (2015). Content-based instruction and content and language integrated learning: The same or different? *Language, Culture and Curriculum, 28*(1), 8-24.

Cenoz, J., Genesee, F., & Gorter, D. (2014). Critical analysis of CLIL: Taking stock and looking forward. *Applied linguistics, 35*(3), 243-262.

Chaqmaqchee, Z. A. (2015). Student's Perspective on Formative Assessment: Quizzes and Discussion as Ongoing Process in Higher Education. *American Scientific Research Journal for Engineering, Technology, and Sciences (ASRJETS), 13*(1), 160-177.

Chen, G., Britun, N., Godfroid, T., Georgieva, V., Snyders, R., & Delplancke-Ogletree, M.-P. (2017). An overview of CO2 conversion in a microwave discharge: the role of plasma-catalysis. *Journal of Physics D: Applied Physics, 50*(8), 084001.

Chisholm, & Hoadley, U. (2005). wa Kivulu. *M., Brookes, H., Prinsloo, C., Kgobe, A., Mosia, D., Narsee, H., & Rule, S*.

Choi, J., Choi, W., Choi, Y., Jang, H., Jang, J., Jeon, E., . . . Kim, J. (2016). Observation of energy and baseline dependent reactor antineutrino disappearance in the RENO experiment. *Physical review letters, 116*(21), 211801.

Chorley, R. J., Dunn, A. J., & Beckinsale, R. P. (2009). *The History of the Study of Landforms: Volume 1-Geomorphology Before Davis (Routledge Revivals): or the Development of Geomorphology*: Routledge.

Chotai, K. A., & Payne, S. J. (1998). A rapid, PCR based test for differential molecular diagnosis of Prader-Willi and Angelman syndromes. *Journal of medical genetics, 35*(6), 472-475.

Chow, A., Her, Z., Ong, E. K., Chen, J.-m., Dimatatac, F., Kwek, D. J., . . . Leo, Y.-S. (2011). Persistent arthralgia induced by Chikungunya virus infection is associated with interleukin-6 and granulocyte macrophage colony-stimulating factor. *Journal of Infectious Diseases, 203*(2), 149-157.

Christiansen, T., Paulsen, S. K., Bruun, J. M., Pedersen, S. B., & Richelsen, B. (2010). Exercise training versus diet-induced weight-loss on metabolic risk factors and inflammatory markers in obese subjects: a 12-week randomized intervention study. *American Journal of Physiology-Endocrinology and Metabolism*, *298*(4), E824-E831.

Chukwuma, E. C., & Adebisi-Fagbohungbe, T. A. (2015). A checklist of angiosperm diversity surrounding Awba Dam: an important reservoir in Ibadan, Nigeria. *Plant Science Today*, *2*(4), 116-122.

Clotfelter, C. T., Ladd, H. F., & Vigdor, J. L. (2007). Teacher credentials and student achievement: Longitudinal analysis with student fixed effects. *Economics of Education Review*, *26*(6), 673-682.

Coe. (2014). Refining analyses of copy number variation identifies specific genes associated with developmental delay. *Nature genetics*, *46*(10), 1063.

Coe, Aloisi, Higgins, & Major, E. (2014). What makes great teaching? Review of the underpinning research.

Cohen. (2011). Human fatty liver disease: old questions and new insights. *Science*, *332*(6037), 1519-1523.

Cohen, & Levinthal, D. (2000). Absorptive capacity: A new perspective on learning and innovation. In *Strategic Learning in a Knowledge economy* (pp. 39-67): Elsevier.

Cohen, McGuire, Desjardins, Munsamy, Shea, Walker, . . . Alvarado, L. (2015). Evolution of extensively drug-resistant tuberculosis over four decades: whole genome sequencing and dating analysis of Mycobacterium tuberculosis isolates from KwaZulu-Natal. *PLoS medicine*, *12*(9), e1001880.

Cole, J. R., Chai, B., Farris, R. J., Wang, Q., Kulam-Syed-Mohideen, A., McGarrell, D. M., . . . Tiedje, J. M. (2006). The ribosomal database project (RDP-II): introducing myRDP space and quality controlled public data. *Nucleic acids research*, *35*(suppl_1), D169-D172.

Confait, M. F. (2018). Maximising the contributions of PHD graduates to national development: the case of the Seychelles.

Cotton, K., & Wikelund, K. (1990). *Educational time factors*: Northwest Regional Educational Laboratory Portland, OR.

Craig, D. A., & Porter, D. (2006). *Development beyond neoliberalism?: Governance, poverty reduction and political economy*: Routledge.

Cranley, L. A., Cummings, G. G., Profetto-McGrath, J., Toth, F., & Estabrooks, C. A. (2017). Facilitation roles and characteristics associated with research use by healthcare professionals: a scoping review. *BMJ open, 7*(8), e014384.

Creswell, J. W. (1994). *Research design: Qualitative & quantitative approaches*: Sage Publications, Inc.

Creswell, J. W. (2014). *A concise introduction to mixed methods research*: Sage Publications.

Creswell, J. W., & Clark, V. L. P. (2017). *Designing and conducting mixed methods research*: Sage publications.

Day, N., Oakes, S., Luben, R., Khaw, K., Bingham, S., Welch, A., & Wareham, N. (1999). EPIC-Norfolk: study design and characteristics of the cohort. European Prospective Investigation of Cancer. *British journal of cancer, 80*, 95.

DBE. (2010a). Curriculum Assessment Policy Statement (CAPS). In: Pretoria: Government Printers.

DBE. (2010b). Improving the quality of learning and teaching: Planning for 2010 and beyond. *Curriculum News*.

DBE. (2011). *Curriculum and Assessment Policy Statement. mathematics intermediate phase*. Pretoria: Government press.

De Clercq, F., & Shalem, Y. (2014). Teacher knowledge and employer-driven professional development: A critical analysis of the Gauteng Department of Education programmes. *Southern African Review of Education with Education with Production, 20*(1), 129-147.

Delcroix, Lang, Pepke-Zaba, Jansa, D'armini, Snijder, . . . Lewczuk, J. (2016). Long-term outcome of patients with chronic thromboembolic pulmonary hypertension: results from an international prospective registry. *Circulation, 133*(9), 859-871.

Denac, O. (2014). The significance and role of aesthetic education in schooling. *Creative Education, 5*(19), 1714.

Denscombe, M. (2014). *The good research guide: for small-scale social research projects*: McGraw-Hill Education (UK).

Devi, D. V., & Deedi, M. K. (2015). Teacher-centered approach, Student-centered approach, Lecture method, Problem-based method, Large group method, Small group method. *TEACHING AND LEARNING METHODOLOGY IN MEDICAL EDUCATION: AN ANALYSIS-IN GSL MEDICAL COLLEGE, RAJAHMUNDRY, AP*.(8888).

Dewey, J. (1897). *The significance of the problem of knowledge* (Vol. 1): University of Chicago Press.

Dewey, J. (1938). 1997. *Experience and education*.

Dillard, & Siktberg. (2013). Curriculum development: an overview. *Teaching in Nursing E-Book: A Guide for Faculty*, 76.

Doering, A., Veletsianos, G., Scharber, C., & Miller, C. (2009). Using the technological, pedagogical, and content knowledge framework to design online learning environments and professional development. *Journal of Educational Computing Research, 41*(3), 319-346.

Douglas, P. S., Hoffmann, U., Patel, M. R., Mark, D. B., Al-Khalidi, H. R., Cavanaugh, B., . . . Huang, M. (2015). Outcomes of anatomical versus functional testing for coronary artery disease. *New England Journal of Medicine, 372*(14), 1291-1300.

Draper, N. R., & Smith, H. (2014). *Applied regression analysis* (Vol. 326): John Wiley & Sons.

Du Plessis, E. (2013). *DO TEACHERS RECEIVE PROPER IN-SERVICE TRAINING TO IMPLEMENT CHANGING POLICIES: PERSPECTIVES FROM THE SOUTH AFRICAN CASE?*

Duchesne, S., & McMaugh, A. (2018). *Educational psychology for learning and teaching*: Cengage AU.

Dueñas Mendoza, F. P. (2017). *Establecimiento in vitro del frutal andino mortiño (vaccinium floribundum kunth) para la aplicación de agrotecnologías de multiplicación acelerada.* Quito: Universidad de las Américas, 2017,

Dunlosky, J., Rawson, K. A., Marsh, E. J., Nathan, M. J., & Willingham, D. T. (2013). Improving students' learning with effective learning techniques: Promising directions from cognitive and educational psychology. *Psychological Science in the Public Interest, 14*(1), 4-58.

Dziuban, C., Moskal, P., & Hartman, J. (2005). Higher education, blended learning, and the generations: Knowledge is power: No more. *Elements of quality online education: Engaging communities. Needham, MA: Sloan Center for Online Education*, 88-89.

Ebert, E., Ebert, C., & Bentley, M. L. (2013). Curriculum definition. *Retrieved from education. com*.

Elliot, A. J., & Dweck, C. S. (2013). *Handbook of competence and motivation*: Guilford Publications.

Facione, P. (1990). Critical thinking: A statement of expert consensus for purposes of educational assessment and instruction (The Delphi Report).

Fain. (2017). *Reading, understanding, and applying nursing research*: FA Davis.

Fargher, M. (2017). GIS and the Power of Geographical Thinking. In *The Power of Geographical Thinking* (pp. 151-164): Springer.

Fathony, F., & Fithriyah, N. H. M. P. (2017). *AN ANALYSIS ON CONTENT VALIDITY OF ENGLISH SUMMATIVE TEST ITEMS OF SECOND GRADE STUDENTS AT MTsN KALIJAMBE IN THE ACADEMIC YEAR 2015/2016.* IAIN Surakarta,

Florian, L., Rouse, M., & Black-Hawkins, K. (2016). *Achievement and inclusion in schools*: Routledge.

Foley, R. A., & Lewin, R. (2013). *Principles of human evolution*: John Wiley & Sons.

Fomunyam, K. G. (2014). Curriculum theorizing and individualism: An exploration of the curriculum's relation to the social, personal and political dimensions of schooling. *Mevlana International Journal of Education (MIJE), 4*(2), 122-131.

Frenkel, D., & Smit, B. (2001). *Understanding molecular simulation: from algorithms to applications* (Vol. 1): Elsevier.

Froyd, J., & Simpson, N. (2008). *Student-centered learning addressing faculty questions about student centered learning.* Paper presented at the Course, Curriculum, Labor, and Improvement Conference, Washington DC, 30 (11).

Fullan, M., & Langworthy, M. (2014). *A rich seam: How new pedagogies find deep learning*: MaRS Discovery District.

Furchová, J. (2016). Robert Křesťan's Dylanovky: Bob Dylan's Songs in Czech Translation.

Gaborone, B. (2006). The use of documentary research methods in social research. *African sociological review, 10*(1), 221-230.

Gandomi, A., & Haider, M. (2015). Beyond the hype: Big data concepts, methods, and analytics. *International Journal of Information Management, 35*(2), 137-144.

Garrison, C., & Ehringhaus, M. (2007). Formative and summative assessments in the classroom. In.

Garrott, I. (1986). Demountable collapsible trash bag support. In: Google Patents.

Gavin, B., & Harris, L. R. (2014). The future of self-assessment in classroom practice: Reframing self-assessment as a core competency.

Gedera, & Williams, J. (2015). *Activity theory in education: Research and practice*: Springer.

Genesee, F., & Lindholm-Leary, K. (2013). Two case studies of content-based language education. *Journal of Immersion and Content-Based Language Education, 1*(1), 3-33.

Gibb, H. A. R. (2013). *Studies on the Civilization of Islam*: Routledge.

Gibson, W. (2016). Debates in epistemology and ontology. *Designing Research in Education: Concepts and Methodologies*, 54.

Gilbert, M. (2015). *Winston S. Churchill: Never Despair, 1945–1965* (Vol. 8): Rosetta Books.

Gill, R., & Scharff, C. (2013). *New femininities: Postfeminism, neoliberalism and subjectivity*: Springer.

Girvan, C., Conneely, C., & Tangney, B. (2016). Extending experiential learning in teacher professional development. *Teaching and Teacher Education, 58*, 129-139.

Giuliani, A., Tavani, M., Bulgarelli, A., Striani, E., Sabatini, S., Cardillo, M., . . . Furukawa, N. (2010). AGILE detection of GeV $\sf $ γ-ray emission from the SNR W28. *Astronomy & Astrophysics, 516*, L11.

Godfray, H. C. J., Beddington, J. R., Crute, I. R., Haddad, L., Lawrence, D., Muir, J. F., . . . Toulmin, C. (2010). Food security: the challenge of feeding 9 billion people. *Science, 327*(5967), 812-818.

Goodyear, & Dudley, D. (2015). "I'ma facilitator of learning!" Understanding what teachers and students do within student-centered physical education models. *Quest, 67*(3), 274-289.

Goudas, M., Dermitzaki, I., Leondari, A., & Danish, S. (2006). The effectiveness of teaching a life skills program in a physical education context. *European journal of psychology of education, 21*(4), 429.

Goyal, M., Demchuk, A. M., Menon, B. K., Eesa, M., Rempel, J. L., Thornton, J., . . . Sapkota, B. L. (2015). Randomized assessment of rapid endovascular treatment of ischemic stroke. *New England Journal of Medicine, 372*(11), 1019-1030.

Greenfield, E. A. (2011). Developmental systems theory as a conceptual anchor for generalist curriculum on human behavior and the social environment. *Social Work Education, 30*(5), 529-540.

Grix, J. (2010). *The foundations of research*: Palgrave Macmillan.

Gromada, A., & Shewbridge, C. (2016). *Student learning time: A literature review*. Retrieved from

Guba, E. G., & Lincoln, Y. S. (1989). *Fourth generation evaluation*: Sage.

Gueguen, C., Bouley, J., Moussu, H., Luce, S., Duchateau, M., Chamot-Rooke, J., . . . Baron-Bodo, V. (2016). Changes in markers associated with dendritic cells driving the differentiation of either TH2 cells or regulatory T cells correlate with clinical benefit during allergen immunotherapy. *Journal of Allergy and Clinical Immunology, 137*(2), 545-558.

Guerriero, C. J., & Brodsky, J. L. (2012). The delicate balance between secreted protein folding and endoplasmic reticulum-associated degradation in human physiology. *Physiological reviews, 92*(2), 537-576.

Guo, D., & Lakshmikantham, V. (2014). *Nonlinear problems in abstract cones* (Vol. 5): Academic press.

Guragain, M., King, M. M., Williamson, K. S., Pérez-Osorio, A. C., Akiyama, T., Khanam, S., . . . Franklin, M. J. (2016). The Pseudomonas aeruginosa PAO1 two-component regulator, CarSR, regulates calcium homeostasis and calcium-induced virulence factor production through its regulatory targets, CarO and CarP. *Journal of bacteriology*, JB. 00963-00915.

Guskey, T. R. (1986). Staff development and the process of teacher change. *Educational researcher, 15*(5), 5-12.

Guthrie, G. (2010). *Basic research methods: An entry to social science research*: SAGE Publications India.

Haegel, N. M., Margolis, R., Buonassisi, T., Feldman, D., Froitzheim, A., Garabedian, R., . . . Holder, B. (2017). Terawatt-scale photovoltaics: Trajectories and challenges. *Science, 356*(6334), 141-143.

Hammersley, J. (2013). *Monte carlo methods*: Springer Science & Business Media.

Hannah, L. (2013). *The rise of the corporate economy*: Routledge.

Harrisson, S., Smith, J., Lambert, A., & Midwinter, M. (2008). Abdominal compartment syndrome: an emergency department perspective. *Emergency Medicine Journal, 25*(3), 128-132.

Hattie. (2009a). The contributions from teaching approaches-part 1. *J. Hattie.(Eds.), Visible learning: A synthesis of over, 800*, 161-199.

Hattie. (2009b). Visible learning: A synthesis of 800+ meta-analyses on achievement. *Abingdon: Routledge*.

Headey, B., Scott, D., & De Vaus, D. (1999). Domestic violence in Australia: Are women and men equally violent? *Australian Social Monitor, 2*(3), 57.

Hetem, D. J., Bootsma, M. C., & Bonten, M. J. (2015). Prevention of surgical site infections: decontamination with mupirocin based on preoperative screening for Staphylococcus aureus carriers or universal decontamination? *Clinical Infectious Diseases, 62*(5), 631-636.

Hill, P. W., & Barber, M. (2014). *Preparing for a Renaissance in Assessment*: Pearson London.

Hoadley. (2008). The boundaries of care: Education policy interventions for vulnerable children.

Hoadley, & Jansen, J. (2009). Curriculum. *Organizing knowledge for the classroom, 2*.

Hofisi, C., Hofisi, M., & Mago, S. (2014). Critiquing interviewing as a data collection method. *Mediterranean journal of social sciences, 5*(16), 60.

Hogarth, J. M. (2002). Financial literary and family & consumer scences. *Journal of Family and Consumer Sciences, 94*(1), 14.

Hogarth, J. M., & Hilgert, M. A. (2002). Financial knowledge, experience and learning preferences: Preliminary results from a new survey on financial literacy. *Consumer Interest Annual, 48*(1), 1-7.

Hompashe, D. (2018). *Instructional leadership and academic performance: Eastern Cape educators' perceptions and quantitative evidence*. Retrieved from

Howard, G. R. (2016). *We can't teach what we don't know: White teachers, multiracial schools*: Teachers College Press.

Howe, C., & Abedin, M. (2013). Classroom dialogue: A systematic review across four decades of research. *Cambridge journal of education, 43*(3), 325-356.

Humberg, A., Härtel, C., Paul, P., Hanke, K., Bossung, V., Hartz, A., . . . Herting, E. (2017). Delivery mode and intraventricular hemorrhage risk in very-low-birth-weight infants: observational data of the German Neonatal Network. *European Journal of Obstetrics & Gynecology and Reproductive Biology, 212*, 144-149.

Huskin, I., Viesca, L., & Anadón, R. (2004). Particle flux in the Subtropical Atlantic near the Azores: influence of mesozooplankton. *Journal of plankton research, 26*(4), 403-415.

Husu, J. (2004). Navigating through pedagogical practice: Teachers' epistemological stance towards pupils. In *Developing Teachers and Teaching Practice* (pp. 82-96): Routledge.

Hydén, L.-C., & Bülow, P. H. (2003). Who's talking: drawing conclusions from focus groups—some methodological considerations. *Int. J. Social Research Methodology, 6*(4), 305-321.

Irvin, & Trimble, S. (2003). based classroom practices and student achievement. *Middle School Journal, 35*(1), 52-57.

Itulua-Abumere, F. (2013). Understanding men and masculinity in modern society. *Open journal of social science research, 1*(2), 42-45.

Jansen. (1999). Ecstasy (MDMA) dependence. *Drug & Alcohol Dependence, 53*(2), 121-124.

Jansen. (2010). *The logic of qualitative survey research and its position in the field of social research methods.* Paper presented at the Forum Qualitative Sozialforschung/Forum: Qualitative Social Research.

Janson. (2009). *Curriculum: Organizing knowledge for the classroom*: Oxford University Press Southern Africa.

Jerome, L., & Lalor, J. (2016). Citizenship education north and south: learning and progression (CENSLP)-final project report.

Kalaivani, C., Sathish, S. S., Janakiraman, N., & Johnson, M. (2012). GC-MS studies on Andrographis paniculata (Burm. f.) Wall. ex Nees–A medicinally important plant. *Int J Med Arom Plants, 2*(1), 69-74.

Kaplan, C., Chan, R., Farbman, D. A., & Novoryta, A. (2015). Time for Teachers: Leveraging Expanded Time to Strengthen Instruction and Empower Teachers. *National Center on Time & Learning*.

Karlsson, J. (2002). The role of democratic governing bodies in South African schools. *Comparative education, 38*(3), 327-336.

Katiya, M., Mtonjeni, T., & Sefalane-Nkohla, P. (2015). Making sense of errors made by analytical chemistry students in their writing. *Journal of Language Teaching and Research, 6*(3), 490-503.

Kebande, V. R., & Venter, H. (2015). *Towards a model for characterizing potential digital evidence in the cloud environment during digital forensic readiness process.* Paper presented at the ICCSM2015-3rd International Conference on Cloud Security and Management: ICCSM2015.

Kennedy, D., Hyland, A., & Ryan, N. (2006). Writing and using learning outcomes, Bologna handbook, implementing Bologna in your institution. In: Berlin, Germany: Raabe Verlag Publishing.

Khan, S. U. (2016). *Pesticides in the soil environment*: Elsevier.

Kheswa. (2015). Criminal behaviour, substance abuse and sexual practices of South African adolescent males. *Journal of Psychology, 6*(1), 10-18.

Kheswa, J. (2015). Exploring the Impact of Ineffective Communication on Educators' Teaching Performance at Primary Schools. *International Journal of Educational Sciences, 11*(3), 330-340.

Khoza. (2012). Who helps an online facilitator to learn with students in a day. *Mevlana International Journal of Education, 2*(2), 75-84.

Khoza. (2013). Learning Outcomes as Understood by" Publishing Research" Facilitators at a South African University. *Online Submission, 3*(2), 1-11.

Khoza. (2014). Is chemistry everything to engineering students? Let their experiences talk. *South African Journal of Higher Education, 28*(2), 501-513.

Khoza. (2015). Student teachers' reflections on their practices of the curriculum and assessment policy statement. *South African Journal of Higher Education, 29*(4), 179-197.

Khoza. (2016). Can curriculum managers' reflections produce new strategies through Moodlei visions and resources? *South African Journal of Education, 36*(4), 1-9.

Khoza. (2018). Can Teachers' Reflections on Digital and Curriculum Resources Generate Lessons? *Africa Education Review*, 1-16.

Khoza, & Mpungose. (2018). *Use of the Moodle Curriculum by Lecturers at a South African University.* Paper presented at the ICEL 2018 13th International Conference on e-Learning.

Kiefer, & Alley, K., Cheryl (2015). Teacher and peer support for young adolescents' motivation, engagement, and school belonging. *Rmle Online, 38*(8), 1-18.

Killion, J. (2017). Research review. *The Learning Professional, 38*(2), 20.

Kini, T., & Podolsky, A. (2016). Does teaching experience increase teacher effectiveness. *A Review of the Research*.

Kohlbacher, F. (2006b). *The use of qualitative content analysis in case study research.* Paper presented at the Forum Qualitative Sozialforschung/Forum: Qualitative Social Research.

Kolbe, Partridge, & O'Reilly, F. (2012). Time and Learning in Schools: A National Profile. *National Center on Time & Learning*.

Koti, M. (2016). *Challenges experienced by Physical Sciences teachers with the implementation of the Curriculum and assessment policy statement in selected Eastern Cape schools.*

Krauss, S., Brunner, M., Kunter, M., Baumert, J., Blum, W., Neubrand, M., & Jordan, A. (2008). Pedagogical content knowledge and content knowledge of secondary mathematics teachers. *Journal of Educational Psychology, 100*(3), 716.

Kristanto, A., Mariono, A., & Nuryati, D. (2018). *Developing Media Module Proposed to Editor in Editorial Division.* Paper presented at the Journal of Physics: Conference Series.

Kruger, R. A. (1994). *Focus Group: Practical Guide for Applied Research*: Sage.

Kudryashova, A., Gorbatova, T., Rybushkina, S., & Ivanova, E. (2016). Teacher's Roles to Facilitate Active Learning. *Mediterranean journal of social sciences, 7*(1), 460.

Kuhn, M. (2015). Caret: classification and regression training. *Astrophysics Source Code Library*.

Kumaravadivelu, B. (2008). *Cultural globalization and language education*: Yale University Press.

Kung, Schmidt, Ebling, & Hu. (2007). The Effect of Lactobacillus buchneri 40788 on the Fermentation and Aerobic Stability of Ground and Whole High-Moisture Corn1. *Journal of Dairy Science, 90*(5), 2309-2314.

Küng, E. (2006). *An international perspective on the fundamental human rights of educators.* North-West University,

Ladd. (2008). *Intonational phonology*: Cambridge University Press.

Ladd, Sass, & Harris, D. (2007). The impact of national board certified teachers on student achievement in Florida and North Carolina. *Evidence Prepared For The National Academies Committee On The Evaluation Of The Impact Of Teacher Certification By The National Board For Professional Teaching Standards*.

Lak, M., Soleimani, H., & Parvaneh, F. (2017). The Effect of Teacher-Centeredness Method vs. Learner-Centeredness Method on Reading Comprehension among Iranian EFL learners. *Journal of Advances in English Language Teaching, 5*(1), pp. 1-10.

Lather, P. (2004). This is your father's paradigm: Government intrusion and the case of qualitative research in education. *Qualitative inquiry, 10*(1), 15-34.

Lawrence, White, & Snow, C. (2010). The words students need.

Li, W., Liu, J., & Zhao, D. (2016). Mesoporous materials for energy conversion and storage devices. *Nature Reviews Materials, 1*(6), 16023.

Lin, J., Haroun, B., Foo, T., Wang, J.-S., Helmick, B., Randall, S., . . . Kirkpatric, J. (2004). *A PVT tolerant 0.18 MHz to 600MHz self-calibrated digital PLL in 90nm CMOS process.* Paper presented at the Solid-State Circuits Conference, 2004. Digest of Technical Papers. ISSCC. 2004 IEEE International.

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry* (Vol. 75): Sage.

Loewenberg Ball, D., Thames, M. H., & Phelps, G. (2008). Content knowledge for teaching: What makes it special? *Journal of teacher education, 59*(5), 389-407.

Lomibao, L. S. (2016). Enhancing mathematics teachers' quality through Lesson Study. *SpringerPlus, 5*(1), 1590.

Long, C., & Dunne, T. (2014). Mathematics, curriculum and assessment: The role of taxonomies in the quest for coherence. *pythagoras, 35*(2), 1-14.

Loos, R., & Yeo, G. (2014). The bigger picture of FTO—the first GWAS-identified obesity gene. *Nature Reviews Endocrinology, 10*(1), 51.

Lopez, M. H. (2009). Latinos and education: Explaining the attainment gap.

Louws, M. L., van Veen, K., Meirink, J. A., & van Driel, J. H. (2017). Teachers' professional learning goals in relation to teaching experience. *European Journal of Teacher Education, 40*(4), 487-504.

Luce, A., Cash, M., Hundley, V., Cheyne, H., Van Teijlingen, E., & Angell, C. (2016). "Is it realistic?" the portrayal of pregnancy and childbirth in the media. *BMC pregnancy and childbirth, 16*(1), 40.

Luneta, K. (2014). Foundation phase teachers'(limited) knowledge of geometry. *South African Journal of Childhood Education, 4*(3), 71-86.

Ma, S., & Zhou, H.-C. (2010). Gas storage in porous metal–organic frameworks for clean energy applications. *Chemical Communications, 46*(1), 44-53.

Maasum, T. N. R. T. M., Maarof, N., Zakaria, E., & Yamat, H. (2012). Content-based instruction needs and challenges in diversified literacy context. *US-China Foreign Language, 10*(3), 999-1004.

Mac Kay, J. (2004). *Developmental local government: a study of public participation of the Integrated Development Planning Process of the City of Cape Town.* University of the Western Cape,

Machaba, M. M. (2013). *Teacher challenges in the teaching of mathematics at foundation phase.*

Machaka, Ganesh, & Mapfumo. (2013). Managing the expectations between the regulatory authority and consultants in the environmental impact assessment system in Zimbabwe. *Internafional Journal of Scienfific Research, 2*, 107-112.

Macri, J. I. (2015). *Computer-assisted self-assessment in high school instrumental music: An exploratory case study.* University of Phoenix,

Mahendra, A., Bahagia, Y., Nugraha, E., & Komariyah, L. (2008). The Implementation of Movement Problem-Based Learning: A Community-Based Action Research. *Educationist, 2*(1), pp. 38-43.

Maimela, H. S. (2015). *Impact of curriculum changes on primary school teachers in Seshego Circuit, Limpopo Province.*

Malik, M. A., & Ghazi, S. A. (2011). Enhancing Learning Outcomes through Proper Management of Teaching Learning Situation. *International Journal of Social Sciences & Education, 1*(4).

Maluleka. (2015). To understand SA's History Curriculum change in Democracy, let's first look at this change during transformation. *Accessed on, 26*(11), 2015.

Manqele, C. M. (2017). *An evaluation of learner-centred teaching as part of curriculum delivery in under-resourced schools.*

Mantyi-Ncube, B., Ndlovu, T., Moyo, N., & Sibanda, W. (2012). THE EXAMINATION SYSTEM AS A MEASUREMENT TOOL FOR PROVIDING RELIABLE INFORMATION ON QUALITY OF EDUCATION IN SKILLS-BASED SUBJECTS: A REVIEW. *UNISWA Journal of Agriculture (UJA), 16*.

Marais, B., Gie, R., Schaaf, H., Hesseling, A., Obihara, C., Starke, J., . . . Beyers, N. (2004). The natural history of childhood intra-thoracic tuberculosis: A critical review of literature from the pre-chemotherapy era [state of the art]. *The International Journal of Tuberculosis and Lung Disease, 8*(4), 392-402.

Marchetti, Joanny, Ramaswamy, Liverpool, Prost, J., Rao, & Simha, A. (2013). Hydrodynamics of soft active matter. *Reviews of Modern Physics, 85*(3), 1143.

Maree, J. K. (2015). Blending retrospect and prospect in order to convert challenges into opportunities in career counselling. In *Exploring new horizons in career counselling* (pp. 3-24): Springer.

Marisaldi, M., Fuschino, F., Labanti, C., Galli, M., Longo, F., Del Monte, E., . . . Moretti, E. (2010). Detection of terrestrial gamma ray flashes up to 40 MeV by the AGILE satellite. *Journal of Geophysical Research: Space Physics, 115*(A3).

Martin, & White, P. (2003). *The language of evaluation* (Vol. 2): Springer.

Mayan. (2016). *Essentials of qualitative inquiry*: Routledge.

McGarry, A., McDermott, M., Kieburtz, K., de Blieck, E. A., Beal, F., Marder, K., . . . Mallonee, W. M. (2017). A randomized, double-blind, placebo-controlled trial of coenzyme Q10 in Huntington disease. *Neurology, 88*(2), 152-159.

McKenney, S., Nieveen, N., & van den Akker, J. (2006). Design research from a curriculum perspective. *Educational design research*, 67-90.

Memari, A., Ahmad, R., Rahim, A. R. A., & Hassan, A. (2017). Optimizing a Just-In-Time logistics network problem under fuzzy supply and demand: two parameter-tuned metaheuristics algorithms. *Neural Computing and Applications*, 1-13.

Mercer. (2012). *Aerosol technology in hazard evaluation*: Elsevier.

Mercer, N., & Dawes, L. (2014). The study of talk between teachers and students, from the 1970s until the 2010s. *Oxford Review of Education, 40*(4), 430-445.

Merriam-Webster, D. (2002). Merriam-Webster. *On-line at http://www. mw. com/home. htm*.

Mhlongo. (2005). Diabetes misdiagnosed as AIDS in the teaching hospital at the University of Limpopo. *MEDUNSA campus*.

Mhlongo, Motaung, Kortidis, Mathe, Ntwaeaborwa, Swart, . . . Kiriakidis. (2015). A study on the sensing of NO2 and O2 utilizing ZnO films grown by aerosol spray pyrolysis. *Materials Chemistry and Physics, 162*, 628-639.

Miliszewska, I. (2007). Is it fully 'on'or partly 'off'? The case of fully-online provision of transnational education. *Journal of Information Technology Education: Research, 6*, 499-514.

Miliszewska, I., & Tan, G. (2007). Befriending computer programming: A proposed approach to teaching introductory programming. *Informing Science: International Journal of an Emerging Transdiscipline, 4*(1), 277-289.

Mishra, & Mishra. (2013). The research on trust in leadership: The need for context. *Journal of Trust Research, 3*(1), 59-69.

Mntunjani, L. (2016). *The use of mathematical resources to teach number concepts in the foundation phase.* Cape Peninsula University of Technology,

Mokoena, S. (2013). Engagement with and participation in online discussion Forums. *Turkish Online Journal Of Educational Technology-TOJET, 12*(2), 97-105.

Mollah, M. B., Azad, M. A. K., & Vasilakos, A. (2017). Security and privacy challenges in mobile cloud computing: Survey and way ahead. *Journal of Network and Computer Applications, 84*, 38-54.

Moon, J. A. (2013). *Reflection in learning and professional development: Theory and practice*: Routledge.

Moskal, P., Dziuban, C., & Hartman, J. (2013). Blended learning: A dangerous idea? *The Internet and Higher Education, 18*, 15-23.

Motshekga, M. A. (2009). Report of the task team for the review of the implementation of the National Curriculum Statement. *Statement by Minister of Basic Education on CurriculumReview Final Report. Pretoria: Government Printers*.

Moyo, P., Sibanda, B., & Beushausen, H. (2012). Modelling and integrity assessment of shear connectors in precast cast-in-situ concrete bridges. *Structural Engineering and Mechanics, 42*(1), 55-72.

Mpungose. (2016). Rationale of Teaching Physical Sciences Curriculum and Assessment Policy Statement Content: Teachers' Reflections. *International Journal of Educational Sciences, 14*(3), 256-264.

Mqadi, L. S. (2015). *An Exploration of the Experiences of Grade Ten Life Orientation Teachers Towards the Teaching of Physical Education in Schools Under Ugu District, KwaZulu-Natal.* University of KwaZulu-Natal, Edgewood,

Msibi, T., & Mchunu, S. (2013). The knot of curriculum and teacher professionalism in post-apartheid South Africa. *Education as Change, 17*(1), 19-35.

Munisi, G. H. (2017). Determinants of capital structure: evidence from Sub-Saharan Africa. *International Journal of Managerial and Financial Accounting, 9*(2), 182-199.

Mupa, P., & Chinooneka, T. I. (2015). Factors Contributing to Ineffective Teaching and Learning in Primary Schools: Why Are Schools in Decadence? *Journal of Education and Practice, 6*(19), 125-132.

Murphy. (2009). How mitochondria produce reactive oxygen species. *Biochemical Journal, 417*(1), 1-13.

Murphy. (2013). *Tourism: A community approach (RLE Tourism)*: Routledge.

Muszynska, A., & Bently, D. (1989). Anti-swirl arrangements prevent rotor/seal instability. *Journal of Vibration, Acoustics, Stress, and Reliability in Design, 111*(2), 156-162.

Naidoo, J., & Mkhabela, N. (2017). Teaching data handling in foundation phase: Teachers' experiences. *Research in Education, 97*(1), 95-111.

Ndoziya, C. (2014). *The instructional leadership roles of the secondary school principal towards quality school improvement in Zimbabwean schools.*

Nel, M., Engelbrecht, P., Nel, N., & Tlale, D. (2014). South African teachers' views of collaboration within an inclusive education system. *International Journal of Inclusive Education, 18*(9), 903-917.

Neuman, M., & Simmons, W. (2000). Leadership for student learning. *Phi Delta Kappan, 82*(1), 9-12.

Nguyen, T., Nguyen, H., Nguyen, M., Komatsu, S., & Michiels, R. (2016). Heart valve prosthesis and methods of manufacture and use. In: Google Patents.

Nkhama, E., Ndhlovu, M., Dvonch, J., Siziya, S., & Voyi, K. (2015). Prevalence of Self-Reported Pulmonary Symptoms in a Community Residing Near a Cement Factory in Chilanga, Zambia: A Cross Sectional Study. *J Pollut Eff Cont, 3*(146), 2.

Nkohla, M. B. (2016). *Educators' Reflections on Their Practices of Agricultural Sciences Curriculum and Assessment Policy Statement.* University of KwaZulu-Natal, Edgewood,

Nkosi, M. (2015). Student Teachers' Experiences of Teaching Physical Education of Curriculum and Assessment Policy Statement (CAPS): Exploring the Gendered Implications. *International Journal of Educational Sciences, 8*(2), 345-361.

Nordhaus, W. D. (2010). Economic aspects of global warming in a post-Copenhagen environment. *Proceedings of the National Academy of Sciences, 107*(26), 11721-11726.

Nosek, B. A., Alter, G., Banks, G. C., Borsboom, D., Bowman, S. D., Breckler, S. J., . . . Christensen, G. (2015). Promoting an open research culture. *Science, 348*(6242), 1422-1425.

Nzimande, N. (2015). Teaching pre-service teachers about LGBTI issues: Transforming the self. *Agenda, 29*(1), 74-80.

O'Reilly, C. C. (2016). *The Irish language in Northern Ireland: the politics of culture and identity*: Springer.

Olfos, R., Goldrine, T., & Estrella, S. (2014). Teachers' pedagogical content knowledge and its relation with students' understanding. *Revista Brasileira de Educação, 19*(59), 913-944.

Olver, F. W., Lozier, D. W., Boisvert, R. F., & Clark, C. W. (2010). *NIST handbook of mathematical functions hardback and CD-ROM*: Cambridge University Press.

Ormston, R., Spencer, L., Barnard, M., & Snape, D. (2014). The foundations of qualitative research. *Qualitative research practice: A guide for social science students and researchers, 2*, 52-55.

Orne-Gliemann, J., Larmarange, J., Boyer, S., Iwuji, C., McGrath, N., Bärnighausen, T., . . . Rochat, T. (2015). Addressing social issues in a universal HIV test and treat intervention trial (ANRS 12249 TasP) in South Africa: methods for appraisal. *BMC Public Health, 15*(1), 209.

Ornstein, A. C., & Hunkin, F. (2004). *Foundations, principles and issues*: New York, NY: Allyn.

Oyugi, P. (2015). Knowledge, Skills and Dispositions of School Principals: Perspectives from Kisumu County, Kenya. *American Journal of Educational Science, 1*(3), 79-90.

Padgett, D. K. (2016). *Qualitative methods in social work research* (Vol. 36): Sage Publications.

Parker-Jenkins, M. (2018). Problematising ethnography and case study: reflections on using ethnographic techniques and researcher positioning. *Ethnography and Education, 13*(1), 18-33.

Patterson, T. F., Thompson III, G. R., Denning, D. W., Fishman, J. A., Hadley, S., Herbrecht, R., . . . Nguyen, M. H. (2016). Practice guidelines for the diagnosis and management of aspergillosis: 2016 update by the Infectious Diseases Society of America. *Clinical Infectious Diseases, 63*(4), e1-e60.

Peersman, G., & Wagner, W. (2014). Shocks to bank lending, risk-taking, securitization, and their role for US business cycle fluctuations.

Perry, N. E., VandeKamp, K. O., Mercer, L. K., & Nordby, C. J. (2002). Investigating teacher-student interactions that foster self-regulated learning. *Educational psychologist, 37*(1), 5-15.

Peters, R. S. (2015). *Ethics and Education (Routledge Revivals)*: Routledge.

Phillipson, R. (1996). Linguistic imperialism: African perspectives. *ELT journal, 50*(2), 160-167.

Pillay, S. (2007). *The effect of bullying on the primary school learner.*

Plomp, T., & Nieveen, N. (2009). An introduction to educational design research: Proceedings of the seminar conducted at the East China Normal University, Shanghai. In: Enschede, The Netherlands: SLO-Netherlands Institute for Curriculum Institute.

Porcu, E., Alegría, A., & Furrer, R. (2017). Modeling Temporally Evolving and Spatially Globally Dependent Data. *arXiv preprint arXiv:1706.09233*.

Porter, & Bratter. (2015). Investigating race, class and context through historical evidence: Segregation and the ecology of aspirations of Black college students in the 1960s south. *Sociological Spectrum, 35*(3), 286-308.

Porter, L., & Smithson, J. (2001). Are content standards being implemented in the classroom? A methodology and some tentative answers. *Yearbook-National Society for the Study of Education, 2*, 60-80.

Powell, D. A., Jacob, C. J., & Chapman, B. J. (2012). Using blogs and new media in academic practice: Potential roles in research, teaching, learning, and extension. *Innovative Higher Education, 37*(4), 271-282.

Puderbaugh, A. (2015). Research Suggestions in the Design of a Global Graduate Business Program Delivered by Online Learning. *International Association for Development of the Information Society*.

Queirós, A., Faria, D., & Almeida, F. (2017). Strengths and Limitations of Qualitative and Quantitative Research Methods. *European Journal of Education Studies*.

Radakovic, M., & Antonijevic, S. (2013). Balance between formal and informal learning: Experience and challenges of civil servants training in Serbia. *Retrieved from*.

Rahman, Akhtar, Jamil, Banik, & Asaduzzaman. (2015). TGF-β/BMP signaling and other molecular events: regulation of osteoblastogenesis and bone formation. *Bone research, 3*, 15005.

Rakometsi, M. S. (2008). *The transformation of Black school education in South Africa, 1950-1994: A historical perspective.* University of the Free State,

Ramdhani, M. A., & Muhammadiyah, H. (2015). The Criteria of Learning Media Selection for Character Education in Higher Education.

Ramsden, P. (2003). *Learning to teach in higher education*: Routledge.

Reddy, P., Zuma, K., Shisana, O., Jonas, K., & Sewpaul, R. (2015). Prevalence of tobacco use among adults in South Africa: Results from the first South African National Health and Nutrition examination survey. *South African Medical Journal, 105*(8), 648-655.

Reid, N. I., & Hawley, S. L. (2013). *New light on dark stars: red dwarfs, low-mass stars, brown dwarfs*: Springer Science & Business Media.

Remillard, J., & Heck, D. (2014). Conceptualizing the enacted curriculum in mathematics education. *Enacted mathematics curriculum: A conceptual framework and research needs*, 121-148.

Reynek, M., Meyer, L., & Nel, C. (2010). School-based assessment: The leash needed to keep the poetic 'unruly pack of hounds' effectively in the hunt for learning outcomes. *South African Journal of Education, 30*(2).

Richwine, & Biggs. (2013). How Much Time Do Teachers Spend Working? Evidence from the American Time Use Survey.

Ritchie, J., Lewis, J., Nicholls, C. M., & Ormston, R. (2013). *Qualitative research practice: A guide for social science students and researchers*: sage.

Roddy, C. W., Covington, R., Ravi, K. M., Bittar, M., Bonavides, C., Moake, G., . . . Tapie, W. (2017). Use of micro-electro-mechanical systems (MEMS) in well treatments. In: Google Patents.

Rolfe, G. (2006). Validity, trustworthiness and rigour: quality and the idea of qualitative research. *Journal of advanced nursing, 53*(3), 304-310.

Roscoe, D. D. (2012). Comparing student outcomes in blended and face-to-face courses. *Journal of Political Science Education, 8*(1), 1-19.

Rosell, R., Carcereny, E., Gervais, R., Vergnenegre, A., Massuti, B., Felip, E., . . . Sanchez, J. M. (2012). Erlotinib versus standard chemotherapy as first-line treatment for European patients with advanced EGFR mutation-positive non-small-cell lung cancer (EURTAC): a multicentre, open-label, randomised phase 3 trial. *The lancet oncology, 13*(3), 239-246.

Rowland, T., & Ruthven, K. (2011). Introduction: Mathematical knowledge in teaching. In *Mathematical knowledge in teaching* (pp. 1-5): Springer.

Rusznyak, L., & Bertram, C. (2015). Knowledge and judgement for assessing student teaching: A cross-institutional analysis of teaching practicum assessment instruments. *Journal of Education, 60*, 31-58.

Sajedi. (2014). A metaheuristic algorithm for job scheduling in grid computing. *International Journal of Modern Education and Computer Science, 6*(5), 52.

Saltzman, J. R., Cash, B. D., Pasha, S. F., Early, D. S., Muthusamy, V. R., Khashab, M. A., . . . Lightdale, J. R. (2015). Bowel preparation before colonoscopy. *Gastrointestinal endoscopy, 81*(4), 781-794.

Sartory, E. A. (2014). Eliciting and foregrounding the voices of young people at risk of school exclusion: How does this change schools' perceptions of pupil disaffection?

Sass, T. R. (2008). The Stability of Value-Added Measures of Teacher Quality and Implications for Teacher Compensation Policy. Brief 4. *National Center for Analysis of Longitudinal Data in Education Research*.

Sayed, Y., & Soudien, C. (2005). Decentralisation and the construction of inclusion education policy in South Africa. *Compare: A Journal of Comparative and International Education, 35*(2), 115-125.

Schwandt, T. (2014). *The Sage dictionary of qualitative inquiry*: Sage Publications.

Scoboria, A., Wade, K. A., Lindsay, D. S., Azad, T., Strange, D., Ost, J., & Hyman, I. E. (2017). A mega-analysis of memory reports from eight peer-reviewed false memory implantation studies. *Memory, 25*(2), 146-163.

Scott, Yeld, & Hendry. (2007). *Higher education monitor: A case for improving teaching and learning in South African higher education*: Council on Higher Education Pretoria.

Sebbane, Y. B. (2015). *Smart autonomous aircraft: flight control and planning for UAV*: Crc Press.

Sedio. (2013). How specialised must natural enemies be to facilitate coexistence among plants? *Ecology letters, 16*(8), 995-1003.

Sehlapelo, T. W. (2015). *Investigating factors that motivate teachers to teach after normal working hours: a case study in the Capricorn district of Limpopo.*

Senge, M. O. (2000). Highly substituted porphyrins. *The porphyrin handbook, 1*, 239.

Sergiou, C., Antoniou, P., & Vassiliou, V. (2014). A comprehensive survey of congestion control protocols in wireless sensor networks. *IEEE Communications Surveys & Tutorials, 16*(4), 1839-1859.

Serin, N., Serin, T., Horzum, Ş., & Celik, Y. (2005). Annealing effects on the properties of copper oxide thin films prepared by chemical deposition. *Semiconductor Science and Technology, 20*(5), 398.

Shabiralyani, G., Hasan, K. S., Hamad, N., & Iqbal, N. (2015). Impact of Visual Aids in Enhancing the Learning Process Case Research: District Dera Ghazi Khan. *Journal of Education and Practice, 6*(19), 226-233.

Shellard, E., & Moyer, P. S. (2002). What Principals Need to Know about Teaching Math.

Shenton, A. K. (2004). Strategies for ensuring trustworthiness in qualitative research projects. *Education for information, 22*(2), 63-75.

Shulman. (1986). Those who understand: Knowledge growth in teaching. *Educational researcher, 15*(2), 4-14.

Shulman, L. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard educational review, 57*(1), 1-23.

Silverman, D. (2015). *Interpreting qualitative data*: Sage.

Small, P. M., & Pai, M. (2010). Tuberculosis diagnosis—time for a game change. In: Mass Medical Soc.

Smith-, W. (2014). *Mobile interactive fitness technologies and the recreational experience of bicycling: A phenomenological exploration of the Strava community*. Clemson University,

Smith, & Frenkel. (2005). Glucocorticoids inhibit the transcriptional activity of LEF/TCF in differentiating osteoblasts in a glycogen synthase kinase-3β-dependent and-independent manner. *Journal of Biological Chemistry, 280*(3), 2388-2394.

Smith, & Joyce. (2004). Mozart versus new age music: Relaxation states, stress, and ABC relaxation theory. *Journal of Music Therapy, 41*(3), 215-224.

Smithson, J. (2000). Using and analysing focus groups: limitations and possibilities. *International journal of social research methodology, 3*(2), 103-119.

Snoek, J., Rippel, O., Swersky, K., Kiros, R., Satish, N., Sundaram, N., . . . Adams, R. (2015). *Scalable bayesian optimization using deep neural networks.* Paper presented at the International Conference on Machine Learning.

Snow, C. E. (2010). Academic language and the challenge of reading for learning about science. *Science, 328*(5977), 450-452.

Snyders, D. J., & Chaudhary, A. (1996). High affinity open channel block by dofetilide of HERG expressed in a human cell line. *Molecular pharmacology, 49*(6), 949-955.

Sober, S. J., & Brainard, M. S. (2009). Adult birdsong is actively maintained by error correction. *Nature neuroscience, 12*(7), 927.

Solak, E., & Cakir, R. (2014). Face to Face or E-Learning in Turkish EFL Context. *Turkish Online Journal of Distance Education, 15*(3), 37-49.

Sollenberger, D., Darpel, D., Talevski, S., Shumaker, L., Meyer, K., Journey, J., . . . Gimbert, N. (2002). Personalized intranet portal. In: Google Patents.

Sormunen, E., Alamettälä, T., & Heinström, J. (2013). *The teacher's role as facilitator of collaborative learning in information literacy assignments.* Paper presented at the European Conference on Information Literacy.

Souto-Manning, M. (2012). Teacher as researcher: Teacher action research in teacher education. *Childhood Education, 88*(1), 54-56.

Spaull, N. (2013). South Africa's education crisis: The quality of education in South Africa 1994-2011. *Johannesburg: Centre for Development and Enterprise*, 1-65.

Spiegelman, M., Brown, D. E., Sutton, L. A., Schiro, P., Stelzmuller, C. M., Sahay, S. S., . . . Ramachandra, P. C. G. B. (2013). Method for sharing and searching playlists. In: Google Patents.

Steen, V. D., Costantino, J. P., Shapiro, A. P., & Medsger, T. A. (1990). Outcome of renal crisis in systemic sclerosis: relation to availability of angiotensin converting enzyme (ACE) inhibitors. *Annals of internal medicine, 113*(5), 352-357.

Steyn. (2014). Towards the development of equal and fair home language assessments: Outline of a pilot study. *MS, Interim report to Umalusi*.

Stigendal, M. (2013). Om kunskap: men en annan typ av kunskap.

Stoll, B. J., Hansen, N. I., Bell, E. F., Walsh, M. C., Carlo, W. A., Shankaran, S., . . . Wyckoff, M. (2015). Trends in care practices, morbidity, and mortality of extremely preterm neonates, 1993-2012. *Jama, 314*(10), 1039-1051.

Stoller, F. L. (2008). Content-based instruction. In *Encyclopedia of language and education* (pp. 1163-1174): Springer.

Stols, G., Ferreira, a., Pelser, A., Olivier, W., Van der Merwe, A., De Villiers, C., & Venter, S. (2015). Perceptions and needs of South African Mathematics teachers concerning their use of technology for instruction. *South African Journal of Education, 35*(4).

Tan, E., & Barton, A. C. (2010). Transforming science learning and student participation in sixth grade science: A case study of a low-income, urban, racial minority classroom. *Equity & Excellence in Education, 43*(1), 38-55.

Tasca, L., Le Fèvre, O., Hathi, N., Schaerer, D., Ilbert, O., Zamorani, G., . . . Le Brun, V. (2015). The evolving star formation rate: M⋆ relation and sSFR since z≃ 5 from the VUDS spectroscopic survey. *Astronomy & Astrophysics, 581*, A54.

Teddlie, C., & Yu, F. (2007). Mixed methods sampling: A typology with examples. *Journal of mixed methods research, 1*(1), 77-100.

Thomas, K. (1962). The structure of scientific revolutions.

Tofade, T., Elsner, J., & Haines, S. T. (2013). Best practice strategies for effective use of questions as a teaching tool. *American journal of pharmaceutical education, 77*(7), 155.

Topping, K. J. (2009). Peer assessment. *Theory into practice, 48*(1), 20-27.

Tossell, D. (2013). *Tommy Doc: The Controversial and Colourful Life of One of Football's Most Dominant Personalities*: Random House.

Tridane, M., Belaaouad, S., Benmokhtar, S., Gourja, B., & Radid, M. (2015). The impact of formative assessment on the learning process and the unreliability of the mark for the summative evaluation. *Procedia-Social and Behavioral Sciences, 197*, 680-685.

Tshiredo, L. L. (2013). *The impact of the curriculum change in the teaching and learning of science: A case study in under-resourced schools in Vhembe district.*

Umugiraneza, O., Bansilal, S., & North, D. (2017). Exploring teachers' practices in teaching Mathematics and Statistics in KwaZulu-Natal schools. *South African Journal of Education, 37*(2).

Van de Loosdrecht, J., Botes, F., Ciobica, I., Ferreira, A., Gibson, P., Moodley, D., . . . Niemantsverdriet, J. (2013). Fischer-Tropsch synthesis: catalysts and chemistry. In *Comprehensive Inorganic Chemistry II: from elements to applications*: Elsevier.

Van Den Akker. (2004). Curriculum perspectives: An introduction. In *Curriculum landscapes and trends* (pp. 1-10): Springer.

Van den Akker. (2013). Curricular Development Research as Specimen of Educational Design Research. *Educational Design Research*, 53-70.

Van den Akker, Gravemeijer, & McKenney. (2006). *Educational design research*: Routledge.

van den Akker, Gravemeijer, McKenney, & Nieveen. (2006). Introducing educational design research. *Educational design research, 1*, 3-7.

Van Wyk, H., Davis, R., & Davies, J. (2016). A critical review of low-carbohydrate diets in people with Type 2 diabetes. *Diabetic Medicine, 33*(2), 148-157.

Voogt, J. (2008). IT and curriculum processes: Dilemmas and challenges. In *International handbook of information technology in primary and secondary education* (pp. 117-132): Springer.

Voogt, J., Pieters, J., & Handelzalts. (2016). Teacher collaboration in curriculum design teams: effects, mechanisms, and conditions. *Educational Research and Evaluation, 22*(3-4), 121-140.

Voogt, J., Tilya, F., & van den Akker, J. (2009). Science teacher learning of MBL-supported student-centered science education in the context of secondary education in Tanzania. *Journal of Science Education and Technology, 18*(5), 429-438.

Wambugu, J., & Mokoena, S. (2013). Education Financing in Kenya: Parents' Perceptions about the Implementation of the Cost-Sharing Policy in Secondary School Education. *Mediterranean journal of social sciences, 4*(13), 441.

Warrington, C. (2017). *A study of personality traits to explain employees' information security behavior among generational cohorts.* Capella University,

Watkiss, P., Hunt, A., Blyth, W., & Dyszynski, J. (2015). The use of new economic decision support tools for adaptation assessment: A review of methods and applications, towards guidance on applicability. *Climatic Change, 132*(3), 401-416.

Watson. (2002). Visibility: Science and regulation. *Journal of the Air & Waste Management Association, 52*(6), 628-713.

Watterson, D., Kobe, B., & Young, P. R. (2012). Residues in domain III of the dengue virus envelope glycoprotein involved in cell-surface glycosaminoglycan binding. *Journal of General Virology, 93*(1), 72-82.

Watterston. (2012). Blended Learning: A Synthesis of Research Finding in Victorian Education. In: Melbourne: Ultranet and Digital Learning Branch Department of Education and Early Childhood Development.

Webster, Thompson, & Mayou. (2002). The experiences and needs of Gujarati Hindu patients and partners in the first month after a myocardial infarction. *European Journal of Cardiovascular Nursing, 1*(1), 69-76.

Weeks, J. (2014). *Sex, politics and society: The regulations of sexuality since 1800*: Routledge.

Wegrzyniak, L., Hedderly, D., Chaudry, K., & Bollu, P. (2018). Measuring the effectiveness of patient-chosen reminder methods in a private orthodontic practice. *The Angle Orthodontist, 88*(3), 314-318.

Weiss, E. (2018). *Virtual School Leaders' Experiences and Perspectives of the Benefits of and Barriers to Kindergarten through Grade 12 Virtual Schools in Florida.* Nova Southeastern University,

Wellington, J. (2015). *Educational research: Contemporary issues and practical approaches*: Bloomsbury Publishing.

Wiesnerová, D. (2012). *Benefits of Self-assessment in English classes at Elementary Schools.* Masarykova univerzita, Pedagogická fakulta,

Willms, J. D., Friesen, S., & Milton, P. (2009). *What Did You Do in School Today? Transforming Classrooms through Social, Academic, and Intellectual Engagement.(First National Report)*: ERIC.

Wilmore, E. L., & Papa, R. (2016). Socially Just Elementary Schools, Classrooms, and Social Studies Practices and Strategies. In *Social Justice Instruction* (pp. 199-211): Springer.

Yin, R. K. (2009). Case study research: Design and methods (applied social research methods). *London and Singapore: Sage*.

Yin, R. K. (2017). *Case study research and applications: Design and methods*: Sage publications.

Yule, S., & Paterson-Brown, S. (2012). Surgeons' non-technical skills. *Surgical Clinics, 92*(1), 37-50.

Zheng, Erzurumluoglu, Elsworth, Kemp, Howe, Haycock, . . . Pourcain, B. (2017). LD Hub: a centralized database and web interface to perform LD score regression that maximizes the potential of summary level GWAS data for SNP heritability and genetic correlation analysis. *Bioinformatics, 33*(2), 272-279.

Ziegler, J. F., Ziegler, M. D., & Biersack, J. P. (2010). SRIM–The stopping and range of ions in matter (2010). *Nuclear Instruments and Methods in Physics Research Section B: Beam Interactions with Materials and Atoms, 268*(11-12), 1818-1823.

Zohrabi, M., Torabi, M. A., & Baybourdiani, P. (2012). Teacher-centered and/or student-centered learning: English language in Iran. *English Language and Literature Studies, 2*(3), 18.

Zwerver, J., Bredeweg, S. W., & van den Akker-Scheek, I. (2011). Prevalence of Jumper's knee among nonelite athletes from different sports: a cross-sectional survey. *The American journal of sports medicine, 39*(9), 1984-1988.

ANNEXURE A: DOCUMENT ANALYSIS SCHEDULE

1.	Rationale -	Personal reason
		Professional reason
		Social reason
2.	Goals -	Aims
		Objectives
		Outcomes
3.	Resources -	Hardware resources
		Software resources
		Ideological resources
4.	Assessment -	Peer assessment
		Formative assessment
		Summative assessment
5.	Content -	Space and shapes
		Data handling
		Measurements
6.	Accessibility -	Physical
		Financial
		Culture
7.	Teacher role -	Leader
		Facilitator
		Moderator
8.	Time -	School time
		Instructional time
		Extra time

9. Teaching environment - face to face
Online learning
Blended learning

10. Learning activities - Teacher based
Learner based
Content based

ANNEXURE B: INTERVIEW SCHEDULE

Exploring teachers' experiences in the teaching of mathematics in the intermediate phase.

Question 1:	Why do you have an interest in teaching mathematics in the intermediate phase? (reasons)
Sub questions	1. What personal rationale/reasons that made you to teach mathematics in the intermediate phase? 2. What social rationale/reasons made you to teach mathematics in the intermediate phase? 3. What professional rationale/reasons that made you to teach mathematics in the intermediate phase?
Question 2:	What resources do you use when teaching mathematics in the intermediate phase? (resources)
Sub questions	1. What software resources do you use when teaching mathematics in the intermediate phase? 2. What hardware resources do you use when teaching mathematics in the intermediate phase? 3. Which learning theories or theories that guide you in teaching mathematics in the intermediate phase?
Question 3:	Who are you teaching mathematics in the intermediate phase, in terms of financial, cultural and physical aspects? (accessibility)
Sub questions	1. What is the cultural background of the majority teachers teaching mathematics in the intermediate phase? 2. What is the financial state of the majority of teachers teaching mathematics in the intermediate phase? 3. What is the physical state of the majority of teachers teaching mathematics in the intermediate phase? (physical ability)

Question 4:	How do you ensure justice when teaching mathematics in the intermediate phase? (goals to be achieve)
Sub questions	1. What are your aims of teaching mathematics in the intermediate phase? 2. What are the objectives of teaching mathematics in the intermediate phase? 3. Indicate learning outcomes in the teaching of mathematics in the intermediate phase?
Question 5:	What content are you teaching in mathematics in the intermediate phase?
Sub questions	1. What are teaching activities do you use when teaching mathematics in the intermediate phase?
Question 6:	What are teaching activities do you use when teaching mathematics in the intermediate phase?
Sub questions	1. What activities do you use to engage students? 2. What activities do you use in to unpack the content? 3. What activities do you use to ensure the attendance of students in your teaching?
Question 7:	How do you perceive your character when teaching mathematics in the intermediate phase? (teacher's role)
Sub questions	1. Is your role seem as the leader, facilitator or moderator when teaching mathematics in the intermediate phase?
Question 8:	Where do you teach your subject, mathematics in the intermediate phase? (location/environment)
Sub questions	1. Is online platform conducive? Substantiate 2. Do you teach mathematics for intermediate phase in the classroom (face to face) interaction)? 3. Is blended learning possible in the teaching of mathematics in the intermediate phase?
Question 9:	What is the time allocation for each aspect (topic) in mathematics is in the intermediate phase? (time)

Sub questions	• How is time allocation for teach aspect (topic) in the subject? 1. Number of weeks 2. Number of days 3. Number of hours
Question 10:	How do you assess your subject, mathematics in the intermediate phase?
Sub questions	1. What activities do you use during peer assessment for learning? 2. What activities do you use during formative assessment as learning? 3. What activities do you use during summative of learning?

ANNEXURE C: FOCUS GROUP DISCUSSION

Name of the participant_____ time

Date of Observation ____ / ____2018 Place_____ Subject/lesson _____

1. Why do you have an interest in teaching mathematics in the intermediate phase? (Reasons)

2. What resources do you use when teaching mathematics in the intermediate phase? (Resources)

3. Who are you teaching mathematics in the intermediate phase, in terms of financial, cultural and physical aspects? (Accessibility)

4. How do you assess your subject, Mathematics in the Intermediate Phase?

5. What is the time allocation for each aspect (content) for Mathematics in the Intermediate Phase?

6. Where do you teach your subject, Mathematics in the Intermediate phase? (Location/Environment)

7. What do you perceive your character when teaching Mathematics in the Intermediate Phase? (Teachers' role)

8. What are the teaching activities do you use when teaching Mathematics in the Intermediate Phase?

9. How do you ensure justice when teaching Mathematics in the Intermediate Phase? (Goals to be achieved)

10. What is the physical state of the majority of teachers teaching Mathematics in the Intermediate Phase? (Physical ability)

ANNEXURE D: A LETTER FROM THE EDITOR

Christine Davis
5A Denys Reitz
Roosevelt Park
Tel: 0716850170
Email: christinem4c@gmail.com

Thokozani A. Biyela
Mashona White City
Mahlabatini
3865

06 December 2018

To whom it may concern

Re: Thesis: Exploring the teachers' experiences of the teaching of Mathematics in the Intermediate Phase in (Grade 4-6) Nongoma Circuit.

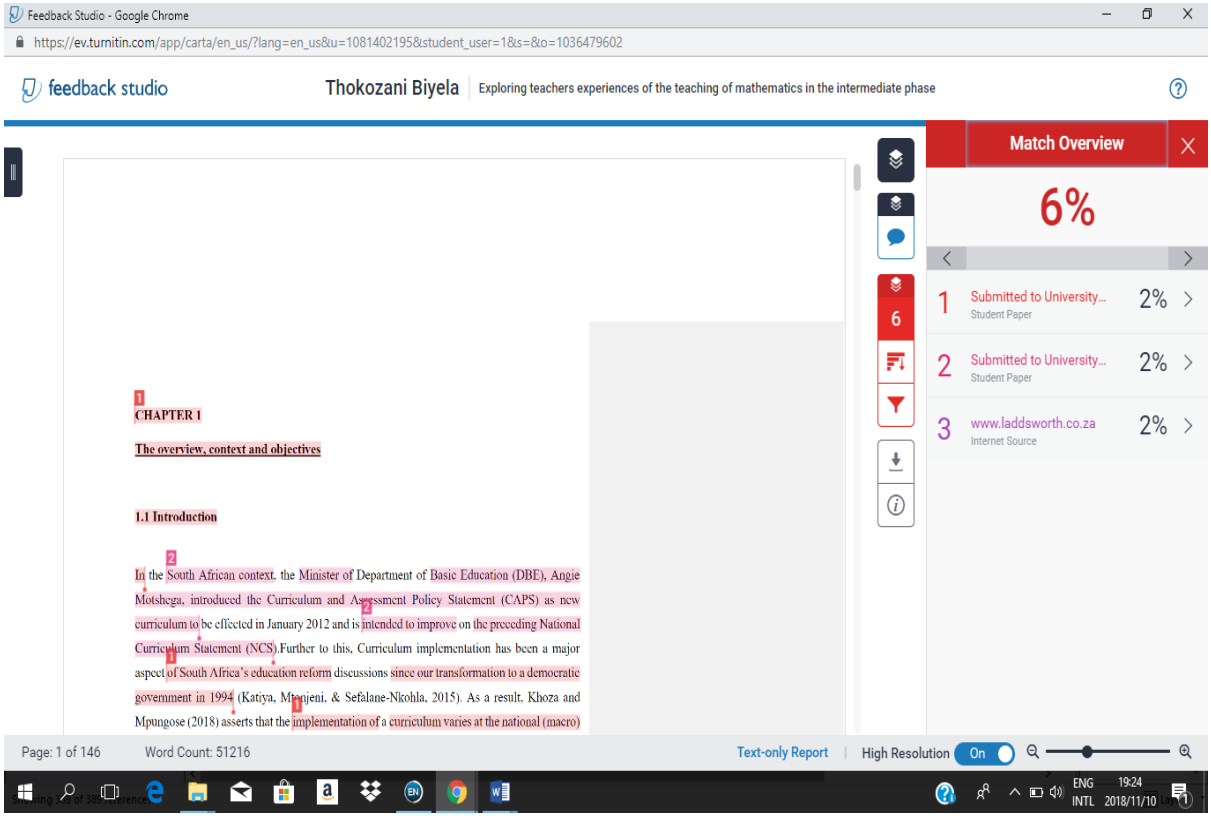
This letter serves to confirm that I edited Thokozani Biyela's paper before submission.

No content was added and very little was changed by me during the process. Changes were limited to spelling and grammar, while content changes were identified and submitted to Mr. Biyela for review.

Please feel free to contact me should you have any further questions.

Christine Davis

ANNEXURE E: TURNITIN REPORT



ANNEXURE F: GATE KEEPERS' LETTER

education

Department:
Education
PROVINCE OF KWAZULU-NATAL

Enq.: CF mbatha Tel:0358310229 Date: 24/05/2018

Mr Thokozani Biyela
P.O. Box 467
MAHLABATHINI
3865

PERMISSION TO INTERVIEW LEARNERS AND EDUCATORS

The above matter refers.

Permission is hereby granted to interview Departmental Officials, learners and educators in selected schools of the Province of KwaZulu Natal subject to the following conditions:

1. **You make all the arrangements concerning the interviews.**
2. **Educators' programmes are not interrupted.**
3. **Interviews are not conducted during the time of writing examinations in schools.**
4. **Learners, educators and schools are not identifiable in any way from the results of the interviews**
5. **Your interviews are limited only to targeted schools.**
6. **A brief summary of the interview content, findings and recommendations is provided to my office.**
7. **A copy of this letter is submitted to District Managers and principals of schools where the intended interviews are to be conducted.**

The KZN Department of Education fully supports your commitment to research: **Exploring teachers' experiences of teaching Mathematics in the Intermediate Phase particularly decimal fractions at Holinyoka Primary School, Nongoma Circuit Management Centre.**

It is hoped that you will find the above in order.

DEPARTMENT OF EDUCATION
Nongoma Circuit
Mona Ward
2018 -05- 24
Private Bag X 5002, Nongoma 3950

Best Wishes.

CF MBATHA: MAHLOMBE CIRCUIT MANAGER
NONGOMA CMC

...Championing Quality Education - Creating and Securing a Brighter Future

KWAZULU-NATAL DEPARTMENT OF EDUCATION
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Tel.: +27 33 392 1029 • **Fax.:** +27 033 392 1212• **Email:** Nompumelelo.gasa@kzndoe.gov.za •**Web:**www.kzneducation.gov.za
Facebook: KZNDOE....Twitter: @DBE_KZN....Instagram: kzn_education....Youtube:kzndoe

ANNEXURE G: CLEARANCE LETTER

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

23 July 2018

Mr Thokozani Andreas Biyela 227522305
School of Education
Edgewood Campus

Dear Mr Biyela

Protocol Reference Number : HSS/0647/018M
Project title: Exploring teachers' experiences of the teaching of Mathematics in the intermediate Phase in (Grade 4 - 6) Nongoma Circuit

Full Approval – Expedited Application

In response to your application received 8 June 2018, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol has been granted **FULL APPROVAL.**

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment /modification prior to its implementation. In case you have further queries, please quote the above reference number.

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

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

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

Yours faithfully

.....

Dr Shamila Naidoo (Deputy Chair)
Humanities & Social Sciences Research Ethics Committe

/pm

Cc Supervisor: Dr CB Mpungose
cc Academic Leader Research: SB Khoza
cc School Administrators: Ms Tyzer Khumalo

Humanities & Social Sciences Research Ethics Committee
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Website: www.ukzn.ac.za

1910 - 2010
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