FACTORS AFFECTING GRADE 6 LEARNERS' PERFORMANCE IN MATHEMATICS INTHE EAST LONDON EDUCATION DISTRICT

By

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DECLARATION

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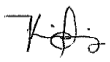

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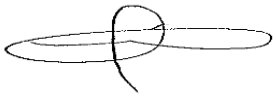

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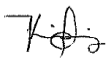

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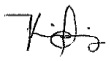

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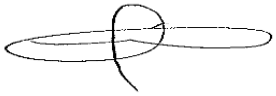

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ABSTRACT

Mathematics is one of the most important subjects rooted in many fields of study but has also been one of the greatest challenges for learners in every country, most especially in the Republic of South Africa. There have been attempts to curb the challenges that have bedeviled the success of mathematics education by governments, the Department of Education and many other stakeholders who have not enjoyed positive results in mathematics in the district of East London. Therefore, this study examines factors affecting grade 6 learners' performance in mathematics in selected schools within the East London education district. There were three hundred and forty-five (345) grade 6 learners and 12 teachers drawn through a parallel mixed methods sampling. Stratified random sampling was used to select participants for the quantitative strand while purposive sampling was used for selecting 60 learners and 12 teachers for the qualitative strand. The researcher used the mixed method research approach. The instruments used in collecting data were structured questionnaire and semi-structured interviews to elicit information from grade 6 learners and teachers. Information gathered from the learners and teachers included: biographical information, factors affecting teaching and learning of mathematics and suggestions. The quantitative data were analyzed by using descriptive statistics of percentage from the responses of learners. The quantitative analysis was done by using excel 2010 to formulate data into percentages and qualitatively, voice recordings from the respondents semi-structured interviews were reduced through thematic analysis. The findings of the study revealed that some of the qualified mathematics educators preferred to work in another profession. Quality of teaching and learning were less effective due to overcrowded classrooms, inadequate teaching and learning resources, poor monitoring of educators, some of the learners were not adequately motivated and many others. For performance in mathematics to improve in the primary schools in East London Education District, the study made some recommendations from the findings to the stakeholders in education such as the Department of Education, principals, the government, educators and learners. These recommendations might virtually assist in finding lasting solutions to grade 6 learners with mathematics challenges.

Keywords: Mathematics, Learner, Poor performance, Educator, Educator turnover, Grade 6, Paradigm, Annual National Assessment, Trends in International Mathematics and Science Studies.

ACRONYMS

ANA: Annual National Assessment

DoE: Department of Education

EC: European Commission

HSC: Higher School Certificate

DBE: Department of Basic Education.

PST: Pre-Service Teachers

TIMSS: Trends in International Mathematics and Science Studies

IMU: International Mathematics Union

WEF: World Economic Forum

GMMDU: Govan Mbeki Mathematics Development Unit

CK: Content Knowledge

TEDS-M: Teacher Education

SES: Socio Economic Status

PCK: Pedagogical Content Knowledge

SAQMEC: Southern Eastern African Consortium for Quality Monitoring Education Quality

TABLE OF CONTENTS

CHAPTER ONE

INTRODUCTION AND BACKGROUND TO THE STUDY

1.1 INTRODUCTION

Mathematics Education is very vital in all countries because of the numerous contributions it offers such as developments in technologies. Adu, Galloway, and Olaoye (2014) asserted that it is not an overstatement to say that mathematics is an indispensable tool in the march towards technological breakthrough. Mathematics cuts across all the fields of human endeavours in its wide application and mind development. However, despite its wide applicability, many students still can not find their feet in the subject. Governments and educational systems around the world recognize the need for students to be skilled, creative and confident users of a wide range of Information Communication Technology of which the knowledge of mathematics is required. Furinghetti, Matos, and Menghini (2013) are of the view that from the first half of the twentieth century mathematics education was mainly the business of professional mathematicians.

According to the National Research Council (2010), the preparation of mathematics teachers in the United States has been a topic of increasingly impassioned discussion in the last 20 years. There is deep concern about the numeracy of the nation's primary and high school graduates, as well as concern about perceived shortages of highly qualified mathematics teachers. The United States primary and high school learners perform poorly in mathematics which presents particular challenges for mathematics education. The government in South Africa also introduced the Annual National Assessment (ANA) to measure progress in learners' achievement in literacy and numeracy and also to provide valuable feedback to schools, teachers, learners and parents (Department of Education (DoE), 2011). With all these measures put in place by government to improve the performance of learners' mathematics, only little improvement has been documented.

1.2 BACKGROUND

Mathematics is a very important subject but it is a challenge across the world for its knowledge to be acquired. Genlott and Grönlund (2016) point out that the development of learners' mathematical skills require that educational systems equip learners with new skills and competencies, sometimes called 21st century skills (European Commission, 2007 ; 2010), which allow them to collaborate and contribute actively in ways more related to needs of social development.

In Australia, more than 15% of aspiring teachers with no specific mathematics pre-requisites for entry into a teaching degree in the Higher School Certificate (HSC) or equivalent add on to the concern about the mathematics content knowledge and teaching ability of our future teachers (Bradforth, Miller, Dichtel, Leibovich, Feig, Martin & Smith, 2015). As such, a large number of pre-service teachers (PST) lack sufficient content knowledge and therefore cannot fully engage in teaching method units within their education degrees, which are designed to explore strategies to teach mathematics content (Felton, Sutherland & Tracy, 2016).

In Norway, a scholar advised students to be motivated in mathematics "because you will meet it more and more in the future". Mathematics has become more and more important in all areas of work and scholarship. There will be more mathematics at work, so you will need more mathematics at school" (Hanushek & Ludger, 2008). The American Diploma Project, (2004) agrees with this assessment, estimating that "in 62 percent of American jobs over the next 10 years, entry-level workers will need to be proficient in algebra, geometry, data interpretation, probability and statistics"(cited in Friedman, 2007:302; Miyake & Friedman, 2012:12).

In Africa, there are many challenges when it comes to mathematics education. Findings of the update report of Mathematics in Africa in the International Mathematics Union (IMU, 2014) suggest that the primary and secondary levels in mathematics education are weak in most African countries, thus reducing the potential population of talented students who choose mathematics majors at the university level. In some sub-Saharan

countries, the primary schools' quality of education has dropped because of less quality of teachers and less than 10% of the primary school learners are enrolled in the secondary school. Except South Africa and Swaziland that have gross enrolment ratios greater than 50%.

Irrespective of South Africa having one of the highest enrollments from the primary to secondary schools in Africa, the country is burdened with abysmal performance. A report published by the World Economic Forum (WEF), (2015) has ranked the quality of South Africa's maths and science education (excluding tertiary) last out of 148 countries in the world. There have been concerns in the Republic of South Africa's mathematics Education with low performances over the past twenty years and lack of qualified Mathematics teachers to bring quality teaching to assist the learners. Research on teaching demonstrates that teaching quality is a critical policy issue in education reforms, particularly given the investment on teachers in low resourced environments.

Teachers are some of the most important school-based factors influencing student achievement (Hattie, 2009). The experiences teachers have on teaching mathematics leave much to be desired in South Africa. In as much as the quality of teachers is of paramount concern, there should be requisite resources for teachers to augment the quality of teaching. The government of South Africa has organized a series of trainings and workshops for handling mathematics in order to sharpen their skills and tap into modern learners' natural affinity. Parallel to the teacher training, Govan Mbeki Mathematical Development Unit (GMMDU) is also running incubator schools for more than 400 selected learners from under-resourced schools. Learners receive Android tablets which they are trained to use as a "personal tutor" after school hours (GMMDU, 2015). Despite the above, the South African government's own evaluations of over twenty years of democracy show little improvement in educational outcomes despite significant policy changes (DoE, 2006). While some reasons for this poor performance may be evident, and there is widespread agreement that the main challenge in South Africa is the quality of education, there is little empirical analysis that helps policy

makers to understand the low level of student performance in South African schools or how to improve it (Letseka & Maile, 2008).

Like building a house, it must always have its foundation right. If much attention is not given to the current challenges in both the primary and the secondary school levels, it could affect the goodwill of the tertiary institutions because there must be quality learners to be produced yearly to feed into the tertiary demand. Grade 6 is a strategic grade which is the pivot or the centre of all the twelve years of education from grade 1 to grade 12. In addition, it is the grade where all challenges and progress can be fairly identified (Jacobs, Lanza, Osgood, Eccles & Wigfield, 2002; Scammacca, Roberts, Vaughn & Stuebing, 2015). The attention and support that should be given to Grade 6 mathematics teachers and learners have long been neglected and the focus has been on grade 12 mathematics teachers and learners. Recently, the Department of Education saw the need to give some attention to grade 3, 6, 9 and 12 with regards to Annual National Assessment (ANA).

Of all the nine provinces in South Africa, Eastern Cape has been the lowest performing province as far as performance in education at primary and secondary levels are concerned (Bantwini, 2010). Studies have shown that in South Africa, that there is high rate of poor performance in mathematic. The Department of Basic Education (DBE) released the Annual National Assessment (ANA) report which revealed a picture of students' achievement in mathematics that is extremely worrying. The Table 1.1 below shows the level of scoring in mathematics as used in the national codes, together with percentages or descriptions for recording and reporting learner performance in the intermediate phase.

Table 1.1: The Scoring of Mathematics for grade 4 – 6 (Intermediate phase) by the Department of Basic Education

Rating	Percentage	Description
Level 1	0-29	Not achieved
Level 2	30-39	Elementary achievement
Level 3	40-49	Moderate achievement
Level 4	50-59	Adequate achievement
Level 5	60-69	Substantial achievement
Level 6	70-79	Meritorious achievement
Level 7	80-100	Outstanding achievement

Source: (DBE, 2015)

In Table 1.2, the performance by provinces has been consistent across different tests. For example, Western Cape has consistently performed better than other provinces, regardless of grade or subject. Gauteng, more than any other province, has taken the second position. Limpopo has, before ANA, performed at a considerably lower level than any other province. The high average scores in Grade 3 in the case of Eastern Cape in ANA suggest that different standards were applicable in these tests and in this province as it is unlikely that Eastern Cape would have seen such an improvement in Grade 3 marks previously. However, in Grade 6, Eastern Cape province achieved averagely high. Generally, the province with the highest average mark which is 41% is still below the basic achievement on the continent and the world at large.

Table 1.2: Average percentage scores after re-marking in 2011

	GRADE 3		GRADE 6	
Province	Literacy	Numeracy	Languages	Mathematics
EC	39	35	29	29
FS	37	26	23	28
GP	35	30	35	37
KN	39	31	29	32
LP	30	20	21	25
MP	27	19	20	25
NC	28	21	27	28
NW	30	21	22	26
WC	43	36	40	41
SA	35	28	28	30

Source: (DBE, 2014)

Table 1.3 provides a summary of ANA for the province from the stage it was piloted from Grade 1 to 6, to a fully-fledged assessment that includes Grade 6 (Grade 3, 6 and 9). The results in Table 1.3 show that Mathematics pass rate decreased as learners progressed to higher Grades from 41% in Grade 3, 25% in Grade 6 to 15% in Grade 9 by 2012 and 51%, 33% and 16% respectively in 2013. Although there was a decrease in the performance of learners in languages from Grade 3 to Grade 9, the situation was worse in mathematics.

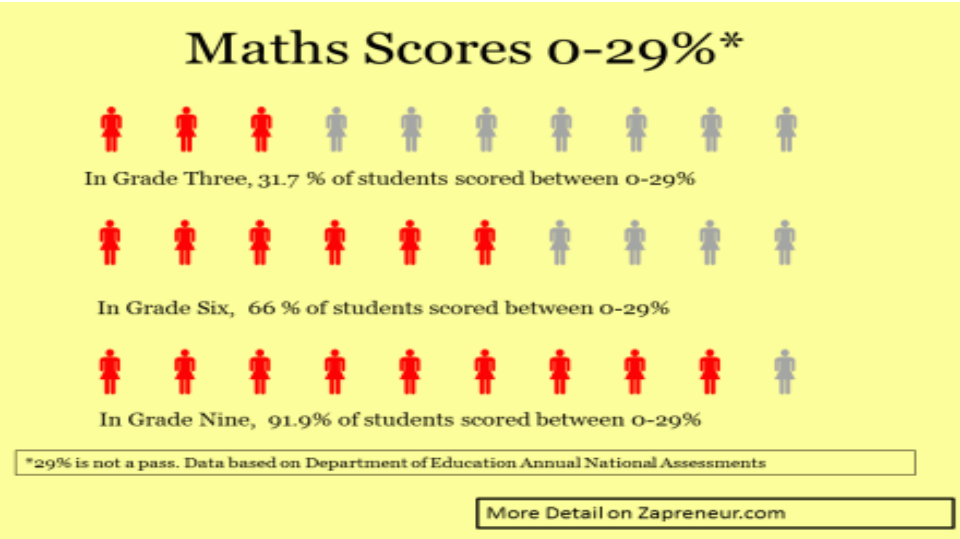
Table 1.3: Summary of Eastern Cape ANA's average percent 2009-2013

YEAR	GRADE 3	GRADE 6
2009	39	39
2010	-	-
2011	29	29
2012	25	25
2013	33	33

Source: (DBE, 2014)

Figure 1.1 shows that the majority of South African students were assessed in mathematics and scored below 30%, which is described as "not achieved" from 0-29 percent in Grades 3, 6 and 9.

Fig.1: The Scoring of Mathematics by the Department of Basic Education



Source: Zapreneur: South African Entrepreneur Newsletter (2012)

The model in figure 1.2 suggests that success in mathematics is influenced by English language proficiency in both productive (writing and speaking) and receptive (listening and reading) skills. Receptive skills in both general and technical areas directly influence mathematics achievement because general and technical productive skills in writing and speaking play a vital role in mathematics achievement while writing skills in the technical areas of mathematics and science are more closely related to mathematics achievement than non-technical areas.

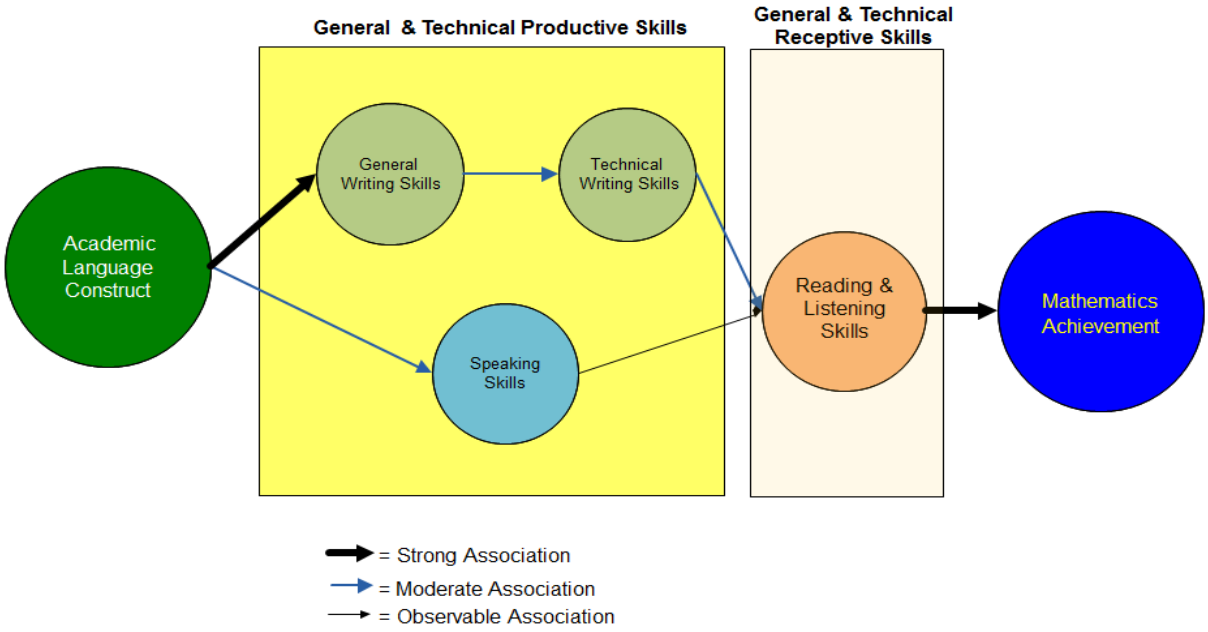


Figure 1.2: English language proficiency and mathematics achievement relationships (Grant, Cook & Phakiti, 2011)

Fatimat (2015) argues that mathematics has focused on linguistic issues, and some of the key variables that have been explored include: semantic structure, clarity of word-order of the problem and language of the test items (Yoshiba, Verschaffel & Decorte, 1997), including the mathematical proficiency and language background of the learners (Bernado, 1999).

A large body of literature has established that students perform poorly in mathematics word problems as compared to straight computation tasks. Language challenges faced by students learning mathematics have led to a steep decline in their achievement. Briars and Larkin (1984) argue that some of the difficulties students experienced which contributed to their poor achievement in mathematics are related to reading comprehension, syntactic variables, the presence of “cue” words or the size of numbers involved. However, recent studies have challenged these notions. For instance, Nathan (2008) found that learners in both the primary and the high school “were better” at solving simple story problems in mathematics. Many other scholars have shared similar ideas, (Koedinger, Alibali & Nathan, 2008).

One of the challenges encountered by mathematics students in multilingual classroom settings, as in the case of South Africa, is that of linguistic alienation from the classroom discourse because they lack fluency and proficiency in the language of teaching and learning mathematics. Students are particularly disadvantaged with respect to their ability to listen with understanding, to comprehend the written word and to express themselves orally and in writing (Chitera, 2011), and to develop conceptual understanding of the mathematical concepts and procedures. This has been an issue of great concern among mathematics educators. Webb and Webb (2008a) and Setati and Barwell (2006) have suggested a lot of factors contributing to abysmal achievement in mathematics. Among these are: lack of concrete measures to implement the official language-in-education (LiE) policy, limited or unavailability of mother tongue instructional materials, and negative attitudes towards the use and development of mother tongues. (Jones & Barkhuizen, 2011; Muthwii, 2004).

A multitude of studies have acknowledged the influence of language on the construction and communication of accurate concepts in mathematics (Kaplan, Fisher & Rogness, 2009; Rutherford, 2000). Many anecdotal reports have also revealed pupils’ misinterpretation of algebraic expressions in an attempt to decode ambiguity in its everyday sense. Barwell (2005) argues that words do not always provide clarity that learners need in order to make sense of algebraic problems. Schleppegrell (2007) noted

that ambiguity creates difficulty in mathematical communication and contributes to poor academic achievement. Previous studies have investigated the relationship between some linguistic features and the difficulty of mathematics word problems for English language learners and non-English language learners in elementary, middle and high school levels. Howie (2004, 2003) on the analysis of a large scale study of South Africa learners in the Trend International Mathematics and Science Study of 1995 (TIMSS), identified learners' proficiency in English language as a strong predictor of their success in mathematics, while home language had no significant relationship with students' performance.

In 2001, the US federal No Child Left behind Act of 2001 and corresponding state statutes mandated that states annually administer a standards-based English language proficiency test to all English learners (ELs) from kindergarten through to grade twelve in public schools. Glasnapp and Poggio (2006) found a link between language proficiency and students' performance in mathematics as mentioned earlier, seeing it is an avenue to providing students access to global languages of communication through education so that they can successfully compete nationally and improve students' academic achievement in mathematics. On the other hand, some researchers have suggested using learners' home languages as a resource in the mathematics classroom with the additional use of techniques such as code-switching, translation, re-voice, to mention just a few (Chitera, 2009).

The use of English language in teaching mathematics has been criticized as being a vehicle of acculturation and a trait for maintaining privilege (Setati, Chitera & Essien, 2009; Barwell, Barton & Setati, 2007; Molefe, 2007; Essien, 2007). This study sought to find out the relevance of English language proficiency on students' academic achievement in algebra. In this study, gender refers to the categorization of people based on their sex as either male or female. At different times and places, it has been observed that several stereotypical and prejudiced assumptions have been made when using gender for categorizations. Again, as far back as the 1960s, gender differences have been linked with mathematics achievement. Early results provided a scenario

showing that boys consistently performed better than girls. Contrary to that, boys and girls performed comparably during primary school, until the boys' mathematical skills increased faster than girls', beginning around the ages of 12 or 13, reaching a significant difference in achievement scores by high school. Males are considered to be more logical than females (Sumpter, 2008).

Mathematics is considered a male dominated course. It is in this milieu that boys and girls develop their gender identities by facing, often contradictory images which are negotiated for personal identity. This presupposition has made many students in the senior secondary school to perceive mathematics as a male domain (Brandell & Staberg, 2008), which means that the structure, the symbols and the identities are all more likely to be pro-male. Such an environment could be a contributory factor to female underperformance since they are under a stereotype threat (Cadinu, Maass, Rosabianca & Kiesner, 2005). It is therefore pertinent to find out (empirically) if gender actually influences secondary school students' academic achievement in mathematics. In a different study in Lesotho, Nenty (2010) reported that, while the gender of students had no significant influence on students' poor performance in mathematics, the person with whom the students were living, students' preferred occupation after school, the type of proprietor of the school and preferred classroom seating zone during mathematics lessons all had significant influence on students' academic achievement in mathematics.

Again, gender equality issue in education has been a major concern in many countries, including South Africa, because of its link with health and nutrition, economic development, and civic responsibilities. The concept of 'gender equality in education' follows the UNESCO (2003) interpretation, which refers to the notion of boys and girls experiencing the same advantages or disadvantages in attending school, receiving teaching methods, curricula, and academic orientation, and producing equal learning achievements and subsequent life opportunities. However, one of the greatest achievements of the democratic government in South Africa has been the immense development of access to basic education, especially in the enrolment of girls. The

success can be attributed to a progressive constitution that ensures the right to education for both females and males.

The South African Government has committed itself to transforming gender relations, achieving gender parity between males and females, and promoting women's empowerment. The 2001 National Census revealed that for the population of these twenty years and older, there were twice as many women as men in the social sciences, while there were ten times as many men as women in the engineering and the natural sciences DoE, (2008). The 2010 Education for All (EFA) Country Report indicated that in 2008 South Africa ranked 22 out of 138 countries that were assessed for gender parity (DoE, 2010). It is also indicated, that, according to the 2009 Global Gender Gap Report that South Africa had made great strides in closing the gender gap in various spheres of life, thereby entering the top 10 of countries at sixth position. The DBE, in close collaboration with Provincial Education Departments (PED), has taken a number of initiatives to give effect to the national priorities of upholding gender parity in vocations and societal responsibilities. The Girls Education Movement (GEM) was introduced specifically to encourage girls to study science and technology (DoE, 2008). The 'Techno-Girl Programme' was introduced to provide career guidance and life-skills support to girls, particularly in careers that involve mathematics and technology.

In general, the DBE and PEDs have made concerted efforts to engrain programmes that will serve as vehicles to empower both girls and boys, by providing career guidance and the teaching of socially related life skills. In South Africa at the national level for both mathematics and science, the girls outperform the boys, but this difference is not statistically significant, while at a provincial level, there is no statistically significant gender difference for mathematics and science, except for the Western Cape, where boys outperform girls and the difference is statistically significant (Spaull & Kotze, 2015). However, despite the great deal of work directed at understanding students' difficulties in the teaching and learning process, there is no clear evidence that these studies have made a significant impact in terms of improving students' academic achievement in mathematics. There are still indications of the difficulties encountered in

classroom teaching and learning and low achievement in mathematics among second language learners.

1.3 STATEMENT OF THE PROBLEM

There have been a number of interventions to deal with mathematics challenges in South Africa. The introduction of Annual National Assessment (ANA) has been one of the interventional tools to assist in reducing or curbing the challenges. In the Annual National Assessment report of 2011,DoE deals with one of the two significant national interventions: the introduction of standardized national workbooks for Grades 1 to 6 aimed at improving classroom practices and the first fully-fledged application of the Annual National Assessments (ANA) programme with a focus on learning in Grades 1 to 6. This report deals with the second of these two interventions. Specifically, the report describes the successes and challenges experienced in the implementation of the 2011 wave of ANA and provide key findings emerging from the data collected. The introduction of Annual National Assessment which only assesses learners' academic performance but does not reveal factors contributing to the challenges affecting learners' performance such as motivation of teachers and learners for performance maximization, qualified teachers to teach subject specialization and lack of adequate resources in schools.

There is also a challenge of non – activeness of parents to assist their children. Huang and Mason (2008) and Werang, Betaubun & Radja (2014) emphasized that the role of parents in their children's education has long been recognised as a significant factor in educational success and school improvement. Furthermore, because of the increased academic success as parents become more involved, parental involvement has been identified as a strategy to decrease the achievement gap (Jeynes, 2011). In recent years we have reached the stage where certain educational organisations and international conferences concentrate almost entirely on the issue of partnership between schools and parents as demonstrated by the following institutions: Parents in Education Research Network, European Research Network about Parents in Education.

(Dhingra & Manhas, 2009). Within this area of interest lies a vast spread of concerns and purposes. Furthermore, Epstein (2001) as cited by Wanke (2008) in his thesis states that children learn and develop through three overlapping “spheres of influence”: family, school, and community. Students who have support from their parents at home show better performance at school, while students lacking support are struggling.

South Africa, being one of the African giants has the best tertiary education on the continent. Uthman and Uthman (2007) revealed that 315 South African universities were ranked highly on the continent of Africa in the year 2005 in the Global Rankings. However, the primary and senior phases do not depict the best on the continent of Africa. According to a pilot study of grade 6 mathematics lessons in Gauteng province which was conducted by the Human Sciences Research Council (HSRC) (2008), South African students score at low levels in mathematics and language tests even when compared with students in other African countries (van der Berg & Louw, 2006). Therefore, there is a very big disparity between the standard of Education in the primary and secondary phases compared to the tertiary.

Spaull (2013) analyzed the report of the Department of Basic Education (DBE) (2011) and found that the quality of basic education is still well below what it should be. The percentage of learners reaching at least a ‘partially achieved’ level of performance varies from 30% to 47%, depending on the grade and subject considered. The percentage of learners reaching the ‘achieved’ level of performance varies from 12% to 31%. Even the best provincial figure in this regard, 46% for Grade 3 literacy in Eastern Cape, is well below what can be considered acceptable. East London education district within the Eastern Cape Province was listed among poorly performing districts in mathematics in grade 6 and is an issue of concern (ANA, 2012). There are few studies conducted on grade 6 learners’ performance in mathematics and this limitation motivated the researcher to investigate the factors affecting grade 6 learners’ performance in mathematics in East London Education District.

1.4 RESEARCH QUESTIONS

1.4.1 Main research questions

What are the factors affecting grade 6 learners' performance in mathematics in East London Education District?

1.4.2 Sub-research questions

The following research sub questions were addressed:

1. How is the subject content introduced and taught by mathematics teachers?

2. In what way does the motivation of educators affect the teaching of mathematics?

3. How does the motivation of learners affect learning of mathematics?

4. What is the impact of teacher's qualification on learners' performance in mathematics?

5. In what way do parents partnerships with teachers play adequate role in assisting learners?

6. What are some of the measures to be put in place to address the problem of learners' low level of performance in mathematics?

1.5 PURPOSE OF THE STUDY

The purpose of the study is to examine the factors affecting grade 6 learners' performance in mathematics in East London education district.

1.6 RESEARCH OBJECTIVES

The study has the following objectives:

1. To find out how subject content is introduced and taught by mathematics teachers;
2. To examine whether motivation of educators affects teaching of mathematics;

3. To examine whether motivation of learners affects learning of mathematics;

4. To assess how teachers' qualification impact on learners' performance in mathematics;

5. To ascertain if parent-teacher partnerships play an adequate role in assisting learners in effective learning of mathematics; and

6. To identify some of the measures to be put in place to address the problem of learners' low performance in mathematics.

1.7 SIGNIFICANCE OF THE STUDY

This study is relevant to the following stakeholders:
Teachers will eventually develop the knowledge or acquire information on other factors affecting grade 6 learners' performance. Learners will be assisted by this study to understand where they are lacking which impacts adversely on their academic performance. The study will also assist parents in supporting the learners for optimal performance. The school management will benefit from this study on why upgrading the requisite resources is needed in schools to ensure quality teaching of mathematics. The government departments such as DBE will benefit from this study with regards to policy changes, monitoring and implementation of policies. Private companies as their social responsibilities require, will benefit from with regards to understanding why sponsorships trainings and provision of school resources in challenging areas of education is needed.

1.8 RESEARCH METHODOLOGY

The methodology used for this research was a mixed methods research approach. This is a methodology for conducting research that involves collecting, analysing and integrating quantitative and qualitative research (FoodRisC, 2015). The instruments used for this study emphasized are structured questionnaire, semi-structured interviews and observation to source for information from both the learners and the educators. This method was meaningful to the study because it comprehensively took into consideration

of the in-depth views of both the learners and the educators and also provided checks on the responses from the respondents for a valid and relaible data.

1.9 DELIMITATION

The study was limited to grade 6 learners of both public and private primary schools in the East London Education District. Only some selected primary schools within East London district were used in the study. This study then focused on 345 grade 6 learners in both public and private primary schools and 12 grade 6 mathematics teachers. Grade 6 is a strategic grade which is the pivot or the centre of all the twelve years of education from grade 1 to grade 12 and also the grade where most challenges and progresses can be fairly identified (Scammacca, Roberts, Vaughn & Stuebing, 2015).

1.10 DEFINITION OF KEY TERMS

1.10.1 Mathematics

Harel (2008) defines mathematics as carrying out mental acts with particular characteristics (ways of thinking) to produce particular constructs. This is achieved firstly through the collection of structures consisting of particular axioms, definitions, theorems, proofs, problems, and solutions. Secondly, this is done through ways of thinking, which are characteristics of the mental acts whose products comprise the first set. In this study, mathematics refers to the South African basic mathematics in the primary school.

1.10.2 Learner

A learner is a person who is trying to gain knowledge or skill in something by studying, practicing, or being taught or a person who is undergoing tutelage (DoE, 2014). This study sees a learner as a school-going person with the appropriate age in both primary and high school.

1.10.3 Poor performance:

A performance below the desirable results (ANA, 2014). It also refers to poor academic achievement. Poor performance in this study means performing below the bench mark.

1.10.4 Educator:

This is a person such as a teacher or a school administrator who has a job in the field of education (Marrocco, 2009). This study refers to an educator or a teacher as a person who provides tutelage to a learner.

1.10.5 Grade 6:

The study refers to the highest grade in the intermediate phase in a primary school education in South Africa (DoE, 2014).

1.10.6 Annual National Assessment (ANA):

Annual National Assessment (ANA) in this study is an assessment programme used to measure learners' progress and achievement in literacy and numeracy in South Africa. It also provides valuable feedback to schools, teachers, learners and parents.

1.10.7 Trends in International Mathematics and Science Studies (TIMSS):

Trends in International Mathematics and Science Studies (TIMSS) are assessment programmes used to test learners in mathematics and science globally. This study uses TIMSS for comparing performance in mathematics of some selected countries internationally.

1.11 ORGANISATION OF THE STUDY

Chapter One

Chapter one deals with the introduction**,** background of the study, statement of the research problem, research questions, significance of the study, scope of the study and operational definition of terms are outlined.

Chapter Two

Chapter two provides the literature review of the study. It places emphasis on global and South African literature concerning the topic of the study and reviews some studies which helps to identify the gaps that the study seeks to fill.

Chapter Three

Chapter three discusses the research method used in the study. It shows the orientation of the study, a thorough explanation of the design of the study, the instruments used and the whole process of collection of data. Emphasis is placed on the study area, study population, sample size, sampling techniques, sources of data, data collection instruments and method of data analysis.

Chapter Four

Chapter four encompasses the analysis and the presentation of the analyzed data or the findings of the study.

Chapter Five

Chapter five consists of the summary and conclusions of the analyzed results of the study based on the findings as well as the recommendations.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 INTRODUCTION

This chapter of the study provides critical review of literature. The chapter provides an account of the review of the existing studies related to the present study of literature on factors affecting both learning and performance of learners in mathematics in primary schools in South Africa. The emphasis on “factors” affecting learners’ performance has great impact on educators’ teaching and performance, learners’ learning and performance as well as the education system. This chapter, thus, rigorously reviews literature on factors which have been categorized into primary factors and secondary factors that impede learners’ performance. Rocco and Plakhotnik (2009) explain that a literature review provides a framework for establishing the importance of the study. In addition, it serves as a benchmark for comparing results with other findings.

2.2 THEORETICAL FRAMEWORK

The researcher was guided by the Normative theory. According to Ho, MacGlashan, Littman and Cushman (2017) cited by Dayan and Niv (2008) normative theory uses evaluative feedback as a result of philosophical thought and / or factual inquiries about human beings and the psychology of learning. Evaluative feedback plays an important role in any learning process. The predominant view of augmented feedback in the motor learning literature is that it provides the learner with information about his or her performance relative to the task goal (Pearson, 2016). The Normative Theory of Causal Reasoning was pioneered by Galileo who fully controlled experiments which lasted for almost 400 years until Sir Ronald Fisher’s (1935) famous work on experimental design made a real headway made on the statistical problem of causal discovery. Fisher’s work, like Galileo’s, was confined to experimental settings in which treatment could be

assigned. In Galileo's case, however, all the variables in a system could be perfectly controlled, and the treatment could thus be isolated and made to be the only quantity varying in a given experiment. In agricultural or biological experiments, however, it is not possible to control all the quantities, e.g., the genetic and environmental history of each person. Fisher's technique of randomization not only solved this problem, but also produced a reference distribution against which experimental results could be compared statistically. His work is still the statistical foundation of most modern medical research. Representing Causal Systems: Causal Bayes Nets (CBNs), Wright (1934) then pioneered representing causal systems as "path diagrams" in the 1920s and 1930s (Wright, 1934). However, until about the middle of the 20th century, the entire topic of how causal claims can or cannot be discovered from data collected in non-experimental studies was largely written off as hopeless. Simon (1954) and Blalock (1961) made major inroads, but gave no general theory. In the mid-1980s, however, artificial intelligence researchers, philosophers, statisticians and epidemiologists began to make real headway on a rigorous theory of causal discovery from non-experimental as well as experimental data.

Like Fisher's statistical work on experiments, CBNs seek to model the relations among a set of random variables, such as an individual's level of education or annual income. Alternative approaches aim to model the causes of individual events, for example the cause(s) of the space shuttle Challenger disaster. We confine our attention to relations among variables. If we are instead concerned with a system in which certain types of events cause other types of events, we represent the occurrence or nonoccurrence of the events by binary variables. For example, if a blue light bulb going on is followed by a red light bulb going on, we use the variables Red Light Bulb [lit, not lit] and Blue Light Bulb [lit, not lit]. Any approach that models the statistical relations among a set of variables must first confront what we call the ontological problem: how do we get from a messy and complicated world to a coherent and meaningful set of variables that might plausibly be related either statistically or causally? For example, it is reasonable to examine the association between the number of years of education and the number of dollars spent yearly. For instance, Spirtes, Glymour and Scheines (2000), Pearl (2000)

and Glymour and Cooper (1999) explained that income of a middle aged man in Western Pennsylvania makes no sense to examine the average level of education for the aggregate of people in a state like Pennsylvania and compare it to the level of income for individual residents of New York. It also does not make sense to posit a "variable" whose range of values is not exclusive for example having blond hair, curly hair, etc. After teaching causal reasoning to hundreds of students over almost a decade, the ontological problem seems the most difficult to teach and the most difficult for students to learn. We need to study it much more thoroughly, but for the present investigation, we will simply assume it has been solved for a particular learning problem.

Humans often attempt to influence one another's behavior by using rewards and punishment. On the other hand, psychologists have often assumed that ''evaluative feedback" influences behaviour via standard learning mechanisms that are learnt from environmental contingencies. This is important for mathematics teachers to consistently give feedback to learners on the tasks that are given to them. In addition, teaching with evaluative feedback involves leveraging learning systems designed to maximize an organism's positive outcomes.

The logic of evaluative feedback shows that specialized learning mechanisms are uniquely favoured in the case of evaluative feedback from a social partner. Specifically, evaluative feedback works best when it is treated as communicating information about the value of an action rather than as a form of reward to be maximized. This account suggests that human learning from evaluative feedback depends on inferences about communicative intent, goals and other mental states — much like learning from other sources, such as demonstration, observation and instruction (Pearson, 2016). After the mathematics teacher has given work to the learners, s/he must mark the work and within reasonable time limit, as feedback from the marked work must be given to the learners.

The main focus of normative theories which apparently impact on learners' performance include methods used to teach. The method a teacher uses in a classroom has much influence on the performance of the learners by taking into consideration the

selection of teaching strategies, utilisation of instructional resources and selection of learning experiences (Lederman, Lederman, Bartos, Bartels, Meyer, & Schwartz, 2014).

Regarding assessment of learners after effective teaching, the learners must be assessed in different ways to ensure that learning has taken place. Assessment helps to know the cognitive levels of the learner and thus, gives much information on how to assist weak learners (Williams, 2016).

Feedback about task performance reflects on successful performance, while ignoring less successful attempts that benefit learning. Feedback after good trials has also been found to increase perceptions of competence. The conviction that one is doing well, and the confidence in being able to perform well in the future, or their correlates such as positive affect, are conditions consistent with optimal performance, and learning (Badami, VaezMousavi, Wulf, & Namazizadeh, 2011).

In this study therefore, the researcher in relation to learners' performance, adopted normative theory. Below is further review of related literature in various sub-headings.

2.3 PRIMARY FACTORS AFFECTING PERFORMANCE IN MATHEMATICS

2.3.1 Introduction

The performance of learners in mathematics is dependent on the factors employed by the three main parties in education which are the teacher, learner and the parent. These factors have direct impact on learners' good or poor academic performance. It is imperative that the main factors that affect learners' performance positively or negatively are ascertained and addressed constructively to harness good academic performance in mathematics. The primary factors that affect performance of learners in mathematics are expatiated subsequently in the study.

2.3.2 Lack of teaching professionalism in mathematics

In all over the world, professionalism is vital in every profession most especially in the teaching field where all professionals are produced. Creasy (2015) agrees with other scholars that educators are expected to develop the characteristics of a professional and model professionalism every day. The definition of "professionalism," the definition would probably include examples of what is commonly considered professional-like behaviour. In teacher education literature, most of these definitions confirm that a professional demonstrates behaviors which portray the knowledge and skills of the profession. Thus, professionalism is an ideal to which individuals and occupational groups aspire, in order to distinguish themselves from other workers. Helbling and Lubeck (2008:603) added that a professional also "exercises discretion in making decisions within the scope of their expertise, and they assume some authority for their own professional development". Regardless of the lack of a universally accepted professionalism definition, what is consistent in the relevant literature is that professionals are expected to have specific knowledge which they utilize to make sound judgments, specialized training, characteristics that are unique to their field, and standards to which they are accountable.

Ryan and Bourke (2013) argue that educators have been receiving declining support, tighter controls, shrinking budgets, intensified workload and standardization. Again, they are under increasing pressure from politicians and the community to be more accountable and to maintain standards. Over the past decade, their positions have been further weakened by curriculum prescription, testing regimes, performance management, a casual workforce, new standards of professionalism, increased monitoring and appraisal systems as well as the continued 'discourses of derision' (Thomas, 2011). The complexity of such political agendas, along with the already difficult tasks of understanding and applying a plethora of educational theories and approaches, catering for diverse student groups, and implementing new curricula, can create an overwhelming space for teachers to inhabit. Leaton Gray & Whitty (2010) argue that reflexivity is an essential element of teacher professionalism so teachers can

mediate the diverse conditions within which they work. They further emphasized that teachers are discursively repositioned as non-experts, the last in the line of a management hierarchy with central office at the top descending to regional offices and then to school principals. Educational decisions are made elsewhere and it is up to the teacher to work effectively and efficiently in a standardized accountable environment. Managerialism sees teachers as unquestioning supporters and implementers of a competency-based, outcome-oriented pedagogy related to the world of work. Ingvarson (2010) claims that Australia is at an 'unprecedented level of agreement about the need to implement a standards-based system for recognizing highly accomplished teachers and lead teachers' (p. 59).

In South Africa, teachers often stand accused of neglecting their professional responsibilities, as stipulated in the Norms and Standards policy of the Department of Basic Education (Department of Education, 2011). Davids (2014) concurred that teachers are becoming frustrated because of the pressure mounted on them to achieve targets. This makes them compromise their professional standards. Absenteeism, corporal punishment, lack of adequate preparation in class, sexual harassment and many other unprofessional acts by teachers impact negatively on learners' performance. Msibi and Mchunu (2013) agreed that the current educational sector is inundated with complaints of unprofessional teacher behaviour which seriously affect learners' performance.

2.3.3 Lack of financial support of the learners

Money plays important role in schools, be it private or public schools. The cost of education is not only borne by the government, but also by parents (or carers/guardians) whether indirectly through taxes or directly through personal expenditure to support the day-to-day schooling activities. Hassan and Rasiah (2017) asserted that in Malaysia and many parts of the world, parents have to meet a number of costs in order to educate their children. These include school fees, school uniform, books and equipment, pocket money for meals, school trips and other charges. While many of these are quite standard as they are determined by the schools and usually

with the support of Parent-Teacher's Associations and the government, there are also expenditures which may vary widely among students, such as extra reading materials and tuition. Poor parents who cannot provide basic assistance such as transport fares, food and school uniforms (even when school fees and other costs have been paid by the government or Parents-Teacher's Association) become helpless in realising the academic dreams of their children (Graven, 2014).

South Africa, being the giant on the continent of Africa, is still saddled with lack of funds to ensure good quality education for its citizens. Since poverty affects more than half of the learners, education studies tend to focus on the poorest (but largest) socioeconomic status (SES) group. As with international research, Pais & Valero (2012) explain that mathematics education data linking SES and performance is found within broader education research driven by national societal and economic concerns. Ramala (2009) observes that poverty has spatial, racial, and gender dimensions. The high poverty levels among the rural black communities in South Africa are largely due to high illiteracy and unemployment. This eventually affects the academic performance of their children in school. Large-scale national researches on the issue have been done. Examples are: the Department of Education's systemic evaluations in 2001 and 2007 (DBE 2008); SA's data gathered within TIMMS; the Organization for Economic Co-operation and Development (OECD) (2008); the Development Bank of South Africa's (DBSA) (2009) Education Roadmap: Focus on the schooling system; and more recently the National Planning Commission's (NPC's) (2011) Diagnostic Overview. To cite only a selection of poverty statistics, the OECD (2008) report outlines that in 2003: 24 % of children were often or sometimes went hungry; HIV-prevalence amongst children is around 5.6 %; 12.7 % of educators are HIV-positive; 3 % of children had no parents; 6 % of children live an hour or more away from a school (Graven, 2013).

2.3.4 Inconsistency of government policies

There have been some educational policies which were intended to promote teaching and learning of mathematics in both the primary and the secondary schools in South Africa but over the years these policies have not achieved the intended purposes. One of the well-known policies is on over-age learners which Burgerm, Berg and Fintel

(2015) stressed the South African Department of Education implemented that was meant to reduce the large number of over-age learners in the school system. Schools were no longer allowed to accept students who were more than two years older than the correct Grade-age, and students could not be held back more than once in each of four schooling phases. In their analysis, they used school administrative data and household survey data to show that these policies coincided with a decrease in school enrolment of at least 400,000 and possibly more than 900,000 learners. The policies impact negatively on slow learners who are forced to progress to the next grade and are not fully prepared for the grade. Additionally, the learners' performance in mathematics in primary schools is attributed to the large number of under qualified teachers employed to teach mathematics in poorly equipped classrooms. For instance, The Education For All (EFA) assessment (2005) reported that, in spite of approximately 85% of mathematics educators being professionally qualified, only 50% have specialized in mathematics in their training (DoE, 2001a). The mathematics audit report revealed that more than 50% of mathematics educators have had no formal subject training. Studies have shown that teachers with certification in mathematics are more likely to be passionate and committed about teaching mathematics than those without certification. However, those without certification vary in their commitment to the profession depending on coursework preparations (Laturner, 2002). In addition, teachers are not given in-service training to equip them with the modern trends of teaching mathematics. This adversely affects the performance of the learners.

2.3.5 Teacher turnover rate

In recent times, teacher turnover has been increasing and impacting adversely on learners' performance. Almost all developed and under–developed countries are saddled with the high rate of teacher turnover due to many reasons such as salaries, job security, difficult subjects, government policies, working health hazards etc.

Adnot, Dee, Katz and Wyckoff (2017) argue that having an effective teacher can dramatically alter students' educational and economic outcomes. Salaries remain one of the main reasons for teachers' high turnover rate. Schools that pay teachers well also

perform well. In some urban areas less effective teachers are often concentrated in lower-performing schools where salaries or resources are low which becomes disadvantage to students. Policymakers and researchers recognized these issues and have sought policies to provide all children with effective teachers. The selective retention of effective teachers has been one of the most-discussed strategies that may contribute to this goal. In theory, districts could dismiss ineffective teachers, hire more effective teachers and redouble efforts to retain effective teachers in these schools. However, we know relatively little about how such policies would work in practice. In particular, the capacity of districts to identify effective teachers at the hiring stage is limited (Jackson, Rockoff & Staiger, 2014). Furthermore, research and practice have only recently begun making progress on accurately and reliably assessing teacher effectiveness. Some simulations (Staiger & Rockoff, 2010) estimate that dismissal of the least effective teachers would dramatically improve student achievement. However, these simulations make assumptions regarding the retention of more effective teachers and the labour supply of new teachers. For example, if teacher evaluation and dismissal policies cause more effective teachers to feel that their jobs are threatened, such policies may have the unintended consequence of actually lowering teacher quality (Rothstein, 2015). The ultimate outcome depends on the details of the policy, the behavioral response of teachers, and the characteristics of the local labor market from which new teachers are hired.

Some school districts have begun to implement rigorous teacher-evaluation policies that could systematically dismiss meaningful numbers of ineffective teachers (Thomsen, 2014). However, we are unaware of any research that documents how the patterns of teacher turnover created by such policies (i.e., the attrition of teachers sanctioned for low performance, other teachers choosing to leave, and the hiring of new teachers) and the influence on student achievement.

In South Africa, teacher or educator turnover is one of the greatest challenges that the Department of Education is facing. In spite of numerous strategic interventions by the Department of Basic education to retain educators in the profession, there continues to be a high number of educators leaving the profession. This attrition of skilled personnel

has had an adverse effect on the capacity of the state to realize its millennium development goals. This goal involves with the achievement of the universal primary education by 2014. A key focus of the South African government strategic objective is to ensure that the country has skilled expertise in various fields i.e. commerce, education, industry, science and technology etc. This goal can only be achieved in an environment of sustained investment in human capital development by the government. In the arena of education, a significant contribution of the country's focus has been directed to teacher development (Mampane, 2012). Despite these gargantuan efforts on the part of government, there continues to be a brain drain with high educator turnover. A tacit indication of this massive investment in education is the fact that of the R165 billion budgeted for education, R2.7 billion has been earmarked for teacher development. This clearly points out to the strategic importance of leadership and human capital development as critical areas for broad human resource development goals of the state (Keisant, Lewis, Potter & Meissels, 2007).

2.3.6 Language and communication barriers

Language is the basic tool for effective communication and in schools, teaching and learning of mathematics takes place orally in the form of language. Teachers who teach in a language that is not the home language sometimes struggle to effectively explain Mathematics concepts for the learners to understand. However, it is only few teachers who cannot express themselves in the language they teach. The main challenge is the learner who is studying using a second language medium of instruction. Even learners who are great achievers are not able to give their best because of communication barriers.

Hallberg (2010) explained that students who are studying in a second language face many challenges because they are not able to give their best because of the language used. For instance all foreign students whose languages are different from the Catalan language, a language with Latin roots have academic challenges especially in mathematics where each step that is taught needs a clear and precise explanation. The official language of instruction in Catalan schools is Catalan, but all Catalan people can

speak Spanish language depending on their preferences, mainly related to their social context.

There is a challenge for second language learners to understand what they have been taught which leads to low expectations in their academic work. The medium of instruction in most rural schools in South Africa is the home language. However, learning materials are in the First Additional Languages which are English and Afrikaans. Learners are therefore faced with the challenge of understanding the concept of mathematics in this regard. (Education White Paper 2001, 6:19). The United Nations Educational, Scientific and Cultural Organization (UNESCO) (2008) conducted research across 26 countries that showed that over 50 percent of students who dropped out of school did not speak the language in which they were being educated.

2.3.7 Attitudinal barriers

Many people in the society who are stakeholders in education such as educators, learners and the community lack awareness of discrimination tendencies against learners with disabilities which poses a challenge that kills their confidence. In South Africa, it is common to see a segregated education system and most educators and learners lack the exposure to people with disabilities.

Inclusive education was an agenda item in 1994 at the United Nations Educational, Scientific and Cultural Organization (UNESCO) Salamanca Conference (UNESCO, 1994). The Salamanca Statement on inclusive education is one of the most significant international documents in the area of special needs (UNESCO, 2004 as cited in Shadaya (2012:2). It states that every child has a fundamental right to education and must be given the opportunity to achieve and maintain an acceptable level of learning. Thus, the education system should be designed and educational programmes implemented to take into account the wide diversity of the characteristics and needs of children (UNESCO, 1994).

The UN Standard Rules on the Equalization of Opportunities for Persons with Disability (1993) affirms the equal rights to education for all children, youth and adults with disability, and states that education should be provided in an integrated school setting and in the general school setting. Article 2 of the Convention on the Rights of the Child (1989) affirms the right of children not to be discriminated against while article 23 of the same instrument states that: “Children with disabilities should have effective access to receive education, training, health care services, rehabilitation services, preparation for employment and recreation opportunities in a manner conducive to the child’s achieving the fullest possible social integration and individual development, including his/ her cultural and spiritual development” (UNESCO, 2004:21).

All children have potential, and that all respond differently as learners. Within an inclusive education system, it is recognized that children enter the formal educational environment with different levels of learning experience, different cognitive abilities, and different prior exposure to knowledge and, that they need to be supported in different ways to achieve their full potential. Using differentiated learning as an underpinning philosophy to support learners is one way to uphold values of inclusive education. Differentiated learning philosophies, in essence, acknowledge that each child is unique. Since most classrooms have mixed-ability groups, it is necessary that a variety of methods and avenues are used to ensure that learning takes place (Tomlinson, 2003).

In countries where educational programs are ‘inclusive’ or based on the ‘no child left behind’ premise, what tends to happen is a focus on remediation or on lowering standards to accommodate the most basic levels of cognitive ability within the classroom. Often, the needs of the child with high ability and/or potential are not fully accommodated in these classrooms. In inclusive education discourses, support often revolves around assisting teachers to cater for the needs of children with barriers to learning (Forlin, 2010). In fact, misunderstandings about differentiation - that it is a form of scaffolding for struggling learners rather than a method of meeting the unique needs of all levels of learners (Hertberg-Davis, 2009) and hence can actually contribute not

only to making a differentiated classroom less interesting to high potential children, but also to making such children invisible.

Research into ‘giftedness’ indicates that “all pupils have a right to a broad and balanced curriculum that allows them the opportunities to reach their potential” (Bates & Munday, 2005: 15). This suggests that high potential and/or gifted children ought to be catered for in an inclusive educational environment. Differentiation, understood from this perspective, is one way to cater for the unique needs of each child. In South Africa, in July 2001, the National Department of Education released the White Paper 6, which underpins the notion of inclusive education in this country. It states that the needs of all children should be catered for within the educational framework and proposes that “the central objective of this White Paper is to extend the policy foundations, frameworks and programmes of existing policy for all bands of education and training so that our education and training system will recognize and accommodate the diverse range of learning needs” (Tomlinson, 2003; 2005; Sousa & Tomlinson, 2011; Department of Education, 2001:27).

The details contained within the paper, although specifically mentioning disabled or impaired learners, are aimed at an education system that is inclusive at both the low- and high-ability ranges of the learning spectrum. The values that the White Paper espouses, such as “accepting and respecting the fact that all learners are different in some way and have different learning needs which are equally valued and an ordinary part of our human experience” and “enabling education structures, systems and learning methodologies to meet the needs of all learners” (Department of Education, 2001:19), indicate that the potential of all children ought to be accommodated and supported within the South African educational framework.

2.4 CONTENT KNOWLEDGE AND PLANNING IN MATHEMATICS

2.4.1 Teachers' content knowledge and teaching skills

Content knowledge (CK) is the driving force that teachers use to enhance better understanding to learners. A teacher must develop much knowledge concerning the content to be taught. Tay, Lim and Ho (2017) in their study on preparing mathematics teachers in Singapore, discovered that some teachers "do not teach mathematics" but that they "teach children". This was wrongly used and downplays the importance of a subject matter in the education of a child. We should be "teaching mathematics to children". To this end, any self-respecting and child-respecting teacher should never short-change children by being deficient in the CK that he / she is supposed to develop in the child. Furthermore, the International Association for the Evaluation of Educational Achievement (IEA) conducted the Teacher Education Study in Mathematics (TEDS-M) in 2012 in 17 countries to provide data on the knowledge that primary and lower-secondary school teachers acquire during their mathematics teacher education. Mathematics learning has a distinct character, thereby reflecting the developmental and educational needs of different age groups. For teachers, this structure has meant that different types of preparation are required to teach each level. Most elementary teachers are prepared to teach all subjects, while teachers in other places are prepared as specialists in a particular content area.

In Sub-Saharan Africa, teachers have a huge task in improving the scholastic outcomes of students who come from different social backgrounds. Spall and Kotze (2015) confirmed that the average performance of mathematics in African countries appears much poorer than elsewhere in the world (Educ Stud Math, 2015). For instance, five African countries namely; South Africa, Botswana, Ghana, Morocco, and Tunisia that participated in the Trends in International Mathematics and Science Study in 2003 were ranked in the last seven of the 45 participating countries (Kastberg, Roey, Williams & Gonzales, 2006). However, it is notable that there exist wide variations in the quality of Education within African countries which underlines the need to consider the situation at the country level. One way of improving the quality of education is through quality

teaching and empowering teachers with the required content knowledge to teach a subject like mathematics.

Wright (2017) argues that excellence in teaching should be the primary focus of all teacher preparation institutions. The training of teacher candidates is critical to the success of schools. Darling-Hammond (2010a) noted that “the traditional elements of the profession are formal preparation, licensure, certification, and accreditation” (p. 36). Monroe, Blackwell and Pepper (2010) maintain that “teacher education programs have the task of developing thoughtful and socially progressive educators who can teach effectively” (p. 1). Research documents the importance of teacher preparation in other countries such as South Korea, Finland and China, where top high school candidates are chosen to attend universities, where they are trained in theory, as well as pedagogical practices. However, American colleges and universities are under attack because of student achievement concerns.

Currently, with four million teachers in the United States, teaching is the largest profession that continues to grow in order to address the high attrition rate, teacher shortage and prepare students for a complex and changing world. The question of how to produce the most effective teachers continues to have dialogic tension among educators and policy makers. “Curriculum development, assessment, and differentiated instruction” are being strengthened to increase the effectiveness of teacher preparation programs and keep teachers in the field (Scherer, 2012:18). Darling-Hammond, Powell (2015:27) state that “substantial research evidence suggests that well-prepared teachers have the largest impact on student learning”.

2.4.2 Impact of teacher qualification on mathematics performance

Qualifications as in every field are very important. They show that the person has been trained and, therefore, gives assurance to people that whatever service to be rendered will be undoubtedly a good one. Berry, Depaepe and van Driel (2016) aver that even though there are debates on how to define a qualified teacher, teachers with qualifications mostly have a grasp on the subject matter and this has been long considered an important influence on teaching and learning.

There is growing interest in the professional development of educators as the demands, expectations, and requirements of teacher education increasingly come under scrutiny (Louhran, 2014). What the teacher does influences the whole process of learning. Effective teachers mostly have qualifications and produce better performing students (Akiri, 2013). Curwood (2014) argues that professional development of teachers can be effective and sustainable, if certain conditions are met. Koster, Bouwer and van den Bergh (2017) suggested that the implementation of educational reforms, including reforms associated with technology integration and literacy education, are often dependent upon teachers' skills, values, and cultural models, which means hiring of qualified teachers is encouraged for improvement of academic performance.

Unanma and Unanma (2013) examined the relationship between teachers' academic qualifications and academic achievement of Senior Secondary school students in mathematics and discovered that there is a positive relationship between the variables. Lopes, Boyd, Andrew and Pereira (2014) discovered that improvement in teacher qualifications, especially among the poorest schools, appeared to have resulted in improved student achievement.

2.4.3 Teachers' preparedness in the classroom

The classroom is a world on its own. Therefore, teachers should plan effectively to ensure success of the learners with various challenges in the classroom. Learners have different educational needs or challenges which call for teachers to apply their planning tailored to the needs of the learners. Dunn, Craig, Favre, Markus, Pedota, Sookdeo, Stock and Terry (2010) emphasize that educators talk about differentiated instruction, individualization, multiple intelligences, and responding to learners' learning styles, but how many teachers actually implement these instructional strategies to any extent? We know of one school district which is Lakeland in Westchester County, New York, in which more than half of the teachers and administrators have undergone intensive staff development concerning how to differentiate and individualize teaching through students' learning style strengths. We know of many international schools in which students' learning styles have been identified where teachers are making excellent

strides toward wide-scale implementation (Dunn & Dunn 2008; Dunn, Honigs feld, & Shea Doolan, 2009).

In the field of education, general lesson plans are used to guide a teacher's classroom instruction. In public schools or government-funded education programs, a State department defines the standards and curriculum guidelines to be followed. At the next level down in the education system, the local administration/board of education specifies age appropriate curriculum and particulars that meet the State's minimum standard guidelines. Each teacher then creates lesson plans that satisfy the curriculum set forth by the local administration (Dunn, Craig, Favre, Markus, Pedota, Sookdeo, Stock, & Terry 2010). In specialized school programs, lesson plans need to be customized per student, and if the school program is federally funded, lesson plans need to meet governmental requirements in terms of curriculum standards.

2.4.4 The classroom management of the teacher

Teaching can be a daunting endeavor—for both experts and novice teachers. It is a profession that requires the ability to be responsive to new demands and changing needs. The management of the classroom becomes a good platform for content to be taught and for the effective implementation of the lesson plan. Allen (2010) reveales that in recent years, school reforms promoting high-stakes testing in the name of improving academic achievement have dominated the list of problems demanding consideration. However, there are other problems that also demand attention—for example, bullying. Although not a new problem, attention to bullying was limited until the events at Columbine High School in April, 1999. In recent years, research has implicated teasing, harassment, and bullying in a number of the targeted school shootings that have taken place in the United States (Vossekuil, Fein, Reddy, Borum, & Modzeleski, 2002). Data indicate that bullying is embedded in a larger problem of school violence. There is another perhaps related issue that has received less attention but is nevertheless a concern for educators: classroom management. Research over the past few decades has consistently indicated that new teachers feel unprepared when it comes to classroom management skills (Duck, 2007) and that they are often unprepared to

function successfully in today's classrooms with regard to managing administrative tasks, curriculum, and behaviour problems (Bauman & Del Rio, 2006; Kirkpatrick, Lincoln, & Morrow, 2006).

Additionally, it is a well-established fact that student misbehavior is a factor in teacher burnout and the decision of novice teachers to leave the profession (Public Agenda, 2004). It seems that the need for successful classroom management skills has not diminished during a time when school reform has put the spotlight on academic testing and student achievement. Thus, it is important to ask the following questions: What is the nature of bullying in the classroom? How is it manifested? Is there a connection between school bullying in the Kathleen P. Allen The Professional Educator classroom and classroom management? If so, what is it? Would it be beneficial to consider these two issues together? How do teachers learn classroom management skills? How do they learn about bullying? When and where does learning about these two issues intersect?

Through a review of research literature related to bullying in the school environment, the purpose of this section is to explore the relationships between classroom bullying, classroom management, and teacher practices. One of the main challenges facing South African schools with the management of the classroom is overcrowded classrooms especially in the government schools. Marais (2016) argued that the effects of overcrowded classrooms are far-reaching for teachers and learners. Many parents base their decision on whether to send their child to a particular school on the prospective number of learners in the child's classroom (Mustafa, Mahmoud, Assaf, Al-Hamadi & Abdulhamid, 2014:178). All teacher training institutions ought to ascertain whether they offer appropriate teacher training programmes that will enable student teachers to deal with the numerous demands associated with the teaching profession, among others, teaching in overcrowded classrooms.

2.5 EFFECTS OF TEACHERS'S MOTIVATION ON MATHEMATICS PERFORMANCE

2.5.1 Teachers' motivation on the educational system

Work motivation of teachers is an important concept. The strength of an educational system largely depends upon attracting and maintaining high quality teachers. Defining motivation is a major issue due to the fact that the term itself has no specific meaning in contemporary psychology. Motives are sometimes defined as needs, wants, drives, or impulses within the individual. The same levels of motives may be directed either toward goals that may either be conscious or subconscious to an individual. The definition of motivation may include other concepts, such as drive, need, incentive, reward, reinforcement, goal setting, and expectancy (Kocabas, 2009).

Bareket (2008) argues that teachers in the low-Socio Economic Status (SES) schools are motivated by growth opportunities and relationships with principals, colleagues, and students. Bogler and Nir (2012) aver that the best teachers cite intrinsic rewards as the factors that make teaching rewarding for them. Only when these intrinsic factors are diminished do extrinsic concerns like salary and working conditions become truly significant. Studies have shown that although financial incentives can promote specific behaviours and direct teachers' efforts toward measurable goals, they are less promising as tools to improve general teaching performance. When there is a good system (policies, materials, recognition of efforts etc.) mathematics teachers are able to express themselves in teaching the subject with joy because they have what it takes to make the learners understand. This contributes to the motivation and satisfaction of teachers. The expectations and demands of educational accountability continue to be factors that influence the self-perceptions of teachers' effectiveness and desire to teach. Motivated teachers feel that they can help students learn, put extra time to instructional planning, and work with students to ensure that learning and mastery of knowledge and skills are achieved. When motivation declines, other educational outcomes also suffer (Mohseni Takaloo & Ahmadi, 2017).

2.5.2 Teachers' motivation in relation to condition of service

Motivation is a very useful tool to achieve productivity. In the teaching field, most especially mathematics which is perceived by many to be a challenging subject, there should be some considerable form of motivation to encourage the teachers to go an extra mile in order to achieve the needed results.

In a study by Nyam and West (2014) it was found that teachers and other school workers tend to remain contented and reasonably motivated as long as salaries are paid on time and they are promoted regularly. Earlier, Eton (1984) identified the payment of salaries, allowances and promotion as the key factors that shape teachers' attitude towards their work. As a direct implication of these aforesaid findings, it is arguably true that prompt payment of salaries induces a direct commitment to teaching. However, there is no widespread agreement on the extent to which financial inducement motivates teachers. This prompts us to infer that prompt payment of salaries, allowances and promotion are desirable incentives to boost teachers' motivation. According to Youlonfoun (1992), good salaries and their prompt payment are important motivating factors. Nevertheless, there is evidence that other factors can undermine the job commitment.

However, other recent studies have proven otherwise. There is extensive evidence that teachers regard professional efficacy, not money, as the primary motivator in their work, and there is some evidence that the prospect of extrinsic rewards may diminish the potency of intrinsic rewards for them (Klassen & Chiu, 2010). One of such factors is the disparity that exists between the teaching profession and other professions. For example, the working conditions that surround the teaching profession portray the face value assigned to the profession. A typical example is the impoverished working environment teachers in the developing countries find themselves in. In such an environment, even if a teacher has an intrinsic motivation, (possibly) in a short term, the crisis associated with job satisfaction would adversely influence teacher motivation. Akuoko, Dwumah and Baba (2012) outlined two types of motivation. The first is intrinsic motivation, which entails self-generated factors that influence people to behave in a

particular way or to move in a particular direction. These factors include responsibility (feeling that the work is important and having control over one's resources), autonomy (freedom to act), scope to use and develop skills and abilities, interesting and challenging work and opportunities for advancement (Armstrong, 2007). The second is extrinsic motivation relates to what is done to or for people to motivate them. These include rewards such as increased pay, praise, or promotion, and punishment, such as disciplinary action, withholding pay or criticism, (Armstrong, 2007). The latter is also influenced by external factors such as salary, providing better working and living conditions and opportunities for in-service training.

There are several theories of motivation which can be applied to studies on teacher motivation. Content theory assumes that all individuals possess the same set of needs and therefore prescribe the characteristics that ought to be present in jobs. In other words, it states that motivation is essentially about taking action to satisfy needs, and identifies the main needs that influence behaviour (Armstrong, 2007). Process theory focuses on psychological processes which affect motivation, with reference to expectations (Vroom, 1964 cited in Bennell & Akyeampong, 2007), goals (Latham & Locke, 1979 in Huczynski & Buchanan, 2001) and perception of equity.

Teacher motivation could, therefore, be referred to as those factors that operate within the school system which if not made available to the teacher, could hamper performance, cause stress, discontentment and frustration, all of which would subsequently reduce classroom effectiveness and student quality output. This implies that teacher motivation includes factors that cause, channel, sustain and influence teachers' behaviour towards high management and academic achievement standards in schools (Ofoegbu, 2004).

2.5.3 Teachers' motivation in relation to the school environment

The school environment is vital in sustaining and motivating teachers because it determines the safety of the school, congeniality of teaching learners, sanitation, availability of resources to make teaching interesting etc. Many teachers are well able to manage stress because of the good environment of the school, but the other teachers

who are not satisfied with the school environment remain stressed out or burnout. For instance Fernet, Guay, Senécal and Austin (2012) reveal that in Canada, and more particularly, in the province of Quebec where the current data suggest that from 12% to 20% of teachers report burnout symptoms at least once a week (Fernet, 2003; Houlfort & Sauvé, 2010). To prevent teacher burnout, researchers have investigated a variety of causes. So far, the work environment has been considered the main determinant of burnout (Maslach, 2001). For instance the job demands-resources (JD-R) model (Demerouti, Bakker, Nachreiner & Schaufeli, 2001; Schaufeli & Bakker, 2004) emphasizes two sets of workplace factors: job demands and resources. At school, job demands include several aspects such as work overload, role problems, deficient equipment, school policies and climate, interpersonal conflicts, and students' behavioural problems. Job resources include administrative leadership, flexible schedules, decision latitude, skill utilization, participation in decision-making, recognition, professional development, coaching, and support from colleagues, among others (see Byrne, 1999; Rudow, 1999). At the heart of Self Determination Theory (SDT) is the assumption that environmental factors are critical because they can facilitate or thwart motivational factors, which, in turn, influence individual psychological functioning.

SDT-based research has thus devoted considerable attention on the workplace factors that can affect employee motivation (Gagné & Deci, 2005). Different aspects of the school or classroom environment may be considered as either autonomy-supportive or controlling (Ryan & Deci, 2000). Autonomy-supportive conditions allow teachers to make certain choices and decisions about their work and develop a meaningful rationale. They also minimize pressure, provide competence feedback, and acknowledge teachers' feelings and views (Deci, Eghrari, Patrick & Leone, 1994). These conditions parallel job resources, because they are thought to be functional in achieving work goals (Schaufeli & Bakker, 2004) and they allow the satisfaction of basic psychological needs such as autonomy, competence, and relatedness (Ryan & Deci, 2000). Conversely, controlling factors such as imposed goals, time constraints, or contingent rewards, constrain and put pressure on how teachers think, feel and behave.

Such conditions preclude energy investment and may become job stressors. It is important to recognize that these assumptions share some similarities with the JD-R model. Relying on environmental factors, this model posits that burnout is mainly the result of deleterious working conditions. The main proposition is that job demands and resources imply two distinct processes that may result in burnout. First, there is the energetic process whereby demanding aspects of the job drain the employee's energy, leading to exhaustion. Second, there is a motivational process whereby a lack of job resources hampers employee motivation and contributes to depersonalization and reduced personal accomplishment (Bakker, Demerouti, Taris, Schaufeli & Schreurs, 2003).

Despite growing evidence in support of this model, some studies also suggest that job resources are involved in the energetic process and job demands in the motivational process (Lee & Ashforth, 1996). For instance, in a sub-sample of health care employees, Bakker (2003) found that job resources were related to emotional exhaustion in addition to de-personalization and personal accomplishment. Results also showed that job demands were related to personal accomplishment. In addition, Van den Broeck, Vansteenkiste, De Witte and Lens (2008) demonstrated that psychological needs satisfaction as indexed by competence, autonomy, and relatedness play a partial mediating role between job demands and emotional exhaustion and act as mediators between job resources and exhaustion. Other studies have shown that both job demands and resources are related to energy depletion (Crawford, LePine & Rich, 2010; Hakanen, 2006).

The school environment must be creative enough to encourage learners to exhibit their mathematical talents. Language plays a major role in concept development in mathematics. In South Africa, mathematics is taught in the second language which serves as an impediment to the learners who cannot read and write English or Afrikaans. This affects the performance of the learners because they find it difficult to understand and express their mathematical knowledge in the second language. In addition, research has found that there have been reported cases of violence at some

schools in South Africa and this makes learners feel unsafe and so they absent themselves from school (DoE, 2002).

2.6 EFFECTS OF LEARNERS'S MOTIVATION ON MATHEMATICS PERFORMANCE

2.6.1 Learners' motivation on the educational system

Motivation is an internal condition that stimulates, directx and maintains behavior to achieve a targeted goal or objective. Awan, Noureen and Naz (2011:72) aver that lack of motivation is "a big hurdle in learning and a pertinent cause in the deterioration of education standards."

Awan, Noureen and Naz (2011) as cited by Sikhwari (2014) claim that students who are motivated to learn about a topic are keen to engage in activities they believe will help them learn. These attributes includes: attending carefully to the instruction, taking notes to facilitate subsequent studying, checking their level of understanding and asking for help when they do not understand the material. Ball, Bowling and Bird (2016) stress that motivation is an important quality that pervades all aspects of teaching and learning. Motivated students display an interest in activities, feel self-efficacious, expend efforts to succeed, persist at tasks, and typically use effective task, cognitive, and self-regulatory strategies to learn. Teachers must not only impart knowledge and teach skills, but also establish a motivating environment for learning.

Mohseni Takaloo and Ahmadi (2017) also affirm that without learners' motivation, there is no pulse and no life in the classroom. When learners learn to incorporate direct approaches to generate motivation in their learning, they will become happier and more successful learners. Gonzalez, Willems and Holbein (2005) and Wilder (2014) claimed that favourable variables such as time spent on homework and educational aspirations are all indicative of how much students value education and how motivated they are to succeed academically. Individuals with sufficient ability are likely to do better on intelligence tests when their motivation is high while those lower in ability are unlikely to perform well on intelligence tests even when highly motivated (Hill, Foster, Sofko, Elliott & Shelton, 2016).

2.6.2 Learners' motivation in relation to rewards

A good deal of attention had been given to the effect of rewards on motivation. Kohn (1993), for example, has conducted experimental studies which he interprets as showing that associating a particular behaviour with a reward decreases the likelihood of the behaviour being continued voluntarily if not again rewarded. Others have concluded from similar experimental studies that attention is narrowly focused on what is required to obtain the reward. The meta-analysis in a systematic review by Deci, Koestner and Ryan (1999) on 128 studies of the effects of extrinsic rewards on intrinsic motivation appear to show clearly that such rewards undermined intrinsic motivation across a wide range of activities, populations and types of reward.

However, the conclusions of Deci et al. (1999) have been challenged by Hidi (2000) who pointed out that these were drawn from studies that only related to activities that were interesting (as defined by the researcher), and excluded uninteresting tasks. There was also relatively short-term engagement of learners with the activities. In a separate analysis of a smaller number of uninteresting tasks, rewards did not reduce intrinsic motivation. Hidi and Harackiewicz (2000) argue that 'the effects of external rewards may depend on the complexity of the activity and the length of involvement. A combination of intrinsic rewards inherent in interesting activities and external rewards, particularly those that provide performance feedback, may be required to maintain individuals' engagement across complex and often difficult – perhaps painful – periods of learning' (ibid p. 159).

From their own review of research on the role of interests and goals on achievement Harackiewicz, Durik, Barron, Linnenbrink-Garcia and Tauer (2008) concluded that the dichotomy between intrinsic and extrinsic motivation is unhelpful and that it is time to seek 'optimal combinations'. This may be particularly necessary for students lacking interest and intrinsic motivation for academic studies. Ames (1992)'s review of the research on the impact of rewards in the context of summative classroom assessment supported the findings of Deci and Ryan, (1985), but added that other research shows that rewards can enhance achievement of goals when it is contingent on effort, on progress in relation to short-term goals or on 'meaningful aspects of performance.

2.6.3 Motivation of learners in relation to self–concept

Lack of motivation is one of the most critical factors affecting learning, especially in historically disadvantaged institutions of higher learning. Brown (1998) point out that the challenge in both lower and higher education has always been to stimulate, engender and enhance the motivation of those learners whose enthusiasm for learning is low. Pintrich and Schunk (2002) regarded motivation as an integral part of learning. Awan, Noureen and Naz (2011) are of the opinion that a lack of motivation is "a big hurdle in learning and a pertinent cause in the deterioration of education standards." Awan, Noureen and Naz (2011:72) defined motivation as an "internal condition that stimulates, directs and maintains behaviour" and they believe that there is a strong relationship between learning and motivation. Learners who are motivated to learn about a topic are keen to engage in activities they believe will help them learn, such as attending carefully to the instruction, taking notes to facilitate subsequent studying, checking their level of understanding and asking for help when they do not understand the material (Pintrich & Schunk, 2002).

In contrast, learners who are unmotivated to learn are not enthusiastic in their learning efforts. They may be inattentive during the lesson and not organize or revise the learning material. Note-taking may be done haphazardly or not at all. They may not monitor their level of understanding or ask for help when they do not understand what is being taught. According to Pintrich and Schunk (2002), motivation influences learning and performance and what students do and learn influence their motivation. It is assumed, however, that people differ in their need to achieve in situations that call for excellence (Muola, 2010). Gesinde, in Muola (2010), argues that the urge to achieve varies from one individual to the other. He adds that those who have high achievers as their role models in their early life experience would develop a high need for achievement, while those who have low achievers as their role models will hardly develop the need for achievement. According to Tella (2007), the issue of motivating learners is seen as an important aspect of effective learning. Fontana, in Tella (2007), argued that satisfactory school learning is unlikely to take place in the absence of sufficient motivation to learn. Self-concept according to Drew and Watkins (1998), self-

concept is a psychological construct which refers to a cluster of ideas and attitudes an individual holds about himself/herself. Mwamwenda and Kamla-Raj (2014) regard self-concept as a person's way of perceiving himself/herself and may either be positive or negative.

In the current study, academic self-concept is regarded as the main component of self-concept. Cokley (2000:149) defines academic self-concept as "attitudes, feelings and perceptions relative to one's intellectual or academic skills". The same author considers academic self-concept to be how a student views his/her academic ability when compared with other students. Students attach a lot of importance on academic ability, so that self-acceptance is based largely on cognitive abilities (Cokley 2000). A student with a negative academic self-concept, for example, might just avoid studying hard because he would regard the subject content as too difficult.

McCoach and Siegle (2003) pointed out that academic self-concept involves a description and an evaluation of one's perceived academic abilities and encompasses beliefs of self-worth associated with one's perceived academic competence. These authors state further that students compare their own performance with that of their classmates (an internal comparison). This implies that students' academic self-concepts are determined by their perceptions of their academic ability in an area as well as their assessment of their academic standing relative to their classmates (McCoach & Siegle, 2003). The same authors regard academic self-concept as a significant predictor of academic achievement. In an investigation of academic achievement in African-American learners (Cokley, 2000) found that there was a strong positive correlation between academic self-concept and academic scores. Chowdhury and Pati, in Awan, Noureen and Naz (2011:73) asserted that "self-concept plays a significant role in the educational process when a child is accepted, approved, respected and liked". According to Wang and Lin, in Awan, Noureen and Naz (2011), self-concept is seen as the general confidence that individuals feel about themselves and the levels of an individual's self-concept predicts the extent to which he or she is able to accomplish academic tasks successfully or unsuccessfully. They further argue that much of the earlier interest in self-concept versus achievement relationship stemmed from the belief

that academic self-concept had motivational functions and thus, changes in academic self-concept would lead to changes in subsequent academic achievement. Learners who are confident in mathematics perform well in examination.

2.7 THE ROLE OF PARENTS AND GOVERNMENT ON THE PERFORMANCE OF LEARNERS IN MATHEMATICS

2.7.1 Parents' role in the education of learners in Mathematics

Researchers have concluded that parental involvement generally benefits children's and adolescents' learning and academic success (Wang & Sheikh-Khalil, 2014). The impact of parental involvement on student academic achievement has been recognized by teachers, administrators, and policy-makers who consider parental involvement to be one of the integral parts of new educational reforms and initiatives. There was a meta-analysis that examined learners' results in relation to parental involvement which indicated that the relationship between parental involvement and academic achievement is positive, regardless of a definition of parental involvement or measure of achievement. Parental involvement is a powerful influence on educational outcomes of children, especially in Mathematics. Hill and Tyson (2009:40) state that "family-school relations and parental involvement in education have been identified as a way to close demographic gaps in achievement and maximize students' potential". Parents can model effective learning behaviors, reinforce productive choices, and help set future goals such as college attendance (Bergerson, 2009). Facilitation of parental involvement is beneficial to the schools as well as to the students; thus, many school counselors are increasing their outreach to parents (Bryan & Griffin, 2010).

The value of parental participation is widely accepted, but participation is difficult to promote and maintain. Schools are becoming more diverse, and a great challenge facing educators is meeting the needs of all students. Closing the achievement gap and increasing student learning requires the collaboration of various interested groups, most notably parents. Families play an important role in creating a school that meets their

children's needs, yet teachers admit that they have little information or training on how to effectively work with diverse parents. In this section, numerous strategies for addressing barriers to school involvement and participation are presented. Methods for using families' cultures and experiences are also explored as a base for new learning and understanding especially in mathematics which is always a challenging subject to learners (LaRocque, Kleiman & Darling, 2011).

Lemmer (2007) avers that good school, family and community partnerships lead to improved academic learner achievement, self-esteem, school attendance and social behaviour. Parents and teachers experience mutual support and satisfaction in achieving positive changes in children and the school. Resources available to children, teachers, parents and the school are expanded and useful collaboration with community agencies are established. These benefits place parent involvement firmly on the national reform agendas of most education authorities. However, definitions of parent involvement vary greatly. Schools and families seldom share the same perspectives on what is wanted or needed. Moreover, government rhetoric and education department policies are not always equally matched by effective site-based implementation.

Although parent involvement is linked to school success, schools frequently fail to establish strong links between home and school, and parent participation is not significant in many schools even where parents are invited (Chrispeels, 1996). In many countries, including South Africa, one of the strongest trends in education reform has been to give parents and, in some cases, community members, an increased role in governing schools. This pattern of reform often disappoints in achieving the range of expected outcomes. A considerable body of evidence suggests that changes in governance arrangements are only weakly related to teaching and learning and thus do not improve student achievement. It appears that relatively few parents are actively involved and that involvement may drop off after the first few years (Kratochwill, McDonald, Levin, Scalia & Coover, 2009). Moreover, the preference of most parents is not for involvement through school governing bodies but for involvement in their own children's learning (Epstein 1995, 2008:9).

Mncube (2009:83) cited the South African Schools Act 84, 1996 (SASA), which came into effect at the beginning of 1997. In terms of this Act, all public or state schools in South Africa must have democratically elected School Governing Bodies (SGBs) comprising parents, learners, educators, non-teaching staff and school principal. Their functions include: creating an environment conducive to teaching and learning, developing a mission statement for the school, promoting the best interests of the school, ensuring quality education for learners, safety and security of learners, deciding on school-uniform policy, disciplinary action and policy regarding determination of school fees." However, there is a challenge of non–activeness of parents to assist their children. Huang and Mason (2008) and Werang, Betaubun and Radja (2014) emphasize that the role of parents in their children's education has long been recognised as a significant factor in educational success and school improvement. Students who have mathematics support from their parents at home show better performance at school, while students lacking support struggle.

2.7.2 Parents' financial support for learners' education in mathematics

Parental involvement (PI) in the education of their children has been regarded as an important element of effective education for at least 50 years (Sloper & Turner, 1993). There is now extensive research literature indicating that PI is advantageous for children of all ages which is embedded in financial commitment. Most learners who have this support perform very well, especially in mathematics (Cox, 2005; Desforges & Abouchaar, 2003). This includes home-based PI such as listening to children read and supervision of homework as well as school-based PI such as attending parent education workshops and parent–teacher meetings. This, however, can mostly be implemented by the middle class and the rich where homework supervision is mostly done well by hiring a teacher. Many parents do not have the requisite knowledge to assist their children with mathematics homework and even if they do, they do not have the time to do that because of their busy work schedule. The effectiveness of both home-based and school-based PI in facilitating academic achievement has been reported by several reviews and meta-analyses of the literature (Jeynes 2005, 2007; Pomerantz, Moorman & Litwack, 2007). The other benefits of PI which emerge from

these reviews include: improved parent–teacher relationships, teacher morale and school climate; improved school attendance, attitudes, behaviour and mental health of children; and, increased parental confidence, satisfaction and interest in their children's education.

One of the means by which learners have inconsistent performance is through inadequate parental financial support. In most cases where the government makes education free, there are however financial issues like transport fare, the cost of food, cost of school uniform, and the cost of other learning aids which must be provided by either the parent or the guardian of the learner. Hence, it is very important for parents to remain committed financially in the academic pursuits of their children (Garriott, Flores, Prabhakar, Mazzotta, Liskov & Shapiro, 2014). Learners from low socio-economic status families are not academically inclined, not because they are not intelligent but they already have real financial challenges to attend to. Such children are forced by circumstances into child labour and they have little time for studies and their parents are mostly financially incapable to move them into academic soundness.

There are many parents who understand the essence of education but despite their hard labour find it impossible to make two ends meet. Children of tender age in such families have to work for their living. These coupled with limited government financing of education sector, makes many families unable to meet the requirements for their children's education, thus contributing greatly to their poor performance especially in mathematics. In a study by McDonnall, Cavenaugh and Giesen (2012) they observed that parental involvement at school has positive impact on mathematics achievement for learners in the elementary school.

2.7.3 Interventional measures to improve learners' performance

The Uwezo initiative is one of the interventions for the improvement of children's learning in East Africa. It is a large-scale, multi-country, information-based intervention that seeks to promote citizen action toward the improvement of education which covers three East African countries (Kenya, Tanzania and Uganda). Kenya, being a democratic, multi-ethnic country with a historically solid educational system, according

to the in 2011 UNDP report, provides seven average years of schooling to children (high compared to 4.5 for sub-Saharan Africa as a whole). The initiative has brought an increase in academic performance, especially in mathematics and sciences over the years.

Another intervention that helps to diagnose low academic performance and make recommendations for the achievement of high academic performance, especially in mathematics, is the introduction of the Annual National Assessment (ANA) in South Africa. During the last decade the government and society general, have placed a growing emphasis on monitoring learner performance at the lower grades, in particular within the Foundation and Intermediate Phases. ANA sets to measure progress in learners' achievement in literacy and numeracy in South Africa. This provides valuable feedback to schools, teachers, learners and parents. One of the closely monitored performance areas is learners' mathematics pass rates ranging from grade 3 to grade 12 which has improved learners performance since its inception (ANA, 2011).

The government has the responsibility in its intervention measures to learners' performance. It introduced an upgrading programme to focus on upgrading the knowledge competences and skills of under- qualified and unqualified educators already in the system (DoE, 2001; 2011).

Most mathematics teachers have undergone a series of training and workshops in order to equip their skills and tap into modern learners' natural affinity for all things that are technological. Learners and educators have received laptops and tablets loaded with GMMDU's innovative curriculum-aligned classroom support package for grades 10 to 12. GMMDU is also running incubator schools for more than 400 selected learners from under-resourced schools. Learners receive Android tablets which they are trained to use as a "personal tutor" after school hours (GMMDU, 2013).

2.8 SECONDARY FACTORS AFFECTING PERFORMANCE IN MATHEMATICS

2.8.1 The attitude and training of the mathematics educator

The attitude of a teacher is one of the important traits especially for mathematics educators. A teacher with a good attitude is professional, welcoming, easy to be approached, easy to receive teachings from others and has a sense of humour. A good mathematics teacher is mostly innovative, competent, analytical and has the ability to teach to the understanding of the learners. Goulding, Rowland and Barber (2002) suggest that there are linkages between a teacher's lack of subject knowledge and ability to plan teaching materials effectively. Teachers who do not have sufficient background knowledge in mathematics may struggle with the development of comprehensive lesson plans for their students.

In recent years, much emphasis has been placed on the preparedness of the teacher. Most teachers know that they need to prepare before they teach but many times the lack of appropriate planning has hindered effective teaching (Garfield, 2013; Nunnery, Chappell & Arnold, 2013). Unfortunately, it has been well documented that teachers sometimes incorporate cooperative learning in their classes spontaneously, without any previous preparation, which always obstructs its successful implementation at any educational level which is attitudinal than being an oversight (Oortwijn, Boekaerts, Vedder, & Strijbos, 2008; Thanh, 2011).

A study on teachers revealed that the perception or attitude of teachers could be related to the teachers' ineffective teacher training in novel methodologies in their initial or in their professional training. Previous studies have called into question teachers' knowledge on cooperative learning (Nguyen, Terlouw, & Pilot, 2006). In the study of Saborit, Fernandez-Rio, Estrada, Mendez-Gimenez and Alonso (2016), it was found that teachers' attitude is a key factor for a effective implementation of cooperative learning and one of the main reasons to determine whether cooperative learning is efficient or not (Hijzen, Boekaerts, & Vedder, 2007), since only teachers who adopt a positive attitude can promote and use it in their classes (Dweck, 2012).

There have been numerous studies which describe teachers' negative attitude towards cooperative learning as an important barrier for its implementation in schools (Gillies,

2014; Roseth, Johnson, & Johnson, 2008; Slavin, 2013). Teachers' objections to the use of cooperative learning in their classes may be partly due to the demands imposed by curricular organization, as well as their lack of knowledge (Gillies & Boyle, 2010; Kohn, 1992). Thus, it seems important for teachers to know how to implement cooperative learning in their subjects. Previous research concluded that teachers who implemented cooperative methodology in their classes lacked previous knowledge and proper language patterns to fulfil its essential elements (formerly introduced in this section). Again, teacher competency in teaching mathematics is reflected in the learner's thinking, understanding and learning in mathematics education. There is no doubt that student achievement in mathematics education requires teachers to have a firm understanding of the subject domain and the epistemology that guides Mathematics education (Ball, 1993; Rosebery, 1992) as well as an equally meticulous understanding of different kinds of instructional activities that promote student achievement. Competent mathematics teachers provide a roadmap to guide students to an organized understanding of mathematical concepts, to reflective learning, to critical thinking, ultimately to mathematical achievement.

Most mathematics educators are incompetent and also lack content knowledge of the subject. They find it difficult to create a positive mathematical environment that best fits the development of the learner. Teachers who are themselves anxious about their mathematical abilities often dampen the zeal learners have for the subject (Gatto, 2013).

2.8.2 Learning climate in the classroom

The classroom is where teaching and learning takes place and needs to be a conducive environment for effective teaching and learning to be achieved. According to Wang and Eccles (2016), the classroom climate is optimized when individuals perceive that the learning context fulfills their needs for competence, autonomy, and relatedness and supports the students' confidence in their ability to master the material being taught and the value the students attach to learning the material (Eccles, 1993). Both students' need for competence and confidence in their ability to master the material is fostered

when they experience their classroom settings as optimal in structure, perceive that their teachers have confidence in their abilities, and know what they need to do to be successful (Skinner & Belmont, 1993). Both the students' need for autonomy and the value they attach to the material being taught is promoted when they experience freedom in determining their behavior and when they believe what they are being taught is meaningful to them (Wigfield, 2006). The need for relatedness is supported when teachers create a socially and emotionally supportive environment (Connell & Wellborn, 1991).

These theoretical and empirical works enable us to conceptualize a mathematics classroom climate as a function of the dynamic interactions between individuals and their classroom environments at different ecological levels (Bronfenbrenner, 1979). The classroom climate literature has identified several critical characteristics of an effective mathematics classroom and linked these to mathematics achievement. We know little about the extent to which individual demographic characteristics (e.g., gender and ethnicity) and school or classroom structure (e.g., teacher turnover and class size) independently or jointly influence student and teacher perceptions of the classroom climate, even though ample evidence suggests that individual characteristics influence perceptions of social phenomena (Mitchell, Bradshaw & Leaf, 2010).

If we are to understand the predictive role of classroom characteristics on student learning, motivation, and achievement, we need to understand the role that personal and structural characteristics play in the perceptions of these contexts (Pianta & Hamre, 2009). Teacher perceptions of classroom climate may differ from those of their students. Collecting information from teachers can provide an alternative and important perspective on classroom climate (Feldlaufer, Midgley & Eccles, 1988; Mitchell, 2010). The use of multi-informants (i.e. teacher and student) to study different aspects of classroom climate may help to examine to what extent student perceptions and teacher perceptions of mathematics classroom climate converge or diverge. It is well documented that classroom climate influences students' social-emotional and academic outcomes (Pianta & Hamre, 2009; Wang, 2009). Positive classroom climate is

associated with greater mastery, motivation, school satisfaction, academic performance, and less disruptive behavior (Barth, Dunlap, Dane, Lochman, & Wells, 2004;). Recent research on academic motivation and engagement has identified four aspects of classroom climate that are central to students' mathematics achievement: (1) authentic instruction, (2) collaboration promotion, (3) autonomy support, and (4) teacher social support (Cleary & Chen, 2009; Patrick, Kaplan, & Ryan, 2011). These classroom characteristics are particularly important for adolescents during the middle school years as they support early adolescent developmental needs for competency, autonomy, and relatedness in the mathematics classroom (Eccles, Lord & Midgley, 1991). Authentic instruction includes tasks that emphasize real-life importance and promote connections to the world beyond the classroom (Newman & Wehlage, 1993).

Meaningful and authentic instruction provides opportunities for students to connect personal goals and interests to classroom experiences, thus increasing their feelings of competence and autonomy and supporting the subjective task value they attach to the course material (Gentry & Owen, 2004; Wang, 2012). Instruction that facilitates interaction and cooperation can increase students' interest and foster competence and commitment to the class (Newman & Wehlage, 1993). Autonomy support can promote academic achievement through the sense of personal satisfaction and responsibility that students experience when they exert influence on their learning environment (Reeve, Jang, Carrell, Jeon & Barch, 2004; Wang, 2009; Wang & Holcombe, 2010). Furthermore, teachers who like and respect their students and who show an interest in what their students have to say provide the kind of socio-emotional support that students need to approach, engage in, and persist on academic learning tasks (Wang, 2012). However, it is not yet clear what individual or structural characteristics promote or undermine positive perceptions of classroom climate.

2.8.3 Socio–economic impact on learners

These arise from issues relating to poverty and underdevelopment. Such factors might put learners at risk due to lack of access to basic services (Shadaya, 2012). Thus, according to the National Center on Secondary Education and Transition (NCSET)

report, recognition must be made to the relationship between education provision and the socio-economic conditions in any society. This relationship impacts on the learning process of any child. In other words, effective learning is influenced by the availability of educational resources that meet the needs of any society. Therefore, to avoid such barriers, South Africa as a country should ensure its learners are well provided for educationally. The country must also look at its policies as these also affect society and learning.

2.8.4 Inflexible curriculum

The system of education should be dynamic and flexible because the world is changing and so the methods, systems and knowledge keep on changing. In teaching and learning the curriculum is very important as it is the road map to ensuring that the right lessons are taught. Irrespective of the need for curriculum flexibility, there are inflexible curriculums that cannot be changed. Teachers cannot change this curriculum to suit the needs of their learners. When learners such as those with special education needs cannot access the curriculum, there is no learning taking place on the learners. A curriculum is not just about pedagogy but it includes such issues as communication when teaching, policies and legislation that are not clear and hence they do not commit the government or deal with a situation (learners with special education needs) and a lack of capacity among school staff. For example, teachers might be using teaching styles which might not cater for all learners. Assessment strategies are also part of the curriculum. Often, they are designed to test particular kinds of knowledge rather than the understanding of the learners. The seriousness of an inflexible curriculum can be seen in the number of learners repeating grades. Some learners end up dropping out as they see themselves as failures.

2.8.5 Language and communication

The medium of teaching and learning can also leave out some learners during the teaching and learning process. This is mostly evident when the language of teaching and learning is not the learner's first language. The learner is placed at a disadvantage. Sometimes this leads to difficulties in the acquisition of the second language. Some

educators are themselves not conversant in the second language thereby making the situation worse especially for a learner with special education needs. In an English lesson and class, some teachers explain in the learner's first language. This can be a problem when the learner masters one language and not the other which in fact is the recommended one (Shadaya, 2012).

Marcellino (2015) argues that competency-based teaching and learning model is not a new teaching-learning revolution in language teaching methodology. The expected learning outcomes as emphasized in this language instruction are similar to the traits as proposed in the Communicative Language Teaching (CLT) or in the Task-Based Language Instruction (TBLI). The ability to state one's preference or intention, for example, in Competency-based learning (CBL) is exactly the same as that in CLT and TBLI. The same thing is true for other traits as expected from all these curricula. In these approaches, learning outcomes are determined, produced, and evaluated explicitly as distinct measurement units within their own specific contexts and situations. In other words, these new paths lead directly to the teaching-learning current trends rather than changing the basic methodological paradigm of its kind. The main question is: at what point do teachers as practitioners or educators and theorists experts consider the class implementing a particular approach successful for teaching-learning? interac- Marcellino opines that English Language Teaching in Indonesia will never be exclusively dependent upon a particular teaching method because some of the methods get out of date over time (Marcellino, 2005).

Ling (1999) argued that competency is supposedly to be seen more broadly in CBL as it includes many demands rather than completing a single task. As a result, different teachers and raters may use different words to describe their students' competence. He further claims that assessment is always subjective and interpretative, and it may, thus, lead to biases in teachers or assessors making the judgments.

2.8.6 Lack of enabling and protective legislation and policy

Policy and legislation generally have an impact on the teaching and learning process because it influences how teachers teach learners. Barriers to learning arise when

policy or legislation fails to protect learners from issues such as socio-economic conditions, societal attitudes, an inflexible curriculum, language and communication, inappropriate and inadequate provision support services, lack of parental recognition and involvement and disability, to mention a few. Mostly when the policy or regulation is not amended or changed timeously to meet the current situation, it will not achieve the positive impact it seeks. Policies or regulations do get outmoded over time. For instance, the policies or regulations in the apartheid regime are not relevant in the current situation in the republic of South Africa. The policies set in teaching in 1994 in South Africa will not be the same in 2018 because changes of the policy or regulation helps to address the situation. Learners can be at great disadvantage if the policies or regulations are not revised.

2.9 PARADIGMS REGARDING THE LEARNING OF MATHEMATICS

Every subject is dynamic and not static, especially with mathematics so all mathematics educators need holistic approaches in teaching mathematics. Khorasani and Almasifard (2017) cited Kuhn's definition of a paradigm as a fundamental change in the basic concepts and experimental practices of a scientific discipline. He emphasised that this is a set of beliefs which is given a status of being so fundamental that it does not need any testing to prove its authenticity. The following paradigms were used to explain the learners' shortfalls in the learning of mathematics:

2.9.1 Behaviourist paradigm

Behaviourism has been regarded as a reliable source of explanation of the learning process and consequently has had a profound influence on the field of educational theory (Watson, 2017). In the behavioural paradigm, the learning process is perceived in terms of conditioned behaviour or conditioning. The behaviourist paradigm views mathematical problems as the result of behaviour learnt. Mathematics learning is an external activity exclusively planned by the educator. Therefore, unwarranted mathematical mistakes are behaviour which had been learnt. Efforts must be made to

rectify this. Educators need to teach learners the basic skills and principles in mathematics rather than dwelling on the analysis of learners' mistakes.

2.9.2 Curricular paradigm

The curricular paradigm argues that most mathematics learning materials are outmoded; yet mathematics is a very fast growing field (cited in Maree, 2013). It reveals that education is no longer defined in terms of what a teacher will teach but rather in terms of what a student will be able to demonstrate**.** Thus, it is from here that instruction must work.

2.9.3 Developmental paradigm

Every learner generally must attain the required age of the grade to understand the work standard of mathematics in that grade. In view of a learner's ability to show maturity in mastery of mathematics, the teacher needs to consider the learner's mental development and assist the learner with the needed teaching skills so as to master the concept of mathematics over time. This, by implication, will not afford the child the opportunity to acquire those mathematical skills if the child has not reached the necessary developmental stage (Brocas, Carrillo, Combs & Kodaverdian, 2016). For the learner to be in a position to understand several concepts in the mathematics curriculum, the child should be in a position to carry out essential mathematical skills for each grade level.

2.9.4 Dyscalculia paradigm

The dyscalculia paradigm deals with learners who lack the ability to learn mathematics. According to the review in Szucs and Goswami (2013), the dyscalculia paradigm is a selective weakness of mathematics, and about 6% of children and adults are affected by it. They attested that intelligence, reading and motivations to learn are normal. Although many researchers believe dyscalculia to be a persistent disorder, evidence on the persistence of dyscalculia remains mixed. The learners do well in other disciplines but perform poorly in mathematics. For instance, in a study done by Mazzocco and Myers (2003), researchers evaluated children on a slew of measures and selected their

most consistent measure as their best diagnostic criterion. Even with their best criterion, they found that dyscalculia diagnoses for children longitudinally did not persist; only 65% of students who were ever diagnosed over the course of four years were diagnosed for at least two years. The percentage of children who were diagnosed in two consecutive years was further reduced. It is unclear whether this was the result of misdiagnosed children improving in mathematics and spatial awareness as they progressed as normal, or that the subjects who showed improvement were accurately diagnosed, but exhibited signs of a non-persistent learning disability.

Access to appropriate educational provision is also normal with people suffering from developmental dyscalculia. About 50-60% of children with developmental dyscalculia have a persistent condition. Around 95% of children with developmental dyscalculia show long-term weak mathematical performance (Shalev et al. (cited in Szucs & Goswami, 2013).

2.9.5 Dyspedagogia paradigm

The way mathematics is taught is very important because good learners will not achieve the desired mark if lessons are not well taught. Dyspedagogia paradigm argues that the mistakes learners make in mathematics come from unsatisfactory teaching. Gannon and Ginsburg cited in Maree (2013), explained that, unprepared teaching or poorly executed teaching which often occurs when there is little or no teaching aids and teaching inadequacy in terms of the inability of the teachers to articulate thoughts for the learners to understand. Some educators lack the ability to explain mathematical concepts to the learners even though they know it, they but lack the skills to impart.

2.9.6 Eclectic paradigm

Maree (1992:34) argues that there is the eclectic paradigm which agrees that any of the above-mentioned or unmentioned paradigms are valuable when evaluating the difficulties that any particular learner experiences in mathematics. Therefore, Maree (1992:29) advised that "Mathematics educators as well as psychologists who deal with more 'technical' problems in mathematics as well as the treatment of emotional

problems connected to mathematics, should take cognizance of these paradigms in an unbiased way".

2.9.7 Psychoanalytic paradigm

The psychoanalytic paradigm describes mathematics problems as symbolic or subconscious behaviour. Many learners have the perception that mathematics is a difficult subject and because of that, the learners are not able to open up to assimilate what is being taught. Once those factors affecting poor performance are eliminated, a higher achievement level is guaranteed. Visser, Morgan, Dees and Dees cited in Maree (2013) explained that the problem of mathematical anxiety attests to this paradigm.

2.9.8 Medical paradigm

The medical paradigm argues that challenges in mathematics that learners encounter are attributed to the chemical or organic malfunctioning of the learner. The learner's poor genes or physical defects inherited from the parents result in the poor performance of the learner. Not much can be done to remedy the defect.

2.9.9 Social paradigm

According to Maree (2007), the social paradigm deals with poor educational background, domestic instability, insufficient parental counselling, and poor adaptation to change of learning and educational circumstances which lead to under achievement. Grossnicke, Reckzeh, Leland and Ganoe (2008) explained that, unless these factors are adequately accommodated, learners cannot achieve much in mathematics. This further suggests that the way the learner interacts with his or her environment as well as the factors in the environment that may be affecting the learner. Environmental factors could be social and involve care-givers, educators and peers.

2.9.10 Moral paradigm

The community where learners live and learn from, impacts greatly on their achievements. The moral paradigm emphasizes that learners' inability to perform well in

mathematics could be due to the deviation in the ethical and moral standard of the community.

2.10 CONCLUSION

This chapter covered several factors which have been categorized into primary and secondary factors that affect learners' performance in mathematics in primary schools globally, and in South Africa for which East London Education District was no together. These primary factors could be traced to: Teaching and learning of mathematics, Content knowledge and planning in mathematics, teachers' and learners' motivation on mathematics performance etc. Some of the highlighted secondary factors are: the attitude and training of mathematics educators; learning climate in the classroom; language and communication etc. This literature review, therefore, suggests a forensic inquiry into factors affecting learners' performance in mathematics. The next chapter deals with the methodology employed for the study.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 INTRODUCTION

Zuber-Skerritt, Wood and Dick (2013) argue that a good research is that which uses methodology which fits with the situation and the goals you are pursuing. The aim of this study was to examine factors affecting learners' performance in mathematics in grade 6 in the East London Education District.

In this chapter the writer presents the research paradigm, research approach, research design, area of study, population, sampling method, stratified sampling method, research sample, data collection procedures, data collection instruments, pilot study, interviews, observations, validity of data, ethical considerations and limitations of the study.

3.2 RESEARCH PARADIGM

This study is embedded in the pragmatic philosophical paradigm. "The paradigm most commonly associated with mixed methods research, although clearly not the only one, is pragmatism, which offers an alternative worldview to those of positivism / post-positivism and constructivism and focuses on the problem to be researched" (Teddlie & Tashakkori, 2009:7). Pragmatism focuses on what things that will make a difference, and also connects abstract issues on the epistemological level to the methodological level.

Shannon-Baker (2016) claims that, pragmatism offers several ways to bridge dichotomies that exist in mixed methods approaches to social science which is suitable for this study. Biesta (2010:96) argues that ''knowledge can only provide us information about our actions and their results, not of the ''once-and-for-all truths''. Instead, pragmatism breaks down the hierarchies between positivist and constructivist ways of

knowing in order to look at what is meaningful from both. It brings out practical solutions to problems and is the foundation of mixed methods research (Kalolo, 2015). The researcher used pragmatism as the research paradigm.

3.3 RESEARCH APPROACH

Johnson (2014) explains that mixed methods research (mixed research or mixed methodologies) is a type of an approach in which a researcher or a team of researchers integrate or combine qualitative and quantitative research approaches or philosophies. This study adopted the mixed methods research approach which creates an opportunity to examine the factors affecting grade 6 learners' performance in mathematics. Creswell (2014) argues that pragmatism opens the door to multiple methods, different worldviews, and different assumptions, as well as to different forms of data collection and analysis in the mixed methods research. "We believe that a broad interpretation and use of the word methods (in mixed methods) allows inclusion of issues and strategies surrounding methods of data collection (e.g., questionnaires, interviews, observations), methods of research (e.g., experiments, ethnography), and related philosophical issues (e.g., ontology, epistemology, axiology)". (Johnson & Onwuegbuzie, 2004:22; Johnson, Onwuegbuzie, Tucker & Icenogle, 2014:557).

Learners' performance in mathematics is a complex phenomenon that attracts multiple conceptions and requires an understanding of how teachers can greatly influence teaching and learning processes for the learners to perform. Such an understanding is supported by viewing the problem from both the qualitative and the quantitative perspective. The factors affecting learners' performance in mathematics can be done through collecting, interpreting and analysing quantitative data. The investigative aspect of factors affecting learners' performance could be best answered through the interpretation and analysis of data which is qualitatively generated. The mixed methods approach has many advantages associated with it and is more preferred because it has an array of strengths. Fetters, Curry and Creswell (2013) aver the strengths of mixed methods which are discussed below:

1. Logic of triangulation: It allows the researcher to tackle a broader and a more complete range of research questions owing to the fact that the researcher is not confined within the tenets of a particular method of research. The findings from one type of study can be checked against those from the other type. For example, the results of a qualitative investigation might be checked against a quantitative study.

2. Qualitative research facilitates quantitative research: Qualitative research may help to provide background information on context and subjects; act as a source of hypotheses; and aid scale construction.

3. Quantitative research facilitates qualitative research: Researchers have the ability to use the strength of one method of research to counter or overcome the weaknesses in another method. In other words, it incorporates the concept of complementarity. Usually, this means quantitative research helps with the choice of subjects for a qualitative investigation.

4. Quantitative and qualitative research are combined in order to provide a general picture of the study: Researchers have the advantage of using numbers to add precision to words, pictures, and narratives. Further, terms, pictures and narratives can be used to add connotation to numbers. Quantitative research may be employed to plug the gaps in a qualitative study which arise because, for example, the researcher cannot be in more than one place at any one time, or if not all issues are amenable solely to a quantitative or a qualitative investigation.

5. Structure and process: Quantitative research is especially efficient at getting at the structural features of social life while qualitative studies are usually stronger on process aspects is adopted. This allows the researcher to add insights and methods that might be omitted when only a single method was used.

6. Researchers' and subjects' perspectives. Quantitative research is usually driven by the researcher's concerns, whereas qualitative research takes the subject's perspective.

7. Problem of generalizability**.** The addition of some quantitative evidence may help generalizability.

8. Precision of a theory. Researchers can generate and actually test grounded theory. In the advent of a researcher conjuring up a conclusion under this method of research, they are in a better position to provide stronger evidence in the conclusion bit through convergence and collaboration of findings.

9. Relationship between macro and micro levels. Employing both quantitative and qualitative research may provide a means of bridging the macro-micro gulf. Quantittive research can tap large-scale structural features of social life while qualitative research tends to address small-scale behavioural aspects (Adapted from Punch, 1998:247).

However, the method has some disadvantages as stated below:

1. The research design can be very complex. The researcher choosing to rely on this method of research has to learn about multiple methods and approaches and understand how to appropriately mix them
2. It takes much more time and resources to plan and implement this type of research.
3. It may be difficult to plan and implement one method by drawing on the findings of another.
4. Owing to its duplicity content, the application of the mixed methodology in one study can prove difficult to handle by any one single researcher. This is the case especially when the researcher has to apply two or more approaches concurrently; and
5. It may be unclear how to resolve discrepancies that arise in the interpretation of the findings (FoodRisC, 2016).

3.4 RESEARCH DESIGN

Kumar (2011) argues that research design is the best recipe for answering the research question. There are three major typologies of designs in mixed method research, namely, convergent parallel design, explanatory sequential design and exploratory sequential design (Creswell, 2014). A convergent concurrent design, also referred to as concurrent triangulation, was used in this study.

In convergent concurrent design, consideration of a comprehensive understanding of the research problem is emphasized by collecting different data that validate findings. Survey data was collected by using a questionnaire and interview. In this study, quantitative and qualitative data were systematically integrated for comprehensive analysis of the research problem. Creswell (2014) argues that mixed methods research has the advantage that neutralises the biases and weaknesses of qualitative and quantitative methods. Greene (2014) avers that mixed methods research encourages interactive combination or mixing at various levels that is methodology, paradigm, data analysis, and theoretical understanding or explanation.

3.4.1 Strengths of Concurrent Triangulation Design

1. It is used to validate and substantiate findings of a study. Precision of this design is achieved where different research methods come to the same conclusion. The researcher can be more confident that the results are truly a reflection of what is actually happening;

2. It requires great effort and expertise to adequately use two separate methods at the same time. This research design relies on the ability to find agreement and validation of results through a variety of research methods; and

3. It is also used to compare sequential designs and data collection takes less time.

3.4.2 Weaknesses of Concurrent Triangulation Design

a) It can be difficult to compare the results of two analyses using data of different forms.

b) It may be unclear how to resolve discrepancies that arise while comparing the results.

c) Given that data collection is conducted concurrently, results of one method (e.g. interview) may not be integrated in the other method (e.g. survey) (FoodRisc, 2016).

3.5 AREA OF STUDY

This study was conducted in the East London education district in selected public and private schools of grade 6 learners and educators teaching grade 6 mathematics within the district.

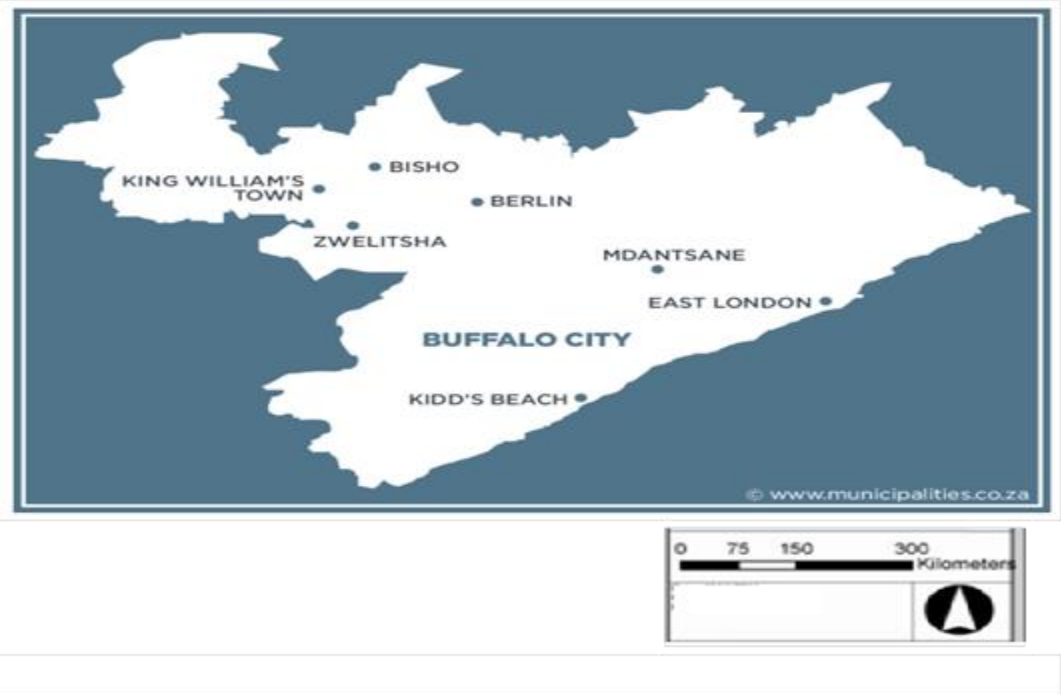


Fig. 3: A map of East London city under Buffalo City Metropolitan Municipality

Source: *AfricGIS (2016) (Pty) Ltd. Google*

East London is a city on the southeast coast of South Africa in the Buffalo City Metropolitan Municipality of the Eastern Cape Province. It is affectionately called Buffalo City by the locals and situated 1000 kilometres from Cape Town on the South East

coast of South Africa. Lying in between the Nahoon River in the north and the Buffalo river to the south is the only river port in South Africa. The shores are lapped by the warm waters of the Indian Ocean and with its sub-tropical climate is a sought after tourist destination for local South Africans and international tourist alike. East London has approximately 400 000 residents, the metropolitan area has 1.4 million, and is the second largest city in the province of the Eastern Cape. It has about 79 schools which is made up of 73 public schools and 6 registered private schools which have an estimated population of 2037 grade 6 learners and an average of 418 grade 6 mathematics educators (DBE, 2015).

3.5.1 Population of the study

Creswell (2013) referred to population as the group of individuals having one characteristic that distinguishes them from other groups. The population of interest for this study were all grade 6 teachers and learners in both the public and private primary schools in East London education district.

3.5.2 Sample

Table.3.1: Number of learners, educators and schools in the primary school sector in East London Education District, 2013 (DBE, 2015)

EASTERN CAPE DISTRICT	TYPES OF SCHOOLS	NUMBER OF REGISTERED SCHOOLS	NUMBER OF AVERAGE LEARNERS (GRADE 6)	SAMPLE 17% OF LEARNERS (14.1% 61%)	SAMPLE % OF EDUCATORS (2% & 16%)
EAST LONDON	PUBLIC (ORDINARY/COMBINED)	73	1915	270	9
EAST LONDON	PRIVATE	6	122	75	3
TOTAL		**79**	**2037**	**345**	**12**

Source: *Education Statistics (DBE, 2015)*

The study population consisted of 345 Grade 6 learners and mathematics educators teaching Grade 6 in 79 schools for both public and private respectively in the East

London Education District. This made up of 270 learners in the public schools and 75 learners in the private schools in the East London Education District. Out of the 12 circuits in the East London district, 1 educator was purposively selected from each circuit, making a total of 12 educators for both public and private schools. To add, 30 learners from each public school and 25 learners from each private school, respectively, were purposively selected from each circuit. This made a sample size percentage of approximately 17% using the parallel mixed methods sampling, that is, the stratified random sampling and purposive technique.

3.5.3 Sampling Technique

Sampling is a way by which units from a study population of interest can have results fairly generalized results back to the population from which they were chosen (Choga & Njaya, 2011). Sampling process is categorised as probability sampling for quantitative research and non-probability sampling for qualitative research, both of which were adopted in this mixed methods study. Samples from population categories were selected using parallel mixed methods sampling strategies.

Parallel mixed methods sampling was adopted in this study whereby stratified random sampling was used to select participants for the quantitative strand while purposive sampling was used for selecting participants for the qualitative strand (Teddlie & Tashakkori, 2009). Using stratified sampling strategy, learners and educators in grade 6 primary schools in this study were selected according to schools' circuits in the East London District. From the circuits, teachers teaching grade 6 mathematics and learners in grade 6 were purposively selected. Using the Morse notation system, parallel mixed methods sampling is presented as QUAN +QUAL or QUAL +QUAN

3.5.4 Stratified method

Stratified random sampling is a method of sampling that involves the division of a population into smaller groups known as strata. In stratified random sampling, or stratification, the strata are formed based on members' shared attributes or characteristics (Denscombe, 2007:14). Every member of the population has an equal

chance of being selected in relation to their proportion within the total population. The researcher purposively selected the 79 public and private schools into 12 circuits strata.

Table.3.2: *The number of learners and educators selected from each stratum*

STRATUM	NUMBER OF PUBLIC SCHOOL	NUMBER OF PRIVATE SCHOOL
CIRCUIT 1	30	-
CIRCUIT 2	30	-
CIRCUIT 3	30	-
CIRCUIT 4	30	-
CIRCUIT 5	30	-
CIRCUIT 6	30	-
CIRCUIT 7	30	-
CIRCUIT 8	30	-
CIRCUIT 9	30	-
CIRCUIT 10	-	25
CIRCUIT 11	-	25
CIRCUIT 12	-	25
TOTAL	**270**	**75**

Source: *Field study (June, 2018)*

Two hundred and seventy (270) grade 6 learners in the public school and seventy - five (75) learners in the private schools, making a total of 345 learners were selected and twelve (12) educators teaching grade 6 mathematics were selected with nine (9) educators from the public schools and three (3) educators from the private schools to form each stratum based on the percentage of the sub-group sizes to the total data population for the quantitative phase. To add, 30 learners in each public school and 25 learners respectively in each private school and twelve educators were purposively selected from each circuit for the qualitative phase of the study from public schools and private schools.

Stratified random sampling involves dividing the entire population into homogeneous groups which are called strata (singular is stratum). Random samples are then selected from each stratum. For example, consider an academic researcher who would like to know the number of mathematics learners in Grade 6 that progressed to Grade 7 in 2018 in Eastern Cape. There could be almost 6,000 grade 7 learners in 2018 that passed grade 6 in 2017. A simple random sample of 600 grade 7 learners can be used to run a survey, or better still, divide the population into strata and take a random sample from the strata. A random sample from each stratum is taken in a number proportional to the stratum's size when compared to the population. These subsets of the strata are then pooled to form a random sample (Acharya, Prakash, Saxena & Nigam, 2013).

3.5.4.1 Proportionate and Disproportionate Stratification

Stratified random sampling ensures that each of the sub-groups of a given population is adequately represented within the whole sample population of a research study. Stratification can be proportionate or disproportionate. In a proportionate stratified method, the sample size of each stratum is proportionate to the population size of the stratum. In this study, the stratified sample was partly disproportionally employed. The disproportional stratification of a subsample allows a more efficient treatment of many research questions (Trappmann, Christoph, Achatz, Wenzig, Müller & Gebhardt, 2009).

3.5.4.2 Sample size and justification

The population represents the number of learners in the grade 6 public and private schools averaging a total of 2037 which sampled 17%. The formula is calculated as the total population 1 (X_1 x Y_1 %) + total population 2 (X_2 x Y_2 %) + … = to sample size

X_1 = total population of public school learners
Y_1 = sample % of **$X_1 < 15\%$**
X_2 = total population of private school learners

Y_2 = sample % of **X_2 > 15%**

X3 = total population of public school educators X4 = total population of private school learners Y3 = sample % of X3 < 8% Y4 = sample % of X4 > 8%

Sample for learners population

$(\frac{Y1}{100} \text{ x } \frac{X1}{1}) + (\frac{Y2}{100} \text{ x } \frac{X2}{1}) =$ sample size

$(\frac{14.1}{100} \text{ x } \frac{1915}{1}) = 270 + (\frac{61.4}{100} \text{ x } \frac{122}{1}) = 75 =$ **345**

(Where $\frac{Y1\% + Y2\% + \ldots}{n^2}$ + is ≥ 15%) = $(\frac{14.1+61.4}{4})$ = **18.9%**

Sample for educators population

$(\frac{Y3}{100} \text{ x } \frac{X3}{1}) + (\frac{Y4}{100} \text{ x } \frac{X4}{1}) =$ sample size

$(\frac{2}{100} \text{ x } \frac{399}{1}) = 8 + (\frac{21}{100} \text{ x } \frac{19}{1}) = 4 = 12$ (Where $\frac{Y3\% + Y4\% + \ldots}{n}$ + is ≥ 8%)

The formula is suitable for high and low variables which in this study, the public schools had a higher number of learners than the private schools. Y_1 represents a percentage that is less than 15% of the high population. Y_2 on the other hand represents a percentage that is more than 15% of the low population. 15% is constant. This is however controlled such that the average squared of Y_1 and Y_2 should be ≤ 25%. The sample would be considered as suitable sample when it is less or equal to 25%. For instance, the average percentage of Y_1 and Y_2 were 14.1% and 61.4% respectively as calculated above is 18.9%. This is suitable because it is less than 25%.

For instance, an assumed population of 1200 learners in schools which consists of 800 females and 400 males can have two scenarios.

Scenario 1:

GENDER	FEMALES	MALES	TOTAL
POPULATION	800	400	**1200**
PERCENTAGE	(Y_1) 15%	(Y_2) 40%	**55%**
SAMPLE	120	160	**280**

PERCENTAGE AVR. SQUARED	3.75%	10%	**13.75%**
SAMPLE REMARKS	-	-	**SUITABLE**

Scenario 2:

GENDER	**FEMALES**	**MALES**	**TOTAL**
POPULATION	800	400	**1200**
PERCENTAGE	(Y_1) 15%	(Y_2) 88%	**103%**
SAMPLE	120	352	**472**
PERCENTAGE AVR. SQUARED	3.75%	22%	**25.75%**
SAMPLE REMARKS	-	-	**NOT SUITABLE**

Advantages of the Stratified random method include the following:

a) It captures key population characteristics in the sample;
b) Similar to a weighted average, this method of sampling produces characteristics in the sample that are proportional to the overall population;
c) It works well for populations with a variety of attributes;
d) Stratification gives a smaller error in estimation and greater precision than the simple random sampling method. The greater the differences between the strata, the greater the gain in precision; and
e) It needs only a minimum knowledge of the study group of the population in advance.

Disadvantages of stratified random sampling include the following:

a) A stratified random sample can be carried out only if the list of the population is available and complete (Cookies & Privacy, 2012);

b) The method cannot be employed where the units of the population are heterogeneous in nature. It is otherwise ineffective if subgroups cannot be formed; and
c) It may be impossible to contact the cases which are very widely dispersed (Matters, 2016).

3.5.5 Purposive sampling method

One of the sampling methods that was deemed suitable for the study is the purposive sampling method. Purposive sampling, also known as judgmental, selective or subjective sampling, is a type of non-probability sampling technique. Non-probability sampling focuses on sampling techniques where the units that are investigated are based on the judgement of the researcher. Ritchie, Lewis, Nicholls and Ormston (2013) in their study share the view that members of a sample are chosen with a 'purpose' to represent a location or type in relation to a key criterion.

This has two principal aims. The first is to ensure that all the key constituencies of relevance to the subject matter are covered. The second is to ensure that, within each of the key criteria, some diversity is included so that the impact of the characteristic concerned can be explored. Taking a very simple example, age is very commonly used as a selection criterion. This is important both to ensure that all relevant age groups are included and to ensure that any differences in perspective between age groups can be explored. The latter requires sufficient representation within each age group for the impact of age and other factors to be disengaged (see further below).

There are a range of different approaches to purposive sampling, designed to yield different types of sample composition depending on the study's aims and coverage. These have been described as follows:

a) **Homogeneous samples** (Holloway and Wheeler, 1996; Patton, 2002; Robson, 2002) chosen to give a detailed picture of a particular phenomenon - for example, individuals who belong to the same subculture or have the same

characteristics. This allows for detailed investigation of social processes in a specified context;

b) **Heterogeneous samples** (Holloway & Wheeler, 1996; Robson, 2002) or maximum variation sampling (Patton, 2002) where there is a deliberate strategy to include phenomena which vary widely from each other. The aim is to identify central themes which cut across the variety of cases or people;

c) **Extreme case or deviant** sampling (Patton, 2002; Robson, 2002). Cases are chosen because they are unusual or special and therefore potentially enlightening. The logic is that learning about phenomena is heightened by looking at exceptions or extremes (for example, ethnomethodologists sometimes use deviant sampling to expose implicit assumptions and norms);

d) **Intensity sampling** (Patton, 2002) employs similar logic to extreme or deviant case sampling but focuses on cases which strongly represent the phenomena of interest rather than unusual cases;

e) **Typical case sampling** (Patton, 2002): cases which characterize positions that are 'normal' or 'average' are selected to provide detailed profiling. This requires prior knowledge about overall patterns of response so that what is 'typical' is known (for example, participants might be selected from their responses to a survey). In this study, the purposive sampling used was homogeneous.

In purposive sampling, decisions about which criteria are used for selection are often made in the early design stages of the research. This is informed by a range of factors, including the principal aims of the study, existing knowledge or theories about the field of study, hypotheses that the research may want to explore or gaps in knowledge about the study population. Barratt, Ferris and Lenton (2015) aver that although 'purposive' selection involves quite deliberate choices, this should not suggest any bias in the nature of the choices made. The process of purposive sampling requires clear objectivity so that the sample stands up to independent scrutiny.

This study was conducted with grade 6 learners of East London Education District in the Eastern Cape province of South Africa. It was aimed identifying the main factors

affecting the mathematics performance of grade 6 school learners in the district. The researcher selected schools that performed very well, averagely well and very poorly in the East London district common paper and the Annual National Assessment for the past years for the study. Denscombe, (2007) indicated that, with purposive sampling, the sample is 'hand-picked' for the research. "The term is applied to those situations where the researcher already knows something about the specific people or events and deliberately selects particular ones because they are seen as instances that are likely to produce the most valuable data" (Denscombe, 2007:17). Having good performing, average performing and poor performing schools enabled the researcher to get first-hand information from the learners and their educators regarding performance measurement which is often achieved by comparing two or more performance.

3.6 DATA COLLECTION PROCEDURES

Data collection is a term used to describe a process of preparing and collecting data, for example, as part of a process of improvement. The purpose of data collection is to obtain information to keep on record, to make decisions about important issues, and to pass information on to others (Richards, 2014). Primarily, data was collected to provide information regarding the topic of study (the factors affecting Grade 6 learners' performance in Mathematics in East London education district). Data for this research were collected from a survey using both questionnaires and interviews for the period of one month. The data collection procedure was done by going through the procedure of gaining access to the schools.

3.6.1 Gaining access

A letter of introduction was given to the researcher by the supervisor to submit to the Department of Education to seek permission to carry out the research (Appendix A). Furthermore, the Department of Education was contacted by the researcher for an introductory letter which was given to each principal of both the private and public schools (Appendix B). This was done by taking into consideration of the rules and regulations of the schools visited concerning access. Arrangements for appointments

were made with research participants in accordance with the time schedules that were drawn up and agreed upon. The researcher did not come across any problems in that regard. Grade 6 mathematics teachers who assisted in the study were orientated before the study started, and the learners were also given orientation on the modality of the study. Depending on the contingencies of the setting and the research problem chosen, there are two kinds of research access that may be obtained (Denzin & Lincoln, 2000). These are discussed below:

a) "Covert" access is done without subjects 'knowledge of researchers' presence.
b) "Overt" access which is based on informing participants and getting permission from all of them, often through 'gatekeepers'.

In this case, gatekeepers are the Department of Education and the principals. In this study, the researcher chose the "overt" access which was relevant to this study due to the fact that my participants had the choice to participate (Denzin & Lincoln, 2000).

3.6.2 Data collection instruments

Data collection instruments are the tools that the researcher uses to collect data. In this study, the researcher used a structured questionnaire, semi-structured interview and observations to collect data. The instruments involved in this study were questionnaires, recorded interviews and observation.

3.6.2.1 Questionnaires

This research involved the use of structured questionnaire. The purpose of using a questionnaire was that they are useful when you need to quickly and/or easily get a lot of information from people in a non-threatening way. Questionnaires have numerous advantages and disadvantages which are discussed below:

Advantages of Questionnaire:

a. **Economical:** It is an economical way of accumulating information. It is economical both for the sender and for the respondent in time, effort and cost. The cost of conducting the study with the help of questionnaire method is very low. In a questionnaire, the researcher has to spend money for paper printing and may be postage only. There is no need to visit each and every respondent personally, so it does not require high cost for conducting research.

b. **Wide Coverage:** It is probably the best method to collect information, compared to the other methods like interview or observation, when the sample population is spread over a large territory. It permits a nationwide or even international coverage;

c. **Rapidity:** Responses may be received very quickly in questionnaire method. In this case there is no need to visit the respondent personally or continue the study over a long period. Therefore, in comparison with other methods, the mailed questionnaire is the quickest method;

d. **Suitable in Special Type of Response:** The information about certain personal, secret matters can be best obtained through questionnaire method. For example, information about sexual relationship, marital relationship, secret desires etc. can.be easily obtained;

e. **Uniformity:** It helps in focusing the respondent's attention on all the significant items. As it is administered, in a written form, its standardized instructions for recording responses ensure some uniformity. Questionnaire does not permit much of variation.

f. **Useful Preliminary Tool:** Questionnaire may be used as a preliminary tool for conducting a depth study later on by any other method;

g. **Anonymity:** Questionnaire ensures anonymity to its respondents. The respondents have a greater confidence that they will not be identified by anybody for giving a particular view or opinion. They feel more comfortable and free to express their views in this method; and

h. **Most Flexible Tool for Data Collection:** A questionnaire is no doubt the most flexible tool in collecting both quantitative and qualitative information.

Disadvantages of Questionnaire:

a. **Limited Response:** One of the major limitations of the questionnaire is that it can be applicable only to those respondents who have a considerable amount of education. It can neither be used for illiterate nor for semi-literate persons.

b. **Lack of Personal Contact:** As in case of questionnaire the researcher does not go to the field, he is not able to establish a proper personal relationship with the respondents. If the respondent fails to understand some of the technical terms or he has any doubt, there is nobody to clarify these technical terms or doubts. Even though the researcher tries in the best possible manner to make the questionnaire a simple, precise and convenient one, the aim and objective of the questionnaire can be much better explained personally than through any other means. Without the proper personal contact it is very difficult to motivate the respondent to fill up the questionnaire.

c. **Unreliability:** The information collected through questionnaire cannot be said to be very much reliable or valid. If the subject misinterprets a question or gives an incomplete or indefinite response, very little can be done to connect such response. As against this, in an interview there is always the possibility of rephrasing questions for further clarification. The investigator here is not in a position to observe the gestures and expressions of the respondents. He cannot cross-check the

inconsistencies or misrepresentation of the responses, so in the questionnaire method, reliability of responses is very low;

d. **Illegibility:** Illegible handwriting of the respondent sometimes creates much difficulty for the researcher to understand the responses. Sometimes the respondents erase and overwrite too much. These create many difficulties in reading the answers.
e. **Incomplete Entries:** Often, most of the respondents fill up the questionnaire form very poorly. They sometimes leave out many questions altogether or fill in such a way that, it becomes very difficult on the part of the investigator to follow those responses. Other than this, there may be the problem of language, use of abbreviations and ambiguous terms etc. All these make a questionnaire an incomplete one; and
f. **Lack of Rapport with the Subject:** There are many people who would not like to share any important information unless and until they are impressed about the rationale of the study and personality of the investigator. The questionnaire does not provide for any opportunity to the investigator to establish rapport with the subject and this cannot attract the respondent for a better response.

3.6.2.2 Interview

The word "interview" refers to a one-on-one conversation with one person acting in the role of the interviewer and the other as the interviewee. The interviewer asks questions, the interviewee responds, with participants taking turns talking. Unstructured interviews aim at identifying participants' emotions, feelings, and opinions regarding a particular research subject (Dipboye, Macan, & Shahani-Denning, 2012). The main advantage of personal interviews is that they involve personal and direct contact between interviewers and interviewees, as well as eliminate non-response rates. However, interviewers need to have developed the necessary skills to successfully carry an interview (Braveman, Robson Velozo, Kielhofner, Fisher, Forsyth & Kerschbaum, 2005). Later, Kvale and Brinkman (2009) further explain that, semi-structured interviews offer flexibility in terms of the flow of the interview, thereby leaving room for the generation of

conclusions that were not initially meant to be derived regarding a research subject. Learners were interviewed using the semi-structured interview.

This is a written list of questions which are tailored for examining the factors that affect the performance of grade 6 learners. The researcher used short notes and a tape recorder to record the responses of the interviewees.

Strengths of a semi-structure interview are as follows:

a) It provides in-depth information about what is being studied.
b) Respondent can influence the topic, and unexpected issues/topics emerge during the interview; and
c) It also enables the researcher to probe to understand perspectives and experiences.

However, some of the weaknesses of semi-structured interview are:

a) Analysis of the findings is difficult because it must be done by people who carried out the interviews;
b) Analysis is time consuming; and
c) It is also difficult to generalize findings from the study.

3.6.3 Observations

During the semi-structure interview, the researcher observed and made notes on non-verbal communication like silence, lack of confidence, laughing, and other worried expressions.

Boundless (2016) argued that observation allows researchers to experience a specific aspect of social life and also get a first-hand look at a trend, institution, or behaviour. During observation, participants may or may not be aware of the researcher's presence, and the researcher does not try to control variables or ask participants to respond to direct questions.

Advantages of observation are:

a) Observation captures behaviour that is more natural than behaviour occurring in the artificial setting; and
b) Observation is also particularly advantageous as a cross-cultural reference.

Disadvantages of observation are:

a) It can be time consuming. Some studies require a lot of observation; and
b) Without the use of multiple researchers, the chances of observer bias increase because behaviour is perceived so subjective (Boundless, 2016).

The researcher adopted these instruments so that almost all issues can be covered for the study. A pilot study preceded the interviews to highlight errors in advance. Some of the information was obtained through casual conversation with participants.

Observations are used by researchers applying the qualitative approach. The strategy is used as a principal data-gathering strategy in qualitative research because researchers are interested in the ways in which people usually make sense of or attach meaning to the world around them (De Vos, 2001:277-281). In this study the researcher adopted the simple observation method to collect data from schools which was aimed at examining the factors affecting the performance of grade 6 learners. The researcher listened to and observed (one lesson per school regarding learners in the classroom and how learners responded. In this study the selected observed factors that the researcher concentrated on are the following: classroom size and environment, lack of teaching materials and learning aids, time management and learners' unpreparedness.

3.6.3.1 Classroom size and environment

The researcher observed the size and ratio of the classes visited, the quality of teaching and learning, the resources such as technology availability, tables, chairs and the classroom climate. Notes were taken by the researcher, and these served as the basis for the identification of emerging patterns of the needed information relevant for the study.

3.6.3.2 Lack of teaching materials and learning aids

The research in this observation considered the teaching and learning materials utilized in all the visited schools. Teaching and learning materials range from traditional to modern (technologically inclined teaching and learning materials). This observations were tailored to determine factors affecting grade 6 learners' performance in mathematics. Almost all visited schools have the basic teaching aids such as the chalk board, chalk, rulers, measuring instruments and few pictures but have no or less technology to enhance teaching and learning for improved performance.

3.6.3.3 Time management

In this study, the researcher focused on the issue of time management by learners. The strategy allowed the researcher to observe the behaviour of the learners and educators at school during lessons as well as after the lessons. The researcher observed critically what transpired during teaching and learning. The emphasis was placed on the effect time has on learners' performance in Mathematics. All data regarding time management was captured as field notes.

3.6.3.4 Learners' unpreparedness

The rationale behind this observation in this study was to determine how prepared learners are in the classroom and how it impacts on mathematics performance. Most of the schools the researcher visited had learners who were quiet but not attentive in class. It became difficult for some of the learners to answer questions which the educators had already explained to them. The researcher, in his observations, noted how many of the learners were unwilling to work, ask questions when they do not understand. Learners' unpreparedness, has dire consequences that hamper their academic achievement.

3.6.4 Administration of measuring instruments

There were two sets of structured questionnaires which were administered for both the learners and the educators respectively. The questionnaire for learners was

structured into three parts. The first part (Section A) dealt with the biographical information of the learners such as:

1. Age;
2. Parental educational level;
3. Employment status of parents;
4. Literacy level of parents;
5. Staying with parents or alone;
6. Proximity of homes to school; and
7. Means of transport to school.

Section B dealt with the difficulties learners encounter in the learning of mathematics and the attitude of their mathematics educators. Finally, Section C dealt with suggestions and solutions that would enhance the performance of the learners.

The educators also responded to the structured questionnaires which were structured into sections A, B and C. The information elicited from the educators was characterized as:

1. Age;
2. Years of teaching;
3. Qualification of educator;
4. Educators' major subject at college / university;
5. Curriculum changes;
6. Teaching strategy / modes of teaching; and
7. Membership of educators' association (See Appendix D)

The focus group interviews (Appendix E) yielded information on the factors affecting learners' mathematics performance.

The researcher used the above measurement instruments due to their immense advantages which are relevant to this study. Consequently, information gathered using questionnaires was considered appropriate for this study.

3.7 Validity and reliability

Mixed methods refer to the embodiments of both quantitative and qualitative methods. Plano Clark and Ivankova (2016) explained reliability and validity as the extent to which results are consistent over time. An accurate representation of the total population under study is referred to as reliability, and if the results of a study can be reproduced under a similar methodology, then the research instrument is considered to be reliable and provides an explanation of validity the research that truly measures what it was intended to measure or how truthful the research results are. In other words, does the research instrument allow you to hit "the bull's eye" of your research object?

When researchers measure a phenomenon that does not change between two points separated by an interval of time, the degree to which the two measurements are related to each other is the best test – retest reliability of the measure. "For example, if you take a test of your math ability and then retake the test 2 months later, the test is performing reliably if you receive a similar score both times presuming that nothing happened during the 2 months to change your math's ability" (Shannon-Baker , 2016:321).

The researcher gathered valid information from grade 6 learners about the topic of the research study. In this study, content, external and construct validity were ensured that the research instrument measures what it is intended to measure, and that it measures this correctly so that the study will produce the same results if the same study was conducted in other zones by another researcher (Hoffman, Kennedy, LoPilato, Monahan & Lance, 2015). In addition, the research instrument (questionnaires) was checked by the researcher's supervisor and empirical research experts in education management before administered it to the study participants for stable results.

3.7.1. Content validity: was ensured that the basic judgement that measures the extent to which statements or questions represented in the study has been measured by the researcher, readers and expert in the field (Kumar, 2011). The researcher ensured that the items in the research questionnaires adequately speak to the domain of interest planned to measure.

3.7.2 External validity: is the degree to which the researcher can generalize research findings to other people, places, settings, and times. Similarly, it is the extent to which one can conclude that, the results a study can be applied to a larger population, which the sample represents, or to other similar contexts (Tashakkori and Teddlie, 2009). Therefore, the researcher used suitable research design to measure external validity by establishing the validity of instrument through content validity of scores through criterion-related and construct validity strategies. This assisted in reducing threats to both internal and external validity.

3.7.3 Construct validity: measures the researcher's theoretical construct adapted in the study can be inferred from the research operations. In this study, the researcher made sure that any error that might have had negative influence on the study was avoided..

In this context, the researcher considered what educators do and considered as important to manage a learning environment. What informs them in the management of classroom learning environment and what challenges educators do face in managing the learning environment for enhanced teaching and learning; to ascertain the degree of their general understanding of classroom management in constructing the research questionnaire and interview questions. Then, the researcher used content data analysis using statistical procedures to establish the contribution of each construct statues identified to total variance. By Doing this, helped the researcher to guarantee the study validity. Yin (2013) advised that the researcher must consider the followings when collecting data to reduce result error. The first thing is reactive error. This error results from the respondents' awareness that they are the targets of study. This may be specific types for example, when participants know that camera is on them they tend to put on proper behaviour during the study rather than acting normally. This can affect the

measurement. Another source of error is investigator effects. This can be of two types (a) interviewer effects i.e. when participants are influenced by characteristics of the interviewer such as age, class, and gender; and (b) change in the research instrument. Varieties of sampling error refer to inevitable errors resulting from the researchers' inability to obtain perfect samples of person, time, or space. These include population restrictions, population stability over time and population stability over areas.

Access content errors are other major errors that the researcher must consider during the field time. This is when the researcher is unable to ascertain perfect samples of relevant content. The problems may be restrictions on content, stability of content over time and stability of content over areas (Heale & Twycross, 2015). It is therefore the researcher's responsibility to be more careful in the use of fundamental principles of mixed methods research to avoid above-mentioned errors in order during data collection to have valid and reliable study results.

3.8 Data Trustworthiness

Anney (2014) emphasized on Lincoln and Cuba (1985)'s constructs correspond to the four criteria employed by the qualitative investigator. These are:

a) **Credibility** (in preference to internal validity): Triangulation via use of different methods, different types of informants and different sites. The researcher kept the notes on research results prepared, coded data to authenticate findings.

b) **Transferability** (in preference to external validity/generalisability): Provision of background data to establish context of study and detailed description of phenomenon in question which allowed comparisons to be made.

c) **Dependability** (in preference to reliability): Employment of "overlapping methods" and in-depth methodological description to allow a study to be repeated. To ensure the dependability of this study, the researcher has quoted freely from the data and stored the voice recording on an external card contining raw individual data.

d) **Confirmability** (in preference to objectivity): Triangulation to reduce effect of investigator bias. In-depth methodological description allowed integrity of research results to be scrutinized.

3.9 ETHICAL ISSUES

People understand things differently and are irritated by some activities involving them in the research process. Therefore, it is important for the researcher to note that he or she is working with people and thus needs to consider behaviour that is acceptable in terms of protecting participants (Jimana, 2012). Since research studies raise issues that are not anticipated, the basic guideline is that the researcher should make sure that no individual suffers adversely as a result of the study and will also be attentive to maximize positive outcomes of the research process (Curtis, Comiskey & Dempsey, 2016). For the purpose of this study, the following ethical issues were observed and respected throughout the study:

3.9.1 Informed consent

Informed consent is one of the most important tools for ensuring respect for persons during research (Schofield, 2014). In this study, all the respondents were given consent forms which briefly described the expectations of them as participants. Marshall, Adebamowo, Adeyemo, Ogundiran, Strenski, and Rotimi (2014) concede that participants should be informed about the purpose and objectives of the research. The researcher sought the consent of the respondents before administering the instrument

3.9.2 Voluntary participation

A researcher should adequately inform participants that their commitment to participate is solely voluntary. When conducting research, the researcher should, under no circumstances force participants to participate or continue unwillingly with the study. The participants were informed of their freedom to withdraw at any time if they no longer

feel interested or comfortable with the study. (Smith, 2017). The participants' refusal to participate or the decision to withdraw would not result in any penalties or loss of benefits (if any) to which the participant was otherwise entitled. The researcher ensured that participation in the research was completely voluntary. Nobody was forced to participate

3.9.3 Confidentiality and anonymity

Confidentiality is about not disclosing the identity of study participants, and not attributing comments to individuals in ways that can permit the individuals or institution with which they are associated to be recognized, unless they have expressly consented to being identified. Participants should be informed about the degree of confidentiality and anonymity throughout the study and upon the study's completion (Lancaster, 2017). In this study, participants were assured that their names would not be revealed anywhere and under no circumstances in the study did the researcher disrespected the privacy of the respondents but obeyed a strict code of ethics in respecting their anonymity when recording their responses (Graf, 2017).

3.9.4 Permission

Permission was sought from the Department of Education and the principals of primary schools where the research was conducted.

3.10 LIMITATIONS

The researcher had difficulty in speaking the local language of the respondents. This condition was minimized by engaging the services of a colleague who is fluent in both English and isiXhosa. The schools' location being far away from the researcher were also a problem.

3.11 CONCLUSION

This mixed methods research was carried out according to research methodology best suited to yield the most reliable results. This chapter consisted of the research design and methodology which formed the basis of this study. An explanation for the choice of methodology and the paradigm of the study was presented. The validity and reliability of the study and the data analysis were acknowledged. The next chapter comprises of detailed analysis of the data collected. Although the researcher does not prove that the results would be applicable to all South African students, there are cohesions between this group and others from a similar background. By providing the research report, other teachers or researchers would be able to examine the findings, and find points of harmony that might be applicable in other situations.

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION

4.1 DATA ANALYSIS

In this study, parallel mixed data analysis of quantitative and qualitative was used. The analysis of both quantitative data from structured questionnaires and semi-structured interviews and observations were done. Descriptive statistics from the responses of teachers and learners applied percentages to analyze the data of the respondents and observations were made for augmentation of the data (Vitone, Stofer, Steininger, Hulcr, Dunn & Lucky, 2016). There were 357 participants comprising 345 learners and 12 educators who administered the questionnaires and both educators and learners were purposively selected from 12 primary schools (both public and private) for interviews. Quantitative analysis was done using excel 2010 to formulate into percentages whiles qualitatively, voice recordings from respondents' semi-structured interviews were kept. Quantitative and qualitative data were compared and merged during interpretation to culminate into consolidated results. This study sought to answer the main research question which examined the factors affecting grade 6 learners' performance in mathematics in East London Education District.

4.2 QUANTITATIVE DATA ANALYSIS

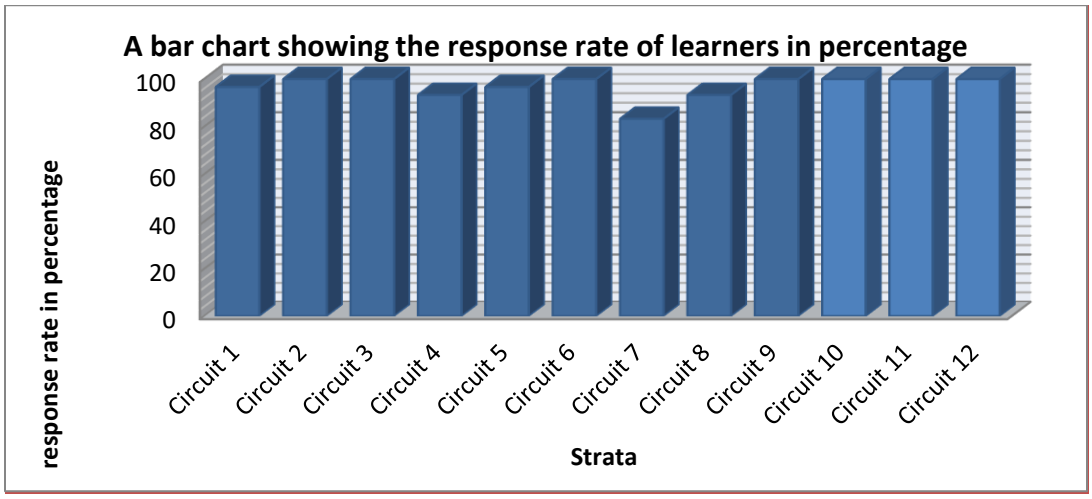
Three hundred and thirty-four (334) out of the three hundred and forty-five (345) learners completed and returned their questionnaires. This gives a response rate of ninety percent (96.8%).

Table 4.1: *The number of questionnaires distributed and the number returned*

Stratum	No. of questionnaires distributed (Circuit 1 – 9 Public schools & Circuit 10 – 12 Private schools)	No. of questionnaires returned (Circuit 1 – 9 Public schools & Circuit 10 – 12 Private schools)	Response rate in percentage (%)
CIRCUIT 1	30	29	96.7
CIRCUIT 2	30	30	100
CIRCUIT 3	30	30	100
CIRCUIT 4	30	28	93.3
CIRCUIT 5	30	29	96.7
CIRCUIT 6	30	30	100
CIRCUIT 7	30	25	83.3
CIRCUIT 8	30	28	93.3
CIRCUIT 9	30	30	100
CIRCUIT 10	25	25	100
CIRCUIT 11	25	25	100
CIRCUIT 12	25	25	100
TOTAL	**345**	**334**	**96.8**

Source: *Field study (September 2018)*

Fig. 4



Source: *Field Study (September, 2018)*

The selected respondents comprise the larger population but did not return all the distributed questionnaires as expected. It could be that some few respondents did not know what to write or might deem it not necessary to write anything, thus affecting the response rate. Even when a response rate is reported it may have been defined in a number of ways, usually according to the choice of the denominator. For example, response rate has been defined traditionally as the total number of participants who were interviewed divided by the total number who were eligible; it has also been defined as the total number of completed interviews divided by the total number of participants with whom contact was made (or the number of all possible interviews). These may be substantially different, and the reason for these differences is often related to the methods used for data collection (Fan & Yan, 2010).

From the Figure 4, it can be seen that circuit 2, 3, 6 & 9 had the highest response rate of one hundred percent (100%) for the public schools. It could be that the respondents understood what was expected of them and had adequate information to give. To add, Circuit 10, 11 & 12 had one hundred percent (100%) for the private schools, and this could be attributed to not having challenges in providing for information; this was followed by circuits 1 and 5 with ninety-six point seven percent (96.7%), and the third group circuits 4 and 8 with ninety-three point three percent (93.3%), while circuit 7 had eighty-three point three (83.3%) response rate respectively.

Some scholars have suggested a minimal level for response rate of 50% while others have suggested 80%. Again, Bailey (1992), asserted that a response rate of fifty percent (50%) is sufficient for analysis of data, a response rate of sixty percent (60%) can be said to be “good”, seventy percent (70%) is classified as “very good”, eighty to ninety percent (80% - 90%) response rate is said to be “excellent”. It can, therefore, be seen that the response rate for this research was an excellent one.

4.3 ANALYSIS OF LEARNERS' BIOGRAPHICAL DATA

The learners' biographical data is to correlate information regarding the learners' age, race, educational level of parents, employment status of parents, living with parents or guardian and mode of transport to school. There were three hundred and thirty-four questionnaires responded to by learners and twelve teachers from 12 schools in East London education district.

4.3.1 Age of learners

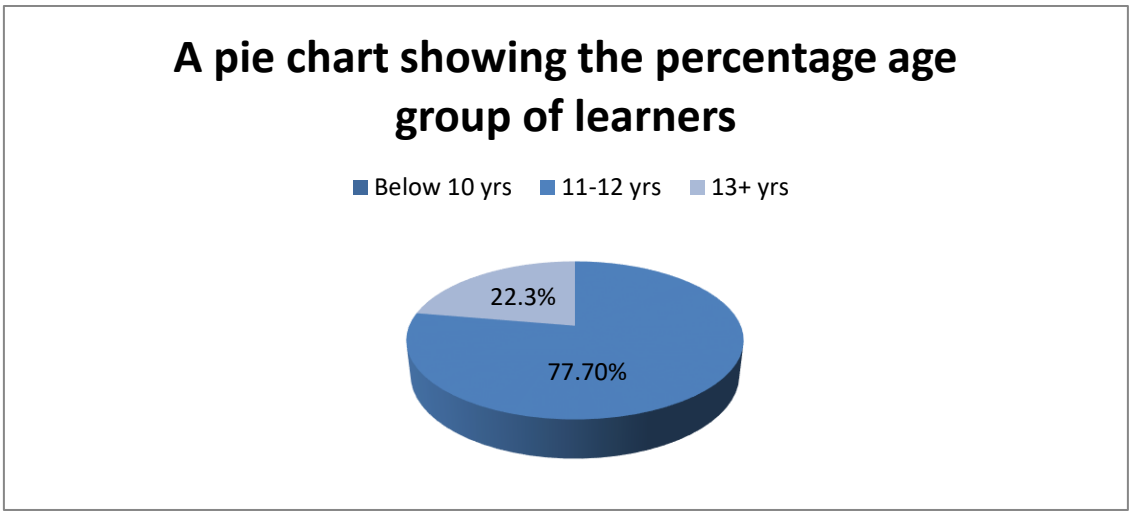
This question seeks to ascertain the average age of grade 6 learners and teachers. The table below depicts the age group of learners and teachers.

Table 4.2: *The average age of grade 6 learners*

Age category	No. of learners	Percentage
Below 10	0	0
11 - 12	322	93.3
13+	23	6.7
Total	345	100

Source: *Field study (September, 2018)*

Fig.5



The age groups of learners

Source: *Field study (September, 2018).*

In Figure 5 above, it can be deduced that three-hundred and twelve (312) learners translated to 77.7% and these are in the age category of 11-12. This is followed by twenty-two (22) learners who represent 22.3% in the age category of 13 years and above. From the above illustration, it can be observed that the average age of grade 6 learners as at the time of the survey was within 11-12 years. Ayotola and Adedeji, (2009) revealed that age had an insignificant negative correlation with mathematics performance of senior students. According to the South African Schools Act of 1996, it used to be that schooling is compulsory for all South Africans from the age of seven (Grade 1). However the revised edition states that if a child with a recognized grade R at the age of 5 years and 6 years for grade 1. If the child has not attended any grade R, then the child should be 7 years old to be admitted to grade 1.

4.3.2 Gender classification of respondents

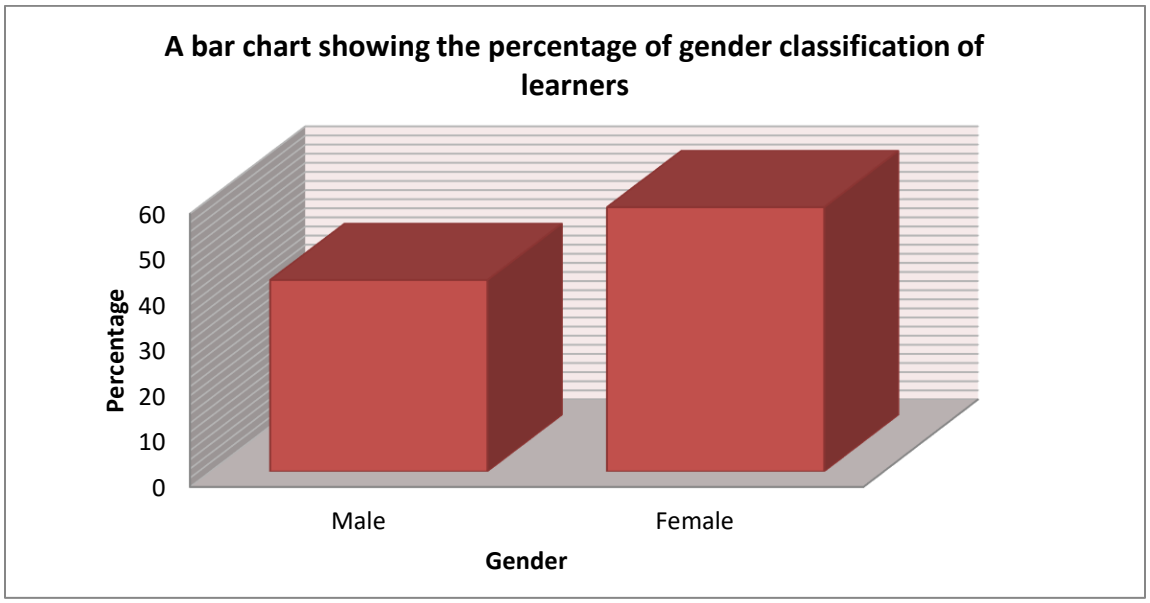
The rationale for this item was to determine the sex status of learners in grade 6.

Table 4.3: *Gender classification of learners*

Gender	No. of learners	Percentage
Male	**140**	**42**
Female	**194**	**58**
Total	**334**	**100**

Source: *Field study (September, 2018)*

Fig. 6 *Percentage of gender classification of respondents.*



Source: *Field study (September, 2018)*

Table 4.3 and Fig. 4 reveal that females happen to dominate their male counterparts in relation to numbers in grade 6 as at the time of the survey. There was a total number of three-hundred and thirty-four (334) respondents, one-hundred and thirty-four (134) representing 42% percent are males as compared to two-hundred (200) female respondents representing 68%. All the respondents indicated their gender status, which made it very easy to know the total gender distribution.

Contini, Di Tommaso and Mendolia (2017) assert that boys perform better than girls in math tests. According to the last available PISA (Programme for International Students Assessment) data set, Italy is one of the countries with the highest gender gap in mathematics for 15 years-old students. However, the traditional gender gap in educational outcomes advantaging boys has been completely filled up in most industrialized countries, and has now been reversed in favour of girls. Girls tend to do better than boys in reading test scores, in grades completion and repetition at school. In this perspective, there is now extensive literature addressing the underperformance of boys (Mann, Legewie & DiPrete, 2015)

4.3.3. Race classification of respondents

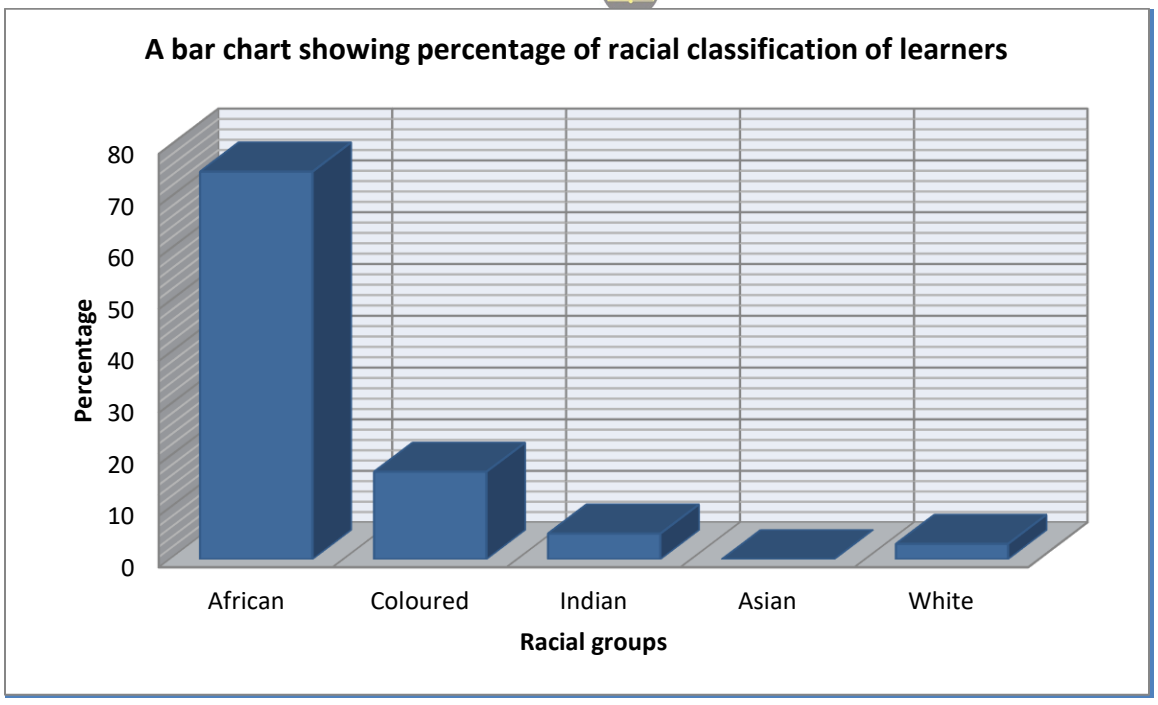
The main rationale for this questionnaire was to determine the dominant racial group in grade 6.

Table 4.4: *The racial groups in grade 6*

Race	No. of learners	Percentage
African	251	75
Coloured	57	17
Indian	17	5
Asian	0	0
White	10	3
Total	**334**	**100**

Source: *Field Study (September, 2018)*

Fig.7.



Percentage of racial classification of respondents.

Source: *Field study (September, 2018)*

From the Table 4.4 and Figure 7, it can be observed that the African learners form the majority which is two-hundred and fifty-one (251) of the respondents translating to 75%. This is followed by the Coloured group with fifty-seven (57) representing 17%. Seventeen (17) learners representing 5% are Indians and ten (10) respondents representing 3%) are Whites. None of the respondents was Asian and all the respondents indicated their race.

It could be concluded that the majority of grade 6 learners in East London education district are African as at the period of the survey.

Akoojee and Nkomo (2007) revealed that there is an undeniable national need at South African institutions to enable not only the participation of women and black students but to ensure that these participation strategies lead to successful outcomes. This has today increased the number of blacks in South African schools more than any other race.

4.3.4 Parents/caretakers of the learner

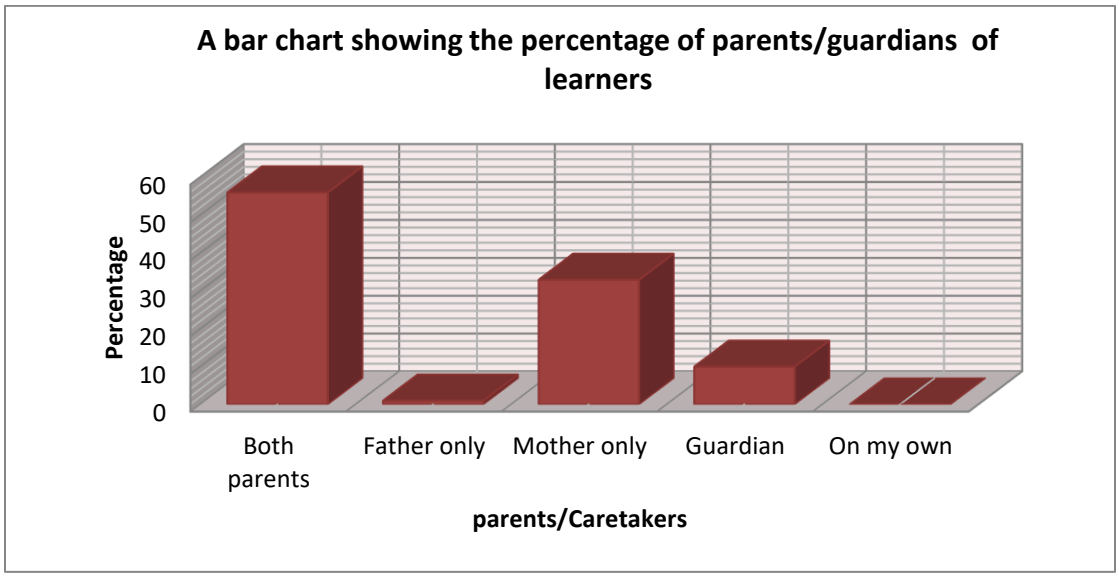
The purpose of this questionnaire was to find out whom the learner is residing with at home or who is parenting the learner.

Table 4.5: *The parents/caretakers of learners*

Caretaker	No. of learners	Percentage
Both parents	**188**	**56.0**
Father only	**1**	**1.0**
Mother only	**111**	**33.0**
Guardian	**32**	**10.0**
On my own	**-**	**0**
Total	**334**	**100**

Source: *Field study (September, 2018)*

Fig.8



Source: *Field study (September, 2018).*

From the Figure 8, the deduction can be made that one hundred and eighty-seven (187) respondents translating to 56.0% are living with both parents, one hundred and ten (110) respondents translating to 33.0% are living with their mothers alone, thirty three respondents (33) representing 10.0% are living with their guardians, four (4) respondents representing 1% are living with their fathers and none of the respondents was living alone. It can be deduced from Table 4.5 that most of the learners are living with both parents, which could mean that most of parents value staying together to raise their children.

A number of learners staying with mothers only could be as a result of job transfers of the fathers, the absence of fathers from home, possible death of their fathers or the neglect of fatherly responsibilities or divorce. None of the learners live alone instead, parents take responsibility of their children as they are minors.

LaRocque, Kleiman and Darling (2011) opined that parents and caregivers are a child's first and most interested teachers whose roles do not cease to exist when children enter school. In fact, they play a critical role in the education of their children. Working with

the school, parents and caregivers can help create collaborative partnerships that support all aspects of a child's achievement at school. Increased parental involvement in their child's education has many positive implications, including increased achievement levels.

4.3.5 The highest educational level of parents/guardian

The purpose of this question was for the researcher to ascertain the highest educational level of parents/guardian.

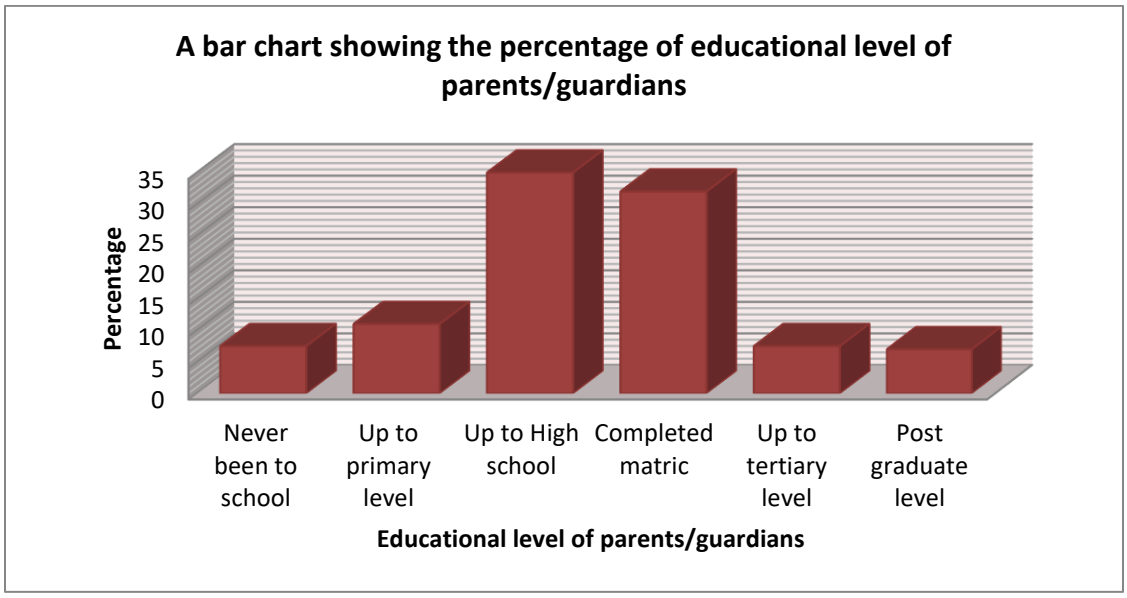
Table 4.6: *The educational level of parents/guardians*

Educational level	No. of learners	Percentage
Never been to school	**26**	**7.5**
Up to primary level	**35**	**11.0**
Up to high school	**118**	**35.0**
Completed matric	**107**	**32.0**
Up to tertiary level	**26**	**7.5**
Post graduate level	**22**	**7.0**
Total	**334**	**100**

Educational level of parents/guardians

Source: *Field study (September, 2018)*

Fig.9



Highest educational level of parents/guardians

Source: *Field study (September, 2018)*

With reference to Table 4.6 and Figure 9, it can be noted that, one hundred and eighteen out of three hundred and thirty-four respondents making 35% majority of the parents/guardians had up to high school level of education, one hundred and seven (107) parents/guardians representing 32% have had up to matric level of education, thirty-five (35) parents/guardians translating to 11% had achieved primary level of education; fifty-two (52) parents/guardians forming twenty-six (26) each have never been to school and another twenty-six (26) have achieved tertiary level of education translating to 7.5% each and twenty-two (22) parents/guardians translating to 7% had achieved postgraduate level of education.

The above shows that most parents and guardians have gone through high school and matriculated. It is quite encouraging that a substantial number of parents/guardians have attained in their education, tertiary level and above which could enhance their ability to assist learners to learn mathematics.

LaRocque, Kleiman and Darling (2011) argue that there is a need to move from this idea that parents are the same, with the same needs because parental involvement in schools and in the education of their children is positively correlated with increasing educational achievement. It is important to devise ways to increase parental involvement. The educational achievement levels of students who are from diverse backgrounds lag behind in terms of performance. The educational levels of parents play much role in their children's academic performance most especially when the parents are on the average of semi – literate to be able to assist their children. It is important that in tackling the issue of achievements of learners, the educational levels of parents must be taken into account because parents are second to the teacher regarding the education of their children. Basically, it is expected that parents/guardians take the responsibility to monitor and supervise learning at home which could go a long way to improve the learning outcomes. However, the educational level of parents from Table 4.8 indicates that some parents/guardians are unlikely to initiate such interactions because they will feel handicapped to do so. In reference to Adewale (2012), revealed that the educational level of parents affect their socio–economic status; this does not only affect their academic performance, but also makes it possible for children from low parental educational background to be out competed by their counterparts from high socio – economic background under the same academic environment.

4.3.6 Employment status of parents/guardians

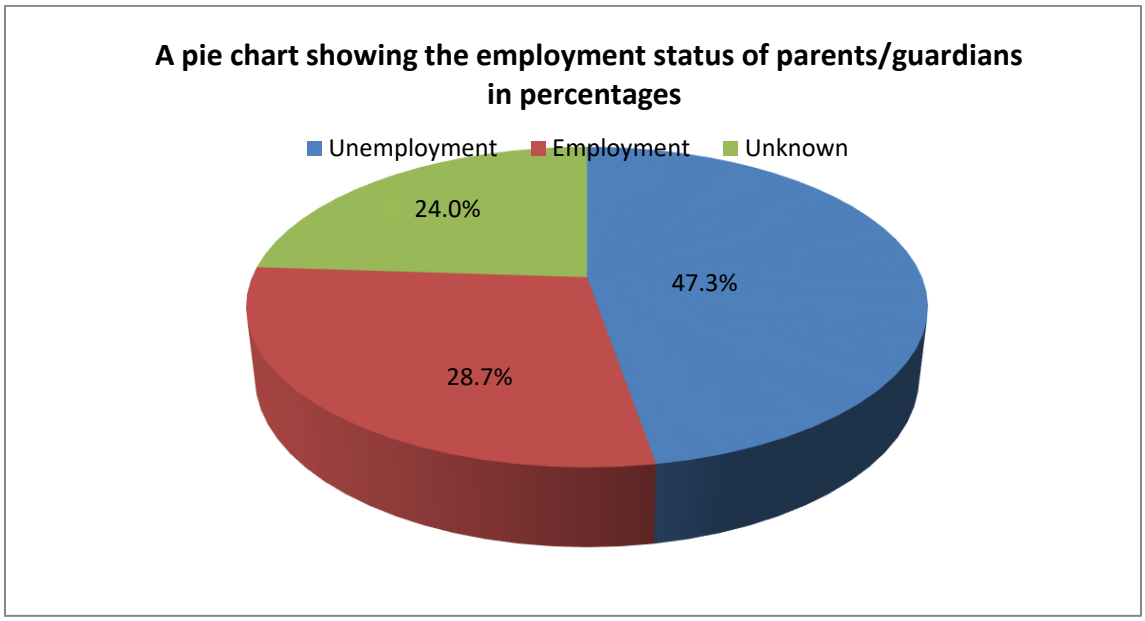
The aim of this question was to find out the employment status of parents/guardians.

Table 4.7: *The employment status of parents/guardians*

Employment status	No. of learners	Percentage
Unemployed	**158**	**47.4**
Employed	**96**	**28.7**
Unknown	**80**	**23.9**
Total	**334**	**100**

Source: *Field study (September, 2018)*

Fig.10



The percentage of employment status of parents/guardians.

Source: *Field study (September, 2018).*

The Table 4.7 and Figure 10, show the employment status of parents/guardians. It is shown that one hundred and fifty-eight (158) translating to 47.3% of the majority of parents /guardians were unemployed as at the time the survey was conducted. Ninety-six (96) representing 28.7% were employed and eighty (80) amounting to 24.0% did not know the employment status of their parents/guardians.

From Figure 10, it can be observed that there is a high unemployment level among parents/guardians in the East London Education District as at the time of the survey. The high unemployment level of parents/guardians is therefore has a tendency to limit the level of parental support to be accorded to their children. This support refers to provision of school uniforms, transportation fares, payment of school fees, providing well-balanced diet food, providing and replacing stationeries and all other expenses that may arise as a result of educational requirements from schools.

Nonetheless, there are some fewer options that unemployed parents can do themselves which are not financial. These can be by supporting their children by encouraging them emotionally and psychologically to take learning seriously, helping them children to identify their strong areas in choosing the best future career according to their academic strengths and monitoring their children's school activities such as getting feedback from Parents Teachers' Association (PTA) regarding the conducts of their children. A possible explanation for the "response unknown" could be attributed to the learners not able to understand the question or did not know the employment status of the parents/guardians. Based on the information above, the actual percentage of parents/guardians who are employed or unemployed cannot be holistically be ascertained.

The inability to have financial means to consistently provide for the basic resources is not far from poverty. Such resources can include financial, emotional, mental, spiritual, and physical resources as well as support systems, relationships, role models, and knowledge of hidden rules. Poverty directly affects academic achievement due to the lack of resources available for learners' success. Low achievement is closely correlated with lack of resources, and numerous studies have documented the correlation between low socio-economic status and low achievement (Lacour & Tissington, 2011).

4.3.7. Modes of transport by learners to school

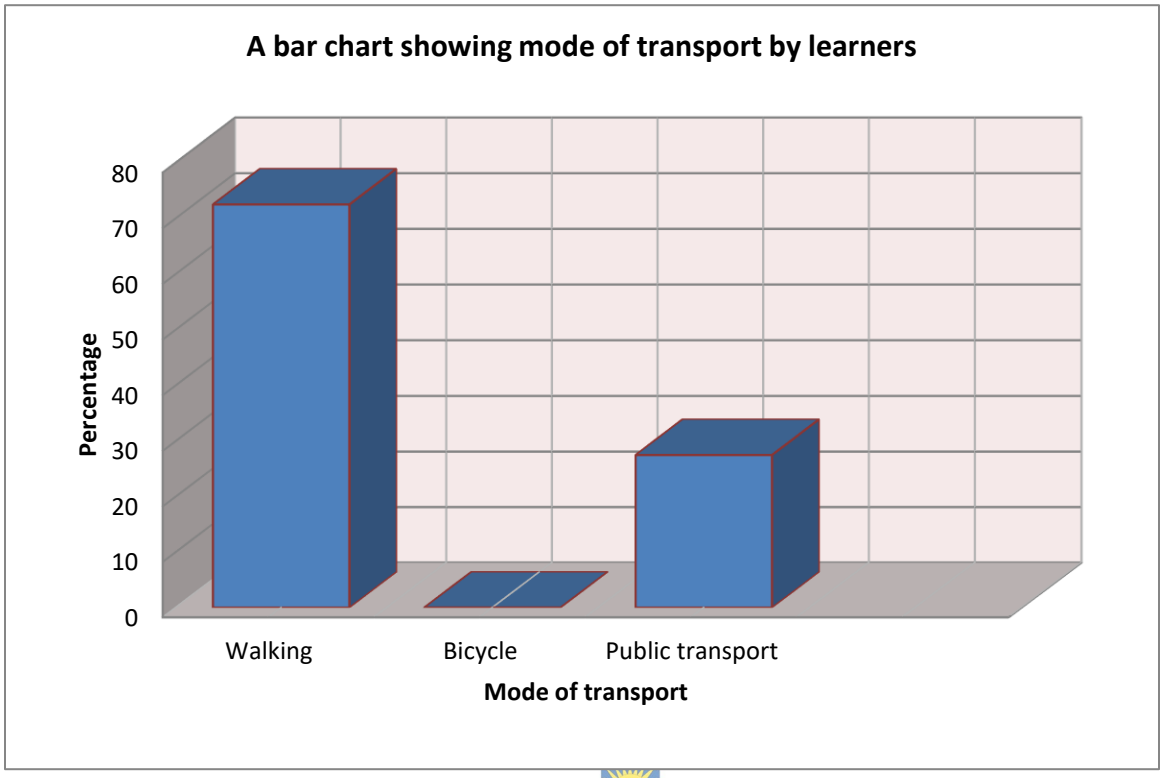
The purpose of this question was to indicate the various modes of transport used by learners to go to school.

Table 4.8: *The mode of transport used by learners to go to school*

Mode of transport	No. of learners	Percentage
Walking	**92**	**27.5**
Bicycle	**0**	**0.0**
Public transport	**242**	**72.5**
Total	**334**	**100**

Source: *Field study (September, 2018)*

Fig.11.



Percentage of mode of transport used by learners to go to school.

Source: *Field study (September, 2018).*

Table 4.8 shows that two-hundred and forty-two (242) respondents translating to 72.5% walk to school, ninety-two (92) learners translating to 27.5% use public transport to school and none of the learners ride on bicycles to school. It can be deduced that the majority of the learners walk to school.

The explanation for this could possibly be related to the distance of the schools to their homes or locations as the majority of parents/guardians who remain unemployed could not afford transport fares.

Röllin, Mathee, Levin, Theodorou and Wewers (2005) asserted that walking to school is great exercise as long as it is a reasonable distance. Generally, an average person is considered to walk between 2-3 km per 30 minutes. According to the information released by Statistics South Africa in July 2014, eight million children in Grade 1 to

Grade 12 walk all the way to school. Two million South African children walk for over 30 minutes to get to school. This means that these children walk more than 6km just going to and from school each day. Over 1 million South African children walk for more than an hour to school, and this translates to walking more than 12km every day to school and back.

From this survey, it possible causes that affect school attendance are often affected when there are unfavourable weather conditions such as a rainstorm or extreme cold or strong wind because the majority of the learners walk to school. This eventually leads to absenteeism or lateness to school which contributes to factors affecting poor performance of learners in mathematics. These backlogs become extremely serious if the educator is not able to offer remedial teaching and also if he/she lacks the technical know-how to find solutions for such learners. Learners who also take public transport to school absent themselves from school if they do not have money for transport.

4.4. QUESTIONNAIRE ON FACTORS AFFECTING LEARNERS' MATHEMATICS PERFORMANCE

4.4.1 What is your attitude towards the subject mathematics?

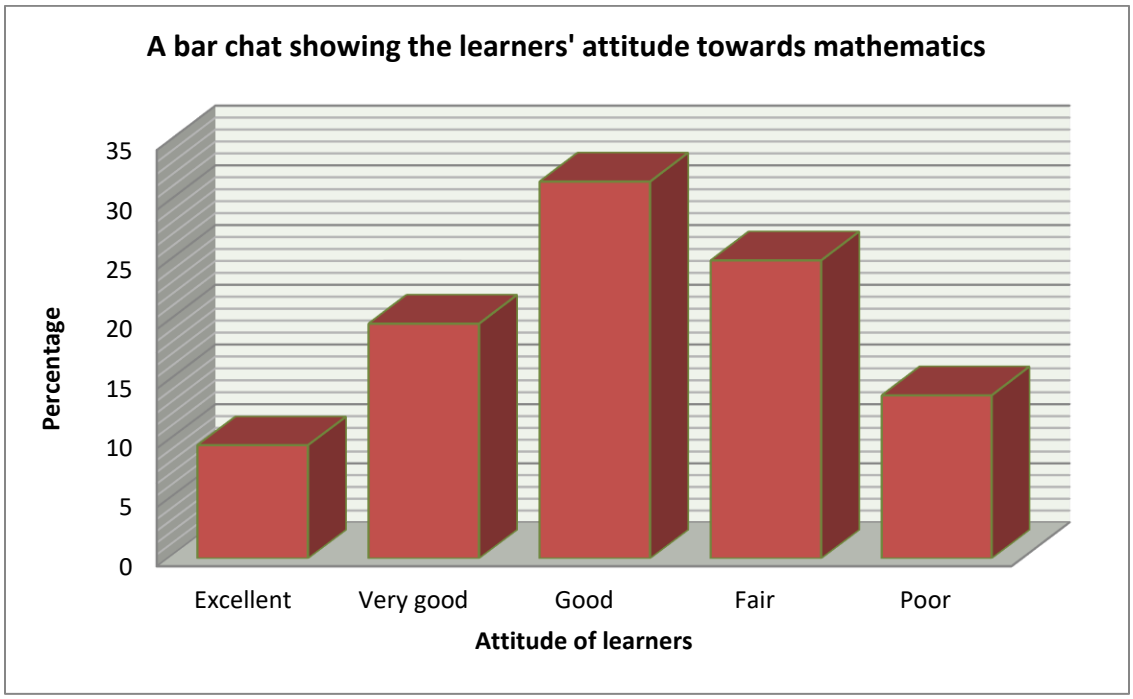
The aim of this question was to find out the attitude learners have towards mathematics.

Table 4.9: *The attitude of learners towards mathematics*

Attitude	No. of learners	Percentage
Excellent	**32**	**9.6**
Very good	**66**	**19.8**
Good	**106**	**31.7**
Fair	**84**	**25.1**
Poor	**46**	**13.8**
Total	**334**	**100**

Source: *Field study (September, 2018)*

Fig.12.



The attitude of learners towards mathematics

Source: *Field study (September, 2018)*

From Table 4.9 and Figure 12, it can be observed that one-hundred and six (106) learners amounting to 31.7% have a good attitude towards mathematics, eighty-four (84) learners representing to 25.1% have a fair attitude towards mathematics, sixty-six (66) learners translating to 19.8% have a very good attitude towards mathematics, forty-six (46) learners representing 13.8% have poor attitude towards mathematics and thirty-two (32) learners representing 9,6% have an excellent attitude towards mathematics.

From the above, it can be observed that the vast majority of the learners like mathematics which forms a total of 61%. A study done by Mohamed and Waheed (2011) supported that learners' positive attitude towards mathematics was not enough to increase performance but there are major factors such as the teachers' attitude, teacher's methodology, classroom environment and the availability and modernization of resources. Their study also showed that despite the lower performance of Maldivian

students in mathematics, the attitude of the respondents of their study was positive. However, other studies have shown that there is a positive correlation between mathematics attitudes and math achievement. According to Schereiber, (2000) and Hemmings, Grootenboer & Kay (2011), those who have positive attitudes toward mathematics perform better in the subject.

4.4.2 What is your level of understanding when English is used as a medium of instruction in teaching mathematics?

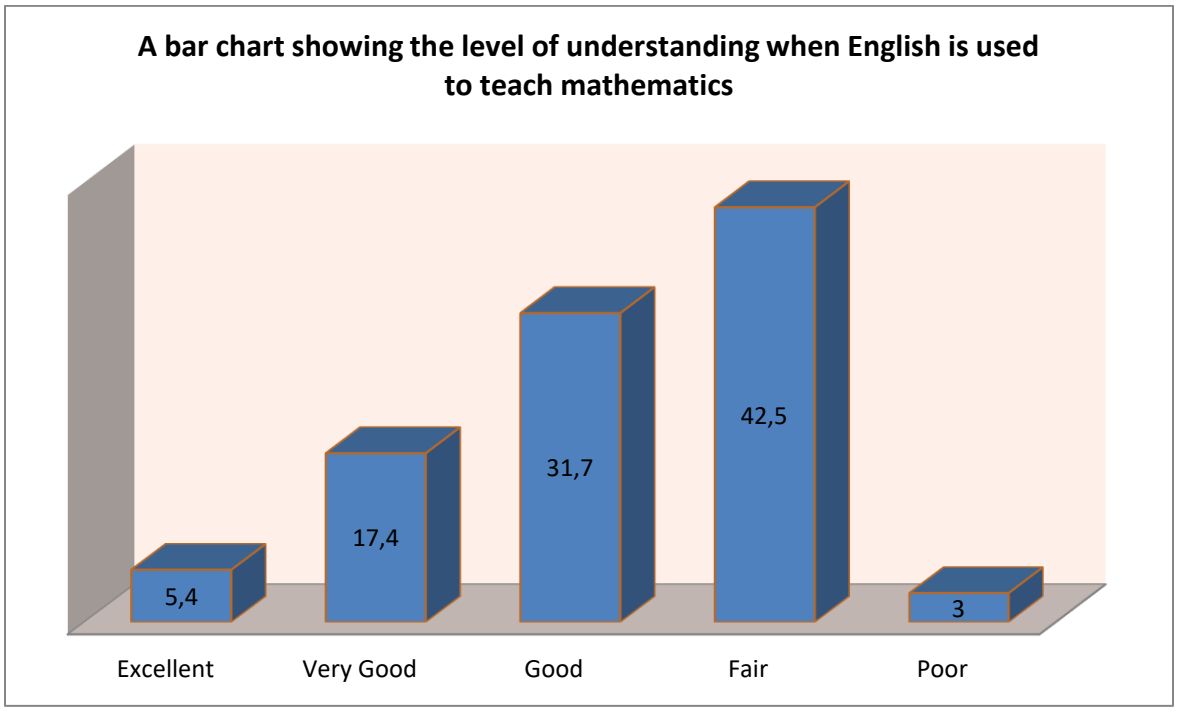
The purpose of this question was to ascertain the level of understanding on the usage of English as a medium of instruction in teaching mathematics.

Table 4.10: *The level of understanding of learners when English is used as a medium of instruction*

Level of understanding	No. of learners	Percentage
Excellent	**18**	**5.4**
Very good	**58**	**17.4**
Good	**106**	**31.7**
Fair	**142**	**42.5**
Poor	**10**	**3.0**
Total	**334**	**100**

Source: *Field study (September, 2018)*

Fig.13.



The level of understanding of learners when English is used as a medium of instruction for mathematics.

Source: *Field study (September, 2018)*

From Table 4.10 shows that one hundred and forty-two (142) learners' representing 42.5% understanding of mathematics when English language is used as a medium of instruction is "fair", one hundred and six (106) learners' understanding, translating 31.7% is "good", fifty-eight (58) learners' understanding, representing to 17.4% is " very good", eighteen (18) learners' understanding reflecting 5.4% understanding "Excellent", and ten (10) learners' understanding representing (3%) level of understanding of mathematics is "poor" when English is used as a medium of instruction.

It can therefore be deduced that majority of the learners' level of understanding mathematics when English is used as a medium of instruction is "fair". However, mathematics as a subject is universal and it is written in the universal language. It is important for mathematics educators to emphasize much on how the learners would be

able to express themselves in universal language of mathematics. For instance, the use of “less than” in English in mathematical language will be “<”; “product” as “x” and so on.

Many researchers have opined that mathematical communication is more than vocabulary. While vocabulary is necessary, it is not sufficient. Learning to communicate mathematically is not merely or primarily a matter of learning vocabulary. During discussions in mathematics classrooms, students are also learning to describe patterns, make generalizations, and use representations to support their claims. The question is not whether students who are ELs should learn vocabulary but rather how instruction can best support students as they learn both vocabulary and mathematics. Vocabulary drill and practice is not the most effective instructional practice for learning either vocabulary or mathematics (Moschkovich, 2012).

4.4.3 What is your level of confidence in solving mathematics questions?

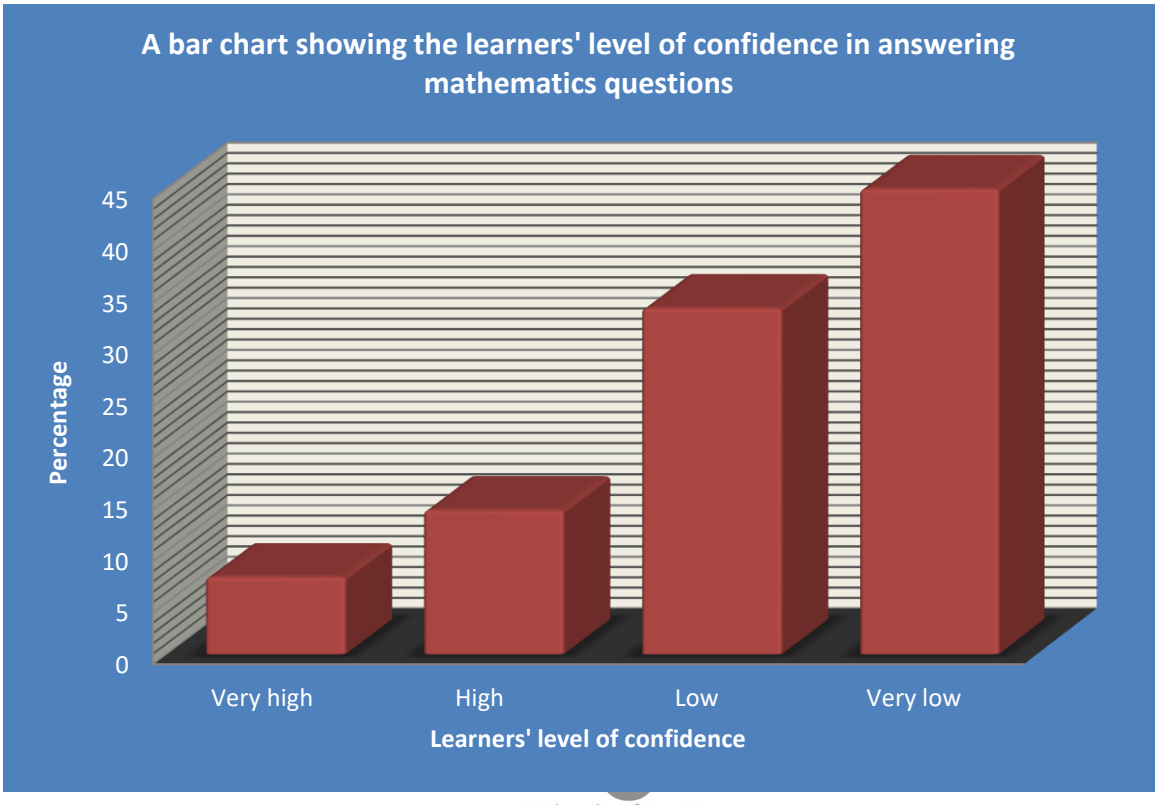
The aim of this question was to access the level of confidence of learners in solving mathematics questions.

Table 4.11: *The confidence level of learners in answering mathematics questions*

Level of confidence	No. of learners	Percentage
Very high	**25**	**7.5**
High	**47**	**14.0**
Low	**112**	**33.5**
Very low	**150**	**45.0**
Total	**334**	**100**

Source: *Field study (September, 2018)*

Fig.14.



The learners' level of confidence in answering mathematical questions.

Source: *Field study (September, 2018)*

Table 4.11 above revealed that one hundred and fifty (150) learners' (45%) level of confidence in solving mathematics is "very low", one hundred and twelve (112) learners' (33.5%) level is "low", forty-seven (47) learners' (14%) level of confidence is "high" and twenty-five (25) learners' (3.7%) level of confidence in solving mathematics questions is "very high".

The level of confidence in solving mathematics questions generally is "very low" as observed from Table 4.11 above. Confidence in mathematics is vital because it creates the awareness of the learners' preparedness in solving mathematics questions. Lack of confidence would affect the performance of learners in mathematics eventually.

In the study of Ku, Chen, Wu, Lao and Chan (2014), they supported that low confidence is one of the critical reasons that makes students to face challenges in learning Mathematics. Such a negative feeling may consequently make a student give up learning mathematics (Brown, Brown, & Bibby, 2008). In other words, self-confidence plays an important role in learning because it is a predictor of a learner's learning behavior and the expectation of outcomes (Maclellan, 2014). Students with high self-confidence may attain better performance in tasks (Kleitman, Stankov, Allwood, Young, & Mak, 2013) and engage in target tasks more actively (Gushue, Scanlan, Pantzer, & Clarke, 2006) than those who are less confident about the tasks. In addition, students with high self-confidence usually regard difficult tasks as meaningful tests (Bandura, 1994) while those with low self-confidence tend to avoid calling for help (Ryan, Patrick, & Shim, 2005). Thus, there is a need to give additional support to students with low confidence toward mathematics.

4.4.4. How do you evaluate the method used by your mathematics educator in teaching?

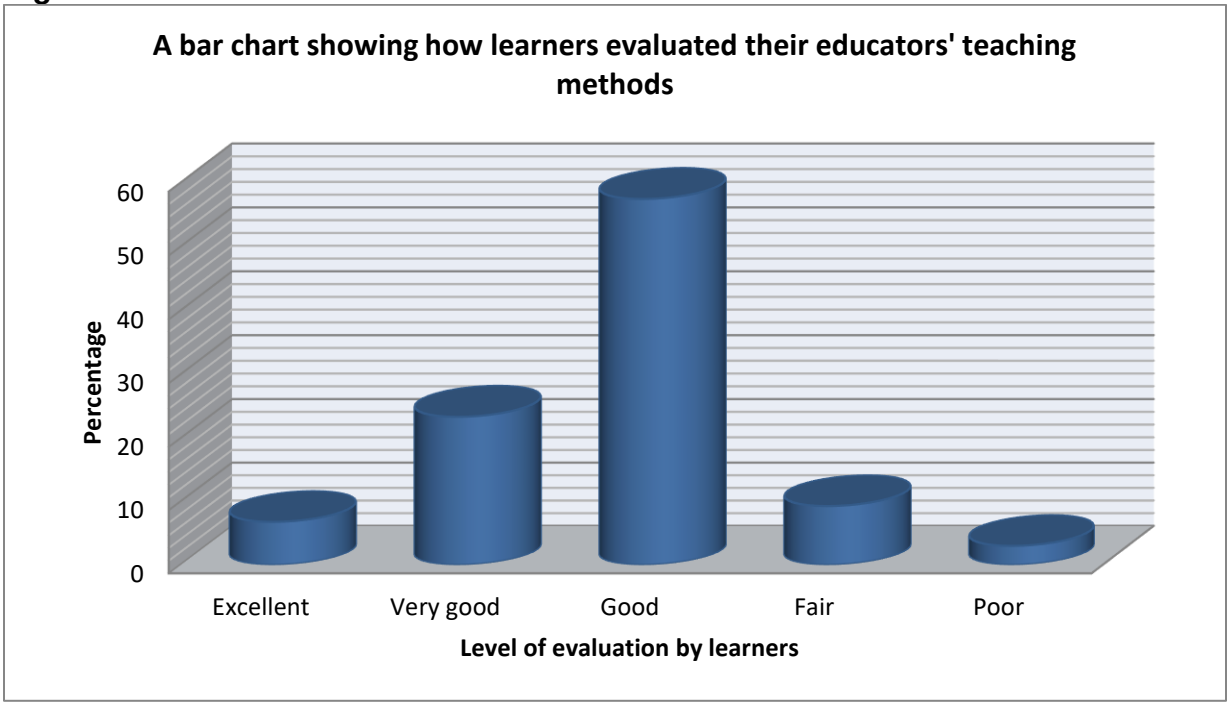
The purpose of this question was to gauge how learners evaluate educators' methods of teaching mathematics

Table 4.12: *How learners evaluate educators' methods of teaching mathematics*

Evaluation	No. of learners	Percentage
Excellent	**23**	**6.8**
Very good	**78**	**23.4**
Good	**192**	**57.5**
Fair	**31**	**9.3**
Poor	**10**	**3.0**
Total	**334**	**100**

Source: Field study (September, 2018)

Fig.15



Evaluation of the method used by the mathematics educator.

Source: *Field study (September, 2018)*

From Table 4.12 it can be noted that one-hundred and ninety-two (192) learners (57.5%) evaluated the methods the mathematics educator uses in teaching as “good”, seventy-eight (78) learners (23.4%) evaluated the methods the mathematics educator use as “very good”, thirty-one (31) learners (9.3%) evaluated the methods the mathematics educator uses as “fair”, ten (10) learners (3%) were of the view that the methods are “poor” and twenty (23) learners (6.8%) evaluated them as “excellent”.

From the above observations, it is clear that the majority of the learners are averagely acquainted with the methods that the mathematics educator uses in teaching mathematics.

Ganyaupfu, (2013) claims that to facilitate the process of knowledge transmission, teachers should apply appropriate teaching methods that best suit specific objectives and level exit outcomes. In the traditional epoch, many teaching practitioners widely

applied teacher-centered methods to impart knowledge to learners comparative to student-centered methods. Moreover, research on teaching and learning constantly examines the extent to which different teaching methods enhance growth in student learning. Quite remarkably, regular poor academic performance by the majority of students is fundamentally linked to application of ineffective teaching methods by teachers to impart knowledge to learners. In order for the method used for teaching to be effective, the teachers need to be conversant with numerous teaching strategies that take recognition of the magnitude of complexity of the concepts to be covered (Adunola, 2011). Substantial research on the effectiveness of teaching methods indicates that the quality of teaching is often reflected by the achievements of learners.

4.4.5. What is the level of motivation given by your mathematics educator in studying mathematics?

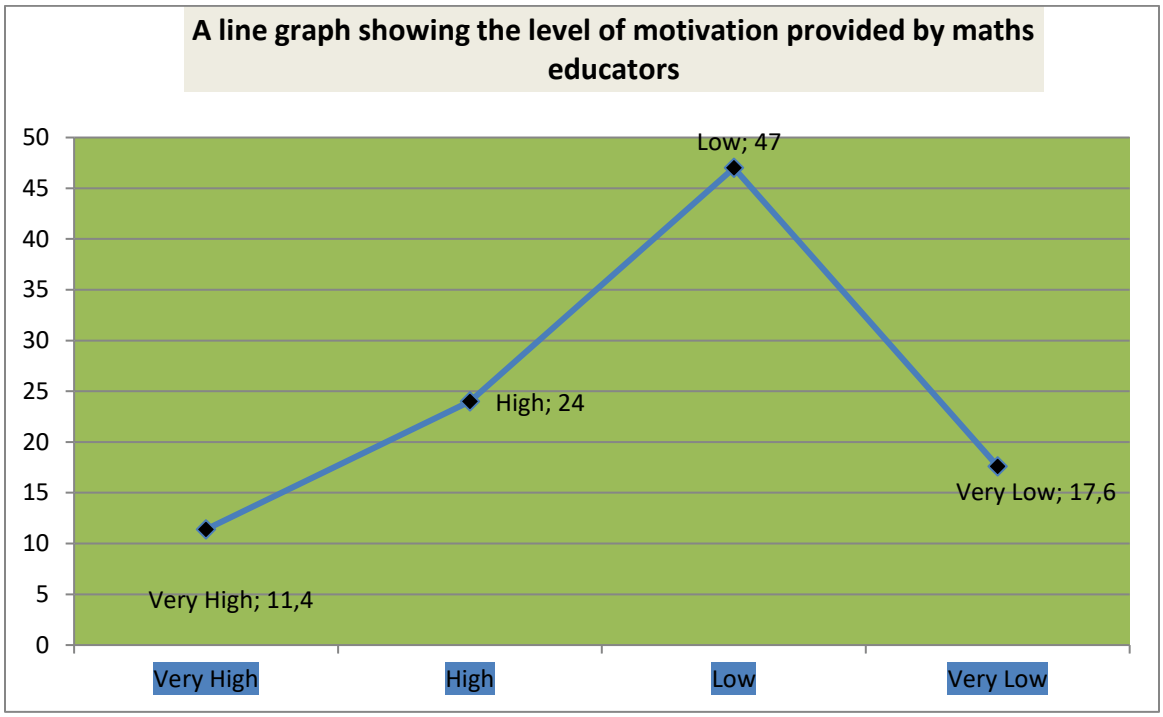
The aim of this question was to determine the level of motivation of learners given by the mathematics educator in studying mathematics.

Table 4.13: *The level of motivation provided by educators to learners*

Level of motivation	No. of learners	Percentage
Very high	38	11.4
High	80	24.0
Low	157	47.0
Very Low	59	17.6
Total	**334**	**100**

Source: *Field study (September, 2018)*

Fig.16.



The level of motivation in mathematics provided by educators to learners.

Source: *Field study (September, 2018)*

From Table 4.13, it can be observed that one hundred and fifty-seven learners (157) representing 47.0% have “low” motivation for learning mathematics from their mathematics educators, eighty (80) learners (24%) have “high” motivation for learning mathematics from their mathematics educators, fifty-nine (59) learners (17.6%) have “very low” motivation and thirty-eight (38) learners (11.4%) have “very high” motivation for learning mathematics from their mathematics educators.

The analysis above shows that generally, the level of motivation given to learners by mathematics educators is low, which could have adverse effects on the learners regarding the learning of mathematics. This might be due to lack of teaching / learning materials to make the subject interesting, or low motivation by government to mathematics educators and learners or lack of interest by the educators to teach the subject.

Sikhwari (2014) cited Awan (2011) that lack of motivation is one of the most critical factors affecting learning, especially in historically disadvantaged educational institutions. The researcher was of the view that there is a strong relationship between learning and motivation. Students who are unmotivated to learn are not enthusiastic in their learning efforts. They may be inattentive during the lesson. Other researchers believe that motivation influences learning and performance and what learners do and learn influence their motivation. Gesinde, in Muola (2010), argues that the urge to achieve varies from one individual to the other. He adds that those who have high achievers as their role models in their early life experience would develop a high need for achievement, while those who have low achievers as their role models will hardly develop the need for achievement. According to Tella (2007) argued that satisfactory school learning is unlikely to take place in the absence of sufficient motivation to learn.

4.4.6. How do you evaluate the examples and activities in the grade 6' mathematics textbook?

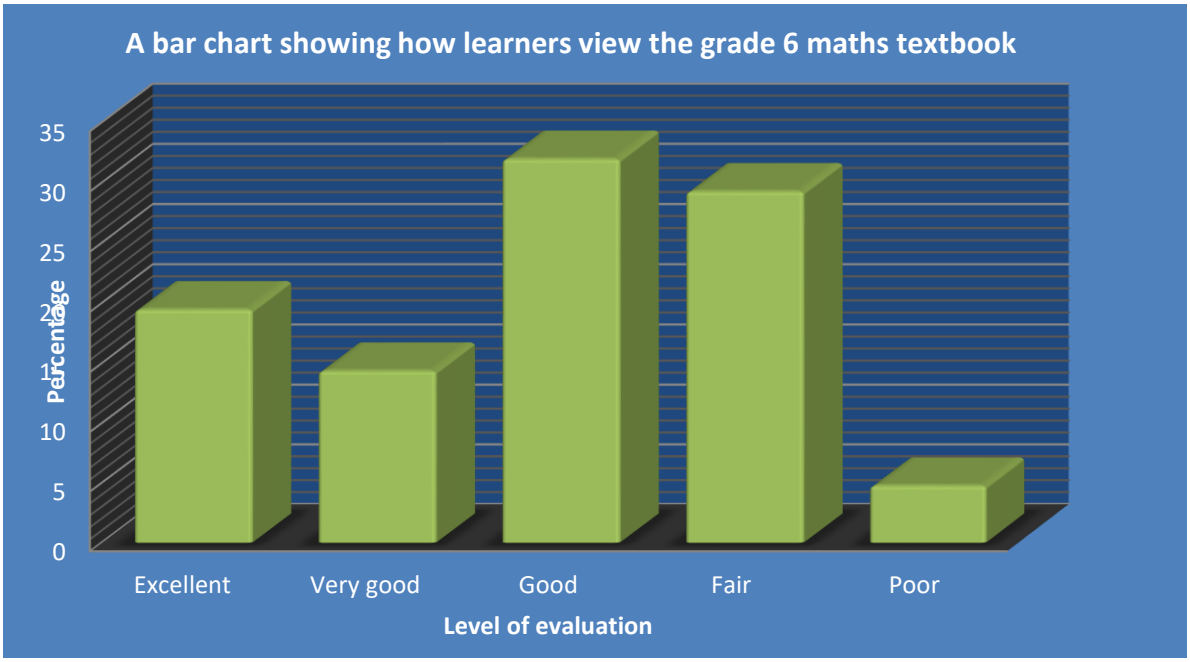
The purpose of this question was to determine how the learners of grade 6 view the examples and activities in the mathematics textbook.

Table 4.14: *How learners evaluate examples and activities in grade 6 mathematics textbook*

Evaluation	No. of learners	Percentage
Excellent	**65**	**19.5**
Very good	**48**	**14.4**
Good	**107**	**32.0**
Fair	**98**	**29.3**
Poor	**16**	**4.8**
Total	**334**	**100**

Source: *Field study (September, 2018)*

Fig.17.



How learners evaluate examples and activities in grade 6 mathematics textbook.

Source: *Field study (September, 2018).*

One-hundred and seven (107) learners representing 32.0% viewed the examples and activities in the grade 6 mathematics textbook as “good”, ninety-eight (98) learners representing 29.3% evaluated examples and activities in the grade 6 mathematics textbook as “fair”, sixty-five (65) learners (19.5%) evaluated examples and activities in the grade six mathematics textbook as “excellent”, forty-eight (48) learners (14.8%) evaluated examples and activities as “very good” and sixteen (16) learners (4.8%) evaluated examples and activities in the grade 6 mathematics textbook as “poor”.

The above observation shows clearly that the majority of the learners viewed the examples and activities in the Grade 6 Mathematics textbook as “good” which could be that on the average they are able to do the activities or might understand fairly the examples given in the textbook.

Erbas, Alacaci and Bulut (2012) in their study explained that mathematics textbook serves student learning in more than one way; as a student reads explanations from the textbook, s/he individually works on exercises to reinforce learning, as student solves problems assigned for homework from the textbook. Also, textbooks serve as a resource for teachers to revisit and refresh the Mathematical knowledge they teach, so textbooks suggest ways to explain and plan for classroom activities for teachers (Rezat, 2006). Good textbooks not only present mathematical knowledge, but also suggest ways for students and teachers of how to interact with the text and construct meaning from it.

4.4.7. What is the state of studying mathematics at home after school?

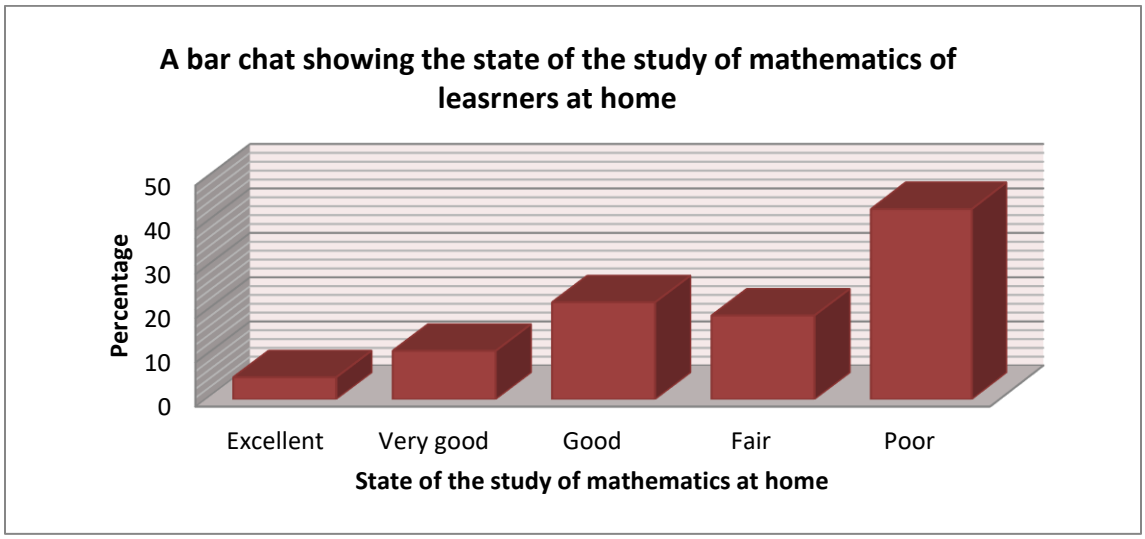
This question was to establish the nature of the studying of mathematics by learners at home.

Table 4.15: *The state of the study of mathematics by learners at home*

State of study	No. of learners	Percentage
Excellent	**18**	**5.0**
Very good	**35**	**11.0**
Good	**63**	**22.0**
Fair	**76**	**19.0**
Poor	**142**	**43.0**
Total	**334**	**100**

Source: *Field study (September, 2018)*

Fig. 18



The state of study of mathematics at home after school.

Source: *Field study (September, 2018).*

From Table 4.15 above it can be noted that one hundred and forty-two (142) learners (43.0%) state that studying of mathematics after school is "poor", seventy-six (76) learners (19.0%) state the state of study of mathematics after school is "fair", sixty-three (63) learners representing 22.0% state that it is "good", thirty-five (35) learners representing 11.0% say it is "very good" and eighteen (18) learners (5.0%) state that their study of mathematics after school is "excellent".

It can be seen clearly from the above responses that the majority of the learners do have the difficulty in studying mathematics at home after school. This might be due to lack of monitoring from the parents/guardians for the learners to study or assist them at home when faced with difficulties in studying Mathematics; it could also be due to laziness on the part of the learners or the inability to solve mathematical problems on their own. Buijs and Admiraal (2013) in their study suggested that one of the ways to stimulate learners' activity and motivation is there through their homework. Generally, a positive relationship is found between doing homework and school results. Some studies demonstrated that there is a positive relationship between homework of learners

and their school results in terms of both class grades and standardized test scores. In addition, there was a conclusion that completing that completing homework has a positive effect on learners' achievements. Again, Epstein and Van Voorhis (2001) concluded that learners performed better in school when they spent more time in general on their homework.

4.4.8 How do you rate the assistance or supervision received from parents/guardians towards the study of mathematics at home?

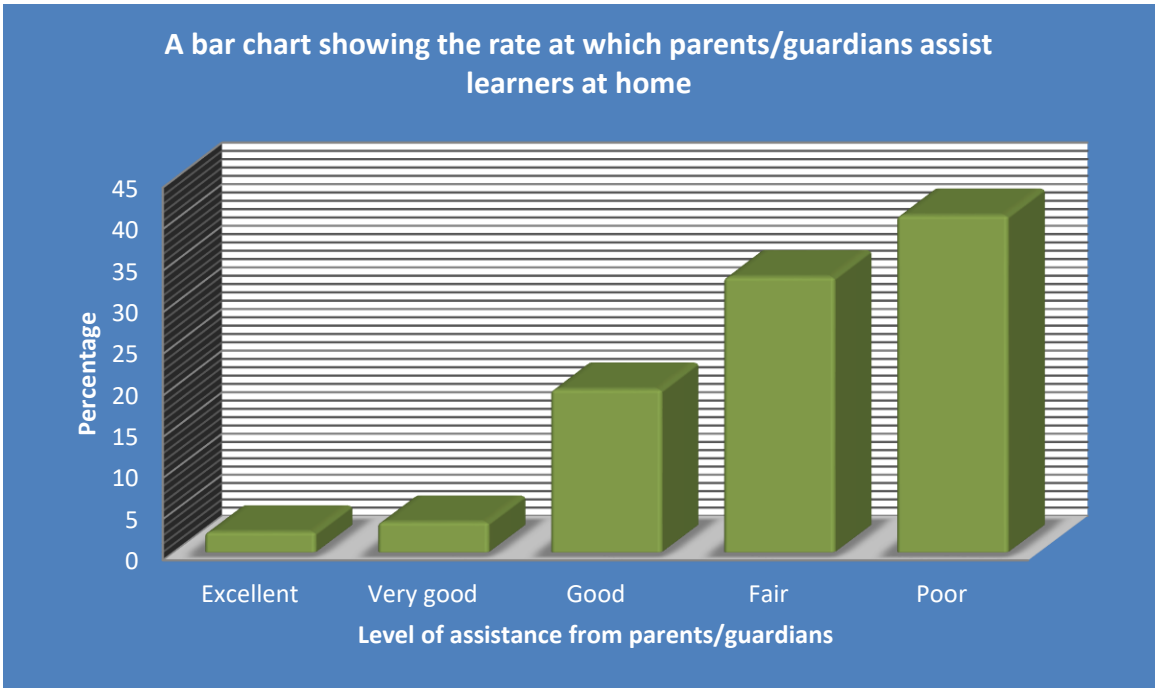
The purpose of this question was to find out the attempt to which parents/guardians assist or supervise their children in the learning of mathematics at home.

Table 4:16: *The rate of parent/guardian assistance to learning of mathematics at home*

Parent/guardian assistance	No. of learners	Percentage
Excellent	**15**	**5.0**
Very good	**22**	**7.0**
Good	**37**	**11.0**
Fair	**78**	**23.0**
Poor	**182**	**54.0**
Total	**334**	**100**

Source: *Field study (September, 2018)*

Fig. 19



The rate at which parents/guardians assist their children to study mathematics at home.

Source: *Field study (September, 2018)*

Table 4:16 shows that one hundred and eighty-two (182) learners (54.0%) rate the assistance or supervision received from their parents/guardians at home for mathematics as “poor”, seventy-eight (78) learners (23.0%) see it as “fair”, thirty-seven (37) learners (11.0%) rate it as “good”, twenty-two (22) learners representing 7.0% rate the assistance or supervision received from their parents or guardians at home for mathematics as “very good” and fifteen (15) learners (5.0%) as “excellent”.

From the above analysis, it can be noted that the majority of the learners do not get assistance or supervision or are not being monitored by parents/guardians at home on mathematics. This might be because of the parents/guardians cannot read or write. It might also be attributed to the absence of parents/guardians from home, tiredness after work or not seeing the need for their children’s education. Parental expectations for children’s educational attainment, parental involvement in homework, cognitive

stimulation activities at home, parent-child communication (about school, friends, and health-risk behaviors) and participation in school and community activities. Some dimensions of parental involvement have been suggested to be associated with learners' academic achievement. Parental involvement has potential factors that affect the development of the academic achievement. Research indicates that parental involvement may affect learners' academic achievement indirectly through influencing their self- regulated learning (Xu, Benson, Mudrey-Camino & Steiner, 2010).

4.5 EDUCATORS' QUESTIONNAIRE ANALYSIS

This section deals with responses and analysis of the selected educators teaching grade 6 mathematics. This includes their demographic details and teaching strategies.

4.5.1 The age of the educator

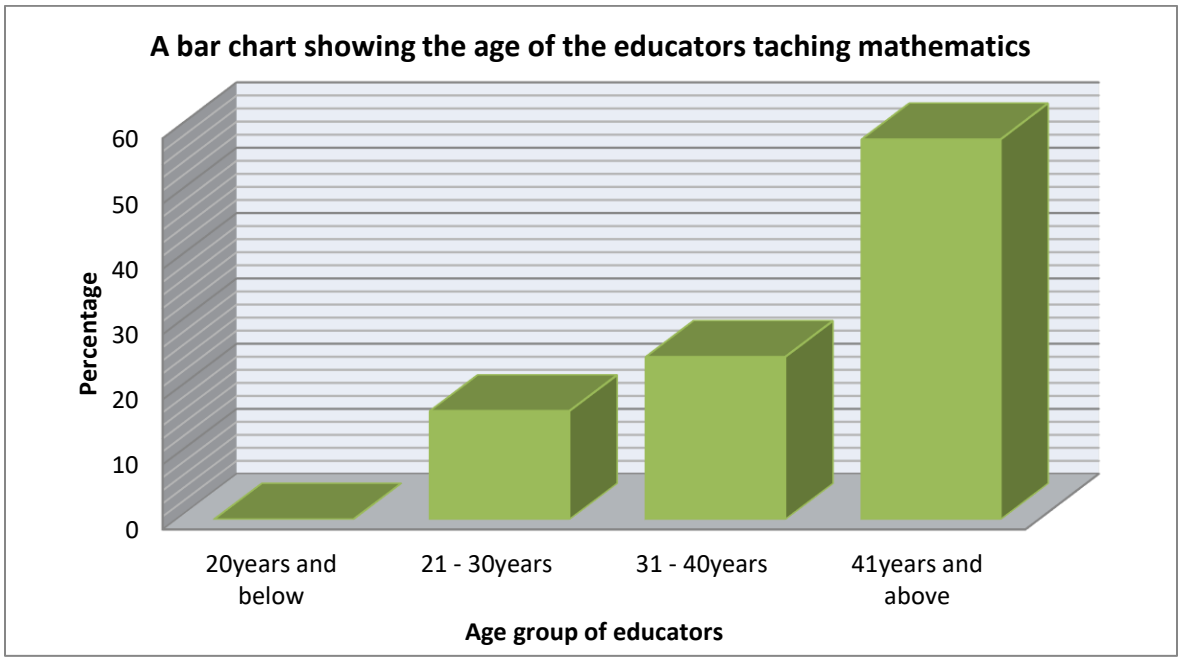
The purpose of this question was to determine the age group distribution of educators teaching Grade 6 Mathematics.

Table 4:17: *The age distribution of educators teaching grade 6 mathematics*

Age	No. of educators	Percentage
20 years and below	**0**	**0.0**
21 – 30 years	**2**	**16.7**
31 – 40 years	**3**	**25.0**
41 years and above	**7**	**58.3**
Total	**12**	**100**

Source: *Field study (September, 2018)*

Fig. 20



The age distribution of educators teaching grade 6 mathematics.

Source: *Field study (September, 2018)*

From the Figure 20, it can be observed that three (7) educators' (58.3%) age ranges between 41 years and above, three (3) educators (25%) are between 31 and 40 years, two educators' (16.7%) age ranges between 21 – 30 years and none of the educators are 20 years and below. The above analysis shows that the majority of the educators teaching grade 6 mathematics fall in the range of 41 years and above. Many researchers agree with Donaldson (2012) that the age of a teacher is very important when it comes to the dedication to service and the experience that comes with it. Young and energetic teachers are strong in new knowledge and old teachers are also strong in having experience in delivering teaching. There is, therefore, no significant negative correlation of teachers' age with mathematics performance.

4.5.2 Sex (Gender classification of educators)

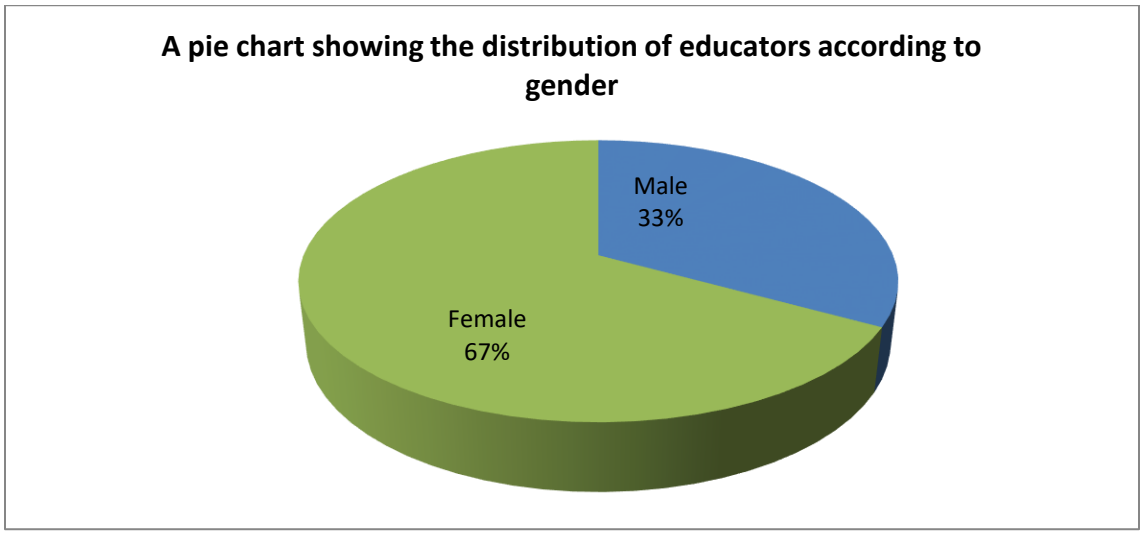
This question was to determine the gender classification of educators teaching grade 6 mathematics.

Table 4:18: *The gender classification of grade 6 educators*

Gender	No. of educators	Percentage
Male	**4**	**33**
Female	**8**	**67**
Total	**12**	**100**

Source: *Field study (September, 2018)*

Fig. 21



The percentage of gender distribution of educators teaching Grade 6 Mathematics.

Source: *Field study (September, 2018)*

Fig.21 of the pie chart shows that eight (8) educators (67%) are females and four (4) educators (33%) are males. This analysis indicates that the majority of educators teaching grade 6 mathematics as at the period of the survey were females.

Beilock, Gunderson, Ramirez and Levine (2010) in their study on "Female teachers' math anxiety affecting girls' Math achievement" they emphasized that people's fear and anxiety about doing math—over and above actual math ability—can be an impediment to their math achievement. They showed that when the math-anxious individuals are female elementary school teachers, their Math anxiety carries negative consequences

for the math achievement of their female students. Early elementary school teachers in the United States are almost exclusively female greater than 90%. In early elementary school, where the teachers are almost all female, teachers' math anxiety carries consequences for girls' math achievement by influencing girls' beliefs about who is good at math. This could be that the 67% female mathematics teachers in this study could be influencing the female learners (58%) in terms of achievement as they are more than the male learners by 16%.

4.5.3 Racial group of educators

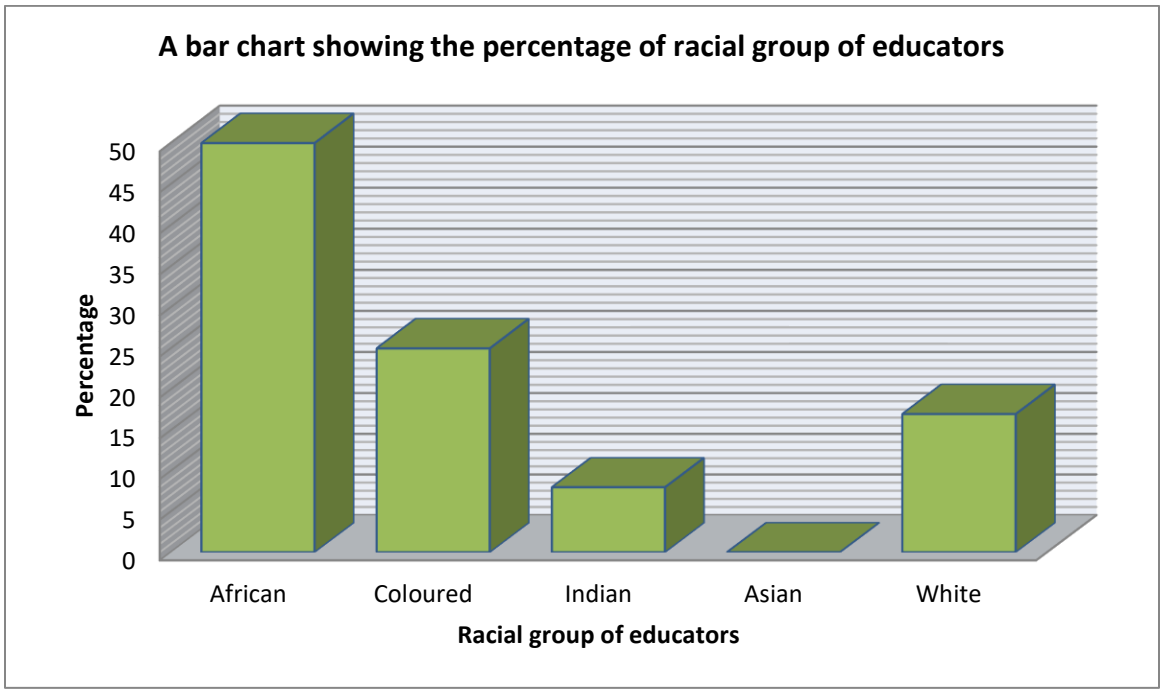
The aim of this question was to determine the racial group of educators teaching grade 6 mathematics.

Table 4:19: *The racial breakdown of educators teaching grade 6 mathematics*

Race	No. of educators	Percentage
African	**6**	**50.0**
Coloured	**3**	**25.0**
Indian	**1**	**8.0**
Asian	**0**	**0.0**
White	**2**	**17.0**
Total	**12**	**100**

Source: *Field study (September, 2018)*

Fig.22



The racial breakdown of educators teaching grade 6 mathematics.

Source: *Field study (September, 2018).*

Figure 22 above reveals that six (6) educators (50%) are African, three (3) educators (25%) are Coloured, two (2) educators (17%) are White, one (1) educator (8%) is Indian and none of the educators was Asian. It can therefore be deduced from the analysis above that the majority of the educators teaching mathematics in grade 6 were African as at the time of the survey.

Martin (2009), a scholar in mathematics education, revealed that race-based sentiments in research and policy discussions focused on African American learners and mathematics in the K–12 context. For example, in a widely proliferated statement, it has been claimed—based on results from the National Assessment of Educational Progress (NAEP)—that African American 12th graders possess mathematics skills and abilities at the level of white eighth graders (Education Trust, 2003).

Most Africans, especially the black race, perceive mathematics as a subject reserved for the white race (Christine in Maree, 2007). However, Pournara, Hodgen, Adler and Pillay (2015) conducted a quasi-experimental study examining the learning gains of Grade 10 learners from five secondary schools in the Johannesburg area, whose teachers participated in a year-long professional development course aimed at improving the teachers' knowledge of mathematics for teaching. Statistical analyses show that the intervention group of learners taught by teachers who had participated in the professional development outperformed a matched control group of learners taught by teachers in the same schools. An effect size for the intervention group is equivalent to two months' additional progress. While the learning gains are small, they are statistically significant. These findings provide empirical support for claims that attending to teachers' mathematical knowledge can impact learners' attainment. Therefore, the race of a teacher does not have significant effects on the learners' performance but teacher development does.

4.5.4 Highest educational level of educators

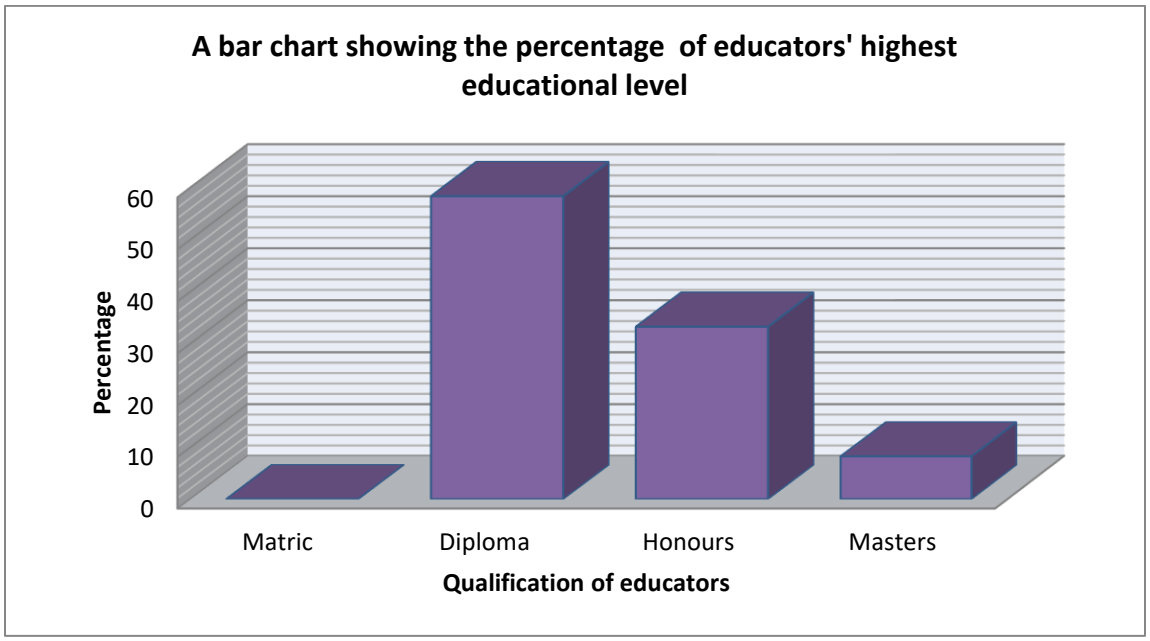
This question was to investigate the highest educational level of the educators teaching grade 6 mathematics.

Table 4:20: *The highest educational level of educators teaching grade 6 mathematics.*

Qualification	No. of educators	Percentage
Matric level	**0**	**0.0**
Diploma	**7**	**58.4**
Honours	**4**	**33.3**
Masters	**1**	**8.3**
Total	**5**	**100**

Source: *Field study (September, 2018)*

Fig. 23



The percentage of the highest educational level of educators teaching grade 6 mathematics.

Source: *Field study (September, 2018)*

Figure 23 above shows that seven (7) educators (58.4%) have Diploma qualifications which include first degree qualifications as well, four (4) educators (33.3%) have Honours qualifications, and one (1) educator representing 8.3% has a Master's qualification. None of the educators has a Matric level qualification at the schools visited as at the time of the survey. The analysis above shows clearly that the majority of the educators have Diploma which includes first degree qualifications. Therefore, almost all the teachers meet the basic qualification requirements as educators as at the time of the survey.

A qualified teacher in South Africa should possess a three-year post-secondary school qualification with an appropriate teacher professional training. The South Africa Department of Education (DoE) is currently working toward a minimum requirement of REQV 14 for qualified teachers. New teachers are now required to acquire a four-year

bachelor's of education degree or three-year undergraduate degree plus a one-year post-graduate professional diploma. The thinking is that teaching should be carried out by people with at least an undergraduate degree, and universities are tasked to train teachers through these two pathways (Mukeredzi, 2013).

4.5.5 Major subjects studied by the educators

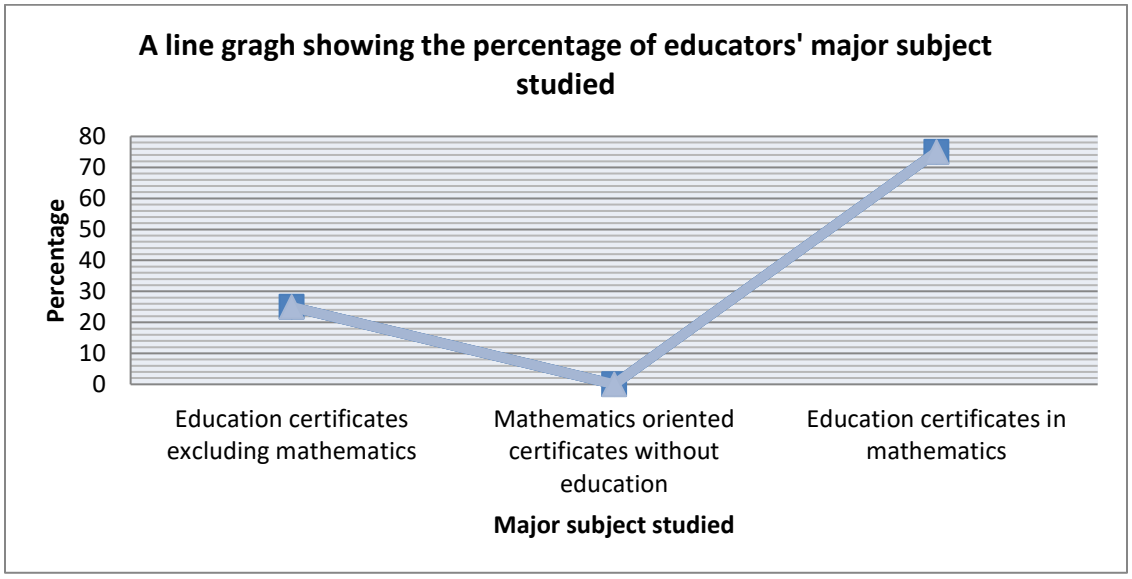
The aim of this question was to find out the major subjects studied by the educators at their various universities.

Table 4:21: *The major subjects studied by the educators at their university*

Major subjects	No. of educators	Percentage
Education certificates excluding mathematics	3	25
Maths oriented certificates without education	0	0
Education certificates in mathematics	9	75
Total	12	100

Source: *Field study (September, 2018)*

Fig.24



Percentage of major subjects studied by the educators at the university.

Source: *Field study (September, 2018).*

From Figure 24, it can be revealed that nine (9) educators (75%) studied Education with certificates in mathematics, three (3) educators (25%) studied Education certificates without mathematics as a major subject and none (0) of the educators studied Maths oriented certificates without education. From the above it can be deduced that all the educators have at least education certificate to teach. Even though not all educators studied mathematics as their major subject, the majority of the teachers (75%) are qualified to teach mathematics as at the period of the survey.

4.5.6 Number of years the educators teaching grade 6 mathematics

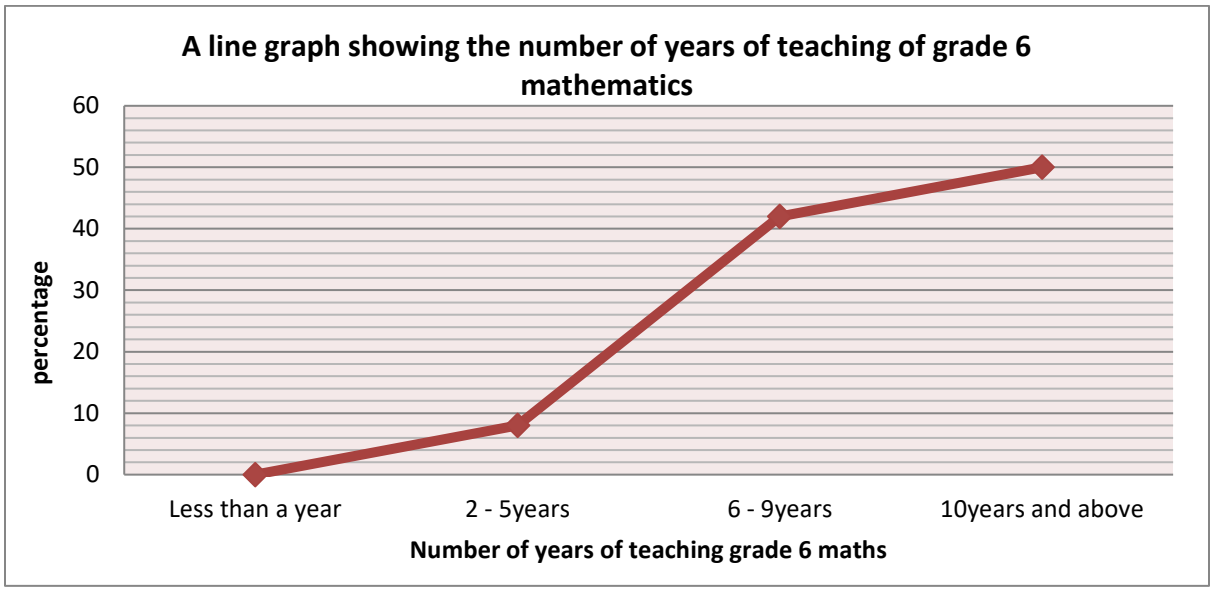
The aim of this question was to determine the number of years the educators had been teaching mathematics in grade 6.

Table 4.22: *The number of years the educators had been teaching mathematics in grade 6*

No. of years	No. of educators	Percentage
Less than a year	**0**	**0**
2 – 5 years	**1**	**8**
6 – 9 years	**5**	**42**
10 years and above	**6**	**50**
Total	**12**	**100**

Source: *Field study (September, 2018).*

Fig.25.



The number of years the educators had been teaching mathematics in grade 6.

Source: *Field study (September, 2018)*

Six (6) educators (50%) had been teaching mathematics in grade 6 for 10 years and above, five (5) educators (42%) had been teaching mathematics in grade 6 from the period between 2 – 5 years, one (1) educator representing 8% and none of the educators had taught mathematics in grade six for less than a year.

It can be deduced from the above analysis that the majority of the educators who have been teaching mathematics in grade 6 are old teachers who have been in the teaching field for more than 10 years. Generally, from this analysis it can be understood that 92% of educators have taught for at least 5 years.

Many studies suggest that South Africa will need between 20 000 and 30 000 new teachers every year for the next decade. However, the number of graduates from the initial teacher education system is far lower. In recent years, the rate of teachers leaving teaching owing to retirement, medical incapacity and death has increased steadily. The current teacher retention policies and mechanisms do not seem to address new

teachers' employment issues effectively or adequately (Pitsoe, 2013). This analysis from Table 4.22 above could mean that the rate at which new teachers are employed are extremely less than what is expected as at the time of the survey.

4.5.7 Number of in-service training sessions attended

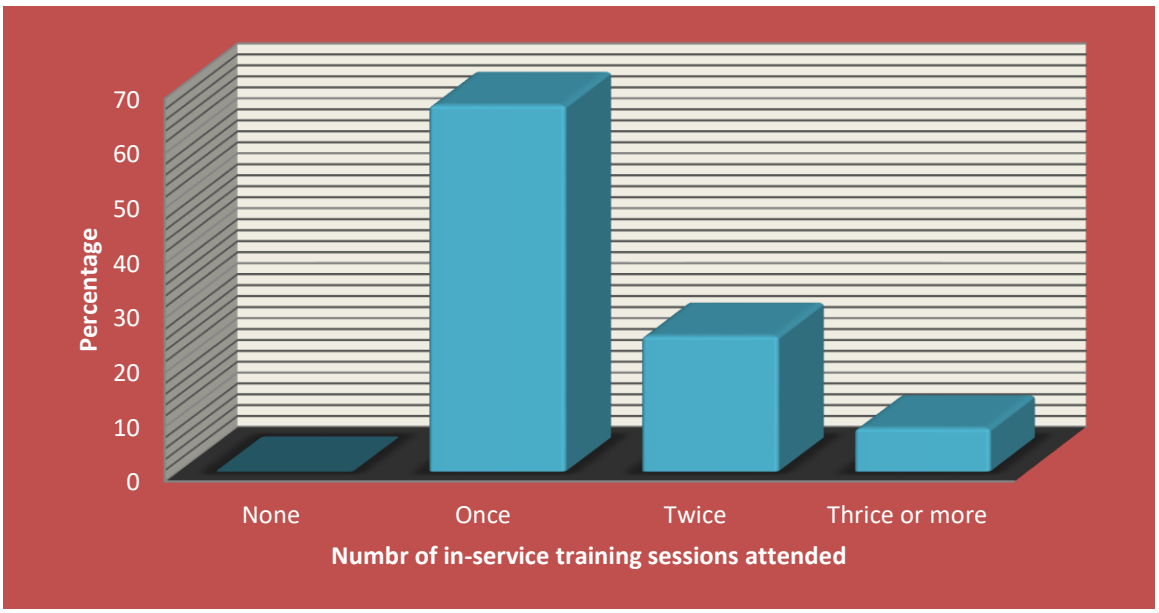
The aim of this question was to find out the number of in-service training sessions attended by mathematics educators in a year.

Table 4.23: *The number of in-service training sessions attended in mathematics by the mathematics educators*

No. of in-service sessions	No. of educators	Percentage
None	0	0
Once	8	67
Twice	3	25
Thrice or more	1	8
Total	12	100

Source: *Field study (September,2018)*

Fig.26.



The number of in-service training sessions attended by mathematics educators.

Source: *Field study (September, 2018).*

Table 4.23 depicts eight (8) educators representing 67% had attended in-service training on mathematics once in a year, three (3) educators attended twice, one (1) educator attended any in-service training in mathematics thrice or more a year, and no educator was never training.

The analysis above reveals that the educators have attended one of the in-service training on mathematics at least once a year at the time of the survey. It shows that the East London education district is doing well regarding trainings and developments. GMMDU (2013) has organised a series of training sessions and workshops in order to equip teachers to handle mathematics with skill and to tap into modern learners' natural affinity for all things technological.

4.5.8 How do you evaluate the in-service training attended in mathematics?

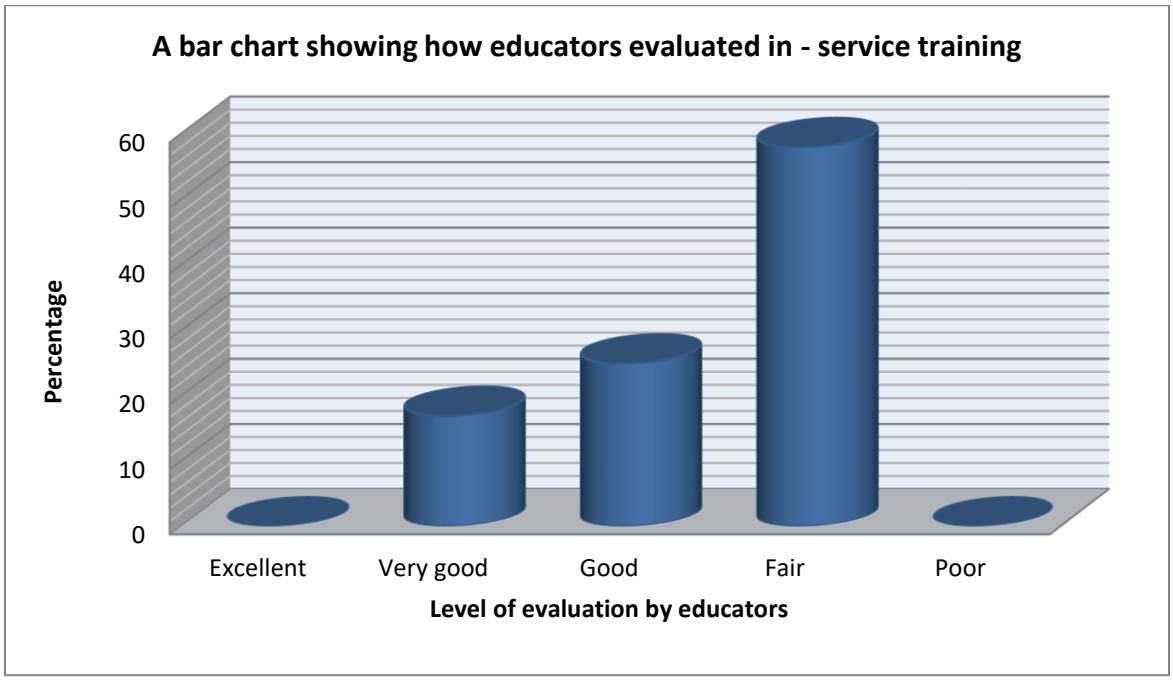
The purpose of this question was to determine how educators assess the in-service training organised for mathematics educators.

Table 4.24: *How educators evaluate in-service training attended*

Evaluations	No. of educators	Percentage
Excellent	**0**	**0**
Very good	**2**	**17**
Good	**3**	**25**
Fair	**7**	**58**
Poor	**0**	**0**
Total	**12**	**100**

Source: *Field study (September, 2018)*

Fig.27.



How mathematics educators evaluated the in-service training attended.

Source: *Field study (September, 2018)*

Table 4.24 shows that seven (7) educators representing 58% evaluated the in-service training attended on mathematics as “fair”, three (3) educators (25%) evaluated the in-service training attended as “good”, two educators translating to (17%) evaluated the in-service training as “very good”. None of the educators evaluated the in-service training as “excellent”.

The above data implies that educators (83%) are averagely content with any in-service training in mathematics they have attended. This means that educators expect a little more from the Department of Education and other stakeholders who train teachers. None of the educators see the in – service training in mathematics as poor which means that educators are, in a way, happy with the training.

Ono and Ferreira (2010) in their study affirmed that nothing has promised so much and has been so frustratingly wasteful as the thousands of workshops and conferences that led to no significant change in practice when the teachers returned to their classrooms.

In many developing countries, professional development of teachers has been neglected because of budget constraints and heavy emphasis on pre-service education, but when it is provided, the cascade approach is popular for reaching many participants in a short time (Leu, 2004). This consequently entails “training-the-trainer” to ensure that the message “flows down” from experts and specialists, eventually to the teachers.

4.5.9 How do you evaluate yourself in the teaching of mathematics?

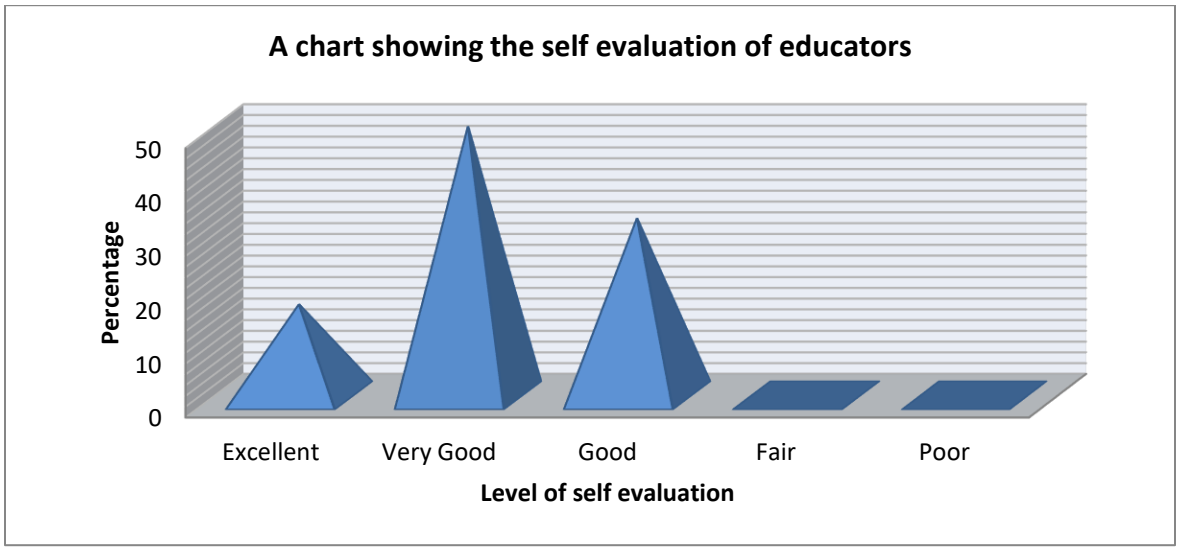
The aim of this question was to determine how educators evaluate themselves in the teaching of grade 6 mathematics.

Table 4.25: *How educators evaluate themselves in the teaching of grade 6 mathematics*

Evaluation	No. of educators	Percentage
Excellent	**2**	**17**
Very Good	**6**	**50**
Good	**4**	**33**
Fair	**0**	**0**
Poor	**0**	**0**
Total	**12**	**100**

Source: *Field study (September, 2018)*

Fig. 28



How mathematics educators evaluated themselves.

Source: *Field study (September, 2018)*

From the above Table 4.25, it can be observed that six (6) educators (50%) evaluated themselves in the teaching of grade 6 mathematics as "very good", four (4) educators (33%) evaluated themselves as "good", two other educators (17%) evaluated themselves as "excellent" and none of the educators evaluated himself/herself as "fair" and "poor" in the teaching and learning of Grade 6 Mathematics.

It can be understood from the above analysis that the majority of the educators have very good level of confidence in teaching grade 6 mathematics. This might be as a result of increased trainings by the East London department of education and other stakeholders doing which have increased the confident level of grade 6 mathematics educators.

Armstrong (2015) admitted that teachers' content knowledge or developments cannot be the determinants to achieving learners' performance which the researcher calls it "elusive". Researchers have found it difficult to find aspects of teacher training that correlate with learners' performance in a statistically significant way (Chingos & Peterson 2011). Conflicting or indeterminate results occur often.

4.5.10 How do you evaluate the teaching and learning materials for mathematics?

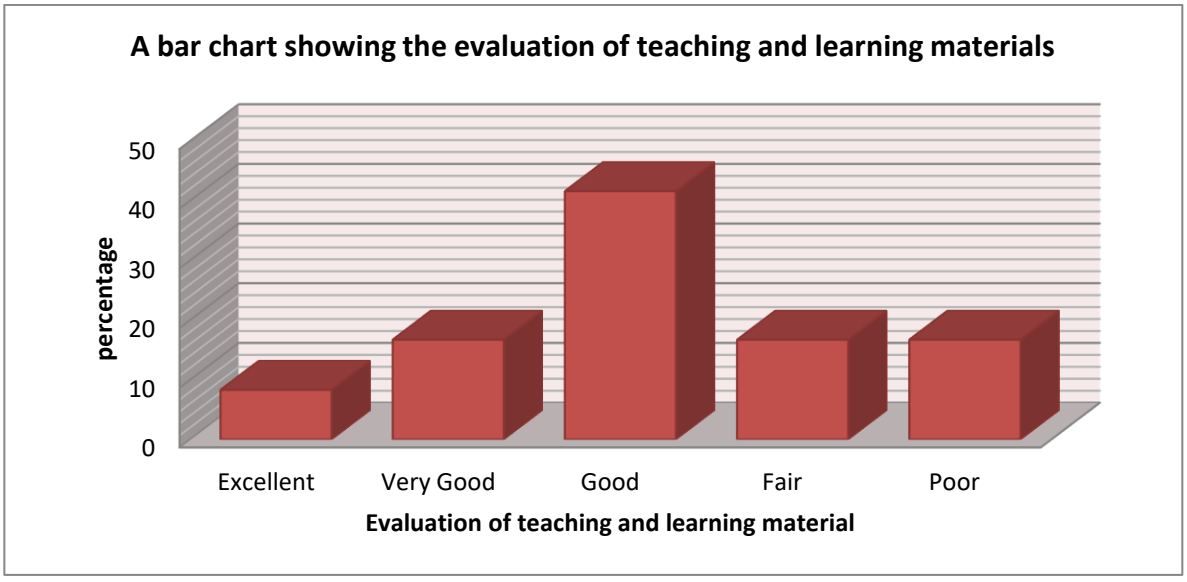
The purpose of this question was to find out how educators evaluate the teaching and learning materials for teaching grade 6 mathematics.

Table 4.26: *How educators evaluate the teaching and learning materials for mathematics in grade 6*

Evaluations	No. of educators	Percentage
Excellent	**1**	**8.3**
Very Good	**2**	**16.7**
Good	**5**	**41.6**
Fair	**2**	**16.7**
Poor	**2**	**16.7**
Total	**12**	**100**

Source: *Field study (September, 2018)*

Fig. 29



How educators evaluate the teaching and learning materials for mathematics in grade 6

Source: *Field study (September, 2018)*

Table 4.26 above reveals that five (5) educators representing 41.6% evaluated the teaching and learning materials for teaching grade 6 mathematics as “good”, two (2) educators representing 16.7% evaluated it as “very good”, another two (2) educators evaluated as it “fair”, another two (2) educators evaluated the teaching and learning materials for teaching grade 6 mathematics as “poor”, while one (1) educator (20%) evaluated the teaching and learning materials as “excellent”. However, from the analysis above, it can be deduced that the majority of educators nine (9) translating to 75% are satisfied with the teaching and learning materials available for teaching grade 6 mathematics. However, two (2) educators representing 16.7% are not satisfied with the teaching and learning materials available for teaching grade 6 mathematics.

Wijaya, van den Heuvel-Panhuizen and Doorman (2015) emphasized that textbooks can be useful to both the teacher and the learners when mathematical skills are used to solve tasks that include relevant and essential contexts, students need to transform the context situation into a mathematical form through the process of mathematization (OECD, 2003). Therefore, it is important that context-based tasks use settings or situations that give access to and support the process of mathematization. In other words, it is crucial that the tasks provide information that can be organized mathematically and offer opportunities for students to use their knowledge and experiences. The process of solving context-based tasks requires interplay between the real world and mathematics and is often described as a modeling process (Blum & Leiss, 2007), which in general contains the following steps: (1) understanding the problem situated in reality, (2) transforming the real-world problem into a mathematical problem, (3) solving the mathematical problem, and (4) interpreting the mathematical solution in terms of the real situation.

4.5.11. How do you rate motivation provided by government to educators teaching mathematics?

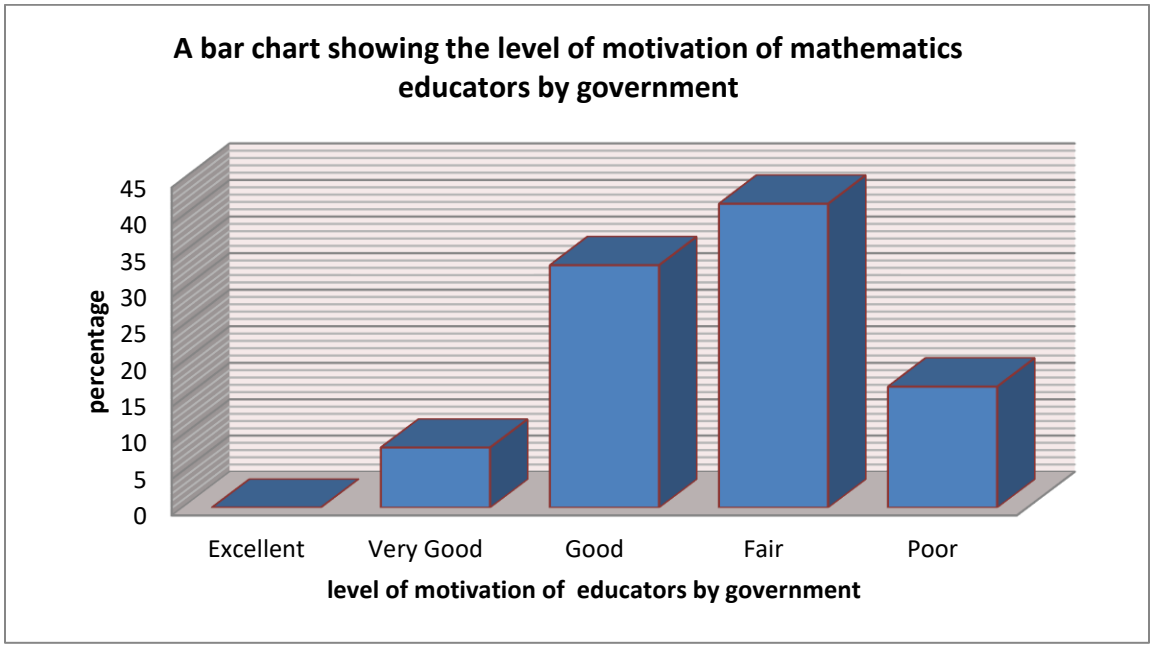
This question aimed to find out how educators teaching grade 6 mathematics evaluate the motivation given to them by government.

Table 4.27: *How educators rate motivation by government to mathematics educators*

Rate of motivation	No. of educators	Percentage
Excellent	**0**	**0.0**
Very Good	**1**	**8.3**
Good	**4**	**33.3**
Fair	**5**	**41.7**
Poor	**2**	**16.7**
Total	**12**	**100**

Source: *Field study (September, 2018)*

Fig. 30



The level of motivation provided by government to educators.

Source: *Field study (September, 2018)*

Table 4.27 above can be observed that five (5) educators representing 41.7% rating as "fair" as the motivation given to educators teaching grade 6 mathematics by government, four (4) educators making up to 33.3% also rated the motivation given to

educators teaching grade 6 mathematics by government as “good”, two (2) educators translating to 16.7% opted for “poor”, one (1) educator representing 8.3% rated “very good” and none of the educators rated “excellent” for the motivation given to educators teaching grade 6 mathematics.

The analysis above indicates that the majority of educators (83.3%) teaching grade 6 mathematics are averagely satisfied with the motivation received from government. This however reflects that there are still some reservations which do not settle well with educators because 41.7% assessed government as “fair” which means that the satisfaction of educators regarding the motivation of government to the educators are on the least.

Iwu, Gwija, Benedict and Tengeh (2013) in their study asserted that what determines job satisfaction varies. Bennell (2004) undertook a study on teacher motivation and incentives in low-income developing countries (LICs) in sub-Saharan Africa and Asia. With regard to the material and psychological needs of teachers, Bennell’s study found, among others, that (1) teacher job satisfaction improves when they are given wider responsibilities other than just class teaching. These other 840 responsibilities can include supervision, professional development, and community relations; (2) enhancing the status and performance of teachers will also require the upgrading of their qualifications; (3) professional growth of a teacher is encouraged when they work collegially, and fourthly; effective de-centralization over staffing in the education sector was probably the most effective way of ensuring a more transparent, equitable and efficient deployment of teachers.

George et al. (2008) reported significantly high levels of dissatisfaction among teachers pertaining to factors related to their workplace. They found that variables of school resources and rank played an important role in determining teacher job satisfaction in Namibia, thus explaining the high levels of dissatisfaction with intrinsic factors of their work. They also found that the inability to understand the dynamics in the learners’ multicultural setting could have contributed to teacher dissatisfaction. The South African Democratic Teachers Union (SADTU) observed that the retrenchment of temporary

teachers in the Eastern Cape Department of Education has left permanent teachers overworked. The Union stated that some teachers who normally worked about 26-and-a-half hours a week were now forced to work more than 35 hours a week (SADTU, 2012). Teachers are also faced with the problem of working in an overcrowded and poorly equipped classroom (Mji & Makgato, 2006:254).

4.5.12. How do you rate your encouragement to learners to use different methods in solving mathematical problems?

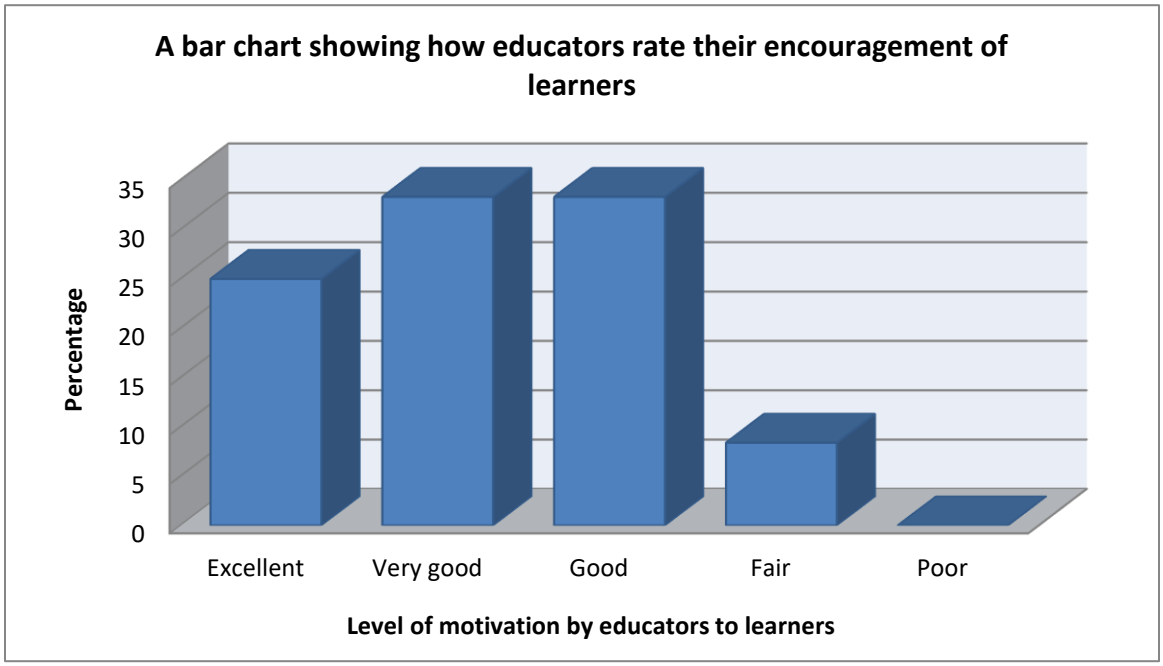
The researcher's purpose for this question was to determine how educators encourage their learners to use different methods in solving mathematical problems.

Table 4:28: *The rate at which educators encourage learners to use different methods in solving maths problems*

Rate of encouragement	No. of educators	Percentage
Excellent	**3**	**25.0**
Very good	**4**	**33.3**
Good	**4**	**33.3**
Fair	**1**	**8.4**
Poor	**0**	**0.0**
Total	**12**	**100**

Source: *Field study (September, 2018)*

Fig.31.



How educators rate their encouragement given to their learners.

Source: *Field study (September, 2018)*

Table 4:28 above depicts four (4) educators' (33.3%) encouragement of learners to use different methods in solving mathematical problems as "very good", four (4) educators' (33.3%) rated the encouragement as "good", three (3) educators translating to 25% indicated that their encouragement to learners to use other methods in solving Mathematical problems is "excellent", another educator also representing 8.3% stated that his/her encouragement to learners to use different approaches in solving mathematical problems is "fair" while none of the educators opted for "poor" regarding their encouragement to learners to use other methods in solving a mathematical problem.

The above analysis points out that the majority of educators (92%) encourage their learners to adopt other methods in solving mathematical problems. Guilloteaux and Dornyei (2008) found a strong positive correlation between ¨ teachers' motivational teaching practices and their learners' learning motivation in the actual classroom. It is

noteworthy that the study was concerned with the teachers' general motivational practice in the classroom and did not specifically target the implementation of motivational strategies. (Moskovsky, Alrabai,Paolini & Ratcheva, 2013).

4.5.13: What is your preferred medium of instruction used in teaching mathematics?

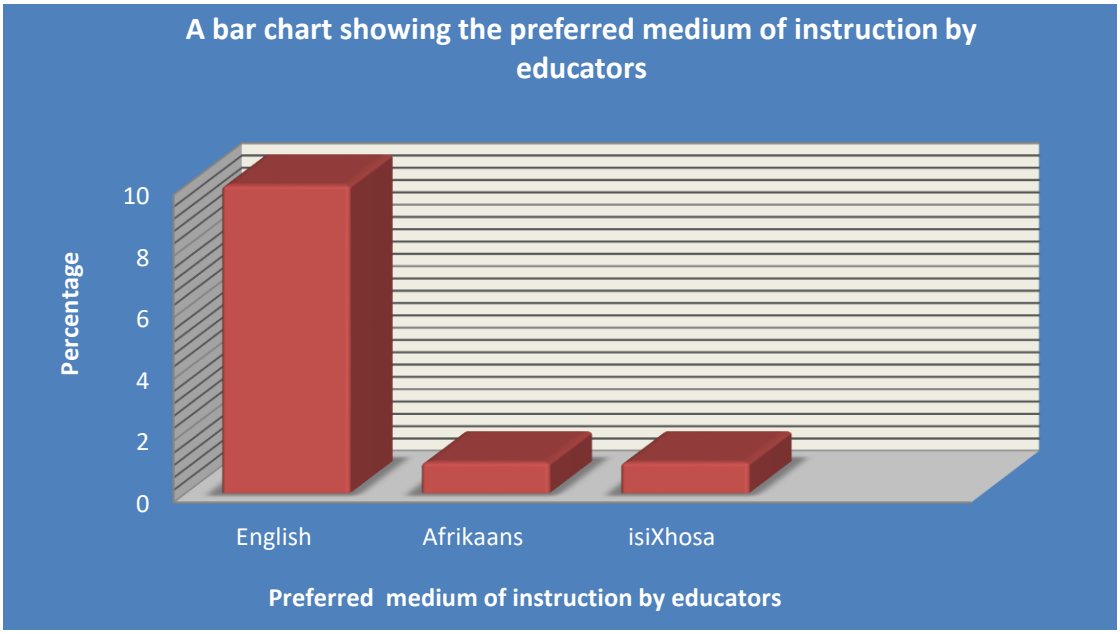
The purpose of this question was to find out the medium of instruction educators prefer using in teaching mathematics.

Table 4:29: *The preferred medium of instruction by educators for teaching mathematics*

Medium of instruction	No. of educators	Percentage
English	**10**	**83.4**
Afrikaans	**1**	**8.3**
isiXhosa	**1**	**8.3**
Total	**12**	**100**

Source: *Field study (September, 2018)*

Fig.32



The preferred medium of instruction by educators teaching mathematics.

Source: *Field study (September, 2018)*

Table 4:29 above explains that ten (10) educators representing 83.4% preferred using English as the medium of instruction for mathematics, one (1) educator representing 8.3% preferred using Afrikaans as the medium of instruction for mathematics, and another educator representing 8.3% preferred using English.

From the above analysis, it is clear that the majority of the educators prefer using English as the medium of instruction for mathematics. Kirkpatrick (2012) attempted to seek answers to many questions, using the situation in countries of the Association of Southeast Asian Nations (ASEAN) to provide the major context, although referrals shall be made to situations in other countries. In so doing, a 'lingua franca approach' to the teaching of English was presented as a possible way of allowing students to learn English successfully, while, at the same time, developing multilingualism in local languages. While this was specific to one region, the principles behind the approach may be transferable to other multilingual settings. It is probably inevitable that the demand for English means that politicians and policy makers are going to succumb to parental pressure and introduce English into the primary school curriculum as a compulsory subject, and often as a medium of instruction. The evidence also shows that English is being introduced at an increasingly early stage, with many jurisdictions now providing English as a compulsory subject from the first year of primary school (henceforth primary 1) (Kirkpatrick, 2010a). This has led Jhingran to argue that, in the context of India, 'we must recognize that the teaching of English from the early primary grades is here to stay.

We may have to accept that the teaching of English is here to stay, even though it is the task of applied linguists to present as much empirically-derived evidence as possible to persuade politicians. Above all, English could be a semi-universal way of preparing learners (Baetens & Beardsmore, 2009). Parents tend to encourage children to use only the languages of education (Coleman, 2010). The trend in the countries of ASEAN (and elsewhere) is for the increasingly early introduction of English into the primary school curriculum.

4.5.14: If your preferred medium of instruction (above) is different from the one being used in the school, how do you evaluate your medium of instruction?

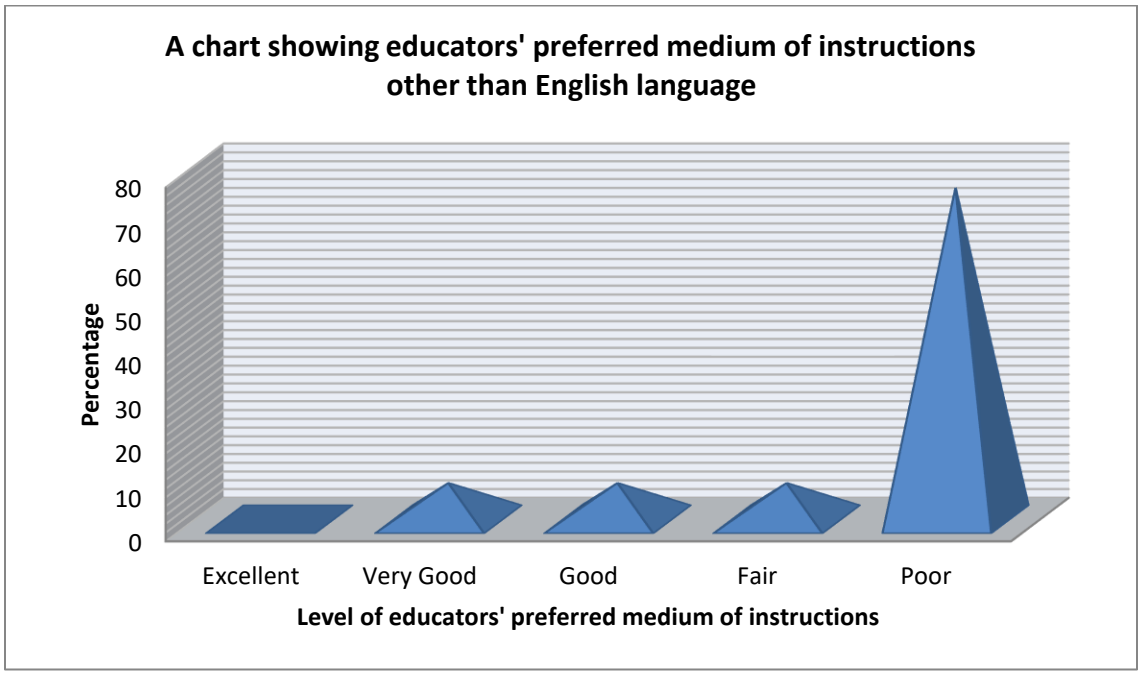
The aim of this question was to determine how educators evaluate themselves if their preferred medium of instruction is different from the one used in the school.

Table 4:30: *The level of expression of educators if his/her preferred medium of instruction is different from the medium of instructions being used in the school.*

Evaluation	No. of educators	Percentage
Excellent	0	0.0
Very Good	0	0.0
Good	1	8.3
Fair	1	8.3
Poor	10	83.4
Total	12	100

Source: *Field study (September, 2018)*

Fig. 33



The educators' level of medium of instruction if a different medium of instruction is used apart from their preferred medium of instruction.

Source: *Field study (September, 2018)*

From Table 4.30 above, it can be observed that ten (10) educators representing 83.4% indicated that their level of medium of instruction in the school apart from their preferred medium of instruction is "poor", one (1) educator translating to 8.3% indicated that her level of medium of instruction in teaching aside their preferred medium of instruction is "fair", another educator representing 8.3% stated that his medium of instruction in teaching aside the preferred medium of instruction is "good", and there was no educator 0.0% who stated that the level of medium of instruction besides the preferred medium of instruction is either "very good" or "excellent".

From the analysis above, it is can be deduced that generally, the majority of the educators are comfortable with the preferred medium of exchange which is English language than the other forms of medium of instruction used in schools.

English language is becoming a global language especially in education and business. Kirkpatrick (2011) stressed that in almost all countries in Asia, English has now become a core course in primary schools. Throughout the rest of Asia, English is a compulsory subject in primary school and is gradually being introduced earlier and earlier into the curriculum. For example, in China, it is now officially introduced at primary 3, but many schools, especially those in urban areas, teach English from primary 1. In some countries it is even a medium of instruction in primary school. This is currently the case in Malaysia and the Philippines, for example, where maths and science are taught through English from primary 1, although both countries have recently announced changes in this regard, which will be discussed below. Brunei primary schools will teach maths and science through English from 2011. In Singapore schools, English is the medium of instruction for all subjects, other than foreign languages (Kirkpatrick, 2010).

South Africa's medium of instruction in most cases is in English language. However, in most of the rural schools in South Africa, it is the home language; learning materials are

in either IsiXhosa or Afrikaans. Learners are, therefore, faced with challenges in understanding the concepts of mathematics in this regard.

4.5.15: Which of the following assessment tools do you adopt in teaching Mathematics?

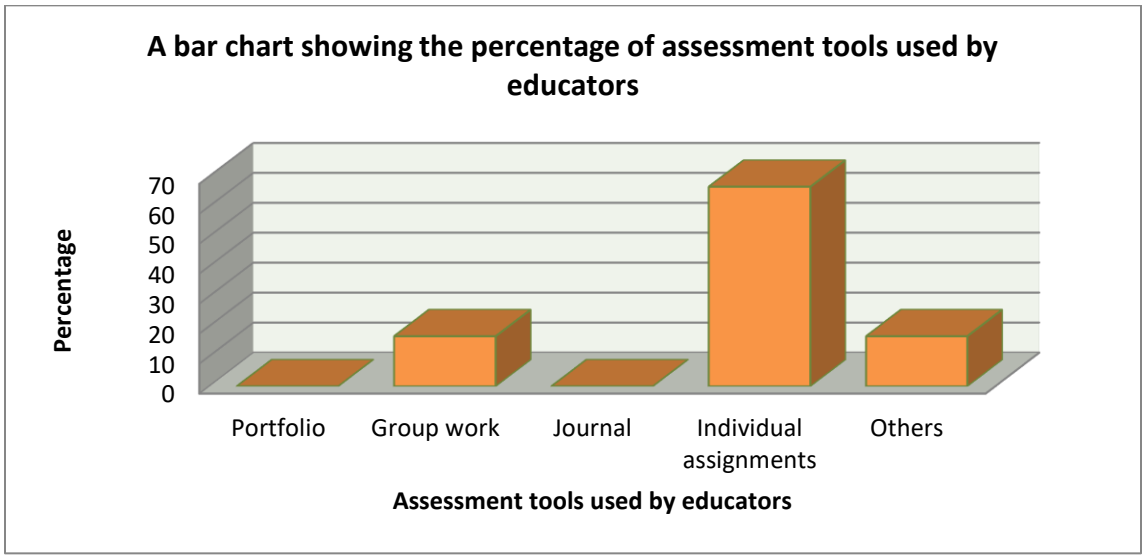
This question was to determine the assessment tools educators use to assess their learners.

Table 4:31: *The assessment tools used by the educators*

Assessment tool	No. of educators	Percentage
Portfolio	0	0
Group work	2	16.7
Journal	0	0
Individual assignments	8	66.6
Others	2	16.7
Total	12	100

Source: *Field study (September, 2018)*

Fig. 34



The percentage of assessment tools used by educators.

Source: *Field study (September, 2018)*

From Table 4:31 above, it can be noted that eight (8) educators amounting to 66.6% use individual assignments to assess their learners, two (2) educators representing 16.7% use group work of assessment in assessing their learners, while two (2) educators representing 16.7% use other forms in assessing learners.

It can be deduced from the above analysis that most of the educators (66.6%) like to use individual assignments, which could be that the time to teach and giving tasks to learners to do in the same period would not be enough for thorough work to be done and be assessed. Therefore, educators prefer to give individual assignments to ensure independent work and have clear understanding whether learners understood the concepts taught or not. Some few educators use different forms of assessments such as projects, group work etc. to assess learners' performance in mathematics.

Wiliam (2011) confirmed that Bloom, the renowned educationist was convinced that "individualization" was beneficial—indeed he regarded one-to-one tutorial instruction as the "gold standard" for education against which others should be but was concerned that this obviously would not be affordable for mass public education, hence the search for methods of group instruction as effective as one-to-one tutoring. One of the main reasons that one-to-one tutoring is so effective, according to Bloom, is that the tutor is able to identify errors in the student's work immediately, and then to provide clarification, and further follow-up if necessary (Guskey, 2010). Bloom described these two processes as "feedback" and "correctives" and this language has become part of the standard way of talking about assessment ever since. However, in a very important sense, Bloom's distinction between "feedback" and "correctives" has been counterproductive, and has served to distort the original meaning of the term "feedback" in a particularly unfortunate manner.

4.5.16 Do you teach mathematics with the aim of getting all learners to pass their examination?

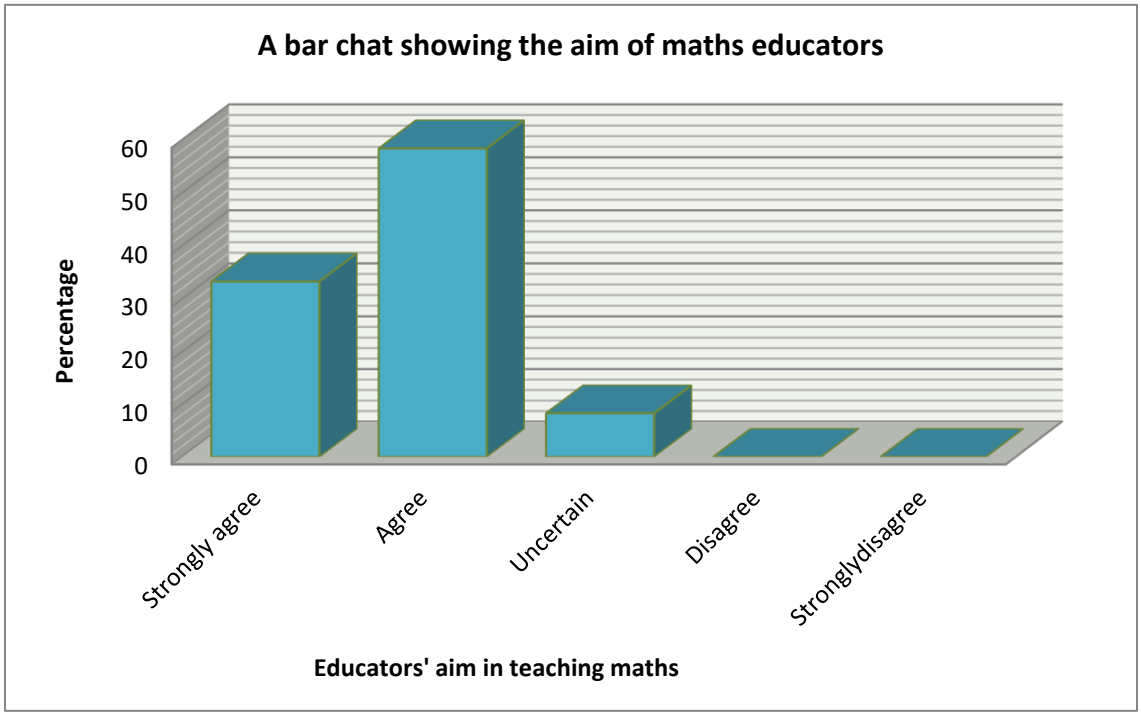
The purpose of this question was to find out the aim mathematics educators have in teaching grade 6 mathematics.

Table 4:32: *The response of mathematics educators teaching grade 6 mathematics with the aim of getting all the learners to pass their examination or not.*

Evaluation	No. of learners	Percentage
Strongly agree	**4**	**33.3**
Agree	**7**	**58.4**
Uncertain	**1**	**8.3**
Disagree	**0**	**0.0**
Strongly Disagree	**0**	**0.0**
Total	**12**	**100**

Source: *Field study (September, 2018)*

Fig.35.



The aim of educators teaching mathematics in getting all the learners to pass their examination.

Source: *Field study (September, 2018)*

Table 4:32 above indicates that seven (7) educators representing 58.4% “agree” with the questionnaire that they teach mathematics with the aim of getting all learners to pass their examinations. Four (4) educators representing 33.3% “strongly agree” with the question that they teach mathematics with the aim of getting all learners to pass their examination, one (1) educator making up to 8.3% remained “uncertain” with the question. None of the educators opted for “disagree” or “strongly disagree” with the question that he/she teaches maths with the aim of getting all learners to pass their examination.

The analysis above revealed that all the majority of the educators (91.7%) teach maths with the aim of getting all the learners to pass their exams, except one educator who is not certain that teaching mathematics with the aim of getting all learners to pass their examination. The reason could be that the educator is not having mastery over the subject or not having confidence in the learners or not having enough to teach the subject to guarantee that all the learners will pass in the subject.

In as much as the aim of a teacher is important, it does not have much significant impact on learners’ performance because almost all teachers have aims to make their learners pass their examinations, but in reality most of the learners end up not passing. Tachie and Chireshe (2013) in their study confirmed that despite the importance of mathematics, learners continue to fail the subject (Feza-Piyose 2012). Many other studies have pointed out that the failure rate in mathematics in South African schools is unacceptably high. Similarly, Mkgato and Mji (2006) cite several studies pointing to high failure rate in mathematics in South Africa in comparison with other countries. While South African learners are generally not performing well in mathematics, the situation is even worse among Black South African learners (Brodie 2004).

4.5.17 I teach the learners so that they understand mathematical concepts and then use the knowledge for life

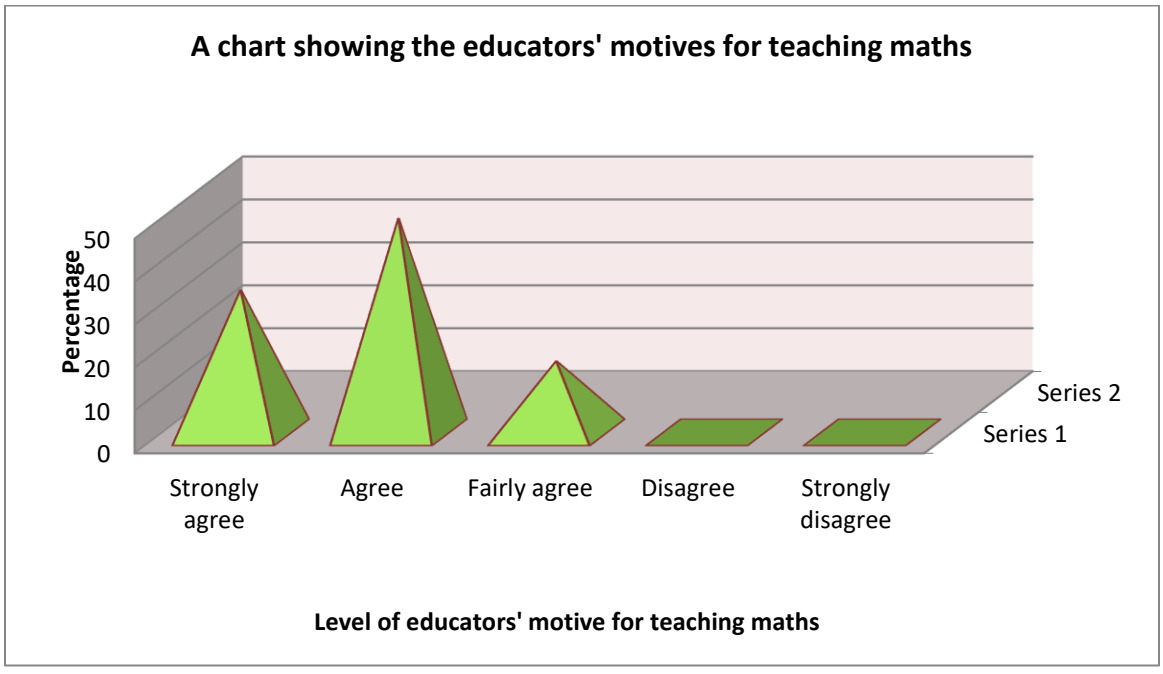
This question was to find out the extent to which educators agreed with the above motive for teaching mathematics.

Table 4:33: *The motive of educators regarding learners' understanding mathematical concept in grade 6.*

Evaluation	No. of learners	Percentage
Strongly agree	**4**	**33.3**
Agree	**6**	**50.0**
Fairly Agree	**2**	**16.7**
Disagree	**0**	**0.0**
Strongly Disagree	**0**	**0.0**
Total	**12**	**100**

Source: *Field study (September, 2018)*

Fig.36.



Educators' motives for teaching mathematics in grade 6.

Source: *Field study (September, 2018)*

Table 4:33 above depicts six (6) educators representing 50% "agree" with the extent to which educators teach learners to understand mathematical concept and then use the knowledge for life., four (4) educators translating to 33.3% "strongly agree" with the question, two (2) educators "fairly agree" with the question and none of the educators selected either "disagree" or "strongly agree".

From the above analysis it is clear that all the educators teach learners so that they understand mathematical concepts and then use the knowledge for life. Mathematics is important because it is interwoven with technology in the workplace - in technique, work organisation and people's competences. Wedege (2010) explained that "mathematical literacy" or "numeracy" is among top 5 on the subject list in the educational programmes. Among the reasons for offering lifelong mathematics education, we recognize the economy to be decisive at the political level; technological development in the labour market is the main reason for demanding mathematics education for all. However, in this context, people's everyday competences do not count as mathematics (FitzSimons, 2002). Mathematics is to a large extent invisible in people's everyday life and they do not feel it relevant to study mathematics. One of the reasons is that people experience themselves as competent in their jobs without being aware of how mathematics plays a role in their activity (Wedege & Evans, 2006).

Mullis, Martin, Ruddock, O'Sullivan and Preuschoff (2009) in their study revealed that TIMSS (the Trends in International Mathematics and Science Study) is a truly global, cooperative enterprise involving more than 60 countries from all around the world. There is enormous diversity among the TIMSS countries—in terms of economic development, geographical location, and population size. However, all have a common desire to improve the mathematics and science education of their students, and the conviction that comparing education systems in terms of their organization, curricula,

instructional practices and corresponding student achievement is an effective policy analysis tool.

4.5.18. I teach with the Revised National Curriculum Statement (RNCS) for mathematics given by the Department of Education.

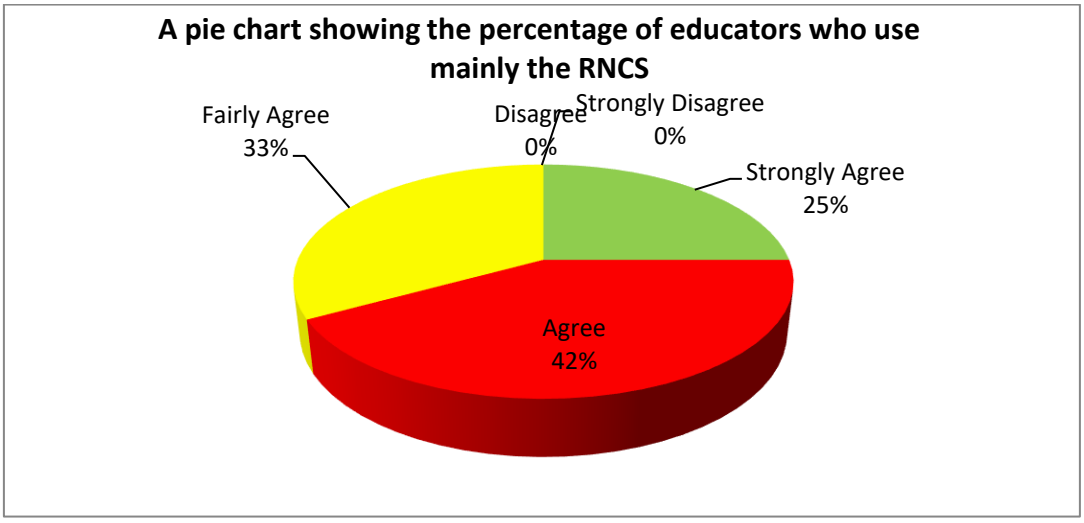
This question seeks to find out if educators base their teaching mainly on the Revised National Curriculum Statement (RNCS).

Table 4.34: *Educators who base their teaching mainly on the Revised National Curriculum Statement (RNCS) for mathematics given by the Department of Education.*

Evaluation	No. of educators	Percentages
Strongly agree	**3**	**25**
Agree	**5**	**42**
Fairly agree	**4**	**33**
Disagree	**0**	**0**
Strongly disagree	**0**	**0**
Total	**12**	**100**

Source: *Field study (September, 2018)*

Fig. 37



The percentage of educators who use mainly the (RNCS).

Source: *Field study (September, 2018)*

Table 4.34 indicates that five (5) educators representing 42% "agree" with the question, four (4) educators translating to 33% "fairly agrees" with the question that they use mainly the Revised National Curriculum Statement (RNCS) for teaching, three (3) educators representing 25% "strongly agrees" with the questionnaire while one other educator representing 20% "disagrees" with the question and none of the educators opted for "disagree" or "strongly disagree".

From the above, it shows clearly that 100% of the educators teach using the Revised National Curriculum Statements (RNCS). This attests to the fact that the Department of Education (DoE, 2011a) provided The National Curriculum and Assessment Policy Statement as a guideline that is intended to provide teachers, principals, subject advisors, administrators and other personnel with parameters and strategies on how to respond to learner diversity in the classroom through the curriculum. In 2014, the final stage of the incremental implementation of the CAPS was also completed in the Senior Phase in grades 7, 8 and 9. CAPS, therefore, provided stability in the sector by giving teachers clear guidelines on content, pedagogy and assessment and this has positively influenced learner performance in these phases (CAPS, 2009).

4.5.19. I prefer context-based teaching as compared to content based teaching

The purpose of this question was to find out whether educators prefer context based teaching or content based teaching.

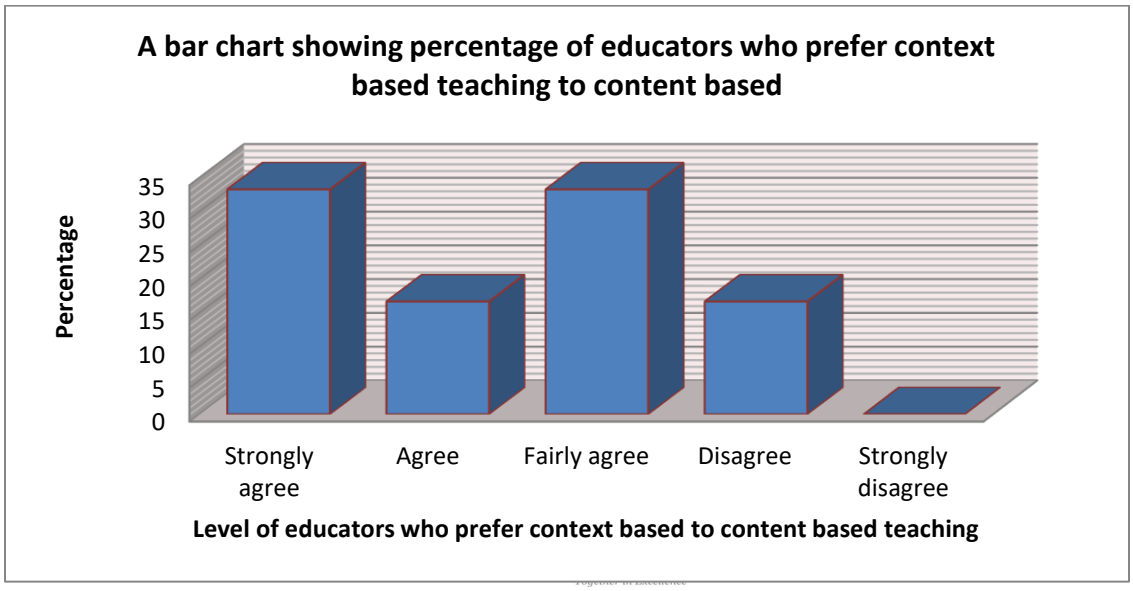
Table 4.35: *The responses of educators who prefer context based teaching to content based teaching*

Evaluation	No. of educators	Percentages
Strongly agree	**4**	**33.3**
Agree	**2**	**16.7**
Fairly agree	**4**	**33.3**

Disagree	**2**	**16.7**
Strongly disagree	**0**	**0**
Total	**12**	**100**

Source: *Field study (September, 2018)*

Fig. 38



The percentage of educators who prefer context based teaching to content based teaching.

Source: *Field study (September, 2018)*

Table 4.35 shows that four (4) educators representing 33.3% "strongly agree" and another four (4) educators translating to 33.3% "fairly agree" that they prefer context based teaching to content-based teaching, two (2) educators translating to 16.7% "agree" and another two (2) educators representing 16.7% "disagree" with the question above and none of the educators opted for "strongly disagree" with the question above.

In reference to the study of Harris, Mishra and Koehler (2009), Content-based teaching or pedagogy is the conceptualization of teaching knowledge applicable to a specific content area. It covers essential knowledge of teaching and learning content-based

curricula, as well as assessment and reporting of that learning. An awareness of students' prior knowledge, alternative teaching strategies in a particular discipline, common content-related misconceptions, how to forge links and connections among different content-based ideas, and the flexibility that comes from exploring alternative ways of looking at the same idea or problem, and more, are all expressions of pedagogical content knowledge and are essential to effective teaching. Whereas, content-based was traditionally, where instruction was characterized by a cognitive load of facts and concepts, many of them irrelevant to the learners, isolated from disciplines, and demanding the new context-based emphasizes on learning in context, and higher order thinking skills. It assists the teachers to facilitate the promotion of deep learners' understanding. The assumption was that by learning fewer topics that are relevant to the students, they would acquire deeper understanding and higher order thinking skills (Dori & Sasson 2008; Avargil, Herscovitz & Dori, 2012).

From the analysis above it can be explained that 83.3% of the educators prefer context-based teaching to content based teaching. However, two (2) educators prefer content based teaching to context based teaching.

This might be as a result of some teachers having difficulties in implementing the Revised National Curriculum Statement (RNCS). According to Avargil, Herscovitz and Dori (2012), content-based teaching is time consuming and confuses the learners because of the load of work they have to do, while context-based saves time and maximizes performance.

The above analysis shows that teaching mathematics can be very challenging in the sense that each learner coming from different backgrounds and perceptions bring distinct mathematics challenges to class and it is the responsibility of the mathematics educator to identify the challenges of learners both in class and home and develop a mathematical teaching strategy to help the learner overcome those challenges or refer those challenges to the requisite educational institution that has the expertise to assist the learners most especially with special challenges.

In considering the question of the major factors affecting grade 6 learners' performance in mathematics, the educators identified the following factors affecting grade 6 mathematics performance.

Lack of qualified mathematics teachers; Inconsistences of government policies
Low motivation by government the Department of Education and principals of the schools

- Language barrier
- Lack of basic numeracy and literacy skills
- Poor infrastructure
- Lack of parental responsibilities

On the assessment methods used in assessing learners, the educators stated the following:

- Tests
- Projects
- Investigations
- Group work
- Individual assignments

4.6. SEMI-STRUCTURED INTERVIEW

The semi-structured interview was conducted to sixty (60) respondents where five (5) learners in each school were selected purposively from the population in an oral form and then analysed. The questions asked and the responses are as follows:

Question: What is your attitude towards mathematics?

Responses: thirty (32) respondents representing 53.3% responded that their attitude towards mathematics is positive whereas twenty (20) respondents representing 33.3% responded that they have negative attitude towards mathematics. Eight (8) respondents translating to 13.3% responded that they were not sure of their attitude towards mathematics.

From the above response, it can be noted that the majority of learners have a positive attitude towards mathematics. This supports the responses of learners in relation to their attitude towards mathematics as showed in the structured questionnaire administered by the researcher. Some few responses of the learners indicated that they are not sure of their attitude towards mathematics and this could be that their terminal performances in mathematics are passes and fails.

Attitude is another psychological construct that affects learners' performance in mathematics. Akkoyunlu (2003) defines attitude towards mathematics as a matter of either like or dislike of mathematics. He argues that learners' attitudes towards mathematics play an important role in mathematical achievement. According to Bloom as cited in Akın (2002), developing positive attitudes towards mathematics courses increases learners' achievement. Conversely, a math learner with negative attitude affects his/her performance. Attitudes affect the level of performance; and in turn the level of performance affects attitudes. Hence, it can be concluded that there is a reciprocal (non-recursive) relationship between attitude towards and achievement in mathematics. In this study, the attitude of the learners towards mathematics was good except a few of the leaners who needed to be guided and counselled.

The observations of the researcher were that most of the learners paid attention in class because the teachers were able to control the class and engaged the learners. However, some few learners did not revise their notes at home. The classroom environments were not conducive to ease teaching and learning and some few educators made the subject very boring for the learners.

Question: What do you find difficult in mathematics lesson?

Responses: Forty-six (46) learners representing 76.7% responded that they lack understanding during mathematics lessons especially topics like fractions, divisions, multiplications, number patterns were mostly mentioned as very challenging because they are not easily understood and some few learners were battling with English language which hindered their understanding. Fourteen (14) learners representing

23.3% responded that they were confident and did not find difficulty in mathematics lesson being presented to them. This could be that those learners had good mathematics background and they are assisted at home to understand the concept taught by the educators.

Acccording to Spaull (2013), many South African mathematics teachers have below-basic levels of content knowledge, with high proportions of teachers being unable to answer questions aimed at their pupils. Grade six mathematics teachers from quintiles one, two and three have similar levels of content knowledge to the average teacher in Mozambique, Zambia and Malawi, and have substantially lower content knowledge than teachers in Kenya, Zimbabwe, Uganda and Tanzania. Similarly, rural mathematics teachers in South Africa have significantly lower levels of content knowledge than rural mathematics teachers in Swaziland, Tanzania, Uganda and Kenya. Given that the teacher and pupil tests are scaled to be comparable, it is shocking to note that the top 5 percent of Grade Six pupils in South Africa (565 pupils) scored higher marks on the same mathematics test than the bottom 20 per cent of Grade six mathematics teachers in the sample (80 teachers). Given that teachers cannot teach what they do not know, these findings have severe implications for the quality of education in South Africa. The content knowledge (and thereafter pedagogical content knowledge) of mathematics teachers in poor and rural areas is improved, it will be exceedingly difficult to raise pupil achievement in these areas. The challenges for many ELLs are not only overcoming a language barrier but also achieving academically (Garcia & Cuéllar, 2006). According to The Nations Report Card (National Center for Education Statistics, 2009), the average math score for White fourth graders was 248 with only 9% below basic math skills, whereas the average math score for ELL fourth graders was 218 (43%) below basic skill level). By eighth grade, this gap had widened with White students averaging 291 (17% below basic) and ELLs averaging 243 (72% below basic). These gaps challenge school authorities to achieve equitable math outcomes for ELLs.

Question: Who assists you in learning mathematics at home?

Response: Twenty-eight (28) respondents representing 47% responded that their mothers help them in learning mathematics at home. Five (5) respondents representing 8% responded that their fathers help them in learning mathematics at home. Ten (10) respondents translated to 17% responded that their siblings help them in learning mathematics at home and seventeen (17) respondents representing 28% responded that they do not have anybody to help them with mathematics at home.

The majority of the learners' parents are single parents and most of them are staying with their mothers. Although the learners are assisted by their parents to do homework, it is not consistent because they sometimes return home late where learners are left stranded with their homework. Some parents are willing to assist their wards but they do not understand the homework given or do not know the work given at all. Some return to school the following day to ask their colleagues or teachers. This may be an indication that most parents do not have formal education to assist their children at home or are not concerned about their children's mathematics progress.

Cheung and Pomerantz (2012), opined that parents who are motivated to assist their children with school work give their children more support academically over other children who do not have parental assistance. This has great impact on their learning which contributes to their achievement.

Question: Do you use your teacher's method in solving mathematics problems?

Response: Forty-six (51) learners presenting 85% responded "YES" and eleven (11) learners representing 15% responded "NO" because they get confused with the educator's method. According to most of the learners, "they like to use the educators' methods but they get them wrong with some challenging topics such as fractions, divisions, multiplications, number patterns etc." Others said that, "the steps involved are very confusing and complicated", (Learner's own words).

Some researchers have claimed that some topics in mathematics such as decimals are erroneously believed to be fractions. Although there is a close association between decimals and fractions but having a good method of teaching would make it clearer to

the learners. Educators have the responsibilities to engage the learners, anticipate their perplexities, help them avoid pitfalls, and dispel misconceptions. Educators of mathematics are expected to develop appropriate tasks, techniques, and tools for assessing learners' understanding of the topic (Lobato, Ellis & Zbiek, 2010).

Question: Do you like doing mathematics on your own? If not, why?

Response: Forty-eight (48) respondents representing 80% responded that they do not study on their own. This is due to the fact that majority of the learners have at least someone at home to help them do their homework and any other assignments given. It could also be that the learners are still young and needed guidance in their studies and also mathematics is still challenging or difficult which becomes boredom practising alone. Twelve (12) respondents representing 20% responded that they study mathematics on their own. The learners who study mathematics on their own could be that they have good mathematics background and also, have the desired interest in practising it which has made them independent in their studies.

Spaull (2013) in his study revealed in the Southern and Eastern African Consortium for Monitoring Educational Quality (SACMEQ II, 2000) and (SACMEQ III, 2007) that there was no improvement in South African Grade six literacy or numeracy performance over the seven a year period. Given that 13 other African countries also participated, it is possible to compare the achievement levels of South African Grade six children with other Grade six children on the continent. In the most recent round of SACMEQ (2007), South African pupils ranked 10th of the 14 education systems for reading and 8th for mathematics, behind much poorer countries such as Tanzania, Kenya and Swaziland. It is rare in South Africa to see grade 6 learners practicing mathematics on their own to gain the needed understanding of the topics they have been taught as compared to learners in China, Finland and New Zealand.

Question: Which medium of communication (language) do you prefer mathematics to be taught at school with? Why?

Response: Forty-nine (49) respondents representing 82% indicated that mathematics should be taught in English because it is a universal language. Five (5) respondents representing 8% felt that mathematics should be taught in Afrikaans because it was their home language and they understood it better. Six (6) learners representing 10%, responded that mathematics should be taught in Xhosa because it wass their mother tongue and they understand mathematics terms and calculations very well when Xhosa is used. They emphasized that it will help the teachers also to explain mathematics concepts to them well (learner's own words).

From the above analysis, it shows that the majority of the respondents want mathematics to be taught in English instead of any other native languages. Probyn (2009) asserts that in South Africa, as in many parts of postcolonial Africa, English dominates the political economy and as a result is the medium of instruction chosen by the majority of South African schools, despite the fact that most learners do not have the opportunity to acquire English to the levels necessary for effective engagement with the curriculum. Where teachers and learners share a common home language, there is frequently a gap between language policy and practice, and code switching by teachers and learners is a common strategy to achieve a range of social and pedagogical goals. However, in teachers' training the multilingual realities of the classroom have most often been framed in terms of a linguistic problem, with a deficit view of code switching. As a result, the potential to use two languages in the classroom in a structured and systematic way to support learning has not been generally recognized or developed. In addition, code switching practices are often covert with teachers 'smuggling the vernacular into the classroom' and adopting very different linguistic practices when observed, with serious implications for classroom-based practice.

Question: Which mathematics topics do you like most and which ones do you dislike?

Response: Mathematics topics that learners like most and their reasons

The majority of the learners responded that they like mathematics topics like data handling, addition and subtraction, 2-D shapes, time, viewing objects, temperature, line symmetry and measurements. They attributed the reasons for liking the above mentioned topics because they are simple to understand, the teachers are able to explain them better, they score high marks in both classwork and examination questions.

Response: Mathematics topics that learners dislike most and their reasons

They dislike mathematics topics like fractions, Geometric patterns, divisions, multiplications, capacity and volume, percentages and word problems. They dislike the topics mentioned above because they are too complicated for them to understand, teachers are not able to explain it to them for them to understand, and cannot figure out the processes in working them out most especially for divisions and word problems. Those who assist them to do their work home such as parents, siblings, grandparents etc. complain that mathematics in general is very difficult

The following facts could be ascertained from the above results:

- Learners have bad perceptions towards mathematics;
- Learners lack understanding during mathematics lessons;
- Learners use their educator's method in solving mathematical problems yet, they mostly do not get them right; Learners' support from parents and other stakeholders are not consistent to study at home or do homework;
- Learners are unable to do their work independently unless being assisted because they claim most of the mathematics questions are very difficult;
- Learners prefer their mathematics educators to gain mastery over mathematics subjects so that they can understand what they are being taught;
- Learners are willing to be assisted with mathematics topics like fractions, divisions, word problems etc. because they claim they pose great challenges to them;

- It can be noted that learners' perception towards mathematics is negative. When perception is wrong or negative it needs psychological adjustment of support to assist those learners involved. It is therefore important for the mathematics educator to design an innovative and effective method of teaching mathematics so as to assist learners to harness good performance in mathematics.

4.7. FINDINGS FROM RESEARCHER'S OBSERVATIONS

The researcher's observations were based on classroom size and environment, lack of teaching materials and learning aids, time management and learners' unpreparedness.

4.7.1 Classroom size and environment

The researcher observed the size of the classes visited which showed that most of the classes are large classes up to a maximum of 48 learners. The ratio of a teacher to learner is highly disturbing because it becomes difficult for the teachers to control the learners and give quality teaching and learning to the learners. Learners who were not paying attention could not be easily seen by the educator because of the largeness of the class which could be one of the factors that affect learners' poor performance.

Some classrooms also have very poor ventilation which could hamper their scope of absorption during summer season where the temperature could rise up to 39°C. Most of the fans in the classrooms are not working and the ones working make noise which disrupts the teaching and learning in the class and goes a long way to affect the learners' performance. However, there were some few classes that have smaller class sizes from 20 up to 27 learners and can achieve close attention to learners needs by answering questions of the learners.

Blatchford, Bassett and Brown (2011) in their study emphasized that in many countries over the world there has been a widely reported debate over the educational consequences of class size differences. Some policies in different countries have changed in favor of small classes. In the U.S.A, over 30 states have enacted legislation for class size reduction (CSR) programs. Current Government policy in England and Wales is for a maximum class size of 30 for pupils aged 4 to 7 years, and larger cuts

are planned in Scotland. There have been initiatives involving class size or pupil to adult ratio reductions in the Netherlands and New Zealand. In East Asia, many countries and cities (including Shanghai in the Chinese Mainland, Hong Kong, Macau, Taiwan, Korea and Japan) have implemented 'small class teaching' initiatives. There have been many studies pointing smaller classes which have positive effects on pupil academic performance, if introduced immediately after school entry, that is, with the youngest children in school. It is therefore imperative for the ministry of education and other government stakeholders to enact policies that will regulate class size to achieve positive results in learners' performance.

4.7.2 Lack of teaching materials and learning aids

There cannot be effective teaching without the needed teaching materials. The knowledge that educators have is abstract and can be made real or concrete or tangible when those teaching materials are used effectively for the learners to understand what is being taught. Almost all schools visited have the basic teaching aids such as the chalk board, chalk, rulers, measuring instruments and few pictures. In the 21st century the world has evolved quickly where traditional teaching aids are fading out in replacement of technology. None of the schools that the researcher visited used projectors to display pictures and even show learners the real life videos of the topic that was treated. Mostly because of the large class sizes, educators were not able to show pictures to all the learners and where they did, it cost them much time. In a situation where the educators have to show about 4 or 5 different pictures to 45 learners, there wouldn't be enough time to teach. In one case, one of the pictures got torn whiles learners were trying to look at them.

According to Eee Ah Ming (1997) (cited in Zin and Zain (2010)), traditional teaching focused on the lecture method in delivering the content to the students and they used one-way communication to explain the idea or principle. The students become a passive participant in class. This situation will lead the students to become bored to learn and finally will influence their academic performance. An alternative to the traditional way of teaching is edutainment which means that the education that has

been placed within the framework of entertainment with a software which is designed and developed to target parents and educators and is specifically designed to focus on academic subjects. In the same vein, in most of the schools visited, learning aids were not different from the traditional way of having the tables, chairs (some chairs were not in good condition), stationeries etc. as compared to edutainment where phones with some applications explains step by step to the learner how to work out questions regarding the topic that is being treated.

4.7.3 Time management

Time is very important when it comes to teaching and learning routines. The class time table spells out what should be done at any point in time in the classroom. The researcher observed that some few learners arrived at school late in the morning as at the time of the survey. The educators were in school in time but the starting time of most of the schools were delayed. This could be that some learners and educators took more time to settle and start lessons. Some schools started from a minimum of 3 minutes late to a maximum of 9 minutes. An assumption of 5 minutes late a day could cost 120 minutes or 2 hours (5 minutes x 24 (average working days in a month) = 120 minutes) which is 2 teaching periods of 1 hour each or $2\frac{1}{2}$ teaching periods of 45 minutes each. It is shocking to note that schools that start 5 minutes late lose 5 working days or a week in a an academic year (5 minutes x 206 school calendar days) = 1030 ÷ 60 hours = 17.16 hours. This means that those schools lose over 17 teaching periods of 1 hour each in a year. Niemic and Frederic (1994) (as cited in Saloviita (2013)) made a distinction between allocated, engaged, and productive time. Allocated time is the time assigned by curricula for learning. Engaged time means time on task. Productive time is the proportion of engaged time in which the student is really learning with high success.

This is one major contributory factor to the learners' poor performance in mathematics because time is wasted and also there are few schools that have extra lessons or remedial classes for the learners after school.

4.7.4 Learners' unpreparedness

A good educator cannot produce good results when the learners are not prepared to listen to what is being taught, work on the exercises given and practise what is studied to attain the required results. Most of the schools the researcher visited had learners who were quiet but not attentive in class. It became difficult for some of the learners to answer questions which the educators had already explained to them. Majority of the learners do not complete their work within the time frame and some of them do not do the work given to them. The attitude of learners' unpreparedness, have dire consequences in hampering the achievements of learners. This could be that the educators do not know how to motivate those learners to come out of their shells. Many researchers have emphasized that Instruction is relevant to the learner if it is related to concrete examples with the learners' experience. Metaphors, analogies and stories relate information to something the student is familiar with, and helps learners understand new concepts. NGOC and Iwashita (2012) also argued that there is often a mismatch between the attitudes and actual behaviors of learners in the classroom. While educators held favorable attitudes towards classroom practices, often learners' attitudes which are not favorable deviate the goals of the educator and vice versa. Some teachers seems not to bother about what the learners do in class and this eventually affects the performance of learners in maths. Teachers who are themselves anxious about their mathematical abilities often dampen the zeal learners have for the subject (Gatto, 2013).

4.8. CONCLUSION

The study highlighted the findings from the learners, educators and researcher observations about factors affecting grade 6 learners' performance. In the final chapter, a conclusion is provided that summarizes the research, describes the main research findings and offers recommendations for further study.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

Mathematics teachers and researchers in the field of mathematics education have been grappling with what can be done to tackle the performance of learners. Despite the fact that mathematics is a compulsory subject in the teaching field of specialization in South African schools, the schools face many challenges for which this study examines the factors that affect grade 6 learners' performance. This chapter summarises the study by highlighting the factors affecting grade 6 learners' performance in mathematics in East London Education District. The chapter deals with the findings, draws conclusions based on the findings and also makes recommendations to parents, learners, educators, principals, department of education, government, and other stakeholders. The study used the mixed methods' research approach that both qualitative and quantitative methods to examine the factors affecting grade 6 learners' performance.

The instruments used to collect data on the factors affecting grade 6 learners' performance in mathematics in East London Education District were structured questionnaire and semi-structured interview and observations. The learners' questionnaire was structured into three sections which were: demographic details of learners, major factors affecting learners' performance and recommendations. The educators' questionnaire also included demographic information of educators, factors affecting teaching and learning of mathematics in grade 6, and recommendations.

5.2 SUMMARY OF THE MAIN FINDINGS

The main findings of this study were based on the examination of the factors affecting grade 6 learners' performance in mathematics in the East London Education District. The following factors came to light as discussed in the previous chapter.

5.2.1 Lack of teaching specialization

Teaching is very important because it forms the core for all professionals. One of the problems identified from this study is the lack of teaching specialization in most of the schools in East London District. From the data, it was showned that 25% of educators were not qualified to teach mathematics. Generally, almost all the educators have the minimum qualification of a degree certificate which the South African Council of Educators has enforced over the years. This information is consistent with Bernstein (2011) whose study emphasized that teachers who are qualified to teach certain subjects, including scarce subjects such as mathematics, do not actually teach those subjects. Many teachers of mathematics are not qualified to do so, and many of those who are qualified are not teaching mathematics. In 2005 the Department of Education found that 44 per cent of teachers who were qualified to teach an identified scarce subject (e.g. mathematics) were actually teaching other, non-scarce subjects. This can significantly impact adversely on the learners' performance in mathematics. Again, this study from the data analysis shows that 58% of the teachers were above 41 years old and 16.7% were between the ages of 21 and 30 years. This highlights the fact that there are few young educators pursuing teaching of mathematics as their career. Many young educators whose field of teaching is scarce are finding their way to overseas where salaries and working conditions are better. Mda (2009) cited in Mateus, Allen-Ile and Iwu (2014) asserts that if we should consider whether there is in fact a shortage of teachers, then we need to examine perceptions against reality, and interrogate the interpretation of 'scarcity' and 'shortage'. According to Mda, using learner-educator-ratio reveals that there is no scarcity of teachers. Instead, she says the uneven distribution of educators across provinces presented some concerns. She went on to say that while there were graduates in the field of education who were actively job hunting, the geographical areas in which they were seeking employment, were already oversubscribed. Mda however does not dismiss the role of emigration in this case. According to her, while South Africa lacked skilled teachers, the few skilled ones had opted to go overseas in search of greener pastures and in some cases, some form of security. This should raise an alert to government and all other stakeholders in

education that in the next decade, if the same situation persists, there will be extremely mass shortages of educators especially in the field of mathematics. This has currently adverse impact on learners' performance in mathematics even though there are many educators but only few qualified mathematics educators are available.

5.2.2 Lack of classroom management

One of the quotes of Brian Tracy goes "failing to plan means planning to fail" which reveals that there are many schools which lacked planning or having managerial skills to ensure that the schools are running smoothly. According to Wong, Wong, Rogers and Brooks (2012), classroom management refers to all the things that a teacher does to organize students, space, time, and materials so that student learning can take place. It comprises a plan—a set of procedures that structure the classroom so the students know what to do, how to do it, and when to do it in a classroom. Some of the schools from the data gathered reveal that an average of 5 minutes is lost before actual teaching starts. This means that learners lose 17 teaching periods of 1 hour each in a year which is highly significant to impact on learners' performance in mathematics. There are few mechanisms in place to monitor educators and learners in class by either the Head of Department (HOD) or the principal. The most commonly used tool for time monitoring is the time table in class which is a guide but cannot monitor the effective use of time by educators in the classroom.

Effective teachers have a classroom that is organized, structured, and consistent with procedures—steps that guide students in how to get things done in a classroom. Procedures are used to manage a classroom so that instruction and learning can take place. An effectively-managed classroom has an educator who is consistent and predictable in the implementation of lesson plans and the special needs of the learners. This is because many of our students come from homes where chaos and unpredictability are the norm. Research shows that when we provide a place for our students that is safe, predictable, consistent, and nurturing, we will see increased student achievement. A well-managed classroom is safe, predictable, nourishing, and

focused on learning which increases the performance of learners (Wong, Wong, Rogers & Brooks, 2012).

5.2.3 Lack of parental support

It can be recalled from the previous chapter that 77% of the learners said that they either receive little or no support from their parents regarding homework. Homework is vital in preparing learners for achievement in class work, test or examination. There were 53.5% of the parents whose educational level are up to high school and never completed. These parents are not well-versed with knowledge to give adequate support to grade 6 learners in mathematics. According to the South African Council of Educators, anyone basically will be qualified to teach effectively when the person has a recognized university degree or equivalent and should have studied in education. If parents are not having the requisite knowledge to assist their children regarding their mathematics work, there bound to be poor performance by those learners. According to the data analysis in the previous chapter, there are 62% of learners who do not study mathematics at home which means that there is little or no monitoring of the learners at home to do their homework. In some situations parents have the requisite knowledge to assist their children but do not have the time to monitor the studies of their children hence indirectly make their children struggle in mathematics. This could lead to abysmal performance in class because homework irons out what needs to be practised in all the topics covered by the educator.

5.2.4 Lack of motivation

Motivation is the driving force of either an educator or learner to maximize performance. From the data analysed in the previous chapter, 58% of educators expressed either little or no motivation from government in many areas such as training and development, salaries of mainly public school educators, policies and provision of resources that will make their work easier, enjoyable and stable. There are three (3) driving sources of motivation that end up influencing learners' academic performance which are motivation from the educators to learners; motivation from parents to learners; motivation from government to educators. According to Pintrich and Schunk (2002) cited in Muola,

(2010), educators' motivation of leaners influences learning and performance and what learners do and learn influence their motivation. He adds that those who have high achievers as their role models in their early life experience would develop a high need for achievement, while those who have low achievers as their role models will hardly develop the need for achievement. Often, learners will do more of what they have been taught when teachers motivate them. Learners who are motivated by their educators to practice mathematics are keen to engage in activities they believe will help them learn, such as attending carefully to the instruction, taking notes to facilitate subsequent studying, checking their level of understanding and asking for help when they do not understand the material (Sikhwari, 2014).

The data analysis from this study shows that 62% of learners do not study mathematics at home which means that motivation from parents/guardians is very low. Education of learners started at home where parents provide first time motivational influence in their children's lives. Parents' motivation to their children play big role in the academic performance of their children. When this motivation ceases and the child is left to receive motivation from the class teacher only, it leaves some vacuum in the life of the child which can affect the performance of that child. In reference to Fan and Williams (2010), they opined that parental involvement in motivating their children has been documented as positively impacting learners' mathematics proficiency and achievement gained in standardized tests as well as academic assessments.

Lastly, motivation from the government is crucial in inspiring both the educators and the learners as well. When educators are motivated by the government through the education department in terms of very good training and developments, the effects of the motivated educators will be positive on the learners who are the final recipients. From the information gathered in the previous chapter, 58% of educators are not satisfied with the in-service trainings they attended which are organized by the department of education in the East London Education District under the auspices of the government. The motivation that educators' need is broad and covers salaries & bonuses, fringe benefits, working conditions, trainings and development etc.

Mathematics educators lack motivation from government and the schools in which they are teaching. Dean and Kelly (2001) as cited in Chughati and Perveen (2013) argued that inadequate living and working conditions are major problems faced by educators. Unavailability of transport, security and residential facilities in remote rural areas, especially for female teachers is a big issue. Learner- teacher ratio also affects quality of teaching and is linked to the emotional and physical well-being of the teacher. In all these challenges, the government can prioritize education and assist more than what is being done to motivate both the educator and the learners for performance to be improved.

5.2.5 Lack of confidence of learners in mathematics

The study showed that 77.5% of the learners have at least low confidence in mathematics which is worrying. Most of the learners in the classroom knew the answers to the questions that the teacher asked but were not able to say the answers rather, wrote the answers in their books. It was found in the study that some of the learners were confident in terms of written answers but lacked confidence in verbal answers and vice versa. Hunter and Anthony (2011) as cited in Darragh (2013) avered that some learners had confidence in their competence to provide mathematical explanation was problematic. All the learners in this study initially claimed that they lacked the confidence to speak to the class, due to shyness and the need to maintain 'face'. However, participation in an inquiry style of learning in small problem-solving groups eventually led to a feeling of community for these learners. They became more comfortable and stated an increased confidence in participating as a valued contributor to the learning community. Educators need to recognize the needs of learners so that they can be assisted to boost their confident level to increase their performance in mathematics.

5.3 SUMMARY OF THE FINDINGS ON FACTORS AFFECTING LEARNERS' PERFORMANCE IN MATHEMATICS

Some of the factors affecting grade 6 learners' performance in mathematics are outlined as follows:

- Some mathematics educators are found teaching in subjects they are not qualified for which affect the learners' ability to perform well in mathematics.
- Qualified, skilled mathematics educators prefer to work in another profession that have good working conditions than in the teaching field or they go oversees in search for better working conditions which adversely affect learners' performance eventually.
- Quality of teaching and learning were less effective due to the overcrowded classrooms and leaking ceilings during the raining season make the learners get distracted and disruptions during teaching and learning lessons.
- Some mathematics educators do not stick to the set time table during teaching and learning in the classroom which make the learners lose some teaching periods, thereby denying learners of their required teaching time for improved performance in mathematics.
- Most schools lacked managerial skills regarding the monitoring of educators and the provision of the requisite resources for teaching and learning.
- Majority of the educators use traditional methods of teaching with little or no technology in teaching to meet the standard of modern education.
- Quite a large number of parents either do not have time to assist their children with mathematics homework or they do not understand the homework of their children. This make the learners get disinterested in mathematics.
- There is less monitoring by parents to ensuring that learners practice the exercises given to them. This makes the learners to not develop interest in studying and practicing mathematics at home.
- Lack of motivation from school principals, the Department of Education and government to enhance the teaching and learning of mathematics. The

motivation of educators to go extra mile to assist learners is very low. This has adverse effect on the learners' performance in mathematics.

- ❖ Some of the learners are less motivated by their educators and parents in providing verbal, written and other forms of compliments where learners go extra mile regarding improving their performance in mathematics.
- ❖ Most of the learners lacked self-discipline to practice mathematics at home. Homework is often not done which affects them when they are tested or examined by the educators.

5.4 RECOMMENDATIONS

The following are some of the recommendations made by the researcher to the parents, learners, educators, principals, the Department of Education, government and other stakeholders:

5.4.1 Recommendation to the parents

- ❖ Parents should not leave their children's mathematics education solely in the hands of educators but must be actively involved in the work given to their children both in school and home. They must visit the school periodically to know how active their children are and get feedback from educators on salient issues that parents must note about their children.
- ❖ The first place of education is the home so parents must take the responsibility to consistently educate their children regarding discipline in schools, punctuality in schools which will eventually impact positively on the learners' academic performance especially in mathematics.
- ❖ Parents should provide conducive home environments for their children to learn. These conducive environments should be devoid of noise such as consistently playing loud music, unregulated watching of television, quarrels and fighting among parents etc. The effect of broken homes has dire consequences on learners' performance in mathematics.

- Motivation of learners by their parents is one of the major determinants in the learners' work. Mathematics is deemed as a demanding subject where the learners need emotional support from their parents and the presence and commitment of parents to their children become great motivation to the learners. Most learners will go extra mile to do their work and perform better in mathematics when their parents are involved in their school work and parents must avoid creating the perception in their children's mind that mathematics is for certain learners because it is difficult.
- Parents who are not able to assist their children because they are busy or do not understand the work of the children must make arrangements for private tutors if they can afford it or engage the people in the community such as siblings, friends, learners in higher grades to assist their wards with challenging topics being treated at school.

5.4.2 Recommendation to learners

- Learners should form study groups which will help them to improve on their performance in mathematics. These study groups assist slow learners to be assisted by fast learners in solving challenging areas in mathematics. Study groups avoid tension that sometimes could exist in the classroom and the language that are used are at the level of the peers are simple and understandable. A learner who understands a particular topic in mathematics can explain it better to his / her peers in their study groups because they understand each other better and also they feel free to express their challenges and concerns.
- Development of self-motivation is one of the best ways to begin in developing interest in mathematics. Learners should be motivated personally so that they can work hard, set their own academic targets and try to meet the set targets. Some learners who perform well in mathematics but do not have anyone to supervise them at home resort to motivating themselves by consistently

practicing what they have been taught which give them positive attitude towards mathematics.

- ❖ Learners should develop the confidence in asking questions in the classroom for clarity on what they are taught and the topic they do not understand. Learners must have both traits of confidence which are embedded in written and verbal work. Many learners fail to ask questions in the classroom especially in content areas that they do not understand. The lack of confidence of the learners affects their work and build tensions which make them make simple mistakes during tests and or examinations periods.
- ❖ Learners should create conducive environment most especially when the educators are teaching them mathematics. Making extreme noise, disruptions, distractions, fighting etc. can affect the quality of teaching and learning as well. Learners who are slow need no distractions to make them concentrate on what is being taught in the classroom. Mathematics can be studied and practiced well when the learners are attentive to follow steps of calculations and know how it is done.

- ❖ Learners must have adequate relaxation for refreshment of their minds so that they can absorb enough information given to them by their educators. They must sleep early to maximize on rest for them to be energized for the next day at school. The saying goes “a sound body has a sound mind” relates to a situation where some learners are not able to cope with school work because they play all day and watching television and being on phones at late hours. They get extremely tired and never prepared for extra tuition or assistance they may receive after school. This results in mathematics homework not being done and no revision not done on what they were taught at school.

5.4.3 Recommendations to educators

- ❖ Educators should know the strengths and the weaknesses of their learners in the classrooms so that they can offer remedial teaching to learners by focusing on which content areas the learners need help. This will help cater

for all types of learners with different learning difficulties in the mathematics class. Effective remedial lessons should be on few selected learners whose challenges are below the standard of the class where their needs can be met. Where there are available human resources (educators), then one-on-one tuition would be suitable by the mathematics educator to enable learners who are shy to ask questions in class the opportunity to do so privately. The fast learners can also be concentrated on when corrections are done in the classroom and friendly environment should be created for the learners to ask questions on where they find so challenging.

- Educators should adhere to the time table of the class to avoid starting lessons late. Learners are indirectly denied of teaching time which accumulates many teaching periods in a year. 5 minutes out of 60 minutes delay per lesson by the mathematics educators could be 17 lessons lost in a school academic year.

- Mathematics educators must take in-service training and workshops seriously in order to update their teaching methods and skills in mathematics. Educators who have been in the teaching field for many years can benefit from in-service trainings and workshops on new methods of calculations, the use of technology in the classroom and effective teaching styles so as to assist some learners with special learning needs. Common topics that educators find challenging for the learners to understand must be communicated to the subject advisors within the district, so the all trainings to be given to the educators would be done.

- Educators should acknowledge that all learners are unique and that they have different learning needs. Therefore the approach that mathematics educators will use is very important. One of the best approaches in teaching mathematics is the learner-centred approach such as brainstorming method, a discussion method etc. which help the educators to identify the learning

needs of the learners. If learner's needs are identified by the educators, then teaching according to their needs becomes easy. This approach helps learners to be independent in their work and reduces the workload of the educator.

- ❖ Mathematics educators must develop themselves regarding their qualifications to meet the demands of the learners. In the past decade, teachers needed a college training certificate to teach and later, it went up to a Diploma in education. Currently, all South African educators must possess a recognized university degree in education. The emphasis is now on teaching your qualified subject because that is where educators have mastery over the subject. To impact positively in the learners' needs, educators must acquire the knowledge of what they are teaching and how they must teach it.

5.4.4 Recommendation to principals

- ❖ Principals should employ some mechanisms where educators are monitored in the classrooms to ensure that learners are not losing the time set for the educators to teach them.
- ❖ Principals must create room for the parties to education who are the parents, learners and educators to meeting so that issues related to any of the parties can be resolved in the presence of the other parties involved. This will help the principals to know where the problem is coming from. For instance, in a situation where the parent is not actively involved in the learner's education but presents his or her case otherwise to the educator or the principal, that learner will be present to correct that. Again, in a situation where the educator is not doing his work well but presents it differently before the parents, then the learners would say the correct version of the case. Mostly, what we have in schools are Parents, Teachers Associations (PTAs) which exclude the presence of the learners making educators or parents hide their ineffectiveness. The learners are the only

connectors to both the parents and the educators therefore, we cannot leave them in the meeting.

- ❖ Principals should motivate both mathematics educators and learners who put in much effort to do well. Reward and or awards can be given to educators and learners for high performance enhancement. There should be some corrective measures and for both educators and learners who do not attend classes or absent themselves from school. The rules and regulations governing the teaching profession should be applied when necessary to deter recalcitrant educators and learners.
- ❖ Principals must ensure that the classrooms are up to standard such as good condition of tables and chairs, enough ventilation in the classrooms, availability of teaching and learning aids etc. so as to create conducive environment for both the educators and learners to enhance teaching and learning of mathematics.

5.4.5 Recommendations to the Department of Education

- ❖ The Department of Education should conduct trainings that are tailored to the needs of the modern education so that the educators are able to impart the right and modern knowledge to the learners. Some of the trainings are becoming obsolete and will not be relevant in some few years to come. For instance, training educators to teach abstract content would not be adequate for the learners to apply their skill in mathematics because they lacked the knowledge of "know how" or practical way of doing it. Trainings should guide educators about the importance of some topics like fractions, number patterns, measurements etc. in real life situations and not to only centre on how to teach it. Training educators on technology will go a long way to make the topic being taught easy to the leaners. Most of the learners are taught to calculate manually but know a little on how to use the calculator to do the same task.
- ❖ The Department of education should do regular visits to schools to verify what is done in the classrooms by educators, check the availability of resources in the

school and help enforce all the requirements of the schools. For instance, some schools do not have text books for all the learners in the classrooms.

- The department of education should organize mathematics competitions for schools to ensure that learners are being taught the right things. This will motivate schools that are doing well and the ones that not performing to do their best. This will bring healthy competitions among schools and the thereby improving the performance of learners in mathematics.
- Qualified young and energetic educators who are new in the teaching field should be guided, empowered and treated well so that they will stay in the teaching profession. Transferring new educators from the city to the village will be demotivating enough for them to go for posts rather, keep them in their districts. This will have negative effects on the learners because there will be shortage of new mathematics educators to fill in the vacant posts. If there a need to transfer new educators, there could be some allowances given to them such as “family separation allowance” or “new environment allowance”.
- Employment of mathematics educators to fill in vacant post by the Department of Education must only be for those educators who are qualified for the post. Filling in the post with educators who are not qualified for the post will have dire consequences on the learners’ performance. For instance a social studies educator filling in the post for mathematics teacher will end up with poor mathematics performance by the learners.

5.4.6 Recommendation to government

- The government must create good working conditions for educators most especially for those who teach critical subjects like mathematics who are scarce to fill in vacant posts. This will address the problem of some educators teaching the subjects that they are not qualified for. Tax rebates and other fringe benefits used by the government to qualified mathematics educators would stop or reduce mathematics educators who leave to overseas for better working conditions.

- Many educators are retiring therefore there is the need for the government to establish teacher training colleges to augment the already established universities where few prospective educators are able to attend. There could be institutions producing educators for each education phase. A typical example could be that educators to teach foundation and intermediate phase would be produced by colleges and the educators to teach in the senior phase could be produced by the universities. However, the qualification standards should be the same. This will create availability of qualified mathematics educators throughout the phases and maintain phase specialization. Hence, rooting out educators who take the post that they are not qualified for.
- Government must plan in relation to the population growth rate so that yearly budget can take a percentage of the population increase to build schools after every 5 years. The starting age of grade one is from 6 to 7 years old. Building schools for the newly born babies will meet the future population demand of schools. This will reduce or avoid having large class size which hampers quality of teaching and learning thus, create poor academic performance.

5.4.7 Recommendation to stakeholders

- Without quality education, there will not be a great nation because education is the key to the development of every nation. All stakeholders such as profit and non-profit making organizations must contribute immensely towards building of schools, scholarship schemes, building of flats for educators etc. Investors will not think twice to invest in the country if schools are able to produce many and different human resources such as engineers, doctors, accountants etc. in the country to run both the public and private institutions.

- Stakeholders should also establish a mathematics resource centre in every district to enable learners and educators to have access to the modern and scientific methods of teaching and learning mathematics.

- ❖ Stakeholders should liaise with the government to accept learners in private companies during school holidays so that the learners will learn practically the real life use of mathematics so that they can apply the acquired knowledge in their respective schools.

5.5 LIMITATIONS OF THE STUDY

The study was limited to only some selected schools in East London education district in the Eastern Cape province of South Africa. Also, the sample size was made purposively thereby only limited number of students participated in the study. The number of educators too was very small and they do not actually represent the population of schools in East London.

There was a communication barrier between the respondents and the researcher since the researcher cannot speak isiXhosa. The researcher therefore employed the services of one of the educators to translate some of the items in the questionnaire which altered the meaning of what the researcher was asking for.

The researcher could not visit the homes of the respondents to ascertain the situations prevailing in the various homes of the learners and this may have affected the validity of the study.

5.6. CONCLUSION

Education is the pivot of every nation and therefore it is important to examine the factors affecting grade 6 learners' performance in mathematics in the East London Education District and to engage with educators, parents, learners, Department of Education, government and all the stakeholders to come on board and contribute their quota by putting in practice the recommendations made for the solutions to these factors affecting learners' performance in mathematics. For every nation to achieve its goals, education should become the centre of concentration where much focus is placed on the learners who happen to be the future leaders of the Republic of South Africa and

these learners must be assisted to overcome the factors affecting their mathematics performance.

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APPENDIX A
ETHICAL CLEARANCE CERTIFICATE

University of Fort Hare
Together in Excellence

ETHICAL CLEARANCE CERTIFICATE
REC-270710-028-RA Level 01

Certificate Reference Number:	ADU241SKWA01
Project title:	**Factors affecting grade six learners' performance on mathematics in East London Education District.**
Nature of Project	Masters in Education
Principal Researcher:	Jesse Kwateng
Supervisor:	Prof E.O Adu
Co-supervisor:	N/A

On behalf of the University of Fort Hare's Research Ethics Committee (UREC) I hereby give ethical approval in respect of the undertakings contained in the above-mentioned project and research instrument(s). Should any other instruments be used, these require separate authorization. The Researcher may therefore commence with the research as from the date of this certificate, using the reference number indicated above.

Please note that the UREC must be informed immediately of

- Any material change in the conditions or undertakings mentioned in the document
- Any material breaches of ethical undertakings or events that impact upon the ethical conduct of the research

The Principal Researcher must report to the UREC in the prescribed format, where applicable, annually, and at the end of the project, in respect of ethical compliance.

Special conditions: Research that includes children as per the official regulations of the act must take the following into account:

Note: The UREC is aware of the provisions of s71 of the National Health Act 61 of 2003 and that matters pertaining to obtaining the Minister's consent are under discussion and remain unresolved. Nonetheless, as was decided at a meeting between the National Health Research Ethics Committee and stakeholders on 6 June 2013, university ethics committees may continue to grant ethical clearance for research involving children without the Minister's consent, provided that the prescripts of the previous rules have been met. This certificate is granted in terms of this agreement.

The UREC retains the right to

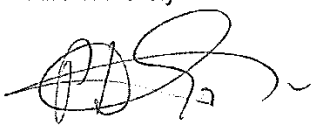
- Withdraw or amend this Ethical Clearance Certificate if
  - Any unethical principal or practices are revealed or suspected
  - Relevant information has been withheld or misrepresented
  - Regulatory changes of whatsoever nature so require
  - The conditions contained in the Certificate have not been adhered to

- Request access to any information or data at any time during the course or after completion of the project.

- In addition to the need to comply with the highest level of ethical conduct principle investigators must report back annually as an evaluation and monitoring mechanism on the progress being made by the research. Such a report must be sent to the Dean of Research's office

The Ethics Committee wished you well in your research.

Yours sincerely



Professor Pumla Dineo Gqola
Dean of Research

05 March 2018

APPENDIX B
APPROVAL LETTER FROM THE DEPARTMENT OF EDUCATION – EAST LONDON EDUCATION DISTRICT

Province of the
EASTERN CAPE
EDUCATION

STRATEGIC PLANNING POLICY RESEARCH AND SECRETARIAT SERVICES
Steve Vukile Tshwete Complex • Zone 6 • Zwelitsha • Eastern Cape
Private Bag X0032 • Bhisho • 5605 • REPUBLIC OF SOUTH AFRICA
Tel: +27 (0)40 608 4537/4773 • Fax: +27 (0)40 608 4574 • Website: www.ecdoe.gov.za

Enquiries: B Pamla Email: babalwa.pamla@ecdoe.gov.za Date: 20 September 2018

Mr. K Jesse

25 Shasta Street

Braelyn Heights

East London

5247

Dear Mr. Jesse

PERMISSION TO UNDERTAKE A MASTERS' THESIS: AN EXAMINATION OF FACTORS AFFECTING GRADE 6 LEARNERS' PERFORMANCE IN MATHEMATICS IN EAST LONDON EDUCATION DISTRICT

1. Thank you for your application to conduct research.

2. Your application to conduct the above-mentioned research in eight (8) selected primary schools in Buffalo City District under the jurisdiction of the Eastern Cape Department of Education (ECDoE) is hereby approved based on the following conditions:

    a. there will be no financial implications for the Department;

    b. institutions and respondents must not be identifiable in any way from the results of the investigation;

    c. you present a copy of the written approval letter of the Eastern Cape Department of Education (ECDoE) to the Cluster and District Directors before any research is undertaken at any institutions within that particular district;

    d. you will make all the arrangements concerning your research;

    e. the research may not be conducted during official contact time;

    f. should you wish to extend the period of research after approval has been granted, an application to do this must be directed to Chief Director: Strategic Management Monitoring and Evaluation;

g. your research will be limited to those institutions for which approval has been granted, should changes be effected written permission must be obtained from the Chief Director: Strategic Management Monitoring and Evaluation;

h. you present the Department with a copy of your final paper/report/dissertation/thesis free of charge in hard copy and electronic format. This must be accompanied by a separate synopsis (maximum 2 – 3 typed pages) of the most important findings and recommendations if it does not already contain a synopsis.

i. you present the findings to the Research Committee and/or Senior Management of the Department when and/or where necessary.

j. you are requested to provide the above to the Chief Director: Strategic Management Monitoring and Evaluation upon completion of your research.

k. you comply with all the requirements as completed in the Terms and Conditions to conduct Research in the ECDoE document duly completed by you.

l. you comply with your ethical undertaking (commitment form).

m. You submit on a six monthly basis, from the date of permission of the research, concise reports to the Chief Director: Strategic Management Monitoring and Evaluation

3. The Department reserves a right to withdraw the permission should there not be compliance to the approval letter and contract signed in the Terms and Conditions to conduct Research in the ECDoE.

4. The Department will publish the completed Research on its website.

5. The Department wishes you well in your undertaking. You can contact the Director, Ms. NY Kanjana on the numbers indicated in the letterhead or email nelisa.kanjana@ecdoe.gov.za should you need any assistance.

NY KANJANA
DIRECTOR: STRATEGIC PLANNING POLICY RESEARCH & SECRETARIAT SERVICES

FOR SUPERINTENDENT-GENERAL: EDUCATION

APPENDIX C
LEARNERS' QUESTIONNAIRE

SCHEDULED QUESTIONNAIRE FOR GRADE 6 MATHEMATICS LEARNERS IN SELECTED SCHOOLS IN EAST LONDON EDUCATION DISTRICT

Section A

1. Indicate your age in years

Below 10	11 – 12	13+

2. Gender or Sex

Male	Female

3. Indicate your Town/Location

4. Race or Racial Group

African	Coloured	Indian	Asian	White

5. Whom do you live with?

Both parents	Father only	Mother only	Guardian	On my own

6. The highest educational level of parent/guardian

Never been to school	Up to primary level	Up to high school	Completed Matric	Up to tertiary level	Post graduate level

7. Employment status of parents

Unemployed	Employed	Unknown

8. What is your mode of transportation to school?

By walking	Bicycle	Public transport

Section B

9. What is your attitude towards the subject mathematics?

Excellent	Very good	Good	Fair	Poor

10. What is your level of understanding when English is used as a medium of instruction in teaching mathematics?

Excellent	Very good	Good	Fair	Poor

11. What is your level of confidence in answering mathematics questions?

Very High	High	Low	Very low

12. How do you evaluate the methods your mathematics educator uses in teaching?

Excellent	Very good	Good	Fair	Poor

13. What is the level of motivation given you by your mathematics educator in studying mathematics?

Very High	High	Low	Very Low

14. How do you evaluate the examples and activities in the grade 6 mathematics textbooks?

Excellent	Very good	Good	Fair	Poor

15. What is the state of your study of mathematics at home after school?

Excellent	Very good	Good	Fair	Poor

16. How do you rate your parents'/guardians' assistance or supervision of mathematics at home?

Excellent	Very good	Good	Fair	Poor

Section C

17. How do you want mathematics to be handled in order to improve your performance?

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Thank you very much.

APPENDIX D
EDUCATORS' QUESTIONNAIRE

SCHEDULED QUESTIONNAIRE FOR GRADE 6 MATHEMATICS EDUCATORS IN SELECTED SCHOOLS IN EAST LONDON EDUCATION DISTRICT

SECTION A

1. Indicate your age in years

Below 20 years	21 – 30 years	31 – 40 years	41+ years

2. Sex

Male	Female

3. Race or racial group

African	Coloured	Indian	Asian	White

4. Highest educational level

Matric level	Diploma	Honours	Post graduate

5. Indicate the major subjects studied

6. Number of years teaching grade 6 mathematics

Less than a year	2 – 5 years	6 – 9 years	10+ years

7. Number of in-service training attended in mathematics in a year

None	Once	Twice	More than thrice

8. How do you evaluate the in-service training you attended in mathematics?

Excellent	Very Good	Good	Fair	Poor

SECTION B

9. How do you evaluate yourself in the teaching of mathematics?

Excellent	Very Good	Good	Fair	Poor

10. How do you evaluate the teaching and learning materials for mathematics?

Excellent	Very Good	Good	Fair	Poor

11. How will you rate motivation of government to teachers teaching mathematics?

Excellent	Very Good	Good	Fair	Poor

12. How do you rate your encouragement to learners to use different methods in solving mathematical problems?

Excellent	Very Good	Good	Fair	Poor

13. What is your preferred medium of instruction used in teaching mathematics?

English	Afrikaans	Xhosa

Specify .....

14. If the medium (above) is different from the one being used in the school, how do you evaluate your medium of instruction?

Excellent	Very good	Good	Fair	Poor

15. Which of the following assessment tools do you adopt?

Portfolio	Group work	Journal	Individual assignments	Others

Specify.....

16. I teach mathematics with the aim of getting all learners to pass their examination.

Strongly agree	Agree	Fairly Agree	Disagree	Strongly disagree

17. I teach the learners so that they understand mathematical concepts and then use the knowledge for life.

Strongly agree	Agree	Fairly Agree	Disagree	Strongly disagree

18. I teach using mainly the Revised National Curriculum Statement (RNCS) for mathematics given by the Department of Education.

Strongly agree	Agree	Fairly Agree	Disagree	Strongly disagree

19. I prefer context based teaching compared to content based teaching

Strongly agree	Agree	Fairly Agree	Disagree	Strongly disagree

SECTION C

20. Your recommendation to government and the stakeholders

……
……
……
……
…….

Thank you very much

APPENDIX E
SEMI – STRUCTURED INTERVIEW

INTERVIEW SCHEDULE FOR GRADE 6 LEARNERS

My name is Jesse Kwateng, a MEd Student at the University of Fort Hare. I am doing research on an examination of factors affecting grade 6 learners' performance in mathematics in East London Education District. I want to assure you of strict confidentiality, that everything discussed here will not be repeated to anyone. Should you feel uncomfortable at any juncture of this interview feel free to end the interview. I would like to record this interview on tape-recorder in order to ensure that I do not misquote you. Thank you for your willingness to share in this study.

A: Background information.

Thank you for accepting to participate in this academic research. Tell me about yourself.

Respondent: Learner

Date of the interview: _____/_____/_____

Time: _____

Venue: _____

Interviewer: Jesse Kwateng

1. Your age range ……

2. Gender: ……..

3. Circuit: ……..

QUESTIONS

1 These questions are designed to explore views of learners about factors affecting grade 6 learners' performance in mathematics in the East London Education District.

1. What is your attitude towards mathematics?
2. Which mathematics topics do you like most and which ones do you dislike? Why?

3. Do you use your teacher's method in solving mathematics problems? If no, why not?
4. How often are you given exercises in class?
5. How often do you get feedback in marking from your teacher?
6. Which medium of communication do you prefer mathematics to be taught in at school? Why?
7. Do you get motivated in any way in mathematics lessons? If no, why?
8. Do you get assistance from your parents/ guardian to do your homework? If no then why?

Thank you for your participation. God Bless you

APPENDIX F
CERTIFICATE OF EDITING

To whom it may concern

This document certifies that the thesis whose title appears below was edited for proper English language usage, grammar, punctuation, spelling and overall style by Dr Anthony Masha who is a member of the Professional Editors' Group and whose academic qualifications appear in the footer of this document.

THESIS TITLE

FACTORS AFFECTING GRADE 6 LEARNERS' PERFORMANCE IN MATHEMATICS IN EAST LONDON EDUCATION DISTRICT

RESEARCHER
KWATENG JESSE

DATE EDITED

February 2019

Editor's comment

All mistakes relating to grammar, punctuation, spelling and overall style have been corrected. The editor was not responsible for conducting a cross- referencing check.

B.A (Ed), Honours B.A. (Social Sciences), Honours B.A (Group Dynamics), Postgraduate Diploma in Education, M.ADMIN (Public Administration), Doctor of Administration in Public Administration