

The Effectiveness of Grade 9 Mathematics Teachers in Mahwelereng Circuit Secondary Schools

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DECLARATION WITH REGARD TO INDEPENDENT WORK

I, **MAWASHA MMAPHUTI JOHANNA**, student number _____, hereby declare that this dissertation titled: **The effectiveness of grade 9 mathematics teachers in Mahwelereng circuit secondary schools** submitted to the Central University of Technology, Free State for the Master of Education (Post Graduate Studies), is my own original work. All sources I have used or cited have been fully pointed out and referenced. I further declare that I have not previously submitted this work to the Central University of Technology or any other higher education institution for certification.

07 – 07 - 2022

Signature

Date

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DEDICATION

This work is dedicated to my late father, Ramorodi Abednigo Mawasha, who died in my first year of college. He was not educated, but wanted to see all his children get educated. To honour his memory, I pursued my studies. To my mother Ramasela Agnes Mawasha who continued to support me so that I do not give up. I persevered to be where I am today because of her encouragement. I also dedicate it to my only child Thelma and her husband Sam Sekoala.

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LIST OF ABBREVIATIONS / ACRONYMS

ANA	Annual National Assessment
CAPS	Curriculum and Assessment Policy Statement
CPTD	Continuing Professional Teacher Development
DBE	Department of Basic Education
FET	Further Education and Training
GET	General Education and Training
IQMS	Integrated Quality Management Systems
NEEDU	National Education Evaluation Development Unit
PCK	Professional Content Knowledge
PISA	Program for International Student Assessment
TIMSS	Trends in International Mathematics and Science Study
UNESCO	United Nations Educational, Scientific and Cultural Organization
ZPD	Zone of Proximal Development

ABSTRACT

Teacher effectiveness is an important aspect of mathematics teaching. The purpose of this study was to examine the effectiveness of grade 9 mathematics teachers and how their effectiveness affects student performance. The central research question is: How effective are the 9th grade mathematics teachers in Mahwelereng Circuit secondary schools? This question is raised because of the high annual failure rate in mathematics in this class. The study was guided by four research objectives, which were to examine the influence of teacher effectiveness on mathematics learning achievement, to examine what teachers can do to improve their teaching effectiveness in 9th grade mathematics, and the qualities and attributes to identify factors that affect learner performance in mathematics. It is important to address these questions to help school districts and policy makers in finding the solution to close the gap. Studies relevant to this topic have been conducted and the relevant literature has been analysed on the topic and conclusions made by several authors regarding the effectiveness of mathematics teachers. Five (5) schools were sampled from the eleven (11) secondary schools in Mahwelereng Circuit, and two grade 9 mathematics teachers from each school were selected to participate in this study, making it 10 participants. All participants were specially selected based on their area of specialisation and experience as subject teachers at their schools. Data collection was conducted through interviews, observations, and document analysis. The findings revealed that learner achievement in grade 9 mathematics is due to high pass requirements of 40%. The findings of this study encourage future research on how teachers can effectively approach math teaching and how effective teaching can help students do math better.

Keywords: Teacher effectiveness, Mathematics, learner performance

CHAPTER 1

INTRODUCTION AND BACKGROUND TO THE STUDY

1.1 INTRODUCTION

Effective teaching is essential to both teaching and learning. The impact of grade nine learners' performance on the effectiveness of mathematics educators was explored in this study. A wide variety of research were conducted around educator-effectiveness and its impact on learner performance in mathematics, but given that all South African learners are required to take mathematics, the researcher thought it was still vital to do more research (Ndlovu, 2018; Mabena, Mokgosi, & Ramapela, 2021). This is so because many learners find mathematics challenging. Educators need to be as effective as possible in grade nine Mathematics teaching to enable learning.

From my experience as a teacher, I have learned that grade 9 students do not reach the required level of performance of 40% in mathematics. Due to the shortage of mathematics educators a few years ago, the researcher was assigned grades 8 and 9 in mathematics. The researcher is not qualified to teach mathematics. It was challenging because learners had no basic mathematics since elementary school. The researcher's approach to teaching caused them to develop a negative attitude towards mathematics. They were, therefore, unable to perform well. Malekano (2018) justifies this fact in the study he did in Tanzania, in which he attributed poor performance in mathematics to learners' negative attitudes, fear of mathematics and poorly qualified educators. In light of this, the researcher decided to look into the effectiveness of educators who teach arithmetic to ninth grade learners. In this qualitative study, the researcher considered educator-effectiveness and learner performance in mathematics. This research is significant because, in the researcher's opinion, it will assist math educators in realising that their commitment to teaching will boost their effectiveness, which is equating with learner performance. According to Brown, Myers, and Collins (2021), there is a correlation between teacher effectiveness and learner accomplishment that is favourable since excellent teachers raise their students' academic achievement.

1.2 BACKGROUND TO THE STUDY

Teacher-effectiveness is a core character in the teaching profession. Effective teachers can make learning more meaningful and understandable to learners (Stronge & Tucker, 2020). Making the learning experience more meaningful and explicable to learners is essential. This study investigated 9 grade mathematics teachers' effectiveness offering in Mahwelereng Circuit secondary schools. It is based on the District norm of accountability sessions conducted every quarter whereby learner achievement in each subject is considered. Grade 9 level results show a trend of poor performance in mathematics as compared to other subjects. This underperformance is always pinned on teachers teaching mathematics in this grade. Because of this dilemma, the study attempted to explore the effectiveness of high school math teachers in Mahwelereng Circuit secondary schools, with a particular focus on grade 9 mathematics teachers.

This study also explored the impact of teacher-effectiveness on learner mathematics achievement. The focus will be on the General Education and Training (GET) as the phase needing exposure to many opportunities to solve various problems (Department of Education, 2011). Mathematics is compulsory for all learners in the senior phase, and difficult to learn effectively. This study will explore measures of teacher-effectiveness to enhance learner performance. While all subjects are essential for learners' and teachers' mental development, mathematics equips creativity and problem-solving abilities. The Department of Education (DBE) (2011) asserts that mathematics uses graphs, numbers, and notions to describe arithmetical relations. Mathematics includes the discovery, representation and analysis of patterns and correlations in physical and social phenomena, as well as between mathematical objects (Jansen & Spaul, 2019).

In Australia, mathematics is taught by teachers who do not hold qualification in mathematics (McKenzie, Weldon, Rowley, Murphy & McMillan, 2014). This practice resulted in a decline in the Australian student scores from previous years, a trend that has been occurring for over a decade according to the 2015 PISA results. Data from TIMSS (Trends in International Mathematics and Sciences Study) revealed the flatlining of Australian students while other countries improve (Thomson, Werner et al. 2016). The declining trend persisted until 2015 with PISA results of mathematics, science and reading literacy (OECD, 2016). Value Added

Modelling, among other tools, was recommended. Policymakers and researchers doubted this measure, claiming it could change over time (Stronge, Ward, & Grant, 2011). According to Darling-Hammond et al. (2012), the VAM model is inconsistent, unrealistic and unable to distinguish between the different factors affecting learning progress. As a result, the VAM model is not a reliable indicator of teacher performance.

It has been a problem in Nigeria where they were facing learners' low performance in basic subjects, namely: science, technology and mathematics, (Gimba, Hassan, Yaki, & Chado, 2018). From the finding of one study in Nigeria, they intend to implement necessary measures to effect a positive change through seminars for the mathematics teachers. Based on findings from a study by Mobolaji (2017), in Nigeria, mathematics teachers would be adequately motivated in terms of awards or prize giving to reinforce their positive effective teaching attitudes. Findings in Ilorin, secondary schools in Nigeria, show that mathematics teachers established strong teacher-learner relationships to build the learners' interest in mathematics (Mobolaji, 2017).

After independence in 1994, learning mathematics up to grade 9 was compulsory (Mahlaba, 2020). From here, learners choose studying mathematics or opt for mathematical literacy, especially for learners who were not competent in grade. It was done to make mathematics to be accessed by all learners. Although it was not a required subject under the old educational system, under the new system, all learners were required to take either Mathematics or Mathematical Literacy in the FET band (DBE, 2015). To maintain the position of being mandatory, this was done. The South African Department of Basic Education (DBE) introduced the Annual National Assessment (ANA) in the lower grades to raise the standard of education (Maphalala & Dhlamini, 2017). This was a critical measure applied after the apartheid system, aimed at developing and training underperforming schools and teachers (DBE, 2013) after the poor performance in mathematics. Research has shown that underperformance in mathematics is a persistent problem, and most teachers attribute the problem to a lack of resources, among other issues. Moreover, Mabena et al. (2021) contend that lack of resources contributes to learners' negative attitudes towards mathematics.

Some teachers blamed the various curriculum changes, which affected the respective content in different grades. Spaul (2013) and Taylor (2019), in the CDE report, suggested that South Africa

was facing underperformance in mathematics. According to the head of the National Education Evaluation and Development Unit (NEEDU), many of schools' low student performance levels are due to teachers' lack of subject matter experts. According to the study, even if teachers are trained and knowledgeable about the subject, there is a problem with the way they teach it to learners. As a result, teaching effectiveness is diminished.

1.3 THEORETICAL FRAMEWORK

According to Grant and Osanloo (2014), the theoretical framework serves as a lens through which the participants and researchers view the world and informs their decisions and actions. Theoretical framework defines assumptions and prejudices about the fields of study by outlining the researcher's worldviews (Green, 2014). It also contributes to the consistency of the research process and guides the selection of the most appropriate methods to achieve research goals (Green, 2014). A theoretical framework is a plan to assist the researcher in developing research strategies (Osanloo & Grant, 2016). It includes assumptions with which the researcher is working. Research has indicated that constructivism is useful in learning. Rather than being a hypothesis on how learners can memorise and regurgitate a large amount of material, it addresses how humans think (Shah, 2020). Constructivism calls for reflections by both teacher and learner. An effective classroom depends on constructivism as a strategy and practice. Constructivism is a theory of gaining knowledge and learning, and learners are at the centre of all the classroom activities. There are two types of constructivism: cognitive constructivism according to the theory of Jean Piaget (Piaget, 1953) and social constructivism according to the theory of Lev Vygotsky. According to Brooks and Brooks (1993), constructivism builds knowledge through exploring and discovering concepts.

This study is located in the theory of constructivism which is an epistemological view of knowledge acquisition that emphasises knowledge construction rather than knowledge transmission (Owusu, 2015). Constructivism assumes that knowledge is actively generated by learners. It is not obtained passively from the environment. Schunk (2012) sees knowledge as the result of mental contradictions arising from human interactions with others in the environment. It is not closely related to the outside world and is not fully connected with the workings of the mind. Piaget's position in this matter is that mathematical ideas are made by children. The focus

of Piaget's constructivism has to do with personal knowledge building. It is through his cognitive development theory which proposes that human beings must construct their knowledge instead of being informed to immediately understand and use knowledge (Piaget, 1953).

The role of the teacher is to facilitate learning. The teacher organises and informs activities that encourage learners to explore their own learning. He provides a supportive learning atmosphere. As moderators, they learned about Zone of Proximal Development (ZPD) from Vygotsky (1978). It is the distinction between what a student can do without assistance or help and what a student can do with assistance. Lev Vygotsky's social constructivism is said to be integral to learning based on learners' social interactions in the classroom (Vygotsky, 1962). Effective teachers who understand Vygotsky's theories and build classroom interactions enhance learning. The theory emphasises that all cognitive functions, including learning, depend on interactions with others such as teachers-learners, learners-learners, and learners-parents. Social constructivists employ open-ended questions to solicit meaning construction (Stake, 1995; 2010; Creswell, 2009). Instead of lecturing, the teacher acts as a facilitator by scaffolding the learners. This interaction exposes learners to experience cognitive conflicts, which leads them to construct their knowledge.

Teachers are not instructors in this case. Teachers are expected to act as facilitators in order to create a positive learning environment and aid learners' learning processes (Li & Du, 2015). The facilitator is aware of Vygotsky's Zone of Proximal Development (ZPD), which he proposed in 1978. This study focuses on the effectiveness of mathematics teachers, which means that learners must train to become constructivist teachers who will assist them in improving their mathematical understanding. Effective teachers will always be good facilitators by creating tasks for learners to be highly motivated to find solutions. According to Clements and Battista (1990), effective teachers stimulate learners to learn, and this stimulation can make learners be critical thinkers and readily build knowledge. To effectively teach mathematics, teachers must possess a thorough understanding of the subject. Research has indicated that constructivism as a form of learning theory has proven to be successful. It also realised it is not easy for teachers to maintain it purely. It is an effective method because it centers the learning process on the learner rather than the teacher.

Constructivism moves away from learning through rote memorisation where teachers give every bit of knowledge to learners. With this theory, the role of the teacher changes dramatically from one-way transmission of knowledge to a discourse in which learners interact with their peers to create new knowledge. The teacher becomes the partner by merely guiding learners, and structuring the learning situation, assesses learner progress and modify as needed. Learning in the constructionist's classroom, according to Marlowe and Page (1998 & 2005), asks questions, interprets, analyses information, creates and modifies the concept of meaning and understanding through a combination of information and thought, and new knowledge of the aforementioned experience. It is conceptualised as a cycle of integration. In this case, learners use different methods to demonstrate understanding and learning, and to compose questions in their own language.

1.4 PROBLEM STATEMENT

A problem statement is a succinct depiction situation of concern. The problem statement defines the difference between current and desired states. Kush (2015) points out that the first condition of solving a problem is to understand the problem. The problem of underperformance in grade 9 mathematics has been a thorny issue for many years in secondary schools in Mahwelereng. The circuit and district have not yet discovered strategies to resolve the problem. Since mathematics is a compulsory subject for the senior phase, the researcher's school has never performed well in mathematics, let alone in the circuit and district. The researcher's results in mathematics are always poor. In the researcher's district, there is a norm of analysis of results every quarter, whereby the circuit managers, principals and subject teachers meet to account for learner performance and achievement in each subject. The grade 9 results have consistently shown a dismal poor performance trend. This poor performance of learners is pinned on teachers offering mathematics (Motshekga, 2013).

This problem of underperformance in mathematics is currently a national dilemma. According to Spaul (2013), South Africa suffers from underachievement in mathematics education due to inadequate subject teaching in the majority of schools. The Minister of Education attributes underperformance in mathematics to the learners' poor understanding of mathematical concepts and teachers' competence deficiencies to teach grade 9. Education Minister, Motshekga, noted

that the mathematics teachers could not solve the equations in the curriculum they taught, which negatively affected learner achievement in the subject (Motshekga, 2013). Furthermore, Taylor and Taylor (2013) hypothesised that learners would not succeed in mathematics unless their teachers mastered the subject. According to Spaul (2013), many South African mathematics teachers' subject content knowledge is wanting because of inadequate training. According to Darling-Hammond (2010a) effective teachers possess traits including a high general intelligence, thorough subject-matter knowledge, and an awareness of how learners learn and develop.

1.5 PURPOSE OF THE STUDY

1.5.1 Aim of the study

The aim of this study is to explore the effectiveness of teachers in teaching mathematics in grade 9 in Mahwelereng secondary school.

1.5.2 Main Question

How effective are grade 9 mathematics teachers in Mahwelereng circuit secondary schools?

1.5.3 Sub Questions

- What can mathematics teachers do to improve their teaching effectiveness of grade 9 mathematics?
- What are the teacher qualities and attributes that can influence performance of learners in mathematics?

1.5.4 Objectives of the study

- To identify what teachers can do in to improve their teaching effectiveness in grade 9 mathematics.
- To identify qualities and attributes that can affect the performance of grade 9 learners in mathematics.

1.6 SIGNIFICANCE OF THE STUDY

Poor learner performance in mathematics in the senior phase needs ongoing investigations. Years of research shows that learner performance is influenced by teacher quality. Several research studies were also carried out to improve teacher quality, but there is not enough to improve teacher-effectiveness. This study will benefit teachers in that they will improve their teaching skills, and it will also assist in increasing teacher-effectiveness as learner outcome depends on it and add to the understanding of teacher-effectiveness, teacher quality and learner achievement. It is significant because it will give rise to teacher empowerment, a process that will bring growth and development. It will make educators involved, a process generating growth and enablement. The study contributes to the teachers' knowledge on implementing innovation in teaching mathematics, simplifying it, and making it relevant to the essentials of an individual learner.

Mathematics teachers were guided in handling mathematics classes, presenting their lessons in an effectively and interestingly to develop a positive attitude. They develop ways of dealing with factors that hinder learners from learning effectively. Their learners develop a positive interest in the learning of mathematics. It can help a lot to understand how the teacher-learner relationship affects the learning process of learners. Policymakers will also benefit by creating or improving educational policies that will uplift or arouse learners' interest in mathematics. Policy on Teacher-effectiveness Assessment may also be formulated. Circuit managers, Principals and Heads of Departments will be able to look into strategies they can put in place to use in teacher evaluation, e.g. a teacher-effectiveness rubric. It is therefore possible to create policies using a teacher's efficacy as a guide.

1.7 RATIONALE OF THE STUDY

This study is important to stakeholders in education, especially grade nine mathematics teachers. The study makes a contribution to the literature concerning mathematics teachers' effectiveness. According to Goe (2007) as well as Gordon, Kane, and Staiger (2006), just meeting the requirements of being highly qualified to teach mathematics is not a guarantee that teachers will be effective. Therefore, research into this topic can assist education departments and policymakers in developing mechanisms of establishing teacher-effectiveness more directly. This will assist the department in realising that all learners should have access to good teachers and

that they need greater assistance in locating them in order to improve performance. Five secondary schools in the Mogalakwena district's Mahwelereng circuit will participate in this project. Ten teachers who teach mathematics in grades 9 will be the participants in this study.

1.8 LIMITATIONS

The limitations of the study were that only grade 9 mathematics teachers were used. Access to schools and teachers who participated in the study and the time it took to meet them to conduct the research were also limitations. Firstly, access to schools and teachers who would participate in the study. Secondly, time needed to meet with participants for the accomplishment of the research. There are 11 high schools in Mahwelereng circuit. The main limitation of this study was that participants were selected from five different high schools. The samples consisted of 9th grade mathematics teachers and departmental heads in the mathematics department of each sampled school.

1.9 DELIMITATIONS

The study location was Mahwelereng Township. The study was conducted at various high schools in the Mahwelereng circuit. It was delimited to five high schools out of the eleven in the circuit. The schools are E D L Rampola, Gojela, Fred Ledwaba, Ebenezer and D G Tsebe, all situated in the township of Mahwelereng, under the Mogalakwena district in Limpopo province. The schools are not very close to each other, which needed the researcher to have ample time of moving in between these schools. Transport was needed to reach these schools. It implied the researcher had to use the money for petrol to visit all these schools on the research day. Participants were grade nine mathematics teachers and departmental heads sampled for the study.

1.10 DEFINITION OF CONCEPTS

1.10.1 A teacher

A teacher is an individual with an accurate and specific ability to instruct others in a subject. According to Kareem & Ravirot (2014), the quality of teachers is an important factor to enhance

learning. Researchers like Chetty et al. (2014) defined teachers' competencies determining learners' achievements.

1.10.2 Teaching

The goal of teaching is to instil learning in learners in order to effect positive change. Teaching, according to Vicky Phillips (2013), is a complex endeavour that involves classroom discourse between the teacher and the learner. It has to do with passing on the acquired knowledge that we want others to have. The process of guiding a learner to understand and acquire the knowledge that is expected of him or her, as well as developing the learner's innate potential, is referred to as teaching.

1.10.3 Effective

Effective means having the desired effect and it can be measured by the goals set and achieved. In the education system, the desired effect means excellent results as learner performance, and it is best estimated with your own teaching goals.

1.10.4 Effectiveness

Effectiveness is the degree to which a goal is achieved. Effectiveness is the mark of a good teacher who encourages learners to believe in teaching their subject, takes the time to explain things, and treats learners equally. It's about doing things right and at the right time (Awo, 2009).

1.10.5 Teacher-effectiveness

Teacher effectiveness is a key characteristic of the teaching profession. It is defined as the teacher's ability to use strategies to improve student performance (Strong, Ward, and Grant, 2011). Effective teaching can be seen as a success in teaching. Tom Kane (2013) argued that if we, as teachers, want learners to learn more, we must become learners of our lessons. It refers to the extent to which the trainer behaves in a way that supports students' acquisition of basic skills, understanding of work habits, positive attitudes, value judgments, and personal changes. It is specifically defined with a focus on teachers' contributions to student learning outcomes.

1.10.6 Performance

Achieving or achieving detailed goals or objectives set in an academic assignment in foundational mathematics is known as achievement. An effective teacher can fulfil the goals and responsibilities set by the school. A teacher's capacity to carry out their responsibilities at school and the presence of an action displayed by instructors in or during learning activities is demonstrated by their performance as a teacher (Prihantoro, Ikhwanto & Dudung, 2019).

1.10.7 Mathematics

Mathematics refers to things that can be counted. According to Abimbola (2013), mathematics is a language of science and stands out as a basic requirement for further studies in learning in any science-oriented field of study. Akanni (2015) contends that mathematics is a symbolic representation of ideas. According to Kalhotra (2013), mathematics is a science of digits and numbers and the art of computing. In addition, mathematics is a language to use to communicate ideas and concepts (Department of Education (DoE), 2011).

1.10.8 Motivation

Motivation is defined as anything done to keep teachers happy, content, engaged, and committed to their work so that learners, parents, and society greatly benefit from their services. It is regarded as natural energy or drive that motivates people to do something. Teacher motivation includes both internal and external forces.

1.11 LAYOUT OF CHAPTERS

This section outlines how the research report is organised and provides a brief summary of what to expect in each chapter of this research study.

Chapter 1: Introduction

Chapter 1 provides an overview including an introduction/background to the research. It also contains the problem statement, the question and the meaning of the study. Here is a clear explanation of the purpose of the study, why it should be conducted, and who will benefit. The

researcher presents the problem, justifies the research, and provides the background for the research, as well as the research questions and research goals.

Chapter 2: Literature Review

The second chapter is a review of the literature on the effectiveness of 9th grade mathematics teachers. The goal of the literature review is to connect previous research to the current problem being studied. The link between the research problem examined in this chapter and existing knowledge is an intertwined one. This chapter will examine existing literature on teacher behaviour, teacher attitude, professional content knowledge and pedagogical knowledge, teacher professional development, teacher experience, teacher-learner relationship, teacher competency, teacher motivation and evaluation of teacher effectiveness.

Chapter 3: Research Methodology

The study methods, including the research methodology, paradigm, design, tools, data collecting, and analysis, are covered in this chapter. The protocols and example strategies for participant recruitment are given in depth. In conclusion, the research methodology chapter goes into great depth on how the study will be carried out. The study methodologies are the main focus, including the research paradigm, research design, tools, sample techniques, data collection and processes, data analysis techniques, and ethical considerations for this study.

Chapter 4: Research results

The chapter reports on the data results as well as the study results. The data of five schools is presented and discussed. Tables were used to present the results.

Chapter 5: Summary, conclusions and recommendations

In chapter 5 is where the results and conclusions of the study are presented. This section also responds to the research questions posed in chapter 1. Possible recommendations will be discussed. The suggestions offered must be practical, doable, and as detailed as feasible in order

to aid future studies on the subject in making advancements. Limitations, recommendations and a list of references are part of this chapter.

1.12 SUMMARY OF THE CHAPTER

Grade 9 mathematics results are always creating a rift between teachers and managers in that they are always poor, and learners have never achieved as expected for almost a decade now. Managers think teachers are not doing enough, and they question their effectiveness. Therefore, the researcher decided on researching the teacher-effectiveness of grade 9 mathematics teachers' and learners' underperformances. The study population consisted of grade 9 mathematics teachers and department heads from the five selected secondary schools. The following research tools were applied in to collect information, such are interviews, observation and documentary reviews. I hope that the findings will help ease the problem.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

Teacher effectiveness is critical to improving student achievement and is a core characteristic of the teaching profession. It deals with good teachers teaching of the subject content and treating learners with dignity. Teacher-effectiveness is sometimes likened to successful teaching. Effective teachers possess attitudes to connect with learners to increase achievement (Stronge, Ward & Grant, 2011). The focus was on teacher-effectiveness and how it influences learner achievement. Hence, teachers are accountable for learner performance (Baker, Oluwole, & Green, 2013). This explored the following themes: the impact of teacher-effectiveness on learner performance, teaching effectiveness of grade nine mathematics with emphasis on teacher qualities and attributes that influence learner performance in mathematics, like teacher approach, teacher behaviour, teacher attitude, teacher professional knowledge, teacher experience, teacher professional development teacher-learner relationship, teacher competence and teacher motivation.

2.1.1 The Effectiveness of Grade 9 Mathematics Teachers

Teacher effectiveness refers to the teacher's ability to apply methods, techniques, and approaches to improve learners' conceptual understanding (Stronge et al., 2011). While mathematics is a compulsory subject in the senior phase, many learners find it difficult. It is a science of digits and numbers and an art of computing (Kalhotra, 2013). Akanni (2015) defines mathematics as a symbolic depiction of ideas and relationships. Mathematics is a language different from commonly used languages, made up of guidelines and relationships that can solve numerous problems if used correctly. This study explored measures of teacher effectiveness to enhance learner performance. The researcher believes that teacher effectiveness impacts on learner performance. The single most significant school-based element in student accomplishment in this complex era is teacher effectiveness. Studies show that effective teachers influence learners' performance (King & Watson, 2010; Goldhaber, et al., 2013; Routman, 2012). According to Darling-Hammond (2015), teachers are the key to improving education.

This study explored the effectiveness of grade 9 mathematics teachers, the impact of teacher effectiveness on learner performance in this subject, what grade 9 teachers can improve their teaching effectiveness, and investigated the teacher qualities and attributes that can influence learners' performance in this subject mathematics. The study focused on the General Education and Training (GET) band (Department of Education, 2002). Whereas all subjects are important, mathematics helps develop individuals intellectually and equip them with creativity and responsibility. Mathematics is a very important subject as it is the basis for studying other science subjects. Therefore, the mathematics teacher is responsible for helping the learner to understand the material. This is one of the most important areas as it forms the basis for the study of other subjects such as science, physics and chemistry that rely on mathematical calculations. Teachers are one of the most stressed professions at work. At present, teachers are under pressure mainly due to their work role, work overload, long working hours, and high work concentration (Yu, Wang, Zhai, & Dai, 2014), all reasons that challenge their effectiveness. With this study the researcher examined effectiveness of teachers teaching mathematics, as it is of great concern to researchers why learners fail mathematics.

In Australia, governments and policy makers recognise that assessing the quality and effectiveness of teachers is important for improving student performance. This conclusion is based on the rejection of Australian learners in the international ranking of literacy, computing and science (Thomson, De Bortoli & Buckley, 2013). The downward trend continued until 2015, when the PISA scores for math, science and reading were published (OECD, 2016). Above all, value-added modeling was recommended. Politicians and researchers question this indicator, claiming that it fluctuates over time and is not evenly distributed (Stronge, Ward, & Grant, 2011). Teacher ineffectiveness, by Darling-Hammond, Amrein-Beardsley, Haertel and Rothstein (2012), is inconsistent, rational, and unable to unravel many impacts on student progress because of the VAM model. It has been criticised as an accurate measurement.

This has been a problem in Nigeria, with poor grades in core subjects, especially math, science and technology learners (Gimba, Hassan, Yaki & Chado, 2018). From the finding of one study in Nigeria, they intend to implement necessary measures to effect a positive change through seminars for the mathematics teachers. Based on the findings of the study made by Mobolaji, Abiodun David, 13/25PD010 (2017) in Nigeria, mathematics teachers would be adequately

motivated in terms of awards or prize giving to reinforce their positive effective teaching attitude. Results from secondary schools in Ilorin, Kwara State, Nigeria showed that mathematics teachers developed a strong teacher-student relationship that helped spark learners' interest in mathematics.

In 1994, mathematics was introduced in South Africa as a compulsory education subject up to grade nine. From here learners have a choice of either continue with mathematics or opt for mathematical literacy as an alternative for learners who were not competent in grade 9 mathematics. This was done to make mathematics to be accessed by all learners. It was stated in one of the articles from the Department of Basic Education (2015) that though mathematics was not compulsory under the previous education system, in the new system all learners must take either mathematics or mathematical literacy in the FET band (DBE, 2015). This is done to retain the compulsory status. The South African Department of Basic Education (DBE) has identified the Annual National Assessment (ANA) as a means of improving the quality of education in the lower grades. This was an important tool used after the apartheid system to train and educate poor grade schools and teachers who had received poor math grades (DBE, 2013). According to studies, unsolved math problems still exist, and most teachers complain about a lack of resources, among other issues. According to Taylor and Reddi (2013), one factor that contributes to learners' negative attitudes toward mathematics is a lack of resources.

Some teachers blamed curriculum changes over the years, which also affected the content to be taught in the lower grades. Spaul (2013) argued in a CDE report that South Africa faces unmatched mathematics education due to inadequate mathematics education in most schools. The head of the Department of Basic Education's National Education Evaluation and Development Unit (NEEDU) argued that poor grades in most schools were largely due to poor math teacher skills. Teachers are struggling to improve learners' performance, probably because they use the following methods: B. Memorise, do not improve the learner's achievements. Teachers strive to improve learners' learning, but what clearly shows us what their children have learned? Will the learning outcomes of standardised tests be a way to measure our effectiveness as teachers? According to Kareem & Ravirot (2014), the quality of education is determined by the quality of teachers, an important element of the education system. According to Rademeyer (2011), inadequate teacher education is one of the main reasons for teacher inefficiency.

Researchers such as Chetty Friedman and Rockoff (2014), Romanian (2012); Goldhaber, Cowan & Walk (2013); King & Watson (2010); Rockoff & Speroni (2011) see teachers as a very important school-based resource in determining student performance in relation to school achievement. Ofem, Iyam and Bassey (2015) also pointed out that teachers are at the heart of the global education system. According to Darling-Hammond (2012a.b), teachers are the key to a school's success or failure. Researchers believe that teachers are knowledgeable and qualified to teach, but the problem lies in how they convey that knowledge to learners. Therefore, the effectiveness of the teacher is affected.

Mathematics is a difficult subject for most learners. It needs teachers who are fully qualified to teach, and have sizable knowledge of mathematical concepts (Stein, Silver & Smith, 2013). Teachers who offer mathematics need to be able to simplify it to meet the individual learner's academic need. Learning Mathematics is compulsory for all South African learners. It is used as a benchmark for high school learners to move on to the next grade. The general education and training phase (GET) forms the basis for the further training phase (FET). For FET math learners to do well, they need a solid foundation in high school from grades 7 through 9. This clearly means that grade 9 is a bridge to FETs, and the teacher's knowledge of his or hers History in mathematics is a key to learners' success across this bridge. Learning mathematics depends on how it is presented to the learner.

In South Africa there is very low percentage of learners doing well in grade 9 mathematics, which tells you that there is a huge failure rate in this grade because of mathematics. Passing mathematics with 40% is the main requirement for learners to progress from grade 9 to grade 10. The Department of Basic Education (DBE) went to an extent of introducing the Annual National Assessment (ANA) to address South Africa's poor performance in international mathematics assessments. The tests were written by grade 9 learners in the years 2012, 2013 and 2014, where a trend of poor performance was huge. I am speaking of a national average of 12.7% in 2012, 13.9% in 2013 and 10.8% 2014 respectively (Learning and Teaching mathematics, no 18, 2015, p. 34 - 41). In the researcher's opinion even to date, things did not change. South Africa is still trapped in a nightmare of poor grade 9 math performance. According to DBE (2013), this is a sign that special attention is needed as this is a critical transition stage into the FET band of the school system.

The South African education system has undergone major restructuring since 1994. This reorganisation did not help math performance as the South African school system ranked last in this area. Global results from Trends in International Mathematics and Scientific Research (TIMSS) and Program for International Student Assessment (PISA). Its performance is still lower than that of Mozambique, Bangladesh and Iran (Van Wyk 2010; Wilmot 2010). Even the 2011 annual national assessment confirmed that the percentage of learners who performed well in literacy and numeracy was very low (Department of Basic Education, 2011a). Essentially, South African learners in mathematics performed well below the international average, as shown by the scores they received in ANA and Trends in International Mathematical and Scientific Research (TIMSS).

2.1.2 Improving Teaching Effectiveness of Grade 9 Mathematics

In the early years of the researcher's teaching, the researcher was thrown into the deep by receiving math classes in grades 8 and 9. The reason for this was the lack of qualified mathematics teachers. In the researcher's observation, learners did not have a strong foundation of mathematics from primary as they could not perform well. This foundation could help them to make sense of mathematics, or even make connection between concepts and patterns through mathematics. Instead they developed a negative attitude. In Nigeria, Tata (2013) found that negative attitudes of most learners, fear of mathematics and lack of qualified teachers are some of the causes of poor mathematics performance. According to research, teachers and their background characteristics affect learning performance on standardised tests (Hanushek & Rivkin, 2010). This includes expertise in a given content or subject area. An effective teacher is regarded as one who is deeply knowledgeable of the appropriate content materials. It also shows that many factors contribute to both short- and long-term success and how much a child learns in school (Duckworth, Quinn, & Tsukayama 2012).

Several factors had been identified to be the reason learners are not performing well in mathematics (Suan, 2014). Teacher factors such as teaching styles, subject matter mastery, instructional techniques and strategies, classroom management, communication skills, and personality were among those mentioned. Some researchers identified factors that have to do with the teacher quality embracing teacher qualification, teacher experience, teacher

development, teacher content knowledge, teacher pedagogical knowledge, teacher approach, attitude and behaviour. All these factors seem to be important in characterising an effective teacher. Achievement in mathematics is also influenced by teaching and learning methods and learners' cultural background. Instructional methods are teacher-centered and learner-centered, as evidenced by the types of homework and assignments assigned to learners, which can affect student performance in mathematics (Sitko, 2013). Learning methods can be when learners work in groups on problem-solving activities, or individually when the teacher sets a task in the textbook.

Teachers have a measurable impact on student learning and performance. Effective teachers are very important to learning and student achievement. However, teacher effectiveness is difficult to define as there is no consensus on what makes a good teacher (Stronge, Ward & Grant, 2011). Stronge et al. (2011) identified four dimensions used to characterise an effective teacher: instructional effectiveness, evaluation for student learning, a positive learning environment, and the teacher's personal quality. Extensive evidence from developed countries showed that teacher quality has large effects on learners' success in school and in adulthood, especially when exposed to quality teaching (Chetty, Friedman, Hilger, Saez, Schanzenbach & Yagan (2011). Highly effective teachers or ineffective teachers play that role equally. This means the influence is either positive or negative. Research revealed some variables linking learner performance to the effectiveness of the teacher. Some of them are: the teacher's professional competence, the teacher's efficacy, teacher's professional qualifications, the personal qualities of the teacher and the classroom management, effective continuing professional development, pedagogical content knowledge and skills.

Several studies have found a link between pedagogical knowledge and subject knowledge as well as teacher effectiveness. König and Kramer (2016) identified pedagogical content knowledge as one of the central cognitive components of teaching competence. By examining teacher education programs in 17 countries, Ingvarson and Rowley (2017) support this viewpoint. Their conclusion is that knowledge of pedagogical content is an important indicator for identifying effective potential new teacher candidates. Numerous studies have found that pedagogical content knowledge and subject matter knowledge are essential for effective mathematics instruction (Blazar & Pollard, 2017; Fagginger Auer, Hickendorff, VanPutten,

Beguin, & Heiser, 2016; Krauss, Baumer & Blum, 2008). In a later study, Kunter, Tsai (2008) found items such as teacher enthusiasm, challenging cognitive tasks, learning support, and classroom management. These findings were reaffirmed by Kunter, Klusmann et al. (2013), who added pedagogical content knowledge as an important element of effective teaching. They also found that when teachers have constructivist beliefs in teaching and learning mathematics, it improves learners' performance in the subject.

Teachers' professional competence has a major impact on student learning (Baumert, Kunter, Blum, Brunner, Voss, Jordan, & Tsai (2010). According to Kafyulilo, Innocent, & Ikupa (2012), they were implemented in Mbeya's study. Teachers were certified as having a high level of ability to exercise their teaching skills. The teachers were successful in stating the performance-based goals of the teachers, student activities and assessment plans. They concluded that competence-based pedagogical approaches are not well implemented in Tanzanian schools and that there are limits to what teachers can demonstrate this pedagogical competence. It seems like this competency-based teaching approach is not practically practiced and this lead to the extent of learners not performing well in their mathematics examinations.

Mathematics achievement is also heavily reliant on efficacy. Leyser, Zeiger & Romi (2011) defined teacher efficacy as the influence that the teacher believes to have on the learners and their success. Such teachers are full of energy in the classroom (Boz & Boz, 2010). Archamault, Janosz, and Chouinard (2012) conducted a study in Quebec, Canada, to examine the relationship between a teacher's sense of effectiveness and student achievement in 1364 secondary school learners. The results showed that teachers' sense of effectiveness directly affected their learners' experiences. An improvement in the mathematical results was noticed. Mutodi & Ngirande (2014), after surveying 30 Limpopo province mathematics teachers' perceptions of the use of certain materials in building mathematical meaning for learners, found that 96.7% of teacher members shared this opinion. They believe that using specific materials has bridged the gap between teaching and learning mathematics. The question is whether the activities lead to mathematical knowledge. A teacher possessing substantial knowledge of mathematics can have a major impact on a student's mathematics performance. The teacher said he will be able to convey his mathematics knowledge in a way to allow his learners to learn easily. Lovitt & Clarke (2011) identified the following characteristics of what they call a balanced and enriching mathematics

classroom: it is engaging for learners; it satisfies a wide spectrum of levels of understanding; it can be done successfully using a variety of methods or approaches; and it actively involves learners in their own learning.

Teacher confidence is another vital relevance to classroom practice that reflects how a teacher enjoys offering the subject. It is a boost to mathematics knowledge and when the teacher teaches, his or her learners will often have better performances. It is only in the classroom situation where confidence is tested. A confident teacher is an effective teacher. Such a teacher maximises instruction time by spending a lot of time teaching and not managing the classroom. It is believed that teachers' knowledge determines how they teach (Bobis, Way, Anderson, & Martin 2016). As they continue each year into a year, teachers further develop their knowledge and confidence in teaching the subject. In addition to teaching, it is also important for teachers to be able to organise their lessons. This also affects learning performance. This can be achieved by establishing routines, monitoring student behaviour and using time efficiently and effectively.

Teaching is working with learners to learn, grow, and succeed together. This is made possible through strong student-teacher relationships, and the classroom is essential to achieving this. The class will allow each member to express their feelings and work together. This can only happen if the teacher has very good classroom management skills. Classroom management refers to the prevention of disruptive behaviours in order to improve student learning outcomes. Classroom management aims to establish student autonomy. This can be done through a process that promotes student achievement and positive behaviour. There is a link between academic achievement, teacher effectiveness, teacher-student behaviour and classroom management. Effective classroom management is determined by teachers' qualifications, experience, teaching methods used and assessment methods (Oliver & Reschly, 2007). Effective classroom management develops proactive methods to avoid problems in the first place while creating a positive learning environment (Kaushar, 2013).

Discipline is seen by teachers as one of the barriers to promoting effective education. Good classroom management benefits the teaching and learning environment and leads to good classroom management that leads to good student learning outcomes. Classroom management goes beyond traditional behavioural management techniques recommended for dealing with

learners who exhibit disruptive behaviour. Teachers must make every effort to build compassionate and supportive relationships between learners. Organise and implement instruction in a way that maximises student access to learning. You can use group management methods to encourage student participation in learning activities. Good or effective educational management is a key to a student's academic success. According to Oliver & Reschly (2007), classroom management is a factor affecting learning outcomes in schools. Emmer & Stough (2007), state that the ability to organise classrooms and manage student behaviour is essential to achieve positive educational outcomes.

Class management is a major concern in today's schools. It is a collective term for definitions of learning interactions, learner interactions, student learning and behaviour, etc. (Martin & Sass, 2010). Effective teachers make good classroom leaders, and good classroom leadership enables good education and is an essential part of an effective teaching and learning process. Effective classroom management is a key to a student's academic performance. Lack of effective classroom management leads to lack of discipline in the classroom, which can adversely affect or disrupt education and learning. Classroom management is concerned with a course of action of teachers' behaviour and activities that are anticipated to develop learners' cooperation and consideration in the classroom (Freiberg, 2013). Teachers are concerned about classroom management and student achievement (Brannon, 2010). It is imperative that classroom behaviour is managed so that student achievement can occur.

2.1.3 Teacher Qualities that Influence Learners Performance

Teacher effectiveness can be assessed using formal and structured processes. It is done to detect high qualities and skills teachers demonstrate and consistently struggle to improve learner performance (Akram & Zepeda, 2015; Akram 2018). A few studies show that effective teachers should be competent in the subject content, employ varied teaching strategies, and assess and facilitate student growth (Akiri, 2013; Akram 2018). According to Akram (2018) and Akram & Zepeda (2015), evaluating the teacher's performance is a means to improving learning. Slater, Davies and Burgess (2009) investigated the correlation between the visible teacher characteristics and teacher effectiveness. Evidence from Pakistan shows that teacher qualifications directly correlate to student performance.

Teachers' abilities to impact learners' emotional and social development vary significantly (Jennings & DiPrete 2010; Backes & Hansen 2015; Ladd & Sorenso 2015; Gershenson 2016; Kraft & Grace 2016; Ruzek et al., 2015). Other researchers have looked at teachers' contributions to learning outcomes, known as teacher effects (Chetty Friedman & Rockoff 2014; Hanushek & Rivkin 2010). Tshabalala and Ncube (2013) showed that learners' mathematics performance was chiefly affected by instructional methods, teaching materials sources, teacher performance, and teacher content knowledge. Suan (2014) also identified that teachers' content knowledge, instructional strategies and classroom administration, are among the factors that affect learning. Teacher effectiveness includes several teacher approaches and behaviours, teacher expertise and development, teacher experience, teacher abilities, teacher motivation, teacher-student relationships, and teacher attitudes towards a particular subject.

Adeogun and Osiilla (2013) argue that the quality of the education system depends on the qualifications of teachers and that schools without human resources cannot achieve the goals of the education system. They also argued that the quality of the education system depends on the qualifications of teachers and that schools without human resources cannot achieve the goals of the education system. Adesina (2011) also found that teachers are an important indicator and determinant of the quality of education. The school needs a qualified and dedicated teacher. There is a strong correlation between what teachers know and what they teach. Therefore, the ability to teach effectively depends on the knowledge of the teacher, and there are many forms of knowledge. If the teacher is unfamiliar with the knowledge system being taught and its effectiveness depends on a particular subject, the teacher's effectiveness is diminished. For teachers, this means that they must fully understand what they are being taught. Teachers who have a deeper understanding of the subject use clearer language and provide better explanations than less knowledgeable teachers. How learners perceive knowledge of the teacher's subject can have a significant impact on their learning outcomes.

2.1.4 Teachers' Professional Content Knowledge

Teacher competence refers to the teacher's knowledge of the subject, the knowledge of the curriculum and the way the knowledge is delivered. Teachers' professional knowledge is influenced by several factors such as the college the teacher attended, degrees earned, and

opportunities to be involved in professional development programs. Any effective teacher must have content knowledge because a teacher can only teach what he/she knows. Knowledge in this category includes facts and concepts in an area, why facts and concepts are true, and how knowledge in that area is constructed and structured (Hill, Ball, & Schilling, 2004). In the case of mathematics, this type of knowledge includes how to see, perceive, and believe in mathematics. Powell and Hanna (2006) argue that teaching areas such as mathematics requires knowledge of mathematics, not teaching materials, but teaching requires knowledge of the subject.

Various studies have reported a positive correlation between teacher content and pedagogical knowledge and teacher effectiveness. A study by König & Kramer (2016) identified educational and content knowledge as the fundamental intellectual elements of teachers' abilities. A teacher who does not know the subject matter cannot deliver the lesson so that learners can understand (Taylor & Taylor, 2013). Teachers can only give from what they have, and teachers that are more knowledgeable are more likely to influence learning (Beswick, Callingham & Watson, 2012). Teachers who lack meaningful knowledge have low self-efficacy. Karnoy & Ahrents (2012) reported a positive relationship between teacher knowledge and student achievement.

Pournara, Hodgen, Adler, & Pilary (2015) suggested that improving teachers' math skills can improve their math performance. Effective teachers have in-depth subject knowledge and apply appropriate teaching skills in the classroom (Liakopoulou, 2011). An effective teacher would focus on grasping the content to be taught and finding the most appropriate way to deliver the content in a way that learning occurs. Shulman (1987) categorised teacher knowledge: curriculum knowledge, content knowledge, educational knowledge, educational content knowledge, learner learning method knowledge, educational context knowledge, educational value, and purpose knowledge. These categories can be interrelated when determining the teacher's knowledge of a subject.

Poor math performance continues to be a major concern in many countries around the world. To address this issue, South Africa participated in several assessments and comparative studies conducted at national, continental, and international levels to determine the actual state of the issue. The results of these participations consistently show that there are serious problems with the quality of mathematics teaching in South Africa. The unfortunate situation in South Africa is

that many mathematics teachers do not have the adequate mathematical knowledge to carry out their work effectively. The inadequate skill is due to the quality of training that many teachers received. Having observed teacher allocation in the latter stages, new and inexperienced teachers are always allocated to the senior phase (grades eight and nine) in high schools. This negatively impacts learners' mathematics performance as these teachers are still trying to create a teacher-learner relationship and are still practicing their teaching skills. Such teachers practice on learners who need a strong foundation to be laid in mathematics, to equip them with the knowledge to grasp mathematics concepts. Learners can only grasp mathematics concepts from a teacher who has mastered the subject, is well versed in various instructional methods, can control the classroom, and communicate effectively (Fisher & Frey, 2021). Teachers are sources of knowledge, and therefore, they lay classroom outcomes. Their performance and classroom management do matter a lot in this case.

The literature claims that poor subject knowledge and poor mathematics teaching and learning are serious problems in South Africa (Diko & Feza, 2014). After Ven Kat & Spaul (2015); George & Adu (2018) there is a positive correlation between learner achievement and teacher knowledge of the content, meaning that teachers cannot help learners without understanding the content themselves. According to Marake (2013); Spaul (2013); Tansil & Kose (2013) and Zuya (2014) mathematics content knowledge is still a challenge in many countries. Learners are expected to learn mathematical procedures, which has a negative impact on their understanding of mathematical concepts. Mosia (2016) reported that mathematics teachers who do not teach geometry collectively do not recognise teaching knowledge as a socially constructed effort.

Gencturk (2012) argued that teachers' mathematics knowledge is a necessity for a standard-based teaching that emphasise understanding, critical thinking, and problem-solving, making connections between mathematical ideas and communicating mathematical ideas to the learners. Therefore, the teacher's mathematical knowledge is inferred as a deep understanding of mathematical concepts, subjects and processes. Teachers' pedagogical knowledge involves more than simply imparting subject knowledge to learners (Loughran, Berry & Mulhall, 2012). Teachers develop pedagogical knowledge in a step-by-step process through experience of how specific content can be delivered in specific ways to improve learner understanding. Effective teaching requires not only the ability to accurately calculate and understand the conceptual

structures of mathematics, but also the ability to teach learners (Maher & Muir, 2013). Specific content knowledge is required to make the topic more understandable (Hill, Ball & Schilling, 2008).

A teacher who deeply understands the concept to be taught can use explicit semantics in delivering the lesson and be articulated to understand (Uya, 2011). This indicates that the positive association between teachers' mathematical knowledge and pedagogical knowledge directly affects learning performance (Campbell et al., 2014). To ensure order and improve learning, teachers need to know and employ appropriate pedagogical skills (Uya, 2011). Hourigan and O'Donoghue (2015) suggest that many qualified teachers lack the appropriate mathematics subject content knowledge for effective teaching (Hourigan & O'Donoghue, 2015). In South Africa, studies have found a positive association between teacher knowledge and learner performance (Carnoy et al., 2008; Carnoy & Arends, 2012), showing that teachers with high expertise, particularly pedagogical expertise (PCK), are more likely to be effective and more employable (Shepherd, 2013).

Pedagogical knowledge includes knowledge of teaching methods and strategies used in the classroom, such as how learners learn (Aksu, Metin & Konyal, 2014). It is well known that pedagogical knowledge includes classroom management, preparation and assessment of learners' work. Therefore, it is the ability to effectively convey the contents of mathematics. Teachers need to have in-depth knowledge to apply teaching and learning methods (Aksu et al. 2014). Teachers need to know what they want to teach, such as presentation skills and skills that help learners understand this knowledge (Greenhill, 2010). Knowledge includes facts and insights, why facts and insights are true, and how knowledge is constructed and structured in the field (Hill; Ball & Schilling, 2004).

To know the content of mathematics in the classroom, you need to know not only the facts and concepts such as the value of place, but also the established rules of what to do and say, in its principles, structure and content. Lack of sound mathematical knowledge is believed to impair educational practice. If the teacher has no knowledge of the content, he or she has nothing to teach. According to Maher & Muir (2013), you cannot teach what you do not know. In particular, teachers need to have a clear knowledge of what to teach and the skills and techniques

in presenting lessons so that learners can understand them. Kar, (2017) discovered that teachers need a deeper understanding of the core math ideas of the classes they intend to teach. Teachers need to be aware that there is a difference between knowing and teaching mathematical answers in order for learners to understand them.

For teachers to be effective, they must have math curriculum knowledge. In the South African context, CAPS sets out the purpose, principles and goals of the National Curriculum Statement, which is a program of study for mathematics grades 7 through 9 (DBE, 2011). Globally the performance of learners in mathematics is a thorn to many. Programs have been designed by UNESCO (2014) to help in training and developing African countries in mathematics and mathematics education. South Africa is one of the countries where these programs have been applied. This is because South Africa suffered from a severe shortage of science and technology skills coupled with the poor quality of the education system (Ann, 2011). Research has shown that teachers who are not proficient in the subject and have difficulty delivering in class therefore their learners do not perform well in the subject. It has been observed that most mathematics teachers are incompetent and lack knowledge of the content and therefore suppress learners' interest in the subject (Gatto, 2013).

According to Biotenbeck (2011) and Clements (2013), learners' low achievement in mathematics is associated with teachers' teaching techniques. Mathematics teaching methods can take the form of lectures, teacher-centered methods and rote memorisation (Biotenbeck, 2011). These types of methods are not relevant to the lower grades. Teaching methods also take a teacher-centered or learner-centered approach. The teacher-centered methods are approaches where the teacher is in direct control, while the learner-centered approaches allow learners to take a more active role. While the Education Department has tried different means to improve performance in mathematics, low performance has persisted. Unfortunately, using mathematics teachers for extra classes only focuses on the FET band. Many learners struggle as they progress through condoning from grade 9, hence; they fail. Therefore, Kiplagat, Role and Makewa (2012) opined that teachers were the major cause of low learners' performance in mathematics. Okigbo and Okeke (2011) believe that teacher incompetency and poor teaching methods cause learners to perform poorly in mathematics. Mbugua et al. (2012) discovered that the persistent failure in

mathematics in Kenya was partly due to the teaching methods that mathematics teachers employed.

Grade 9 learners need enthusiastic teachers who are passionate about teaching and employ methods that are actively involved in the teaching and learning process. Mtitu (2014) recommended that teachers' teaching methods should be linked to the real lives of learners. Therefore, teachers need to enable learners to clearly express their knowledge of the subject. Mtitu (2014) identified such methods as learner-centered and would enable effective and efficient teaching. If learner-centred methods were used and the learner's prior knowledge was considered, effective teaching would occur. Maganga (2013) called this knowledge a priori. For any strategy to be powerful, the teacher must know the learner's prior knowledge about the topic at hand. It will enable such a teacher to be effective and yield excellent results.

The teacher must create opportunities for learners to solve mathematical problems on the chalkboard or even work in groups to find solutions. According to the Department of Basic Education (2011), learners should be able to identify and solve problems and make decisions through critical and creative thinking. A study done by Ali et al. (2010) found that using problem-solving methods could improve learners' performance in mathematics more than using traditional teaching methods. This resonates with what Mtitu (2014) referred to as learner-centered teaching. Teacher effectiveness is one characteristic of a teacher who will create such opportunities for learners, for them to perform well irrespective of their background. Teachers with positive beliefs would use more constructivist approaches when teaching mathematics (Adnan et al., 2012).

Learner- centered teaching methods would involve learners if they attempted given tasks with the teachers' guide and later solved mathematical problems independently. This would make them take responsibility for their study of mathematics. They might set time aside for their studies and study habits or even develop a positive interest in mathematics. Learning is likely to be much more effective when there is a feeling of involvement in the classroom. The teacher's capacity to understand learners' profiles and their strengths and weaknesses is the core character of teacher effectiveness. The most ineffective teaching is when the teacher is talking in front of the class, and the learners are sitting passively. Mathematics teaching requires that teachers know

mathematics as a subject and apply teaching methods (Hodgen, 2011). The focus on the learner when teaching depends on the type of training the teacher received (Sall et al., 2009).

Grade nine learners easily and quickly lose concentration if they are not thoroughly involved in the lessons. A teacher who wants good results will bear this in mind before embarking on the lesson each day. So and Brush (2008) point out that a suitable learning environment must foster interaction and participation, connecting learners to the subject and peers in constructing meaning. At times learners must be grouped to allow those who understand the lesson to interact, while the teacher attends those who did not understand the lesson. In so doing, the teacher allows flexibility in his or her teaching approach. Effective teachers employ different strategies and teaching methods to master different aspects of the subject as much as possible. They are excellent communicators who convey their knowledge in a proactive, clear and structured manner. Learners actively participate in lessons in a variety of ways. Martin & Rimm-Kaufman (2015) emphasised that in mathematics learning, learners engage in reasoning, problem solving and conversation with teachers and other learners to explore mathematical problems.

The teacher's pedagogical knowledge refers to his or her ability to transfer mathematical knowledge to learners properly in the classroom setting (Guerriero, 2017). This is viewed by Loughran, et al. (2012) as the knowledge that teachers develop gradually through the experience of teaching specific content in specific ways to enhance learner understanding. The South African education policy document implies the learner-centered teaching approach, although it is not enacted in most cases. Stols and Howie (2014) found that teachers had a varied understanding of learner-centered methods. In another study, Van Putten et al. (2014) discovered that all teachers provide learners with opportunities for discovery, teach, explain, answer questions, and provide learners with classroom activities. An effective teacher will embrace all learner-centered teaching methods in his mathematics classroom because that will give learners the freedom and flexibility to learn and perform well.

2.1.5 Teacher Behaviour

Dealing with behaviour issues is essential in fostering learning and good performance. Learner achievement can be enhanced through effective teacher behaviour. While many factors contribute to student learning, we can control our behaviour as teachers. A teacher's behaviour

is the teacher's action, interaction, and communication with the learners. Therefore, teacher behaviour is action, interaction, and communication of the teacher with the learners. Teachers display different behaviours in the classroom: some are cordial and social, while others are reserved, and some are very systematic while others are not. Teachers' behaviours have a great impact on learners' performance. Effective educators have strong personalities. They inspire respect, are full of confidence, are positive, enthusiastic and friendly, and genuinely care about their learners.

Another research shows that teacher behaviour affects learners' cognitive and affective learning outcomes (Sammons & Bakkun, 2011; Van de Grift, Van de Lans & Van Veen, 2015). According to Ahmad et al. (2013), the positive attitude of the teacher encourages the positive talent of the learners and increases the chances of high achievement. Teachers who have interpersonal skills and positive behaviour affect the learning and the achievement of learners in their classrooms. Such teachers can inspire learner knowledge and influence the development of learners' skills and personal characteristics, including socio-emotional and spiritual realms and cognitive behaviour. In the Netherlands, Opdenakker et al. (2012) found that the interaction relationship between teachers and learners tends to decrease during the school year.

Shamatov, Meril & CohenMiller (2017) equated teachers to artists who design what their classroom will be like but cannot shape the learners to what they want. Akiri (2013) identified teachers' effectiveness, encompassing lesson preparation and presentation. Effective teachers will take a personal interest in each learner by showing interest with each of them and establishing a caring, loving atmosphere. Such teachers pose characteristics like passion, perseverance and dedication, willingness to take risks, flexibility, patience and pragmatism. Not every learner learns fast or quickly, and some behaviours from learners can challenge even the most effective teacher. Therefore, effective teaching requires patience. As the researcher indicated earlier, that behaviour could be negative, learners face many problems with misbehaving teachers who are still working in our country. Because of such teachers, learners have a problem understanding their subjects, and learners hesitate to communicate or discuss their problems with teachers. These problems adversely impact learning and motivation to learn, leading to poor performance. Gecer (2013) points out that the teachers who mock learners when

they fail negatively affect learner performance. For this reason, teachers' behaviour is an issue of concern in order to enable effective teaching to take place.

2.1.6 Teachers' Attitudes

Attitudes are defined as ways of behaving, feeling or thinking. They are either favourable or unfavourable in relation to a specific object. According to Karlinger in Olatoye (2014), attitude is a mental construct inferred from discernible reactions to stimuli presumed to mediate reliability and rationality among the reactions. Karlinger in Olatoye (2014) further explains that attitude is associated with intellect, emotion, perception and behaviour towards a perceptive object. Attitude is a subjective mental grounding for action (Onoshakpokaiye, 2011). According to Onoshakpokaiye (2011), the education system rotates around the teacher. Taiwo and James (2015) identified that teacher is not a leader who initiates an idea but also sees through implementing the idea to increase learners' learning.

Many mathematics teachers are unaware of its important role in the education system (Kiplagat et al., 2012). Some teachers do not realise that the way they teach and interact with learners can have a more lasting impression than the content they teach. Learners see their teachers as the authority figures, role models and sometimes the sole source of all knowledge (Onoshakpokaiye, 2011). When teachers have positive attitudes towards teaching and employ appropriate teaching methods, learners will learn mathematics. Teachers' positive attitudes towards their profession define the teaching-learning process. Thus, teachers' preferences and moods influence what goes on in the classroom (Ahmad et al., 2013).

In order to enhance learners' skills and strengths, teachers must have a positive attitude (Ahmad, Said, Zeb, Sihatulla & Khalil, 2013). Many qualified mathematics teachers are ineffective in their teaching. Hence, the country's continued low learner performance in grade 9 mathematics. This ineffectiveness stems from the teaching methods employed to teach mathematics, especially in the lower grades. Our education system holds the teacher responsible for effectively developing the learner's character and intellect. This responsibility can only be fulfilled when the teacher develops positive, caring relationships with learners (Can, 2011; Inelme, 2011). Learners can only achieve this if they fully feel free and comfortable with the attitude displayed by their teacher in their presence and how he or she addresses them. A positive attitude increases

learners' comfort levels and confidence. If learners feel confident, they will be more willing to think through the teacher's new concepts. It will contribute positively to their performance in mathematics.

The mathematics teacher's attitude towards the teaching of mathematics can lead to effective mathematics teaching. Teachers with positive attitudes and interest in mathematics can inspire learners to learn mathematics (Kunter et al., 2008). The attitude of the mathematics teacher contributes significantly in influencing learners' interest in the subject. Teachers play an important role in student achievement in mathematics. Teachers' attitudes to teaching mathematics influence learners' attitudes toward subjects (Olasehinde & Olatoye, 2014). This type of teacher can make learners to love the subject and perform well in it. Teacher's attitude is one of the important factors that determine learners' attitudes and learning outcomes in Mathematics. Inappropriate teaching practices and teachers' attitudes are the main causes of learners' negative attitudes towards mathematics.

Teachers' attitudes towards mathematics itself can influence teachers' approach to mathematics teaching, which in turn has a strong impact on the mood and character of mathematics teaching. In particular, teachers' passion and confidence in teaching mathematics will make a great contribution to the ethics of mathematics teaching. Again, this is expected to have a profound impact on learners' perceptions of math. Of course, it is the entire classroom math experience that will contribute to a student's math learning, confidence and attitude toward math, and ultimately, student achievement in math. Teacher training, particularly in mathematics and education, can influence a teacher's math attitude. Confidence in mathematics and pedagogy seems to be linked to teachers' knowledge in these areas through their perception of the relevance of teachers' knowledge.

Teachers who have positive attitudes towards mathematics do not display learners' mistakes instead; they encourage and enhance learners' efforts (Ahmad et al., 2013). Such teachers create a meaningful learning environment for their learners in improving their performance in mathematics (Olasehinde & Olatoye, 2014). Teachers with negative attitudes to their duty as a mathematics teacher will undoubtedly produce learners without interest in mathematics hence increase the chances of the learners performing low in mathematics. Learners' interests and

attainment in any subject are greatly influenced by the teacher-learner relationships (Noah & Ogun, 2010). The teacher must exhibit self-efficacy and should be confident that learning is possible even under difficult conditions (Künsting, Neuber & Lipowsky, 2016). High confidence in a teacher paves the way for greater learner achievement. According to Newton, Leonard, Evans & Eastburn (2012) teacher efficacy is also positively related to content knowledge. Teacher efficacy has been reported to influence learner performance in mathematics and in other subjects (Katz & Stupel, 2016).

According to Mensah et al. (2013) teachers' positive attitudes towards mathematics were correlated with student performance in mathematics. When teachers present mathematics as a very difficult, masculine subject, some learners may develop negative attitudes towards the subject. For instance, some teachers believe girls are not good at mathematics, which will make girls shun investing their energies to understand mathematics. Thomaz and Breazeal (2008) point out that many teachers' ignorance about how they interact and behave with learners during the lesson can affect learners beyond the content being taught. Learners look up to teachers as role models, copying whatever behaviour or attitudes they portray. If they portray a negative attitude, this could harm their learners.

The attitudes of some teachers towards work can be explained by the poor attitudes and performance of their learners. According to Kauchak and Eggen (2011), positive attitudes among educators are fundamental to effective learning. They identified several teacher approaches that would help create a caring and supportive atmosphere in the classroom. Teachers should ensure that learners are motivated. Teacher belief systems also appear to have a strong impact on student achievement (Lawson et al., 2019). Effective educators in mathematics studies have tested educators' beliefs about teaching and mathematics (Askew & Askew, 1997). This study of successful educators shows that they have core beliefs about: (a) the importance of mathematics; (b) the relationship between the teaching and learning of arithmetic by learners; and (c) presentation and intervention strategies (Askew et al., 1997).

2.1.7 Teacher Professional Development

The post-apartheid governments made policy and legislation changes. South African teachers felt that education has been politicised and, therefore, distrusted policymakers. They were ill-

equipped to deal with the country's challenges. Professional development involves activities to develop an individual teacher's expertise (OECD, 2009). It is ascertained that teachers volunteer to attend Continuing Professional Teacher Development (CPTD) to up-skill them to improve learning (Oluremi, 2013) and can be through workshops and Integrated Quality Management System (IQMS) (Weber, 2005). Teachers generally demonstrate some improvement after attending teacher development programmes (Schmude, 2011), although in the study conducted by Martin et al. (2013) there is no statistical significance.

Though teachers are qualified in mathematics teaching, they need to be serviced now and then to equip them with new development in the curriculum. Effective educators continue to learn how to keep up with changing requirements and the rapid progress of knowledge in various disciplines. They are active researchers. CPTD is an opportunity for teachers to up-skill and improve learner achievements for teacher effectiveness. As it appears, for teachers to be effective in their delivery of the subject matter, they must develop professionally on content and instruction, which, according to Suan (2014) has remarkable effect on learner achievement. She also observes that teachers who are math savvy and participate in developmental programs have learners with good math performance. According to Suan (2014), and Blank and De Alas (2009) mathematics teachers who take part in CPTD improve their teaching skills which ultimately increase learners' achievement CPTD are important because the South African Council for Teachers (SACE), a body that accredits teachers, values the program.

Conversely, some researchers have found a link between CPTD and learning outcomes (Blomeke, Olsen & Suhl, 2016; Harries & Sass 2011), while others have found limited improvement (Blomeke et al. 2016; Harries & Sass 2011). Desimone, Smith & Phillips (2013), discovered that career development can affect the quality of education. Effective teachers should always have consistent teaching skills and knowledge so as not to lose their professional focus. The failure to improve or the little improvement learning after attending CPTD could be attributed to conflict messages from the programmes or misunderstanding of the purposes of the programmes (Hill, 2013). In addition, teachers resist change, which is contrary to the learning process. Teacher professional growth is enhanced by improving the knowledge of the subject, the skills and research processes that guide learners, and the knowledge of teaching skills. The

teacher must always be willing to learn new things and keep abreast of the latest developments in his subject (Dhavale, 2010).

Much of the research on teacher professional development has not yielded good results in terms of supporting teachers to improve classroom practices and their impact on student learning and performance (Desimone & Garet, 2015; Garet et al., 2011). Blank & De Alas (2009) found 16 studies that reported a significant and positive association between professional development and learning success. Teacher professional development refers to the opportunities offered by practitioner teachers to develop knowledge, skills, approaches, and temperaments to improve their effectiveness in education. Professional development programs can be formal and informal means that help teachers not only gain insights into education and their practices, but also explore new or advanced knowledge of content and resources. These programs can be delivered by more knowledgeable people through workshops, group meetings, and formal presentations. Individual teachers can continue teaching or self-evaluate their practice. Most researchers found that teachers' experiences in professional development had only a limited correlation with teacher effectiveness, with the exception of teachers with more meaningful training (Blomeke et al., 2016). Desimone, Smith & Phillips, 2013) suggest that career development can affect the quality of education. Competent teachers always and continuously acquire pedagogical skills and knowledge. Otherwise, you will lose your professional focus.

The most meaningful professional development is achieved through a variety of opportunities for teachers to build leadership skills that leverage and reinforce their strengths and expertise (Taylor, Yates, Meyer, and Kinsella, 2011). Quality professional development incorporates the knowledge that teachers already have and enhances education based on that expertise. Many schools and districts engage in a variety of professional development projects to improve student learning and to help both new and experienced teachers develop and acquire new skills (Bayer, 2014). Professional development in education is paramount to keeping up with the demands of stricter mathematical standards. Teachers are empowered to use new effective teaching strategies thanks to CPTD. Furthermore, a teacher should be a change agent in the educational system (Beijaard et al., 2000).

In Texas, professional teachers are expected to engage in 150 hours of CPTD every five years. Polly, Neale, and Pugalee (2014) show that teachers gained mathematics content, which enhanced their quality of teaching. CPTD enhanced teacher classroom effectiveness (Taylor, Yates, Meyer, & Kinsella, 2011). It is no wonder many schools rely on CPTD to up-skill teachers to improve learner achievements (Bayer, 2014). Boston's (2013) findings on CPTD of high school teachers show developments in new ideas in mathematics, which improved their teaching strategies. CPTD improve learner participation and achievements.

The Ministry of Education (MOE) of Namibia has officially introduced a student system to improve education management and provide teachers with professional support (Mendelsohn and Ward, 2007). The National Mathematics Policy Guide states: The purpose of thematic group meetings is to improve efficiency, develop skills, and teacher enrichment. Ratification and reactivation in the thematic activities of the groups play an active role in improving and improving the quality of education and learning (MM, 2008).

The group's goals include, but are not limited to, improving teaching and learning; improving professional performance of teachers and principals, and reducing the isolation of school teachers through school-to-school shifts (Mendelsohn & Ward, 2007). Clusters are said to provide a framework for collaboration between schools and teachers (Mendelsohn & Ward, 2007). The group was also considered to improve pedagogy by sharing resources, experiencing, and expertise in making an effort by teachers (Pomiti & Weber, 2012 & Mosia, 2016). Clusters remain a way to reduce stress for new teachers.

In South Africa, teacher clusters work together in a variety of situations. Clusters provide a platform for teachers to learn from each other. Sharing experiences and expertise among teachers helps improve education (Nwagbara, 2014). Collaborative teaching means a group of teachers regularly works as a team to improve content teaching and pedagogy. This is a means to allow teachers to share their expertise (Jita & Mokhele, 2014). Perspectives of teachers on these engagements are that they were positive. Besides this, teachers update their subject matter and pedagogy of teaching. According to Botha (2011), collaborative work enhances change in school culture in South Africa. Collaborative education means that groups of teachers meet regularly to

create a better teaching and learning environment that improves the school environment through the exchange of ideas and expertise. All of these contribute a lot to teacher effectiveness.

2.1.8 Teacher Experience

Teacher effectiveness increases with teachers' experiences related to the number of years they have worked as a teacher. Ofem et al. (2015) found that experienced teachers are more effective than novices. Papay & Kraft (2015) as well as Ladd & Sorenson (2017) in the United States (US) and Gerritsen, Plug and Webbink (2014) in Denmark pointed out that teacher experience influences learner achievement. Teachers with 5 years of teaching experience were significantly more effective than teachers with less than 5 years of teaching experience. In addition, personal educational experience and gender can influence learning outcomes. Goe, Bell, and Little (2008) found that teachers had a positive impact on learner achievement.

Teacher experience influences teacher-effectiveness after a few years of service, and improvement occurs over the first four to five years of work (Lankford et al., 2010). On average, teachers improve their teaching strategies in the first three to five years and after that, they do not increase significantly. (Jacob 2012). Rice's (2010) found that teacher-effectiveness in mathematics diminished in high school. Some researchers from USA show that teaching experience matters (Staiger & Rockoff, 2010). Research by Martin et al. (2000) on academic achievement using TIMSS data found that classroom experience was not an important factor in student achievement except in Singapore and the United States. As Abbott-Chapman et al. (1990) found that more experienced teachers tended to be promoted from the classroom to managerial positions. Thus, the teacher experience can manifest itself in other contexts within the school.

Research by Pil and Leana (2009) revealed that the teacher gains effectiveness with an experience of teaching the same grade for many years, and this was found to be correlated to learner achievement. In addition, Rice (2010) indicated that teachers' efficiency wanes after a few years of teaching. Conversely, Ladd and Sorenson (2015) found that it is how the improvement is a continuum. According to Panayiotis, Kyriakides and Creemers (2011) and Kini and Podolsky (2016), experienced teachers develop knowledge and skills about their peers. The more experienced the teacher is, the more the learner outcomes (Kini & Podolsky, 2016).

Stronge (2010) and Murnane (2011) claim that the relationship between an experienced teacher and a learner's achievement is between one and three years, while Ferguson (2010) suggested nine years as the years for achieving effectiveness. DEPRG (2014) reported that more experienced teachers are better teachers. Such teachers can be effective in the delivery of their lessons. Despite the inconsistency nature of research presented, many teachers are effective in their first few years of teaching. Some of them cannot maintain the standard of effectiveness as they continue. The longer the term they hold, the lesser the achievement becomes. If only teacher-effectiveness could be measured or evaluated, teachers would know their effect as they continue. Curtis and Wiener (2012) suggested that to achieve a high level of teacher-effectiveness, there must be evidence of learner achievements, learner and peer assessments.

Murnane (2011) found that teacher effectiveness improves rapidly in the first three years of instruction, peaking between years three and five, but found no significant improvement after year five. A small number of studies suggest that the effects of teacher experience can be evident over time. Murnane & Phillips (2011) find that experience had a significantly positive effect on teachers' student performance during the first seven years of their teaching. Ferguson (2010) shows that at the high school level, learners taught by teachers with more than nine years of experience had significantly higher test scores than learners whose teachers had five to nine years of experience. Some researchers have not found that classroom experience beyond the first three years leads to improved student test scores. However, not all teachers, even with the same number of years in the classroom, have the same experience of teacher preparation and professional development over time.

About 28 studies examining the effect of classroom experience on student performance, as measured by standardised test scores, found that classroom experience was positively and significantly associated with teacher effectiveness. A five-year North Carolina high school survey by Ladd and Sorenson (2017) found that multidisciplinary teaching experience was the result of at least 12 years of education. 12 years of experience.

2.1.9 Teacher-Learner Relationship

The researcher believes interactions between teachers and learners play in learning, especially in mathematics (Sitko, 2013). A good teacher-student relationship is useful for learning (Caballero,

2010). Hamre et al., 2012) stated that teachers' interaction with learners improves learning. According to Martin & Rimm-Kaufmann (2015), building teacher-student relationship is one way to improve emotional and social engagement, which allows teachers to provide support to learners' needs.

For teachers to remain effective there must be active interaction between teachers and learners (Hamre et al., 2001). For example, No Child Left Behind, enacted in the United States of America (USA), focused on standardised tests that measure not only student achievement but also teacher effectiveness (United States Department of Education, 2007). The 'No Child Left Behind' law was used in the U.S. public schools as a means of supervision to guarantee success for learners irrespective of capabilities, gender or race. A positive student-teacher relationship provides a unique starting point for improving the learning atmosphere (Hamre & Pianta, 2006). A study on the impact of effective teacher-student interactions conducted by Hamre et al. (2001) confirmed that emotional support and classroom organisation are the primary areas of interaction that support children's academic progress in the classroom.

Learners with poor learning experiences difficulties to having trust in teachers (Varga, 2017), and the lack of trust applies to previously unfairly individuals. In many cases, a child's background may affect learning. If this is the case, the teacher is not the cause of the learner's challenges the experiences. Learners are motivated if their teachers show that they care about them and help them succeed. If these relationships can improve school engagement, they surely can improve academic achievement, particularly in mathematics, which all effective teachers will want to see. Most learners learn best when expressing themselves in class without any fear (Knoell, 2012).

Knowing your learners as a teacher can help in improving classroom management. A teacher can easily influence stubborn learners to develop a socially acceptable behaviour when he / she relates to them as a mentor. Teachers' ability to organise classrooms and manage learners' behaviour is central to achieving excellent educational outcomes (Oliver & Reschly, 2007). Orji (2014) reiterated that effective education requires basic managerial skills, including understanding the classroom. When teachers treat struggling learners as bad or unintelligent, they are unlikely to change. However, when teachers attempt to care about and help them, these

learners are more than capable of growing. Learners, in general, require teachers who believe in them and are willing to collaborate with them. Effective communication between teachers and learners can create a favourable learning atmosphere for the school, and the impact of teachers on their learners can last long after the school year. The researcher believes teacher and learner interactions play an important role in learner performance.

A study conducted by Hamre et al. (2012) highlighted the need for teachers to foster effective interactions with learners. Building effective relationships with learners allow teachers to facilitate learning, based on the learners' potential and interests. The quality of the classroom discourse can motivate learners to reflect and think critically about what they learn. A constructivist teacher can accomplish this in a mathematics classroom by encouraging mutual respect and permitting creative thinking. Taking a constructivist perspective, teachers establish relationships, reflect on their actions, and model and construct clarifications. Vygotsky (1978) asserts that learning stimulates various internal development processes that can only operate in a cooperative environment.

More investigation is needed to determine the strategies teachers use to establish a strong rapport with their learners. Ravitch (2010) argues that educational goal creates well-developed minds to explore the environment. Teacher-learner relationships help engage learners to achieve good grades. In the ecological study that O'Connor, Dearing and Collins (2011), the importance of raising awareness of the relationship between teachers and learners provides a way to support quality learning. Interactive relationships should be based on mutual respect. Poor teacher-learner relationships can sustain academic challenges. A good teacher-student relationship improves learner class attention to improve learning.

Teachers must establish trusting bonds with their pupils while highlighting their advantages. On the other hand, they continue to have high but reasonable success expectations. Respect, trust, compassion, and a sense of unity should underpin these interactive relationships. A strong teacher-student relationship also fosters a sense of belonging and helps learners succeed in school. Learners with poor teacher relationships have a lower level of classroom participation and achievement. Poor teacher-student relationships are a major cause of long-term school difficulties and future school difficulties. Teachers need to build strong relationships with their

learners. This is because learners will have a direct impact on their academic performance in the years to come. A positive teacher-student relationship encourages learners to communicate and interact with their teachers, receive more attention and support in the process of communication, and achieve better academic performance.

According to Toste et al. (2010) the teacher-student relationship has a major impact on the student's academic success. Collaboration of learners and educational experiences has resulted in a variety of learning outcomes at school (Cooke, 2011; Pickens, 2010). In addition, the teacher-learner relationship is the basis of student success (Marzano, et al., 2011). Mathematics is a challenging theme (Luitel & Pant, 2019). Problems in learning math may be related to the teacher-student relationship (Dahal, 2013). Learners feel mathematics is difficult because the misconceptions toward the subject may create a gap between teachers and learners. Learners who receive support from their teachers perform well in stake exams (Gehlbach et al. 2012), while learners who receive no support perform poorly and develop negative attitudes towards learning (Rimm-Kaufman & Sandilos, 2012).

Teachers' experiences with their learners get strained (Spilt, Koomen, Y, & Thijs, 2011). Good teacher-learner relationships can improve the classroom-learning environment (Maulana, Opdenakker, Stroet, & Bosker, 2013). Teachers should use the power they have over their learners to improve themselves and the classroom environment. Improving relationships in schools between teachers and learners will improve classroom environment. Teachers also need to motivate learners. Through such motivations, learners gain interest in learning and get good scores.

2.1.10 Teacher Competency

Teacher skills are discipline management, teaching skills, classroom management, assessment skills and resource selection. Teachers' skills remain one of the purposes of in-service teacher training and on-the-job training to improve teacher qualifications. According to the Ministry of Education (2011), this is an important factor in student achievement. This includes educational outcomes. Competencies are defined in terms of required performance, conditions and standards, so they are not considered purely work activities. It is considered the ability to apply knowledge and skills. Teacher abilities influence teacher behaviour and educational effectiveness.

According to DBE (2011), teachers' competency and effectiveness are significant issues in learners' achievement. Learners encounter different teachers' teaching competency levels. Teachers must be conscious of how their effectiveness affects their teaching (Barnuevo et al., 2011). Adeque (2013) suggested that teacher skills could be used for selection, professional development and promotion. Haberman (2005), as cited by Escorpiso (2014) stated that competencies assist teachers to teach for understanding. Paterno (2012) emphasised that a competent teacher knows the subject content and is familiar with the curriculum content. Such a teacher always strives to know the content and learners' challenges. Vygotsky (1978), as cited by Dahms et al. (2007), highlighted that individual interactions in the classroom improve learning.

A teacher's quality of teaching relates to competence and plays a vital role in teaching (Barnuevo, et al., 2013). According to Barnuevo et al. (2011), competency is demonstrated by learners' achievement. According to Barnuevo et al. (2011), teachers must clearly understand the subject content, and a teacher must know the subject and how to teach it. Teacher efficacy and competency are enhanced by content knowledge (Barnuevo et al., 2011; Escorpiso, 2014). A teacher can be very committed to meeting a school's learning goals, but he or she may lack the necessary skills to teach effectively, which can be demoralising and demotivating. Teacher competencies are the skills and knowledge that enable teachers to be successful. Without the skills and knowledge the teacher can never be effective in his or her teaching. Competence refers to how a teacher teaches as demonstrated by the teacher's actions. A teacher's effectiveness, on the other hand, is measured in terms of student learning. As a result, a competent teacher is always effective, whereas an effective teacher may or may not be competent. Hamdan et al (2010) conducted a Teacher Skills study among Malaysian school teachers, which aimed to clarify their skills in terms of their teaching skills, teaching strategies and classroom management. The results showed that they were all competent in the important relationship between the special teaching and learning experience. Therefore, Barnuevo et al (2011) concluded that teachers' skills will have a profound effect on learners' academic performance.

Personal skills, pedagogical skills, professional skills and social skills are examples of teacher skills in Indonesia. Teachers who teach in accordance with their professional competencies will perform better than teachers who teach in a way that is not consistent with their professional competencies. A number of research results have shown the impact of competence on teacher

performance (Seyaningtyas et al., 2018; Poro et al. 2013; Lotunani et al. 2014; Renyut et al. 2017; Poro et al. 2019; Keerthy & Biyu; 2018; Idrus et al. 2018; Rabo, 2018; Martini et al. 2018). Teacher skills were found to have a large positive effect on learner performance. According to Mahgoub and Elyas (2014), teacher competence is a condition that indicates a teacher's ability to perform tasks in school and the presence of behaviours that the teacher exhibits during or during learning activities. According to Mangkunegara & Agustine (2016), the responsibilities of teachers include the development, implementation and evaluation of educational programs and the selection of appropriate methods and media for the subsequent improvement and enhancement of learners' academic growth.

Effective teachers always demonstrate self-efficacy. Expectations of teacher self-efficacy play an increasingly important role in the study of school psychology, as they influence the effectiveness of education, educational practices, and student achievement (Klaasen & Tze, 2014). Djigic et al. (2014) found that teachers with high levels of openness and integrity of experience reported greater feelings of effectiveness. Teacher self-efficacy has been shown to be a factor related to classroom effectiveness, as it is a powerful driving force that influences teacher behaviour in the classroom (Klaasen & Tze, 2014). Improving teacher self-efficacy can lead to improved teacher mental health and job satisfaction, as well as improved student performance. Teacher effectiveness and effectiveness can be enhanced by teachers' willingness and possession of essential knowledge and information related to subjects and teaching methods. Knowing this, they need to approach their teaching appropriately with relevant approaches related to their motivational factors (Han, & Yin, 2016). Instructional effectiveness is usually studied using instructional styles used by teachers according to Han & Yin (2016). The teacher must familiarise himself with the pedagogical competence of his subject. Teacher pedagogical competence is the teacher's ability to direct learning. It consists of planning, management and evaluation knowledge. This knowledge will create an effective teaching and learning environment. It is important that teachers are competent.

According to Broke & Stone (2010), the type of quality of a teacher's behaviour that makes complete sense is defined by the teacher's ability and expertise. Broke (2010) defines a teacher's ability and expertise as the ability to do his or her work with the dedication required. Sahertian (2009) has a different point of view. According to Sahertian (2009), there are three definitions of

teacher ability: the teacher's ability to be a teacher, the teacher's ability to achieve the purpose of structured education, and the teacher's ability to teach. A teacher's ability is a true aspect of a teacher's personality that determines how a consistent educational goal is created. For education to be a success, a teacher's aptitude is a prerequisite. A teacher's aptitude and professionalism are further defined by Trianto (2009) as "merit, skill, and competence held by a person responsible for teaching a student to have a higher personality as a goal of education." It is described as a collection of skills, abilities, and behaviours that must be understood, acknowledged, and controlled in order for one to carry out their professional responsibilities. Particularly in learning activities, individual teachers have made a significant contribution to educational success. W. S. Winkel discovered that teachers have the power to influence learners when faced with this claim. Using the statement below, "His performance of his duties, in particular, exhibits the general personality traits of teachers. This is increasingly clear in the work of new teachers in classrooms. Whether he knows it or not, his presence in the classroom fosters the development of the learners."

2.1.11 Teacher Motivation

Teacher motivation is everything that is done to make a teacher happy, satisfied and engaged. This is a serious situation. Van Deventer and Kruger (2003) define teacher motivation as "influencing teachers to perform the day-to-day tasks that schools as an organisation expect to achieve the goals of the Ministry of Education." increase. Meshack (2013) connects motivation and ambition. Teachers are responsible for giving their learners knowledge and skills. They can do it productively if they are motivated to do so. Generally, if teachers are satisfied, they can influence their learners towards positive achievement in all subjects. In the researcher's opinion, little things like a welcoming classroom environment, a good salary and a good extra class benefit can motivate a teacher to go extra mile in his teaching endeavour.

Mathematics is a demanding subject and therefore many teachers arrange extra classes for their learners. Such teachers, if motivated by a stipend income or incentives, can produce good results in their subjects. The development of a faith commitment viewpoint among learners can be significantly influenced by a motivated and dedicated mathematics teacher. According to Sartawi et al. (2012), learners perform well in mathematics when their teachers praise them. Lanka

(2012) found that it is highly influenced by the leadership behaviour of school heads. Teacher motivation depends on effective management which is the most crucial thing. They need to be competent in performance, whether they are being supervised internally and externally.

The modern idea of teacher is getting worse. Overcrowded and overcrowded classrooms, poor working conditions, overwork (too many texts) and low pay reduce teachers' ability to learn to simplify and improve the learning process. Most teachers today suffer from stress, delays, absenteeism, and a lack of motivation. In order for teachers to provide quality education, it is necessary to develop the character of teachers. The system must take into account that if the employee is not satisfied there is little chance of pleasing the customer. Most teachers do not have the motivation and motivation to do well. Eventually, they stop using the program or find greener pastures in other departments.

According to Hornstra (2015), teacher motivation should be prioritised by schools because there is a positive correlation between teacher effectiveness and teacher motivation. This implies that an effective teacher is the one who is motivated. Thus, he or she will perform better in terms of yielding good results. According to Mallah (2019), monetary incentives for teachers should be seriously considered in schools. Teachers cited poor pay structures and overcrowded classes as reasons for the country's low math pass rates. Job dissatisfaction was caused by a lack of basic school facilities. Teachers neglect their responsibilities in order to pursue other interests, leaving learners to their fate. Most researchers agree that employers should reward employees who are committed and dedicated. As a result, a contented teacher fosters an eager learner. This implies that the teacher's desires influence the interest and quality of mathematics instruction. According to De Jesus & Lens (2005), teacher motivation is important for the development of educational change, since motivated teachers are likely to engage in educational change and ongoing politics.

Teacher motivation is a concern of academic leaders and managers as it has a significant impact on student motivation. If teachers are not enthusiastic, learners are not enthusiastic (De Jesus & Lens, 2005). This statement influences the motivational role of school leaders and teachers. Teachers can be encouraged in different ways. Lunenburg and Ornstein (2004) suggest that senior teachers may benefit primarily from professional renewal, professional enrichment, and supportive guidance that provide awareness and rewards for success and effort. Despite

environmental issues, inspiration is important for managers and leaders as it makes people want to do something. So they really focus on their work. It is clear that motivation varies from person to person in type and intensity and is influenced in many ways in the workplace (Jones, 2005).

There are two types of teacher motivation: external motivation and internal motivation. In the UK, Zimbabwe and Slovenia, salary, employment security and professional status were ranked as more important reasons for education. According to (Madziyire, 2010), Zimbabwean teachers remain loyal to their work despite low wages. This motivation is underpinned by the essential motivations that appear in their achievements. In China, essential motivation is very important to motivate teachers (Tang, 2011).

Takahashi (2018) identified four types of motivation: motivation, external regulation, assumed regulation, identified regulation, and integrated regulation. All of these contribute to external motivation. Extrinsic motivation is driven, among other things, by externally controlled rewards such as wages, material promotions, fame, and positive valuations. Intrinsic motivation, as contrast to extrinsic motivation, occurs when a person acts out of self-interest rather than in search of monetary or social reward. It exists essentially in the individual. Increased motivation is associated with work behaviour such as attendance, punctuality, productivity and customer service. Maslow's theory of the hierarchy of needs and wants contains several characteristics that can be used to motivate teachers (Ndlovu, 2013). Teachers' physiological needs include an appropriate base salary to enable them to have a position in society and lead a decent life. Teachers also need good housing, good transportation, and good working conditions (Mpofu, 2012).

Teachers' sense of belonging is strengthened by school social relationships that reflect the need for love. The warm environment of the school enhances the effectiveness of teachers (Madziyire, 2010). Teachers in some schools create social clubs to address themes like death, marriage, birthdays, and graduation. They support one another during good times and bad, emphasising the value of community (Ncube, 2013). This kind of practice is done in my school and helps all educators develop a strong sense of belonging. We go through each other thick and thin. According to researchers, it may even promote good cooperation with all employees, including schools and deans. Educators support each other in teaching and learning, leading to team

teaching. With this kind of support for teachers, this kind of practice can be more effective as a teacher. Governments can complement this by funding GET educators to provide additional education in areas that have been pointed out to be unachieved, such as mathematics.

The state of education in Tanzania is depressed. Public secondary school teachers have low wages. Payment may be inadequate or delayed. According to Bennell and Akyeampong (2007), their educational needs are ignored. They believe their status is declining and lack confidence and professional commitment. Teachers in the Tanzania education system continue to work to make more money after regular class hours. They are sometimes asked to attend school emergencies, but this extra time does not include incentives or motivational packs. According to Babyegeya (2007), in other situations, dissatisfaction with motivation will discourage many who want to join the educational community. Without motivation, teachers will refuse to work on weekends or after-school hours to develop their professional skills. Many of them are postponed by this. There is evidence that most Tanzanian teachers are unhappy with their pay, housing, workload, and social standing. Over time, deplorable living and working conditions have diminished many teachers' motivation to fulfil their educational and other commitments in a respectable manner.

Teachers require motivation as stimuli to keep them engaged in their profession. Teachers must be motivated and compensated in order for learners to perform well. It is critical to motivate teachers by providing them with good working conditions, competitive pay, and materials that will assist them in their work. Motivation is also thought to be essential for an effective teaching and learning process. To make teachers feel more invested in the education system, they should be involved in decision-making processes whenever possible. According to Calvert, seeking teacher input at both the school and system levels can improve motivation (2016). Teacher motivation encompasses individual's internal and external forces. There are explicitly two types of motivation, namely extrinsic and intrinsic motivation. Extrinsic motivation refers to an inner drive to achieve externally managed rewards such as salary, material possessions, and positive evaluation by others, while intrinsic motivation refers to an inner drive to achieve a specific goal for the purpose of personal fulfilment. Any teacher who is motivated in one way or the other can increase his or her teaching effectiveness in any subject that he or she is teaching. This is why the researcher thinks that motivation plays a vital role in the teacher effectiveness.

Motivation drives people to perform at their best and overcome obstacles to change. It is the power to make people act in a particular way, as defined by management. The goal of employee motivation is to get them to act in a way that benefits the organisation the most. Motivation leads to positive outcomes in terms of teacher effectiveness and learner performance in the classroom. Teacher motivation is an important factor in improving classroom effectiveness (Carson & Chase, 2009). Teaching effectiveness is associated with behaviours related to teaching style, teaching approach, and teacher motivation (Butler & Shibaz, 2014; Han et al., 2015; Kunter et al., 2008; Retelsdorf et al., 2010).

The most crucial element in a generation's educational process is its teachers. They have to give it their all. The education sector and national authorities must address the variables that influence teacher performance. This directly affects the student's marks. Rewards, academic achievement, career dedication, education, promotion, and promotion possibilities are just a few of the variables that affect teacher motivation. Maslow's (1943) hierarchy of requirements states that before being driven to satisfy higher levels of self-actualisation demands, people must first satisfy lower wants such those for food, water, shelter, safety, and respect. In the context of the classroom, self-actualisation and personal achievement are crucial components of teacher motivation.

If remuneration and incentives are adequate, even an effective teacher will strive for greater effectiveness. It is believed that pay does not increase motivation on its own. Teacher salaries are generally low, especially in Africa, and when teachers don't have enough money to live on, they resort to side-line jobs, which can lead to increased inefficiency. Tutoring is one such side hustle that is detrimental to student achievement. This happens when teachers restrict part of the curriculum at school to generate demand for their tutoring services outside of school. According to Saeed et al. (2012), motivated teachers are energised and activated to the end of the task because their interest and desire to achieve is increased, which increases authentic learner engagement in learning. Motivation improves work performance and attitudes.

Teachers in Nigeria are underappreciated and underpaid. As a result, for many people, teaching is a profession of last resort. According to Eyare (2010), motivation affects teachers' effectiveness and serves as a solution to most administrative problems in educational institutions.

Motivation basically consists of the basic need of the individual. According to Otieno (2010), the existence of a favourable teaching and learning environment in terms of teacher motivation increases the school's effectiveness and increases the production of good academic performance among learners. Put simply, according to Sunday (2015), good management of both human and non-human resources promotes the effective performance of school staff. The effectiveness of teachers is determined by their motivation. Teacher motivation is a method to guide teachers to their profession as it encompasses the strategies and methods used by managers to create an enabling environment for the diverse needs of their employees.

Teachers, if they are motivated will always fulfil their mandates, effective and dedicated in carrying out their duties. Motivated teachers will achieve educational goals and objectives in terms of student achievement. According to Triyanto (2016), teachers' proficiency and effectiveness bring positive academic performance of learners. As Triyanto (2016) points out, teacher effectiveness can also be increased through a favourable school environment, timely payment of salaries and allowances, and measures for teacher professional development. A number of studies in the field of teacher motivation include that of Ayuba (2018) who examined the motivation of private secondary school teachers in Ilorin Metropolis. The results showed that many schools in Nigeria have low teacher motivation and thus low teacher effectiveness. Another finding showed that, in contrast to Ibechukwu (2017), for Ilorin West there was no significant association between motivation and teacher effectiveness. Ibechukwu (2017) found a strong association between teacher effectiveness and motivation in both public and private secondary schools.

The low performance of South African learners in mathematics can be attributed to the lack of motivation of the teachers and the negative attitudes of the learners towards mathematics. In South Africa there is a norm for extra classes to be held on weekends and school holidays. The researcher bear witness that some of those extra lessons are successful because there are incentives given to those teachers who participated in the lesson offerings. Findings revealed that this opportunity is only for grade 12 teachers who offer content subjects like mathematics, sciences and commercial stream. Although Njanja et al. (2013) in their study in Kenya concluded that monetary rewards or cash bonuses have no impact on staff performances, many teachers agree to do so because of the motivational package they receive. This underscores the fact that

motivation can increase teacher effectiveness in any field of study. Grade 9 mathematics teachers lack this kind of motivation. The reason they are not conducting these extra lessons is because in their case they must make own arrangements to meet with learners and see to their travelling costs. No incentive for them, hence, no motivation. If teachers are poorly rewarded in terms of incentives and adequate pay, irregular pay, lack of appropriate housing, and inadequate teaching facilities, it means that motivation is weak. Therefore, a study by Yamoah (2013) reports a significant association between teacher rewards and job performance in Ghana.

According to Guay et al. (2010) motivation is the reason for behaviour. Guy et al. (2010) argue that extrinsic motivation is about participating in an activity for instrumental reasons rather than the intrinsic qualities of an activity, while intrinsic motivation refers to undertaking an activity for its own sake, for enjoyment and satisfaction, arising from participation in an activity. The lack of motivation of mathematics teachers and learners has a negative impact on student performance in mathematics. Educators lack motivation from government and the society in which they live. They lack teaching and learning materials to promote effective teaching and learning. Although mathematics has entered the age of science and technology, many educators lack the knowledge and skills to apply it. Adu, Adelabu and Adjogri (2014) suggest that educators should attend grades 10-12 of the GMMDU in most schools. Despite receiving laptops and tablets loaded with innovative curriculum-compatible classroom support package for classrooms, many educators claim that they lack the knowledge of using ICT in teaching and learning mathematics lessons (GMMDU, 2015). The kind that educators can take is materials such as laptops and tablets for 9th grade, as well as training on how to use equipment to achieve better results in this classroom. This will increase their teaching effectiveness in mathematics and increase student achievement.

Mustafa and Othman (2010) examined teachers' perceptions of the impact of motivation on teachers' job performance in teaching and learning processes. They found a positive relationship between motivation and job performance. This means that higher motivation increases effectiveness, which in turn leads to better academic performance. Kumar (2014) also examined the relationships between some characteristics of organisations and employee satisfaction and performance at Bharti Airtel India Ltd and found a positive relationship. According to Nadeem, Rana, Lone, Maqbool, Naz, and Ali (2011), teachers' social and economic conditions affect their

performance. This has to do with low salaries, lack of facilities, teachers' standing in society, teachers' mental health and morale, stress at work, relationships with staff and school leaders, and the work environment. According to Nadeem et al. (2011), these have a strong impact on teacher performance. Poor social and economic conditions at the school location reduce the motivation of the teachers. The conclusions are that there is a significant association between these motivating factors and teacher productivity.

A study by Azaliwa and Casmir (2016) revealed important motivating factors that can affect teacher performance. These include the provision of attractive salaries, transportation, recognition of teacher performance, timely promotion and provision of temporary and long-term study leave to facilitate professional growth and related benefits. One study found that ensuring adequate teacher salaries has a significant impact on teacher motivation leading to increased academic performance. Similarly, Oko (2014) wrote an article on the effect of teacher motivation on student academic achievement. The study found that the effect of teacher motivation on learners' interdisciplinary academic performance - teacher motivation gives learners a desire to learn. The study concluded that inadequate teacher promotion poses a significant barrier to effective and productive careers. Finally, it is recommended, among other things, that teachers be paid more than in other occupations that require the same level of qualification and responsibility, ensuring that they live modestly at work and are compelled to take on other responsibilities.

There are many factors that have a negative impact on teacher motivation. Some of which are conflict between institutional incompetence and teacher commitment (Shoaib, 2004); the physical conditions of their institutions; working hours and school management (Kazerouni & Sadighi, 2014); test-based curriculum and stress testing (Alam, 2011); a lack of resources; institutional issues; and disagreements between institutions and teachers.

Teacher motivation is seen as an important part of increasing classroom efficiency. Within the classroom there are many factors that teachers need to consider. This includes the application of teaching methods, teaching strategies, the use of other activities such as sports, games and other activities that are mainly aimed at enhancing student learning. In addition, teachers must ensure that infrastructure, tools, equipment, technology and more are in good condition. They often also

provide instructions on nutrition to learners. The effectiveness of teaching is generally evaluated by the teaching methods used by teachers (Han & Yin, 2016). When teachers use a variety of teaching methods, they need to consider many factors. These are learners' needs and requirements, learning skills, lessons and concepts, availability of building materials and resources, and the classroom environment as a whole.

The effectiveness of a teacher's approach has a big impact on how well children learn (Tambunan, 2019). The subjects and ideas studied determine one's educational level. For instance, it's crucial for teachers to clarify the problems on the board while imparting mathematical information to learners. Although it cannot be learned, mathematics must be written down and used. The usage of the board is therefore strongly advised in this regard.

Teaching effectiveness can be increased using two methods. The first is that teachers should be well prepared for the lessons and teaching methods and have the necessary knowledge and experience. The second is that learners pay close attention to the lesson, work hard and achieve the desired results. In addition to having sufficient knowledge and experience related to academic concepts, teachers should apply appropriate teaching methods and behaviours to the classroom (Han & Yin, 2016). Teachers need to be motivated in their work in order to do their job well and achieve their personal and professional goals. It is important that the environment and other members form constructive ideas and opinions about the working conditions so that they are motivated in their work. You need to work on integration and communication with others and build positive goals and relationships.

According to Claeys (2011), the important function of the teacher is to help the student implement and apply ideas by giving directions and making presentations in front of the class. This role is always organised and continuous and takes place in a school or any place where formal education is provided. Rather than just presenting the curriculum, teachers engage in a variety of activities such as parenting, discipline, counseling, mentoring, role modeling, planning, and more. Because of this responsibility, teachers play an important role in shaping learners' future behaviour and academic success. In order for the teacher to be enthusiastic about these activities, the teacher must be engaged and interested in teaching.

Teacher motivation is one of the key factors in achieving educational goals and achieving high levels of student learning, since low teacher motivation can lead to low student achievement. Therefore, the area of learning and teachers' motivation in knowledge development requires more attention in schools (Juma, 2011). This is because the quality of teaching staff is a pillar of learners' academic achievement. But without teacher motivation, educational institutions would continue to support subpar results because, among other things, low academic achievement in many high schools can be related to low teacher motivation (Matoke et al., 2015). It is believed that motivation has an impact on people's attitudes and productivity at work. In conclusion, it is reasonable to conclude that a teacher's level of motivation directly affects his desire to participate in the teaching process and encourages knowledge sharing with his learners. It really determines whether teachers participate in the teaching and learning process.

Idiegbeyan-Ose et al. (2019) conducted a study examining the impact of intrinsic and extrinsic motivation on employee performance. The results show that there is a correlation between external inspiration and performance and there is nothing between intrinsic motivation and employee performance. Abdulsalam and Mawoli (2012) investigated the relationship between motivation and teacher performance. It has shown an impact on education. Motivation and performance are important elements of learning performance.

2.2 EVALUATING TEACHER EFFECTIVENESS

It is imperative to work on measuring the effectiveness of teachers. What causes someone to say that the teacher is effective or ineffective for his performance? Is it the learner's test score or the learner's overall performance? Does the Department of Basic Education have guidelines to determine how we conclude that teachers are effective? Teacher effectiveness is often defined as the ability to achieve good results in student performance. According to Kupermintz (2003), teacher effectiveness can be defined using evaluations. What is striking is that effective teachers have high expectations of all learners, so they support learning as measured by added value or other test-based growth or alternative measures. Effective teachers attend regularly and contribute to positive academic, positive attitudes, and social performance in learners who are promoted to the next grade on time. Effective teachers use a variety of resources to plan and create challenging learning opportunities and to monitor student progress. Effective teachers

contribute to the development of classrooms and schools that value diversity. Effective teachers work with other teachers, administrators, parents, and educators to ensure learning success, particularly for learners with special needs and at high risk of failure (Friend et al., 2010).

So far, much remains to be done to increase teacher success. There should be ways to evaluate teacher performance. According to the research, classroom observation models and value-added models are suggested as ways to measure teacher success, although they may seem useless on their own. These are the two most common procedures. Added models provide summary points for the contribution of different factors to growth in student achievement (Goldhaber, Percy & Anthony, 2004). A teacher is successful when the majority of learners in a given class perform better than expected on a standardised test.

However, when learners do not perform as expected, the teacher may be seen as less efficient. Value-added models are new strategies to improve teacher performance (Hershberg et al., 2004). They offer specialised techniques to identify which teachers are successful in improving learning, claims Sanders (2000). Various studies have been conducted to compare teacher achievement, measured by value points, with achievement measured by other factors, such as classroom perception, qualifications, and personal characteristics. According to Rivkin, Hanishek, and Kain (2005), value added measures do not provide insight into what makes successful teachers successful.

2.3 VALUE- ADDED MODELS (VAMs)

Value Added Models (VAMs) attempt to measure the teacher's effect on the performance of their learners. This involves using a variety of measures to predict each learner's test score. There is growing interest among researchers and policy makers in using standardised test scores from learners to assess the contribution and effectiveness of educators and schools (Ballou & Springer, 2015). The focus on the value that educators add to learner learning over time is largely driven by education reform advocates and the US Department of Education Arne Duncan and his Race to the Top competition (Collins & Amrein Beardsley, 2014).

Value-added models are statistical models that analyse learners' scores on standardised tests to separate the contributions to learner growth made by individual educators from other factors

beyond the control of the teacher (Paige et al, 2018). In order to improve educator effectiveness and educator quality, which seem to be beneficial towards learner achievement, policymakers propose the use of VAMs to inform high stakes decisions in educator resource management such as dismissal, retention, tenure or compensation. In some states and districts, learner growth or value-added measure equal 50% in educator evaluation system (Florida Department of Education, 2015; Ohio Department of Education, 2015).

The reason researchers and policymakers interested in using VAMs to evaluate contribution and effectiveness of educators is that VAMs show face validity and superficial objectiveness (Goldhaber & Theobald, 2013). Face validity means that the measurement looks like it is covering the concept it purports to measure. Value-added educator evaluations seem to measure what it supposes to measure which is educator effectiveness on learners' academic growth. The formula and test used for value-added educator evaluations subject to choice by policymaker and expert, so value-added educator evaluations are not as objective and valid as may seem (Goldring et al, 2015).

Little is known about the validity of value-added models in determining effective instruction, although this suggests that educators' contributions to increases in learner test scores vary widely (Hanushek & Woessmann, 2020). It is evident that educator effectiveness varies, but the reasons for this are not known. Value-added models are a method least understood by most education professionals and educators. It differs from classroom observation in that the evaluators carry out their analysis remotely, whereas in classroom observation the educators actually meet their evaluators. Instructional observation is used to measure observable instructional processes, including specific educator practices, holistic aspects of instruction, and interactions between educators and learners. This law provides comprehensive information on classroom activities and behaviour and is generally viewed by stakeholders as a fair and direct measure. Instructional observation is expensive due to observer time and training costs, but it is necessary for validity, although research protocols of the kind used in the context of educator evaluation are lacking.

Classroom observations vary in the way they are conducted and what they actually measure or evaluate (Lavy, 2016). They can be conducted by a school administrator or an evaluator from outside. Observations can be formally scheduled or unannounced. To perform these types of

observations need valid and appropriate instruments when measuring educator effectiveness. Well trained observers should be employed so that results will be comparable across classrooms. Observations are known to provide significant, useful information about a teacher's practice only if used thoughtfully.

2.4 SUMMARY OF THE CHAPTER

The primary goal of this chapter was to conduct a literature review on the effectiveness of teacher and student performance in mathematics. The literature includes factors related to teacher behaviour and their effective strategies for enhancing learning and improvement. Teachers' attitudes towards mathematics can influence teachers' attitudes towards mathematics teaching, which has a strong impact on the atmosphere and values of mathematics teaching. It is believed that instructor attitudes, in particular, such as excitement and confidence, will considerably contribute to the values of mathematics teaching. This in turn is probably going to have a big effect on how pupils view math. It goes without saying that learners' entire classroom arithmetic learning experiences affect their learning and, eventually, their success in math, as well as their opinions and attitudes toward the subject.

Teachers' views toward mathematics are likely to be influenced by their expertise, particularly their knowledge of mathematics and its teaching. Through the perceived effectiveness of the teacher's knowledge on student accomplishment, confidence in mathematics and mathematics teaching appears to be related to the teacher's knowledge in these areas. According to Doherty and Jacobs (2013), there is disagreement on how to evaluate teacher effectiveness and its relationship with student achievement. Among the sub-topics discussed in this section are teacher behaviour, attitude, professional content knowledge and pedagogical knowledge, teacher experience, teacher-student relationship, teacher competence and teacher motivation. This section also discusses how teacher effectiveness can be measured.

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

Research shows plans to collect valid and reliable data to address aims and objectives. This chapter discussed in detail methods used to collect data and explains the research approach, design, instruments, sample, data collection, and analysis.

3.2 RESEARCH APPROACH

Research is a systematic process of collecting and analysing data collected for a specific purpose, using either qualitative or quantitative approaches. These are methodological models that, according to Marie (2010), refer to assumptions or beliefs about aspects of reality that affect how we perceive reality. This study follows a qualitative approach. The purpose of qualitative research is to better understand the social and cultural processes and contexts underlying different behavioural patterns. Qualitative research is a set of research methods that focus on data quality and is typically collected through interviews. According to Mason (2010), a qualitative research approach allows researchers to understand and explore the richness, depth, context, and complexity of teachers' work in the context of their research. Therefore, the researcher's deep involvement in collecting data is vital in a qualitative study.

3.3 RESEARCH PARADIGM

A research paradigm is a group of presumptions or convictions about essential features of reality that support a specific worldview. According to Furlong (2013) it discusses fundamental ideas, such as those regarding reality's nature (ontology), the link between the known and the knower (epistemology), and methodology-related views (Maree, 2007). Lincoln (1999) presented four fundamental paradigms for research, including constructivism, post-positivism, positivism, and critical theory in (Maree, 2007). This study adhered to the interpretivism research paradigm, which emphasise social interaction as the basis for knowledge. Knowledge is constructed by mutual negotiations and is specific to situation being investigated. According to Willis (2007), interpretivism sought to understand a particular context and its core belief is that reality is

socially constructed. Two observable variables of teacher effectiveness and learner achievement were used in this study.

3.4 RESEARCH DESIGN

A research design is a strategy or plan for selecting participants, choosing data collection methods, and performing data analysis based on underlying philosophical assumptions (Maree, 2010). Six types of qualitative research design are generally discussed in the research literature. Conceptual studies, historical studies, action research, case study, ethnography, and grounded theory. A case study is regarded as a unique entity to identify its characteristics that could be of interest to the communities. This is a case study research which is defined by the fact that it is a bounded system (Merriman, 1988 in Maree 2007) and that it does not necessarily mean that one site only is studied (Schumacher & McMillan, 1989 in Maree 2007). Grade 9 mathematics teachers are regarded as a unit that was studied in order to determine their pedagogical content knowledge through their instructional practices.

3.5 SAMPLING PROCEDURE

The sample is part of the population (Ritchie, Lewis & Elam, 2003). Sampling refers to the process of select a portion of the population under study (Guest, 2014). This study used purposive sampling. Purposive sampling means that participants are selected based on their knowledge of the information they need (Campbell et al, 2020). There are three most commonly used sampling strategies: stratified target sampling, snowball sampling, and reference sampling. This study uses a stratified purpose sample. This means selecting participants based on pre-selected criteria related to a particular research question. Of the 11 secondary schools in Mahwelereng circuit, only 5 are sampled. The sample comprised of 10 grade 9 mathematics teachers, for the 2020 school year. There were two teachers from each of the sampled schools.

3.6 METHODS

3.6.1 Interviews

Interviews were used to collect data. The semi-structured interview (Dawson 2002) helped the researcher gather information from participants. The interesting part of this interview is when it

runs flexibly for the researcher to explore other important information that will arise in the interview session, though not planned. Prior to conducting interviews, the researcher explained confidentiality procedures to participants and assured them that she would uphold confidentiality anonymity of all participants and data collected. The interviews involved one-to-one semi-structured conversations but were open enough to allow for the depth of discussion and exploration. The researcher presented the same questions to each participant and approached each participant in the style to ensure validity. Each interview was audio-recorded for 30 minutes with permission from the participant.

3.6.2 Observation

Blessing and Chakrabarti (2002), state that observation involves recording the occurrences. When the researcher is completely immersed in a culture, participant observation is used to gain more knowledge and a deeper understanding. Observation is where the research records notes or events (Emerson et al., 2011) and watches and records episodes as they happen (Mertler, 2016). According to Mertler (2016), observation as a means of collecting qualitative data, involve carefully watching and systematically recording what you see and hear in a particular setting.

In this study, observation was done on mathematics teachers in their classrooms, which implied the application of teaching styles and methods they used, how learners were involved in the teaching and learning processes meaning the activities they participated in, and whether all these could add to the effectiveness of the teacher concerned.

3.6.3 Documents

According to Omari (2011), documents provide information to triangulate interviews or other data collected in the research. Mare (2010), states that documents include published and unpublished documents, reports, memoranda, files, ledger books, textbooks, and agendas used in the investigation. In this study, the researcher used mathematics files of teachers, external and internal examination files, and learners' books.

3.7 TRUSTWORTHINESS OF THE STUDY

A study's level of confidence in its data, interpretation, and techniques used to maintain its quality is referred to as its trustworthiness (Pilot & Beck, 2014). The researcher used systematic data collection and analysis methods to establish authenticity. The following trustworthiness criteria (Korstjens & Moser, 2018) were followed to improve the quality of this study: credibility, transferability, dependability, and confirmability.

3.7.1 Credibility

Credibility is a key indicator of a qualitative study's truth value, or if the findings are correct and truthful. It partially depends on the reliability of the researchers themselves as well as the techniques they employ. Credibility was assessed in this study using triangulation and membership reviews. Participants received their data back to confirm that it was captured properly. The study triangulated the data by employing several different data collection techniques.

3.7.2 Transferability

The term "transferability" describes how easily findings from qualitative research may be adapted to various contexts or circumstances involving various respondents (Ohman, 2005). Transferability was ensured by using a detailed description of this study's whole research process, from data collection to report writing and documentation.

3.7.3 Dependability

Reliability is the continuity of study results through time. It involves the examination of the study's conclusions, interpretation, and recommendations by the participants in order to make sure that each is supported by the data that the participants in the study have provided (Anney, 2014). An audit trail was employed in this study to demonstrate dependability. To enable a carefully conducted examination of the research procedure and findings, all raw data were securely stored.

3.7.4 Confirmability

The final element of Trustworthiness that a qualitative researcher must prove is confirmability. In order for the behaviour and experiences of the participants to make sense to someone outside of the group, it provides both their environment and their behaviours and experiences. The degree to which the research study's conclusions are based on the participants' stories and statements rather than potential researcher biases is the subject of this criterion (Green, 2014). An audit trail with raw data, including electronically recorded materials, written field notes, documents, and records, is included in confirmability (Lincoln and Guba, 1982).

3.8 DATA COLLECTION

Data collection has to do with data generation, data selection, and data collection techniques. Qualitative research can collect data using four basic techniques: observation, interview, document, and audio-visual material. This study used interviews aimed at deriving and eliciting participants' opinions and opinions, either directly or over the phone. Documentary reviews and observations are also used to help researcher create field notes about their behaviour and activities on the research site.

3.8.1 Semi-structured interviews

Semi-structured interview has to do with an intention to derive or elicit views and opinions from participants through face to face or telephonically. The aim of qualitative interviews is to see the world through the eyes of the participants and to learn more about participants' behaviours, beliefs and knowledge views (Nieuwenhuis, 2007).

Grade 9 mathematics teachers in Mahwelereng circuit were interviewed, two from each of the five selected school. Participants' responses during the interview were recorded on an audio recorder and transcribed later as they consented to being recorded.

3.8.2 Documentary reviews

Documents provide useful information. Document analysis involves gathering of facts which are interpreted by the researcher in order to provide meaning (Owen, 2014). In this case,

mathematics files of teachers were used, from which records of learners' marks were filed. This will help reveal performance of learners in the subject offered by a particular teacher and what is done to help in terms of non-performance.

3.8.3 Observations

A Grade 9 class was observed during the lesson. This was done to check methods used by mathematics teachers in presenting their lessons and how learners are involved in the lesson. This would help in concluding on the effectiveness of the teacher concerned. In addition, field notes on behaviour and activities at the research site were recorded for further cross-checking.

3.9 DATA ANALYSIS

Data analysis is about making sense of the information collected. One can seek patterns and uniqueness of data (Mayan, 2001). Creswell (2013) and Kothari (2004) contend that it is how to decipher deeper issues that answered the research questions. Data obtained from interviews, observation and documentary review were analysed thematically. The qualitative data obtained through interviews, observation and documentary reviews were analysed by considering major themes to extract relevant information.

3.9.1 Document Analysis

The direct content analysis approach was used to analyse teachers' mathematics files, external and internal examination files, and learners' books. In this study, direct content analysis was used to extract meaning from the text data using a theory (Renz, Carrington & Badger, 2018). The constructivist theory guided the study to explore how teachers organise teaching and learning activities, how they engage learners during teaching and learning.

3.9.2 Analysis for interviews data

The researcher used the thematic analysis approach to analyse interview transcripts. Thematic analysis approach is a method of qualitative data analysis. Thematic analysis approach is a qualitative data analysis method in which the researcher reads amongst the data to identify the developing themes (Cohen, Manion & Morrison, 2011). Thematic analysis is a suitable method

of analysing interview transcripts because it is used to identify themes from the data that can be used to address the study's research questions (Maguire & Delahunt, 2017).

In this study, data collected during interviews and observation was analysed by considering themes to extract relevant information. Themes that arose for analysis were aligned to the research questions of the study. These themes guided the way in which analysis and discussion of data was done. It also helped the researcher in making description of the data collected from the field basing on research objectives, and concluding on what to regard as useful.

3.9.3 Analysis of observation data

In study, the observation data was analysed by looking at the teaching styles and methods used by teachers during classroom engagement. The researcher analysed how teachers engage learners during the teaching and learning processes, the activities they plan for learners, determining whether all these teacher actions could add to the effectiveness of learner comprehension.

The following themes emerged: teacher and learners' role, questioning and answering, and assessment. During the lesson observation teachers were regarded as the source of information. Teachers were the only ones talking, dominating by telling and explaining to learners. This was contrary to the constructivist theory which underpins this study. According to Andrawis (2011), engaging learners increases learner retention and understanding of content. As for the questioning and answering, learners were always asked if they understood, and the answer was always "yes".

Assessment took two forms, being formal and informal. The dominating one was informal, through classwork and homework. According to CAPS assessment should be a continuous, planned process of identifying, gathering and interpreting information about the performance of learners, using various forms of assessment (DBE, 2011).

3.9.4 Merging of Study Findings

Content analysis of teachers' responses, thematic analysis of interview transcripts, and observation notes was merged in order to increase the comprehension of teacher effectiveness in

enhancing grade 9 learners' performance. The merging of the content analysis, thematic analysis and observation data will be done by compiling the similarities identified in the data.

3.10 ETHICAL CONSIDERATION

Any study should take into account the needs of the participants (Cohen et al. 2011). The term "ethics" means morality, respect for the rights of each person, and empathy. They are typically concerned with notions of what is appropriate or inappropriate, right or wrong. Protecting the confidentiality of research findings and results and protecting the identity of participants is an important ethical consideration (Maree, 2007). Ethics requires respecting and considering the views of study participants. Christensen et al. (2015), ethical considerations include protecting anonymity and confidentiality, respecting the privacy and confidentiality of participants and their opinions, and protecting participants from being misled by researchers. They are often related to the concepts of right and wrong, good and bad. Important ethical issues are the confidentiality of research results and results, and the protection of participants' identities (Marie, 2007).

Ethical procedures were followed in this study. The researcher made sure that all ethical requirements were met. The proposal was approved by the Faculty Research and Innovation Committee (FRIC). The researcher asked participants for informed consent and ethical approval from the university they applied to. The researcher visited selected schools with the consent letter from the institution to seek permission from the principals and grade 9 mathematics teachers in the schools engaged in the study. After being given approval to conduct the study, the researcher addressed participants on the purpose and relevance of the study to be conducted.

The purpose and implications of the study were explained to all five principals and ten participants from the selected schools. All participants were informed that their names and the names of the schools would not be used. Only pseudonyms are used. The participants were treated anonymously and confidentially. Participants were asked for consent to be included, and participants who disagreed with the request filled in their answers manually. The following were discussed: voluntary participation consent, informed consent, confidentiality, and risk of harm.

3.10.1 Voluntary participation consent

Always make participation voluntary. Nobody ought to be coerced into taking part in a study. Participants in the study were not forced to take part. No trickery or manipulation was employed to entice volunteers. The study's investigator made sure each subject participated of their own free will. Voluntary involvement is essential in research because it enables free will and places research responsibility on the participant (Strydom, 2011). The researcher made sure participants understood that they could opt-out and withdraw at any time if they wished.

3.10.2 Informed consent

According to Flick (2016), informed consent is when an individual offer their explicit approval to engage in the research project. This can be accomplished through the use of a consent form or a trust agreement between the researcher and the subjects. It is unethical to begin data collection without the consent of the subjects. It is critical to notify participants, and they should declare their willingness to volunteer in the required information (Strydom, 2011). The informed consent form is usually a written statement that informs participants about the components of a study and asks for their voluntary consent to participate before the study begins. Blackstone (2012) acknowledges that human beings as research subjects must consent to participate in research. The participants may know when and how the information they give in research will be shared. Here, they were informed it is for a master's degree and can be published to assist education stakeholders to improve their practice.

3.10.3 Confidentiality

Confidentiality refers to the practice of not disclosing vital information. In the case of sensitive information, empathy and learning about participants' feelings helped reduce injuries and stress. The confidentiality of the information provided by the study participants and the anonymity of the answers were preserved. After obtaining permission to conduct the study, the researcher made sure to inform the participants that they would be interviewed and informed them of the intentions and benefits of the study. The researcher was the only one who had access to the participant data, which was treated as strictly confidential.

3.10.4 Anonymity of participants

By not using the participants' true identities, anonymity was established. To help the participants feel comfortable throughout the interviews, they were made aware of their anonymity and confidentiality. As the researcher, it was necessary to learn on ethics policy of institutions. Schools in the research will be named as school A, B, C or D. The raw data may be recorded or saved in researcher's personal computer with a password known only by the researcher.

3.10.5 Avoidance of harm

The researchers are obliged to ensure the safety of the participants. Participants should not be exposed to any greater risk than they are exposed to in their daily experience. This study did not harm the participants. Participants were not placed at undue risk by the researcher, they were informed of the research's use of the data they provided, their interviews were kept confidential, and their identities were not linked to the data they provided (Strydom, 2011).

3.11 SUMMARY OF THE CHAPTER

The chapter introduced the research methods of teacher-effectiveness. The chapter outlined approach, paradigm, design, instruments, population, sample, data collection, analysis, and ethical issues.

CHAPTER 4

FINDINGS AND DISCUSSIONS

4.1 INTRODUCTION

Chapter four presents the results from interviews, observations and documentary reviews. The researcher interviewed grade 9 mathematics teachers and their Departmental Heads from five sampled secondary schools in the Mahwelereng circuit, which is in the district of Mogalakwena. The researcher observed and examined documentary reviews in the schools, and the results are narrated, using tables and linked to the research questions. Findings are presented using tables narrations concerning the research questions, interviews, observation and documentary review, and therefore, the findings are discussed considering the literature that underpinned the study.

4.2 TEACHERS' CHARACTERISTICS

The researcher presented the teachers' profiles of teacher participants and their departmental heads. Demographic profile includes educational attainment, length of teaching experience, and gender.

4.2.1 Educational Attainment

As shown in Table 4.1, most teachers had bachelor's degrees, and a few had master's degrees.

4.2.2 Length of Teaching Experience

Majority participants had teaching experiences ranging from six to 10 years. Only a few participants had teaching experience between one and five years.

4.2.3 Gender

The gender is evident with 50% males and 50% females.

TABLE 4.1: Teachers' profile and their schools

Teacher Attributes		SCHOOL A	SCHOOL B	SCHOOL C	SCHOOL D	SCHOOL
M.Ed.		None	None	None	None	None
B.Ed.		Yes	Yes	Yes	None	Yes
EDUCATION DIPLOMA					Yes	
TEACHING EXPERIENCE (Years)	Teacher	6	21	20	18	19
	HOD	18	17	4	15	12
GENDER	Female	1	1	1	1	1
	Male	1	1	1	1	1

The data in Table 4.1 shows teachers' profiles and their schools. None of the participants holds a Master's degree in Education. This qualification may not be a requirement for a teacher to teach mathematics at grade 9 level. Most of the participating schools (80%) had mathematics teachers who hold a Bachelor of Education Degree. Only one school has a teacher who holds a Diploma in Education. Thus, the qualifications meet the minimum requirements for teaching Mathematics at grade 9 level (Government Gazette, 2015). All the participants have at least four years of teaching experience which makes the suitable and competent enough to teach mathematics effectively in grade 9 classrooms. There was an equal representation of males and females in the sampled group.

4.2.4 School administration

The researcher collected data from five schools. Out of five, three schools are led by head teachers, and headmistresses lead two. In mathematics, male teachers lead four schools, whereas at one school, the departmental head is a female teacher.

The researcher could interview teachers and departmental heads of mathematics, make observations and perused mathematics mark sheets, mark schedules and learner books and test scripts.

4.3 GRADE 9 MATHEMATICS LEARNERS' POOR PERFORMANCE

In the interview conducted with teachers from sampled schools, the researcher was told that mathematics challenges many schools. There are challenges like learners lacking mathematics basics or background knowledge from the primary level. They start with those basics in their teaching and by the time the learners grasped them, there is not enough time to cover the syllabus as per CAPS. This results in learners not performing well at the end of each term. One of the teachers interviewed stated that the problem of mathematics poor performance in grade nine was because of the pass requirements, an average of 40%. Learners are not promoted to the next grade level unless they have achieved an overall average at least 40%. Teachers believe that the problem is caused mainly by being promoted to age cohorts from the lower grades irrespective of their performance. When asked how management systems help to overcome the problem, one of the teachers said it is not helping because the departmental heads are not supportive. All they do is supply you with the Annual Teaching Plans to make an interpretation and plan your lessons. From there, they check the amount of written work given to learners on every week. This is a tool that forces teachers to concentrate on covering ATP instead of ensuring learners understood what was taught.

According to some teachers, the subject advisors should help them to make learners pass, but they blame them when learners fail. These teachers agree with subject advisors to inspect instead of giving them support. They check for curriculum coverage and the number of tasks given to learners per week. They are not even concerned with the standard of the tasks. Theirs is just signing to show that they visited those schools.

The following tables depict the summary of 2020 results of grade 9 of the sampled schools.

TABLE 4.2: Final grade nine results for school A

SUBJECT	NO. WROTE	NO. PASSED	PASS %	NO. FAILED	FAIL %
Sepedi HL	230	212	92.2	18	7.8
English FAL	230	223	97	7	3
Creative Arts	230	228	99	2	1
EMS	230	192	83.4	38	16.6
Life Orientation	230	208	90.4	22	9.6
Natural Sciences	230	113	49.1	117	50.9
Social Sciences	230	220	95.7	10	4.3
Technology	230	194	84.3	36	15.7
Mathematics	230	143	62.2	87	37.8

Table 4.2 shows the performance of grade 9 learners in all the subjects in school A. However, the last row is of particular interest in this study. It shows that 62, 2% of the learners managed to pass Mathematics in Grade 9. This result indicates that their teacher used effective methods to impart mathematical knowledge. Eighty-seven learners (87), which amounts to 37.8% learners failed grade 9 mathematics in school A, which indicates that a significant number of learners this school struggle in mathematics and hence requires the teacher to reflect on the effectiveness of his/ her teaching methods.

In an interview a teacher from school A said that they conduct a one-on-one sessions with learners who do not perform well to encourage them. They create a platform in class for those performing well to explain to others how they got solutions to problems in mathematics. They said all this is done in class during the marking of classwork and homework.

TABLE 4.3: Final grade nine results for school B

SUBJECT	NO. WROTE	NO. PASSED	PASS %	NO. FAILED	FAIL %
Sepedi HL	99	74	75	25	25
English FAL	99	90	91	9	9
Creative Arts	99	94	95	5	5
EMS	99	85	86	14	14
Life Orientation	99	97	98	2	2
Natural Sciences	99	98	99	1	1
Social Sciences	99	65	66	34	34
Technology	99	85	86	14	14
Mathematics	99	19	19	80	81

Table 4.3 shows the final grade nine results for school B. The lowest pass rate (19%) was recorded in Mathematics. This indicates that majority of learners in this school are struggling in Mathematics and this suggests that the methods employed by the teachers are not very effective in helping learners to understand mathematical concepts. The teacher at this school said that she was new at the school and still trying to get to know the learners, and continued to say that she is getting all the support from the DH. She added by saying that she was teaching in the intermediate phase, and that was her first year in high school.

TABLE 4.4: Final grade nine results for school C

SUBJECT	NO. WROTE	NO. PASSED	PASS %	NO. FAILED	FAIL %
Sepedi HL	179	168	94	11	6
English FAL	179	166	93	13	7
Creative Arts	179	176	98	3	2
EMS	179	136	76	43	24
Life Orientation	179	175	98	4	2
Natural Sciences	179	155	87	24	13
Social Sciences	179	160	89	19	11
Technology	179	167	93	12	7
Mathematics	179	93	52	86	48

The results in Table 4.4 show that learners in school C had a pass rate of 52% and a failure rate of 48%. This means that the teaching and learning methods used by the teachers are not effective for all the learners. It is therefore important for the teacher to reflect on these methods to ensure that they cater for all learners.

A teacher from this school complained about the Departmental Head not giving them support in challenges that concern learner assessment. No common tasks in terms of tests, classwork and assignments in this school. Every math teacher set their own tasks for their classes. In a nutshell, there are three grade 9 classes taught by three teachers who do not work together. Another point this teacher raised is that of team teaching. Her concern is that they cannot work as a team. Their Departmental Head failed to guide and encourage them about team work instead they seem to be competing about whose learners perform better than the other.

The greatest concern of mathematics teachers at this school is that even the subject advisors fail to support them. All they expect from them is the curriculum coverage according to the ATP. They fail to support them when learners do not perform satisfactorily.

Table 4.5: Final grade nine results for school D

SUBJECT	NO. WROTE	NO. PASSED	PASS %	NO. FAILED	FAIL %
Grade 9	46	9	20	37	91

School D could not furnish the researcher with a summary per subject but per grade. According to interviewed teachers, the general results at this school are poor because of the poor outcomes in mathematics. All the learners who were not promoted in grade 9 did not perform well in mathematics. It is compulsory to pass mathematics to be promoted to a higher grade or next grade.

Like all teachers in this study, the teachers in school D blame the rotational attendance of learners during the Covid-19 era. Learners were attending two days a week, which made it difficult for them to know their learners better.

TABLE 4.6: Final grade nine results for school E

SUBJECT	NO. WROTE	NO. PASSED	PASS %	NO. FAILED	FAIL %
Sepedi HL	53	47	89	6	11
English FAL	53	48	91	5	9
Creative Arts	53	42	79	11	21
EMS	53	44	83	9	17
Life Orientation	53	45	85	8	15
Natural Sciences	53	42	79	11	21
Social Sciences	53	30	57	23	43
Technology	53	46	87	7	13
Mathematics	53	38	72	15	28

The results for grade 9 learners' performance in Mathematics are shown in Table 4.6. The results indicate that 38(72%) of the learners passed mathematics while 15 (28%) failed the subject. The high pass rate could be attributed to the effectiveness of the methods used by the teacher in this school.

The teachers at this school said that due to rotational attendance of learners, it was not easy for such a performance. They mentioned that the revised ATP assisted in their 2020 final results

because the scope of work was decreased and pass requirements were adjusted in terms of SBA increasing and end of year requirements decreasing.

TABLE 4.7: Summary of mathematics results of the sampled schools

SCHOOL	2020 TERM 4		2021 TERM 2		2021 TERM 3	
	Pass %	Fail %	Pass %	Fail %	Pass %	Fail %
A	48	52	62	38	96	4
B	19	81	78	22	19	81
C	52	48	14	86	2	98
D	20	80	38	68	79	21
E	72	28	78	21	70	30

Table 4.7 represents grade 9 results of 2020 term four and 2021 term two and three. It shows that learners fail during the year but many pass at the end of the year. The researcher questioned teachers why this was happening. Their respond was because many progressed because when schedules are submitted for approval, the district advises schools to make amendments that will make them pass.

4.4 WHAT CAN MATHEMATICS TEACHERS DO TO INCREASE THEIR TEACHING EFFECTIVENESS

At one of the sampled schools, a grade 9 mathematics teacher told the researcher that team teaching could be the solution to underperformance of learners and the ineffectiveness of teachers. According to this teacher, effectiveness is when the teacher produces quality performance and good results in their subject. At this school, there are three grade 9 mathematics teachers. Each of them is assigned one class of grade 9. They are teaching different topics and learners are assessed differently. In other words, learners of the same grade get different class works, homework, assignments, and investigations. They only write similar tasks during a common examination paper or a controlled test set by one teacher. The teacher concerned will set the test according to what he or she taught learners, making other learners fail. This teacher does not consult other teachers on topics they covered.

The teacher also mentioned that besides team teaching, they have to use different teaching methods to deliver their mathematics lessons to accommodate all learners, and this can help them

improve their teaching effectiveness, according to her. In another school, one teacher mentioned that to increase effectiveness; more workshops are needed in the subject they teach to renew and expand their knowledge of mathematics because they still depend on what they did their institutions. This teacher mentioned a similar problem that concerns their subject advisors. He says they cannot improve in their effectiveness because they do not get help from their immediate seniors like HODs and curriculum advisors who always blame them for failing learners.

The researcher interviewed five departmental heads, each from the five sampled schools. In one of the schools, the departmental head raised a concern that some teachers cannot team teach. They do not adhere to the ATP and the number of tasks given to learners per week or term, and they teach for long without assessing learners and depend on common and controlled tasks. A DH at one school said that teachers can conduct one on one lesson session with learners, and extra lessons to impart more knowledge in learners' minds. Besides this, he also made mention of teacher clusters from different schools who sometimes meet to share their experiences and knowledge (Jita & Mokhele, 2014). It forms part of the development and can benefit many teachers in gaining insight into the subject.

4.5 TEACHER QUALITIES AND ATTRIBUTES THAT INFLUENCE LEARNERS' MATHEMATICS PERFORMANCE

A teacher's content knowledge makes effective teaching, and no teacher can be effective without content mastery. This knowledge, as attested to by some teachers, relate very well with learner performance, according to Carnoy & Arends (2012). However, one teacher disagreed and contended a relationship between teacher content mastery and learner performances. Another teacher said that teacher qualities have to do with knowledge of the content matter, loving what you are doing as the teacher, being patient and tolerant, and being determined and dedicated to your work. Discipline, attitude, behaviour and competency are also mentioned in the interview. The personality of the teacher was also mentioned as being significantly related to learners' mathematics achievement. Whether a teacher is liked or disliked by learners influences the learners' attitudes towards their subject, and subsequently, their achievement. The development of the teacher is also very important, and teachers should attend workshops on recent

developments in mathematics education. This will make in-service programs worth attending for teachers. Interviewed teachers wish that these in-service training should be scheduled at least two times a year to add to whatever personal development programs they registered. This will keep them abreast of new developments in this subject.

The interviewed teachers said that they do not believe that teacher experience has anything to do with the learners' mathematics performances. What teachers believe in is the teaching strategies followed. They say involving learners from the onset in your lesson will make it easier for them to love the subject and even answer questions. Let them solve mathematical problems on the chalkboard in your presence and only guide where necessary. One of the teacher participants mentioned the positive approach in teaching creates a meaningful learning environment for their learners, improving their chances of performing high in mathematics.

4.6 SUMMARY OF THE CHAPTER

This chapter reported the findings of the data and the findings of the study. Data from five schools was presented and discussed. Results were presented in tables. Results presented are obtained from interviews, observations and documentary reviews, and are based on research questions and objectives of the study. The researcher will draw conclusive findings on the effectiveness of grade 9 mathematics teachers and aspects that will answer the research questions. Findings will be presented in the next chapter (chapter 5).

CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

The previous chapter presented data in terms of results from interviews, observations and documentary reviews. Grade 9 mathematics teachers from five sampled secondary schools in Mahwelereng circuit of the Mogalakwena District were interviewed. Some documents like marksheets and mark schedules were examined. A classroom of grade 9 learners was observed. Background information in terms of profiles of the participating teachers was presented in a table that illustrated their qualifications, gender and years of teaching experience.

This chapter presents the summary of findings, conclusions and recommendations based on the result of the study. It provides an overview of the study based on reviewing research problem, summary and recommendation for future research.

5.2 REVIEW OF THE RESEARCH PROBLEM

This study was focusing on the effectiveness of grade 9 mathematics teachers. The study took place in Mogalakwena district, involving five secondary schools in Mahwelereng circuit as the sample of study among eleven secondary schools in the circuit. The schools were purposely selected. The main reason for this selection is because these schools are in the same township and not far from each other. The participants of the study were the 10 mathematics teachers who teach grade 9, two from each sampled school. Research indicated that the problem of non – performance in grade 9 mathematics is a national problem according to Spaul (2013).

The study specifically sought to achieve the following:

- To address the problem of poor performance in mathematics in the senior phase with emphasis on grade 9 learners as well as the effectiveness of teachers offering mathematics in this phase.
- To study levels of teacher effectiveness with special reference to secondary school teachers who teach grade 9 mathematics in Mahwelereng circuit in the district of Mogalakwena.

- To explore the impact of teacher effectiveness on learner mathematics achievement, with focus on the General Education and Training (GET).
- To explore measures of teacher effectiveness to enhance learner performance.
- To explore what teachers can do to improve their teaching effectiveness of grade 9 mathematics.
- To investigate the teacher qualities and attributes that can influence learner performance in mathematics.

5.3 DISCUSSION OF FINDINGS

The following discussions of findings are linked to the results from literature review:

5.3.1 Grade 9 mathematics learners' poor performance.

5.3.2 What can mathematics teachers do to increase their teaching effectiveness.

5.3.3 Teacher qualities and attributes that will influence the performance of learners in mathematics.

5.3.1 Grade nine mathematics learners' poor performance

School A had 230 learners in mathematics in the year 2020, and passed only 143. School B managed to pass only 19 learners out of 99 learners, making it the lowest pass rate of 19% recorded in mathematics. School C produced 52%, school D produced 20% overall of all subjects due to non-performance in mathematics and school E performed better than the four mentioned schools with 72%.

Literature review has shown that ineffectiveness of mathematics teachers and poor knowledge of the content contribute to poor performance of learners in the subject.

5.3.2 What can mathematics teachers do to increase their teaching effectiveness of grade 9 mathematics

Research on effectiveness has reported a direct relationship between its quality and learner achievement (Darling-Hammond & Young, 2002). Teacher effectiveness is found to can be increased with expansion of knowledge of the subject.

5.3.3 Teacher qualities and attributes that influence performance of learners in mathematics

Literature revealed that if the teacher is ineffective, learners under his tutelage will underperform in his subject. In terms of teacher qualities, it is revealed that a teacher may have less experience in teaching but could be very effective.

5.4 SUMMARY OF FINDINGS

5.4.1 Poor performance in grade 9 mathematics

The study revealed that learner achievement in grade 9 mathematics is due to the reason that pass requirements are very high, therefore not easily achievable. Most learners are within the progressed group according to interviewed teachers. Such learners are not motivated to study harder in mathematics as they think they have passed to be where they are. Most teachers ascertain that progression of learners not fully meeting the requirements causes the high rate of failure in the subject concerned. There is a norm mentioned by some of the interviewed teachers that a learner is not expected to remain in a phase for a long time, therefore the district recommend progression even if the performance is poor. This is mostly the case with senior phase learners. It is still the responsibility of the teachers to see that these learners perform well according to Baker, Oluwole & Green (2013).

5.4.2 What can mathematics teachers do to increase their teaching effectiveness

What most teachers are suggesting is for each teacher to make sure that they arrange for developmental causes. Clusters as discovered by Jita and Mokhele (2014) may only work for a certain group of teachers. Teachers need to equip themselves with content knowledge, and give their all to the teaching sessions. Most teachers lack motivation in continued studies. The

question of funding is the problem as they are under-paid. They rely on government bursaries but end up not getting them as they are also limited.

Teachers can plan extra lessons for their learners as it will help improve their classroom management skills, and learner achievement. This will help teachers to spend more time with their learners, get to know them well and to help those with learning problems. A teacher can improve their effectiveness by spending a lot of time teaching and studying to increase subject content knowledge.

Results of the study revealed that most teachers concentrate on curriculum coverage rather than knowledge and understanding of learners in the subject concerned. Just a few of the educators consider making learners understand the subject first instead of running after curriculum coverage, because there is time allocated for each topic as put by one teacher. As for the support given by Departmental Heads, it seems limited. Some DH care only about the work done, regardless of the quality thereof.

5.4.3 Teacher qualities and attributes that influence learners' mathematics performance

Teacher qualities has to do with knowledge of the content matter, to love what you are doing as the teacher, to be patient and tolerant at all times, to be determined and dedicated to your work. Discipline, attitude, behaviour and competency are also mentioned in the interview. Personality of the teacher was also mentioned as being significantly related to learners' mathematics achievement. They say whether a teacher is liked or disliked by learners, influences the learners' attitude towards their subject, and subsequently their achievement. Teachers also need to take into consideration the idea of developing themselves in the subject content by studying further. It can be done through distance learning. Carnoy & Arends (2012) attest to the knowledge of the subject. Teacher also agreed in the interview that knowledge of the subject and experience of teaching same subject several years add to the effectiveness of the teacher.

5.5 CONCLUSION

Based on the findings of the study, the teachers selected for the study were 50/50 in terms of male and female participants. Though teachers said they were using different teaching methods, in the researcher's observations some of the methods were never used as teachers have to teach

many periods as one of the teachers said in an interview. Some said there was no significant relationship between effectiveness of the teacher and learner performance. This kind of relationship according to one of the teachers motivates both teachers and learners. Teachers will attend classes regularly and learners will like the subject as they won't display negative attitude towards their teacher.

5.6 RECOMMENDATIONS

Based on the results of the study, the following recommendations were made:

- The researcher recommends mathematics teachers to make it a point that they apply for developmental programs to equip themselves with knowledge that will help their learners to perform well in their subject.
- A recommendation for teachers to engage in continuous teacher development.
- Mathematics Department to make it a point that there are workshops planned at least twice a year for mathematics teachers to improve in their effectiveness by improving their knowledge of subject content in mathematics.
- Performing teachers could be recognised and awarded with prizes publicly at school gatherings and meetings. This will motivate them to strive for performance.
- Teachers should also be encouraged to obtain further qualifications and skills in mathematics.
- The District should develop a policy in terms of a rubric that could be used to assess teacher effectiveness, and this could also assist policy makers in the Education Department. Assessment of teacher effectiveness can help teachers to strive for excellence in their daily teaching and classroom attendance.
- The researcher is recommending future research to be done on the problem of poor performance in mathematics and what exactly causes that. The research must also be conducted on individual teacher factors that affect their teaching to the extent that learners perform so poorly in mathematics.
- More study is needed before making policies regarding teachers.

5.7 SUMMARY OF THE CHAPTER

This chapter dealt with review of the study, summary of findings and conclusions drawn on the research problem. There are recommendations based on the outcome of the data collected. Since this study explored the effectiveness of grade 9 mathematics teachers, data was collected from relevant candidates, who made it clear that teachers need development to improve their effectiveness.

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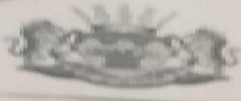
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APPENDIX A – DISTRICT APPROVAL TO DO RESEARCH

**LIMPOPO**
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA
**DEPARTMENT OF
EDUCATION**
MOGALAKWENA DISTRICT

Ref : S11/2/2
Enq : Dolo S.J
Tel : 015 483 7549

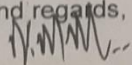
Date : 14 June 2021

To : MAWASHA MJ

From : OFFICE OF THE DISTRICT DIRECTOR
MOGALAKWENA DISTRICT

**SUBJECT: APPROVAL TO CONDUCT RESEARCH ON THE EFFECTIVENESS OF
GRADE 9 MATHEMATICS TEACHERS IN MAHWELERENG CIRCUIT.**

1. Your letter dated 17 May 2021 refers.
2. It is with great pleasure to inform you that approval to conduct research as per subject above is hereby granted.
3. The research must be conducted in accordance with the Department's policies and conditions such as but not limited to:
 - a. No disruption of Learning and teaching;
 - b. No publishing of research outcomes with privilege information before HOD gives approval.
4. We wish you best of luck with your studies. We believe this will add value to education system in our Province especially in Mogalakwena District.

Kind regards,


District Director

17/06/2021

Date

MOGALAKWENA DISTRICT OFFICE
805 Rufus Seakamela Street, Mahwelereng
Tel: 015 483 7500 Fax: 086 425 8313
The heartland of Southern Africa- development is about people

APPENDIX B – INTERVIEW SCHEDULE

FACULTY OF HUMANITIES: DEPARTMENT OF POSTGRADUATES STUDIES.

NAME: MAWASHA M. J.

STUDENT NUMBER: 220049984

INTERVIEW SCHEDULE

RESEARCH TOPIC:

THE EFFECTIVENESS OF GRADE 9 MATHEMATICS TEACHERS IN MAHWELERENG CIRCUIT: A CASE OF SELECTED SECONDARY SCHOOLS.

SECTION A.

MAIN QUESTION	GUIDING QUESTIONS	POSSIBLE INTERVIEW QUESTIONS
How effective are grade 9 mathematics teachers in Mahwelereng Circuit secondary schools?	What is the influence of teacher effectiveness on learner performance in Mathematics?	○ What teaching methods do you apply in mathematics? ○ Which methods of teaching do you think makes a teacher effective in delivering the lesson to learners, making it easy for learners to perform well? ○ What do you think you do well in terms of your teaching?
	What is the relationship between teacher effectiveness	○ From your experience explain what can be done in order to help teachers improve in their math teaching. ○ What should teachers do in order to assist learners with mathematics education? ○ How often did you present information to learners so that they would know what had to be learned

	and learner performance in Mathematics?	before actual teaching? ○ How often did you concentrate on curriculum coverage than mathematics understanding of learners? ○ How highly valued among learners is it to be good at mathematics? ○ Are your learners interested in mathematics subject? ○ How often do your learners consult you for clarification of mathematical concepts?
	What are the teacher qualities that influence performance of learners in Mathematics.	○ Would you say you are effective in teaching mathematics in grade 9? ○ Do you get support from your HOD in terms of teaching processes of mathematics? ○ What is the relationship between teacher experience and student achievement? ○ What other qualities of a teacher do you think influence student achievement in mathematics?

INTERVIEW QUESTIONS FOR DEPARTMENTAL HEADS



1. How long have you been appointed as Departmental Head in mathematics?

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2. How does the school management system support teaching and learning in mathematics?

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3. How often do you meet with your teachers to discuss their teaching, assessment and other challenges in the curriculum?

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-
-
4. Do your teachers ever consult you for support?

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-
-
5. Did the grade 9 mathematics teachers manage to cover term 2 and 3 of the curriculum as stipulated by CAPS?

-
-
-
-
-
6. How was the performance of your grade 9 learners in mathematics in the 2nd and 3rd terms this year?

-
-
-
-
-
7. Comparing the grade 9 final mathematics results of 2019 and 2020, and this year's 2nd and 3rd term's performance, would say there will be improvement in the final results this year, and why?

THANK YOU

APPENDIX C – LETTER TO DISTRICT

P O Box 4473

MOKOPANE

0600

17 May 2021

The Director
Mogalakwena District
Private Bag X601
Mahwelereng
0626

Dear Madam

REQUEST FOR PERMISSION TO CONDUCT RESEARCH

My name is Miss Mmaphuti Johanna Mawasha. I am a Masters student at the Central University of Technology (CUT), Bloemfontein campus, in the Faculty of Humanities. I am specializing in Education Management. I seek permission to conduct research in Mahwelereng circuit which is under your jurisdiction. The title of my study is: The effectiveness of grade 9 mathematics teachers in Mahwelereng circuit: A case of the selected secondary schools.

The study aims to address the problem of poor performance in mathematics in the senior phase with emphasis on grade 9 learners in Mahwelereng circuit secondary schools, as well as the effectiveness of teachers offering mathematics in grade 9. Procedures entail semi-structured interviews with teachers and HODs in the department of Mathematics, observation of mathematics lessons and the analysis of some documents. The duration with each selected participant will be one hour from 14h30 – 15h30.

The research will help the Education Department Policy makers at district level to develop their own mechanism of establishing their teacher effectiveness more directly, e. g. Teacher Effectiveness Assessment tool may be formulated.

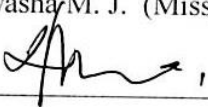
I am under the supervision of Professor P. Sepeng, Tel: +27 51 507 3025 / 082 766 8986 email: psepeng@cut.ac.za; Dr. Ngobeni, Tel: 082 347 3322 email: ngobeniet@gmail.com; and Mr. I. Phage, Tel: +27 51 507 3827 / 082 338 9259 email: iphage@cut.ac.za,

You can contact me at maphuti.mawasha@gmail.com, or 072 708 9686 should you have any queries.

Thanking you in advance for your co-operation

Yours faithfully

Mawasha M. J. (Miss)



APPENDIX D – SAMPLE LETTER TO PRINCIPAL

P O BOX 4473

MOKOPANE

0600

05 October 2021

The Principal

D. G. Tsebe High School

P O BOX 2565

MAHWELERENG

0626

Dear Sir/Madame

APPLICATION TO DO A RESEARCH AT YOUR SCHOOL

My name is Miss Mmaphuti Johanna Mawasha. I am a Masters student at the Central University of Technology (CUT), Bloemfontein campus, in the Faculty of Humanities. I am specializing in Education Management. I seek permission to conduct research in your circuit. The title of my study is: The effectiveness of grade 9 mathematics teachers in Mahwelereng circuit: A case of the selected secondary schools.

Teachers and HODs in Mathematics department are requested to assist in this research project. However, participation is completely voluntary. Participants will be requested to take part in the interview and also in answering the questionnaire. During the interview, participants will be audio recorded for analysis purpose. The identities of participants will be kept strictly confidential, and even the name of the school will not be disclosed. All data will be stored in a secure password protected server where authentication will be required to access such data

Procedures entail semi-structured interviews with teachers and HODs in the department of Mathematics, observation of mathematics lessons and the analysis of some documents. The duration with each selected participant will be one hour.

You can contact me at maphuti.mawasha@gmail.com, or 072 708 9686 should you have any queries.

Thanking you in advance for your co-operation

Yours faithfully

Mawasha M. J. (Miss)



(Researcher's Signature: _____ (Date): 05-10-2021

DECLARATION

I, MORRIS M SHILABJE (NAME and SURNAME) Principal, on this day of 06 month 10 2021, hereby grant permission to the researcher to go ahead with the research in the above-mentioned school following the terms of reference in this request letter.

SIGNATURE: - MmShil.

SCHOOL STAMP



APPENDIX E – SAMPLE PARTICIPANT’S CONSENT



RESEARCH TOPIC:

**THE EFFECTIVENESS OF GRADE 9 MATHEMATICS TEACHERS IN
MAHWELERENG CIRCUIT: A CASE OF SELECTED SECONDARY SCHOOLS.**

Informed Consent

INVITATION TO PARTICIPATE:

Dear Participant

My name is Mmaphuti Johanna Mawasha and I am a Masters student in Education Management at the Central University of Technology. You are invited to participate in a research study of teacher effectiveness. You were selected as a possible participant because you are a grade 9 mathematics teacher. Please read this form carefully and ask any questions you may have before agreeing to be in the study. You must be 18 or older to participate in the study.

KEY INFORMATION ABOUT THIS RESEARCH STUDY:

The following is a short summary of this study to help you decide whether to be a part of this study. Information that is more detailed is listed later on in this form.

The purpose of this study is To address the problem of poor performance in mathematics in the senior phase with emphasis on grade 9 learners in Mahwelereng circuit secondary schools. You will be asked to complete a survey and a follow-up interview. We expect that you will be in this research study for one hour.

STUDY PURPOSE:

The purpose of this study is to inform Education Department and Policy makers to develop mechanisms of establishing and assessing teacher effectiveness more directly, for an example, by formulating a policy on Teacher Effectiveness Assessment, a tool that will be used by principals and circuit managers.

NUMBER OF PARTICIPANTS:

If you agree to participate, you will be one of 10 participants who will be participating in this research. There will be 5 mathematics teachers, each from the sampled secondary schools in Mahwelereng, and five HODs also from those schools.

PROCEDURES FOR THE STUDY:

If you agree to be in the study, you will do the following: answer questionnaires, interviews, observations, audio or videotaping, and field notes which may be employed in the study. Each activity will be performed in the office or a place convenient to the participant, and the classroom.

CONFIDENTIALITY:

Please note that:

Your responses or information will be confidential, and will not be attributed to you in person but reported only as a population member opinion. The interview may last for about an hour and may be split depending on your preference. Any information given by you cannot be used against you and data collected will be used for purposes of this research only. Data will be stored safely in secure storage and be destroyed after four years when the project is completed.

The results of this study may be used in reports, presentations, or publications but your name will not be used.

VOLUNTARY PARTICIPATION:

Taking part in this study is voluntary. You may choose not to take part or may leave the study at any time. Leaving the study will not result in any penalty. Your decision whether or not to participate in this study will not affect your current or future relations with the school.

BENEFITS OF TAKING PART IN THE STUDY:

There are no direct benefits to participation in this study, however, your participation will help in building a teacher community which does not emanate from just meeting the requirements of being highly qualified, but that of striving for effectiveness in their teaching.

PAYMENT OR INCENTIVE:

You will not receive payment for taking part in this study. Your involvement is purely for academic purposes only, and there are no financial benefits involved.

CONTACT INFORMATION:

If you have questions about the study, please call me at 072 708 9686 or e-mail me at maphuti.mawasha@gmail.com, or my supervisor at psepeng@cu.ac.za. You will be given a copy of this form for your records. If you have any questions about your rights as a participant in this research or if you feel you have been placed at risk, you can contact 072 708 9686

PARTICIPANT'S CONSENT:

By signing below, you are giving consent to participate in the study. If you are willing to be interviewed, please indicate by ticking as applicable whether or not you are willing to allow the interview to be recorded by the following equipment:

	Willing	Not willing
Audio equipment	☒	
Photographic equipment		
Video equipment	☒	☒

Name of the Participant: Masemane Malesele Norma

Signature of the Participant: 

Date: 25/10/2021

Adapted from <https://www.csusm.edu/gsr/irb/consent.html>

CONSENT

I hereby confirm that I have been adequately informed by the researcher about the nature, conduct, benefits and risks of the study. I have also received, read and understood the above written information. I am aware that the results of the study will be anonymously processed into a research report. I understand that my participation is voluntary and that I may, at any stage, without prejudice, withdraw my consent and participation in the study. I had sufficient opportunity to ask questions and of my own free will declare myself prepared to participate in the study.

Research participant's name: Masemane Malesela Norman (Please print)

Research participant's signature: [Signature]

Date: 25/10/2021

Researcher's name: MMAPHUTI JOHANNA MAWASHA (Please print)

Researcher's signature: [Signature]

Date: 19/05/2021

APPENDIX F – CERTIFICATE FROM LANGUAGE EDITOR

