

**FACTORS INFLUENCING STUDENTS' PERFORMANCE IN  
MATHEMATICS IN NATIONAL CENTRALIZED EXAMINATIONS IN  
SECONDARY SCHOOLS IN BANADIR REGION, SOMALIA**

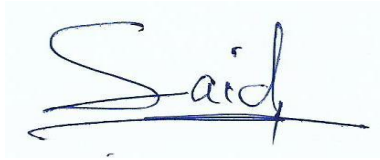
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**A Research Project Submitted in Partial Fulfillment of the Requirements for  
Award of Master of Education Degree in Curriculum Studies of the University  
of Nairobi**

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## DECLARATION

This research project is my original work and has not been presented for an award in any other university:

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## **DEDICATION**

I dedicate this work to my beloved parents: Hida Mohamed and Mohamed Abdirahman, and my dear uncle Ahmed Abdirahman who was behind me all the way through my basic education and encouraged me to enrol for further studies.

## **ACKNOWLEDGEMENT**

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## **LIST OF ABBREVIATION AND ACRONYMS**

|               |  |
|---------------|--|
| <b>KCSE</b>   | Kenya Certificate of Secondary Education                                     |
| <b>MOE</b>    | Ministry of Education  |
| <b>SACMEQ</b> | Southern and Eastern Africa Consortium for Monitoring<br>Educational Quality |
| <b>SPSS</b>   | Statistical Package for Social Sciences                                      |
| <b>TPR</b>    | Textbook Pupil Ratio   |
| <b>USA</b>    | United States of America   |

## ABSTRACT

The purpose of the study was to investigate factors influencing students' performance in mathematics in national centralized examination in secondary schools in Banadir region, Somalia. Four research objectives were developed namely: to establish the influence of teaching and learning facilities on students' performance in mathematics, to examine the influence of students' attitude towards mathematics on their performance in national centralized examinations, to establish the extent to which teaching methods influence students' performance in mathematics in national centralized examinations and to determine the influence of teacher training on students' performance in mathematics in secondary schools in Banadir region, Somalia from which four research questions were conveyed to guide the research. Related literature to factors influencing students' performance in mathematics was reviewed. Two factor theory guided the study and conceptual framework was provided. The study utilized descriptive survey design. A sample size of 41 principals, that's (one from each school), 41 Form four mathematics teachers, (one from each school) and 82 form four students totaling to 164 respondents. The study chose 41 out of 410 schools. Purposive sampling was used to select school principals. Stratified random sampling was used in selection of form four mathematics teachers and form four students. Form four mathematics teachers and form four students were picked randomly from every stratum up to a desirable sample size and then pooled together to form a study sample size of 41 and 82 respectively. Questionnaires and interview guide were both used to gather data were validated and tested were administered and received back. Qualitative data was analyzed thematically based on study objectives. The first objective which sought to establish the influence of teaching and learning facilities on students' performance in mathematics found that teaching and learning facilities in most schools were not adequate enough leading to poor performance in mathematics in national centralized examinations. The second objective sought to examine the influence of students' attitude towards mathematics. Findings showed that students' attitude towards mathematics affected their performance to a very large extent. The third objective that aimed at establishing the extent to which teaching methods influence students' performance in mathematics showed that majority of respondents believed that the ability of appropriately using different teaching methods in teaching improves students' academic performance. The fourth objective sought to determine the influence of teacher training on students' performance in mathematic. The findings showed that most respondents agreed that trained teachers were able to produce good results. The study concluded that most schools in the region lacked adequate teaching and learning facilities that led to poor performance. Negative attitude of students towards mathematics made most of them to perform poorly in that subject. Use of good teaching methods and encouraging student participation improved their performance and finally, trained teachers positively enhanced good performance by producing high mean scores in national centralized examinations. The recommendations made were; that the Ministry of Education should equip all schools with enough teaching and learning facilities to enhance good performance. Principals should encourage and motivate students to improve their performance in mathematics. Ministry of education should advise principals and mathematics teachers to adopt favourable teaching methods that will improve performance. Finally, that revision of teacher education curriculum should be done to make it more relevant and updated.

## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background to the study

Mathematics is essential for daily life and plays a crucial role in school curricula; yet students' performance has over the years remained very low worldwide (Bringula, Alvarez, Evangelista and So, 2018). Mathematics is one of the core subjects in secondary school curriculum geared towards the development of computation skills, growth of logical and abstract thinking of the learners as well as stimulation of creativity (MeFor, 2014). Performance in the subject is crucial for learners' future assimilation into scientific and technological professions.

Academic success among students is a factor that decides their future, so curricula need to be well planned to boost their performance (Tshabalala and Ncube, 2016). European countries have achieved high levels of quality assurance in their educational human resources system, according to Paananen, Kumpulainen and Lipponen (2015), due to certain strategies and adequate attention provided to teacher education, empowerment, encouragement and all other aspects of motivation that lead to the acquisition of quality tea training

Learning resources are tools that enhance literacy in mastery of school curriculum. In South Africa, learning resources for the provision of education are distributed in favour of poorer schools. National framework for education in rural areas is formulated and focused on infrastructure, improving access to curriculum resources,

especially schools serving the poor (Venkat and Spaul, 2015). In Sub-Saharan Africa, countries like Malawi, education in secondary schools are under-resourced, under-staffed and under-funded, creating extremely challenging teaching and learning conditions of students and teachers alike, where lessons are at times carried outside due to lack of classrooms.

Students' attitudes refer to how students perceive something such as good or bad and therefore they may perceive mathematics as a simple or difficult subject. Sa'ad, Adamu, and Sadiq (2014) conducted a study in Nigeria and established that students' negative attitude towards mathematics, inadequate qualified teachers and teaching materials were among the causes of poor performance among the learners. This was also supported by (Mtitu, 2014, Kafyulilo, Rugambuka & Moses 2012) who observed that when students develop negative attitude towards mathematics they tend to perform poorly in that particular subject.

Teaching methods are techniques that teachers use when teaching students such as group discussion. The method of teaching employed by the teacher definitely impact on students' understanding and performance. Students' failure in mathematics is also associated with teachers' teaching methods (Michael, 201). In Tanzania, teachers are encouraged to use student centered methods actively involving students in teaching and learning process (Mtitu, 2014). When students are active participants they ought to develop interest in what they are being taught thereby enabling them to improve their performance.

In Kenya, use of learning resources to achieve academic excellence needs building of classrooms, libraries, playing fields, clean water points, sanitation and availability of safety in school environment (SACMEQ, 2011). Availability, adequacy and use of learning resources by the teacher and students are evidence of better learning. Without teaching and learning resources the learning process becomes rigid, rely heavily on rote learning which places students in a passive role.

Success or failure of learning is in the availability, adequacy, use, and Students' attitude towards Mathematics and mathematics learning and their implications for mathematics instruction have long been a common interest among mathematics educators. Attitude towards mathematics has been considered an important factor in influencing participation and success in mathematics. According to Njoroge and Nyabuto (2014), MOE requires all public schools in Kenya to enhance the quality of education as it has far reaching implication on the socio-economic development of citizens. These types of schools strive to provide quality education to its students and this is achieved when there are adequate resources and high level of discipline in schools.

Another key factor that influences students' success in mathematics is teacher preparation. According to Kosgei, Odera and Ayugi (2013), the availability of trained and motivated teachers and instructional workers, a supportive learning and teaching setting, relevant curriculum facilities, the tools available for use and the instruments used for assessment are decided by academic results. Teachers equipped



with quality training can enhance good performance achievement, especially when they work in a conducive environment that motivates them to work.

In Somalia, students' performance in mathematics in secondary school has for a long time raised alarms due to the continued trend of poor performance. Over the years secondary school students' performance in mathematics has recorded failure rate of almost 93%. Only a minimal number of students scored a pass in the centralized examination in the Banadir region national examination.

Consequently, dismal performance of students in mathematics was seen in Mogadishu based on statistics presented by the Imam Shafi Foundation. This examination board stipulates that 48.7% of secondary school students who sat for the regional examination failed in their mathematics paper as compared to other subjects. The general performance of students in the post war zones of Somalia has seen many students facing many obstacles attributed to institutional factors like learning facilities and teacher retention.

In Banadir region, the trend of dismal performance especially in mathematics has over the year's registered poor performance. There has been a common examination to mark the end of the four secondary schools. Between 2017 and 2019 the three secondary schools in the Banadir region have continued to realize poor performance in science subjects especially mathematics. Therefore this study will seek to

investigate the factors influencing students' performance in mathematics in the centralized examination.

## **1.2 Statement of the problem**

Various factors influence students' performance in learning of Mathematics in secondary schools. Mathematics is as a compulsory subject in secondary schools. Over the past three years the Ministry of Education of Somalia has carried out certificate examination in South and the Central regions in the country to enhance the quality of the education. The Ministry of education states that the students' performance in mathematics is poor since these examinations were adapted. The number of students who sat for the National Centralized Examinations in May 2019 was 29000 in the South Central Somalia in Banadir region, Jubaland, Southwest, Galmudug, Puntland and Hirshabelle states. The results showed an alarming number of 6,935 students to have failed particularly in Mathematics and Science subjects according to the Ministry of Education, Somalia.

Multiple factors impact the success of students in secondary schools studying mathematics. In secondary schools, mathematics is a compulsory subject. The Ministry of Education of Somalia has conducted certificate exams in the southern and central regions of the country over the past three years to improve the standard of education. The Ministry of Education notes that the performance of the students in mathematics is poor since these exams were adapted. The number of students who sat for the National Centralized Examinations in May 2019 was 29000 in the South

Central Somalia in Banadir region, Jubaland, Southwest, Galmudug, Puntland and Hirshabelle states. The results showed an alarming number of 6,935 students to have failed particularly in Mathematics and Science subjects according to the Ministry of Education, Somalia.

Despite interventions by education stakeholders such as the government, international organizations and community at large in putting efforts through workshops, seminars and funding to boost performance, mathematics performance in this region still remains a problem. Although the poor performance has been reported in all the regions in South central, Banadir region has registered very low mathematics scores in the national centralized examinations that really need to be given a priority. The major challenge is that critical factors influencing students' mathematics performance like provision of teaching and learning facilities, students' attitudes towards mathematics, teaching methods and teachers' training are not well handled. This has really raised an alarm among all education stakeholders in the region. Therefore, it is necessary to investigate how these factors influence the students' performance in mathematics in the national centralized examination in Banadir region of Somalia.

**Table 1.1 Mathematics mean scores for the last three years in centralized examinations in Banadir region and Puntland state, Somalia.**

| School year | 2016-2017 |          | 2017-2018 |          | 2018-2019 |          | (3 Years Average) |          |
|-------------|-----------|----------|-----------|----------|-----------|----------|-------------------|----------|
|             | Banadir   | Puntland | Banadir   | Puntland | Banadir   | Puntland | Banadir           | Puntland |
| Category A  | 45        | 48       | 42        | 47       | 44        | 48       | 43.67             | 47.67    |
| Category B  | 50        | 51       | 46        | 45       | 39        | 44       | 45.00             | 46.67    |
| Category C  | 48        | 49       | 41        | 48       | 43        | 46       | 44.00             | 47.67    |

**Source:** Ministry of Education, Somalia (2020)

Table 1.1 indicates the achievement of mathematics students in two regions of Somalia for three consecutive years and their average performance. The schools were placed into three categories. Schools in Banadir region were grouped based on zones while those in Puntland were grouped based on major towns in the state. For those in Banadir region, category A represented North zone schools, category B South zone schools while category C were East zone schools. In Puntland, category A represented schools in Garowe town, category B schools in Bosaso town while category C those in Galkacayo town. It revealed that the performance was below average scores in all school categories. Similarly, in comparison between two regions, it was very clear that Banadir region recorded very low scores as compared to Puntland even though both scores were not good. Therefore, this showed a big concern to address those issue in order to improve mathematics performance in Banadir region.

### **1.3 Purpose of the study**

The purpose of the study investigated factors influencing students' performance in mathematics in national centralized examination in secondary schools in Banadir region.

### **1.4 Objectives of the study**

The study was based on the following objectives:

- i. To establish influence of teaching and learning facilities on students' performance in mathematics in secondary schools in Banadir region.
- ii. To examine the influence of students' attitude towards mathematics on their performance in national centralized examinations in secondary schools in Banadir region, Somalia.
- iii. To establish extent to which teaching methods influence students' performance in mathematics in national centralized examinations in secondary schools in Banadir region, Somalia
- iv. To determine influence of teacher training on students' performance in mathematics in secondary schools in Banadir region.

### **1.5 Research questions**

The study was based on the following research questions:

- i. How do teaching and learning facilities influence students' performance in mathematics in secondary schools in Banadir region?

- ii. What is the influence of students' attitude towards mathematics on their performance in national centralized examinations in secondary schools in Banadir region, Somalia?
- iii. To what extent do teaching methods influence students' performance in mathematics in national centralized examinations in secondary schools in Banadir region, Somalia?
- iv. How does teacher training influence students' performance in mathematics in secondary schools in Banadir region?

### **1.6 Significance of the study**

The findings of the study may be significant to the following persons: Policy makers and planners to use them to reconsider the existing teacher training programmes by planning for improved performance in mathematics. The results might also provide ministry of education with adequate information on qualitative aspects of secondary schools and their effects on students' performance. Educational administrators may use the findings in providing other educationists with information on various factors that influence students' performance in mathematics in national centralized examination in secondary school. Curriculum Developers might be guided on selection of the suitable teaching and learning materials that could help in curriculum change, innovation and intervention in mathematics in the future. The findings of the study would create a platform for future scholars to further research on academic performance by adding information on the existing literature.

### **1.7 Limitations of the study**

Some respondents were reluctant to provide useful information in fear of exposing their negative weaknesses. To overcome this, the researcher assured the respondents that their identity would not be revealed and the responses would only be used for the purpose of the study. The geographical topology of the region could hinder easy access of school. To overcome this drawback the researcher used cheap and convenient means to access the schools that are sparsely distributed across the Banadir region. The researcher faced security challenges due to the perennial conflict in the country. The security challenge in the area was intervened by contacting the area security heads to provide safe data collection environment.

### **1.8 Delimitations of the study**

The study was delimited to factors influencing the students' performance in Mathematics in national centralized examination in Banadir Region's secondary schools. The study variables were; provision of teaching and learning facilities, students' attitudes towards mathematics, teaching methods and teacher training. The study respondents were school principals, mathematic teachers, and form four students.

## **1.9 Basic Assumption of the study**

The study was based on these assumptions;

- i. Provision of adequate and effective use of learning resources like textbooks and other teaching and learning aids could contribute significantly to the academic performance.
- ii. Students' attitudes, method of teaching and teachers' qualifications and experience influenced academic performance in certain subjects like mathematics.
- iii. The study participants could give honest responses during data collection period.

## **1.10 Definition of Significant terms**

**Academic performance** – schools mean scores in national examination

**Centralized examination:** final examination that students undertake in Somalia before they complete secondary school to show mastery of concept.

**Educational resources** – inputs; teachers, teaching and learning materials

**Physical facilities** – Equipment and facilities that teachers and students use in the course of their teaching like classrooms, libraries, toilets, chalk wall, playground and workshops

**Quality of education** – The worth or value one gets by being a consumer of education. In this context, quality of education shall be measured in terms of worth or value of merit gained in achievement of curriculum development at secondary level



**Students' attitude**– refers to how students view Mathematics, positively or negatively.

**Students' Performance:** refers to students' achievement in the mathematics schools.

**Teacher training** – The academic qualification and professional of a teacher

**Teaching and learning resources** – materials and tools that students and teachers use in the course of their learning like textbooks, charts, globes, pens, pencils, note books, maps, chalks, dusters, radio and computers.

**Teaching methods** – refer to the pedagogical processes applied by the teacher to teach mathematics to secondary school students.

### **1:11 Organization of the study**

The study was organized into five chapters. Chapter one which is introduction, lays down the background of the study, statement of the problem, objectives of the study, research questions, significance of the study, limitations, delimitation and definition of terms. Chapter two which is literature review highlights on each objective relative to the dependent variable, summary of literature review, theoretical and conceptual frameworks.

Chapter three is the research methodology covering the research design, target population, sample size, sampling procedure, research instruments, data collection procedure, data analysis techniques and ethical considerations. Chapter four consists of data analysis, presentation and interpretation of research findings. Chapter five focuses on the summary of the study, conclusions, recommendations and suggestions for further study.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter dealt with review of relevant literature in relation to the topic under investigation which is factors influencing students' performance in Mathematics in national centralized examinations in secondary schools in Banadir region, Somalia. The literature to be reviewed will be organized as per the objectives of this study. It will also discuss the theoretical and conceptual frameworks that will be used in this study.

#### **2.2 Overview of Students' Performance in Mathematics**

Mathematics performance varies from one country to another. For instance, the performance in USA, Singapore and Chinese Taipei is different even though students' achievements in these countries show improvement over time (Hsieh, Wong and Wang, (2013). Learners are able to perform in mathematics based on anxiety, motivation, social attitudes and their cognitive capability which is portrayed in the ability to perform well in answering oral questions. Poor attitude towards school and learning, discrimination, domestic factors and school contextual factors are some of the contributing factors to poor performance in mathematics among students (Banerjee, 2016).

Students across the world have shown differences in mathematics performance in their schools. As much as this subject is considered to be very essential in their

learning, its performance has greatly been poorly done across the world that shows subject mean score to be very low. For instance, poor performance in mathematics was noticed among form four candidates who sat for examinations between 2007 and 2010 in Puntland, Somalia. This led to the minister of Education in conjunction with Africa Educational Trust to convene a workshop in 2011 that aimed at finding out the causes of poor performance in mathematics. The findings showed that poor performance in mathematics is as a result of very many factors which include students' attitudes, inadequate text books, inadequate teaching resources and many more others. Many students scored below pass mark as compared to the number of those who scored above average. This is evident that Somalia experience poor performance in mathematics among learners and therefore calls for the need to investigate how these factors influence students' performance in national centralized schools in Banadir region of Somalia.

### **2.3 Provision of educational and learning facilities and progress in mathematics for students**

Students require adequate provision of learning and teaching facilities to enable them perform better in their academics. Physical facilities together with teaching and learning materials like text books, stationery, exercise books and teaching aids greatly contribute to the success of students in their academic performance (Muindi, 2011). Enough reference materials like text books, exercise books and classrooms strengthen learning and correct use of these materials is what leads to academic excellence (Otieno, 2010). This view comes from a research conducted on teaching

and learning resources and academic performance in Mathematics in Secondary schools in Bondo district in Kenya.

A research on the effect of teaching and learning tools on the performance of students in Kenya Certificate of Secondary Schools in free day secondary education in Embakasi district found that most schools lacked sufficient teaching and learning materials that could boost performance, such as reference books, teacher guides and calculators (Atieno, 2014). Similarly, lack of enough learning facilities and resources and poor supervision of learning activities result into students' poor performance (Kabala, 2012). This means that there must be adequate and good control of these learning resources for the students to perform well in mathematics.

Salad (2015) conducted a study in Puntland province, Somalia, on factors affecting the success of mathematics. He developed that the performance of mathematics exams is affected by teaching and learning tools such as books, charts, calculators and rulers. This discovery came after discovering that these services were inadequate in the schools studied, a factor that contributed significantly to low mathematics results.

In respect to the above reviewed literature, this current study will build its research on the knowledge already established. Muindi (2011) observe that there is need to equip learners with adequate teaching and learning materials for them to perform well in their academics. This is in line with Otieno (2010) views in his study. Atieno (2014) study and Kabala (2012) in their studies also argue that better performance is

enhanced with adequacy and good supervision of teaching and learning resources. There is need to conduct a thorough research to find out if there are still challenges of accessing adequate teaching and learning facilities and their influence on mathematics performance of students that will enable the researcher to suggest possible solutions towards them.

#### **2.4 Students' attitudes and students' performance in mathematics**

One of the major factors that affect performance of students in mathematics is their attitude. Students especially those who battle with sciences form a negative attitude towards science subjects and mathematics as they see that sciences are very hard to assimilate while arithmetic are just difficult to understand (Mutondi and Ngirande, 2014). Students attitudes towards learning that also impact on their performance is influenced by teachers' attitude (Aaronson, Barrow and Sander, 2007). When teachers have positive attitudes towards their work and learners, they will enhance students' achievements. Good performance in examinations is observed in students who have positive attitudes and therefore, it becomes an essential element in the curriculum of mathematics (Manoah, Indoshi and Othuon, 2011).

Owo and Ikwut (2015) in their study on performance of students revealed that notion by students, parents and community at large that numeracy is a very challenging subject is an obstacle to good performance in this subject. This led to students losing interest and concentration to study it. Similarly, teachers failed to concentrate and put maximum efforts when solving mathematics assignments, dealing with class

exercises or even setting and marking tests. This greatly led to poor performance among students.

Therefore, the current study seeks to conduct a related study on school based factors and their influence on mathematics performance of students in national centralized examinations in secondary schools in Banadir region of Somalia. This will also enhance revelation of the best ways that can be employed in managing students' attitudes towards mathematics to enable them develop interest to learn the subject and which will also improve their performance and achievements in the national centralized examinations.

### **2.5 Teaching methods and students' performance in mathematics**

Effective curriculum implementation requires active participation of both the teacher and the learners. Infusion of aspects of teaching methods like non formal learning activities and key inquiry questions are some of the most effective teaching methods that enhance students' personalities, abilities and interest in learning especially for young learners (Waiganjo and Waiganjo, 2018). The lecture-cum-demonstration method that involves examples and experiments is very effective method of teaching (Struyven and De Meyst, 2010). It is good for teachers to use dialogue method in teaching (Maganga, 2013). This involves discussion between students and teachers about the learning environment as opposed to depositing knowledge to students who passively participate in the teaching and learning process.

Enu, Agyman and Nkum (2015) investigated on factors influencing students' mathematics performance in some selected colleges of education in Ghana. They established that students' performance is influenced by various factors which include students' personal factors. Lecture method was found to be negatively influencing performance. This led to the researchers to recommend the use of interactive method of teaching so as to enhance full participation of students.

In a study conducted by Mtitu (2014) in Tanzania on implementation of learner centered teaching approaches based on competence based curriculum, results revealed that instructional practices were dominated by teachers a factor that limited students' participation (Mtitu, 2014). The study specifically researched on Geography subject but the researcher recommended same study to be carried out in future for all subjects including mathematics. Domination of teaching by teachers did not provide students with opportunity to connect their real lives in actual practices in learning environment

## **2.6 Teacher training and students' performance in mathematics**

The quality of training imparted in teachers directly influences learner's performance. The presence and number of trained teachers in a school determines the performance of that particular school in examinations. This is also affected by ability of teachers to train and develop during their service period. The researcher found in a study conducted by Jerry 2018 on mathematics performance that mathematics performance was impacted by mathematics teachers who did not

continue to develop and train after their jobs (Jerry, 2018). As they did not make an effort to equip themselves with up-to-date knowledge and skills related to the teaching and learning process, this also contributed to poor performance in their subjects.

Changwe and Mulenga (2017) conducted a study at the University of Zambia on effectiveness of mathematics teacher education curriculum in preparing mathematics secondary school teachers. They established that curriculum was not adequate enough to equip them with relevant and useful content and skills to enable students perform well in this subject. Therefore, their recommendation was that ministry of education should provide in-service training of teachers to enhance their better performance.

Students who are taught by trained teachers significantly score higher mean as compared to those who are taught by untrained teachers (Farooq and Shahzadi, 2006). The future of an individual is predicted by his performance in national examination (Nyagah and Irungu, 2013). Students greatly require to be handled by teachers with quality training to enhance their better performance that leads to students' success in examinations. A well trained teacher is one of the contributing factors to good academic performance among students in KCSE (Simiyu, 2013).

The quality of training of a teacher determines his behaviour and actions. A teacher who has undergone good and quality training will exercise patience and



psychological willpower that enables him to mentor his students well (Ali, 2013). This will also determine how he attends to his students' questions portraying knowledge he possess in that particular area. It therefore becomes important for teachers to acquire knowledge and skills through training to be able to appropriately handle their students in a manner that will enable them to feel motivated and perform better in their academics (Ali, 2013).

The current study will therefore examine in detail the effect of teacher preparation on the success of mathematics in the Banadir region's national centralized examinations. The researcher would identify whether there are any better ways to increase the standard of mathematics in the area in terms of teacher preparation to enhance teacher comparison based on their level of training and performance.

### **2.7 Summary of Literature Review**

The literature which has been reviewed in this section provides a limelight to the current study. Many gaps have been identified. Muindi (2011)), Otieno (2010) and Atieno (2014) only emphasized on provision of physical facilities and teaching and learning materials but failed to emphasize their relevance to the learners. Kabala (2012) denotes a gap in supervision of learning activities that need to be investigated to establish if it is conducted well in schools in Banadir region. Aaronson, Barrow and Sander (2007) observed that students' attitudes towards mathematics are influenced by the attitudes of their teachers. However, they did not suggest how the

attitudes of mathematics teachers can be enhanced to make them enhance good performance in the students.

Owo and Ikwut (2015) just reported that mathematics students' poor performance is due to a notion by students, parents and the general community that this topic is difficult, but did not demonstrate how this notion can be modified to boost good performance. On teaching methods, Struyven and De Meyst (2010) and Maganga (2013) recommended using various methods of teaching to improve performance of mathematics among students. However, their studies did not link these methods with time factor and their appropriateness to students. For instance, group discussion may be appropriate in double lessons as compared to single lesson to give students enough time to discuss and understand concepts.

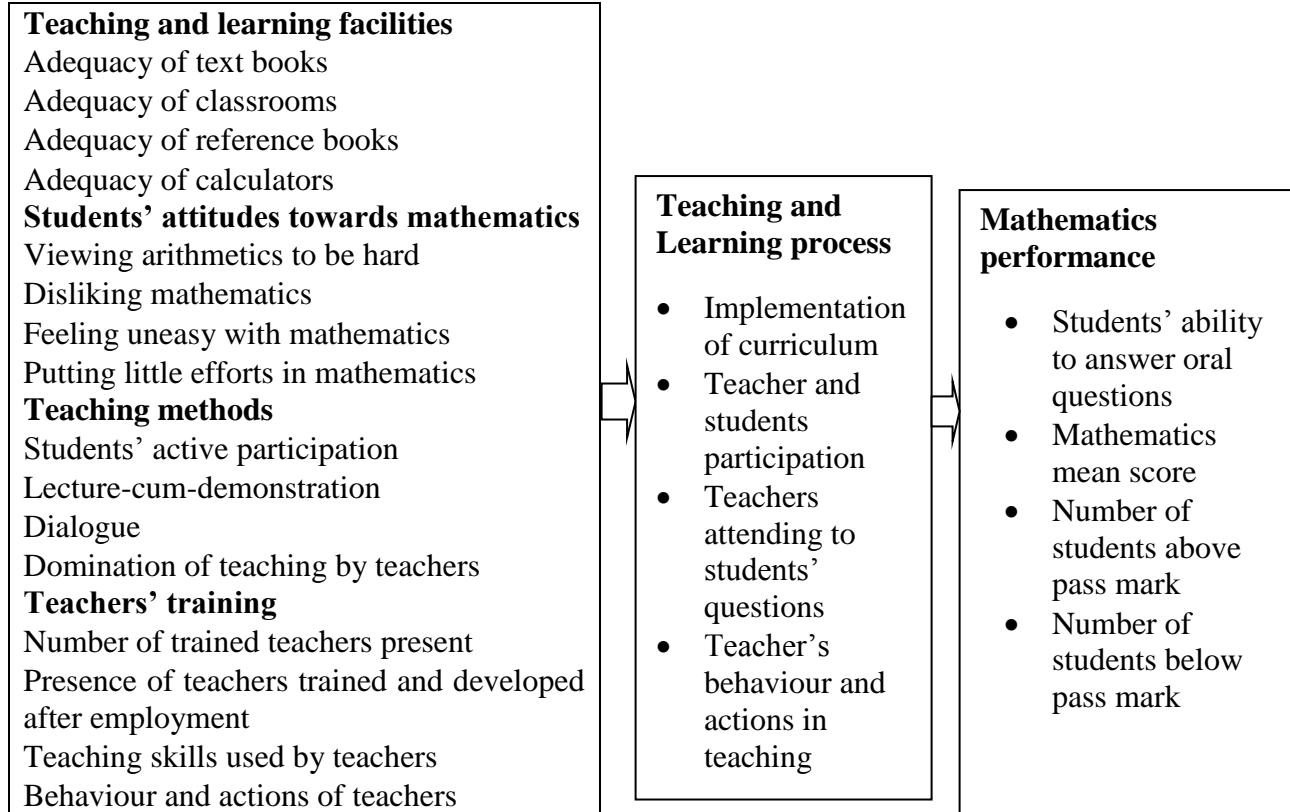
A study by Jerry (2018) also denotes a gap as he only observed that mathematics teachers do not upgrade their skills and knowledge through training and development after employment to enhance good performance. He was also supposed to establish reasons that make these teachers not to further their education upon employment. Changwe and Mulenga (2017) after finding that teacher education curriculum was inadequate to equip them with relevant and useful content, they recommended provision of in-service training. Therefore, this together with other gaps in the literature reviewed will be addressed in the current study that seeks to investigate factors influencing student' mathematics performance in centralized national examinations in Banadir region, Somalia.

## **2.8 Theoretical Framework**

This study was guided by two factor theory. This theory was penned by Fredrick Herzberg in 1959. It is concerned with two factors; motivators and demotivators. The theory states that individuals are motivated when demotivators are reduced and motivators increased. According to Herzberg, motivators make individuals to feel good about what they are doing and therefore, they decide to work even more better while demotivators make them feel bad therefore, discouraging them to work better.

This theory was relevant to this study since it encourages schools to enhance a conducive teaching and learning environments that provides motivating factors such as accessibility of adequate and relevant teaching and learning resources by both students and teachers, consideration of use of relevant and stimulating teaching methods and trained and qualified teachers who are able to teach, guide and appropriately manage students' attitudes accordingly to enhance good performance in mathematics. Additionally, this theory urges that anything which is likely to demotivate students by making them feel bad or discouraged to work hard in mathematics need to be avoided by all means as this may affect their performance. Therefore, it is important for every school focusing on its performance to be aware that there is existence of both motivating and demotivating factors in teaching and learning environment that should be appropriately controlled in order to achieve desired goal which is improved mathematics performance among students.

## 2.9 Conceptual Framework



**Figure 1: Conceptual framework showing dependent and independent variables**

The Conceptual Model demonstrates the relationship between variables that are dependent and independent. The independent variables include instructional strategies, attitudes of students, teaching and learning tools, and the standard of teacher preparation. They interact with dependent variable which is performance in mathematics through teaching and learning process. Independent variables can be controlled to enhance good performance. For instance the availability of adequate teaching and learning facilities, positive attitude of students towards mathematics, effective teaching methods and quality and relevant teacher's training through an

appropriate teaching and learning process will result to good performance in mathematics.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter dealt with the research methodology used to carry out the study. It comprised of research design, target population, sample size and sampling procedures, instruments of research, validity and reliability of study instruments, data collection procedures, data analysis techniques and ethical consideration

#### **3.2 Research design**

Descriptive research design was adopted in this study. According to Kothari (2010), this research design is suitable for describing phenomena exactly the way they are without manipulation was therefore appropriate for measuring the characteristics for a large population in Banadir region. It was used because it would enhance collection of data on attitudes, opinions and habits of participants in the study. This design would enable the researcher to collect data on factors influencing students' mathematics performance in national centralized examinations in Secondary schools in Banadir region, Somalia

#### **3.3 Target population**

The target population refers to the large sample that the researcher is interested in using to depict his data set (Mugenda and Mugenda, 2003). Target population consisted of 410 secondary schools with 410 principals, 425 Form four mathematics teachers and 23, 161 Form four students totaling to 23, 996 target population.

### **3.4 Sample size and sampling procedures**

Mugenda and Mugenda (2003) assert that the study can suitably use a sample size of between 10% and 30%. Therefore, 41 schools with extremely poor performance were chosen to research on what influences poor performance. They comprised of a sample size of 41 principals, that's (one from each school), 41 Form four mathematics teachers, (one from each school) and 82 form four students totaling to 164 respondents.

The study chose 41 out of 410 schools. The chapter strictly based on performance. Schools were ranked from top to bottom and the researcher picked 41 schools from the bottom. Purposive sampling was used to select school principals. This was due to its ability to choose respondents with desired characteristics that suits the topic under investigation such as ability to understand and respond to study questions appropriately (Walliman, 2011). Stratified random sampling was also used in selection of form four mathematics teachers and form four students. This was done by placing populations from targeted schools into three strata based on the three regions under study. Form four mathematics teachers and form four students were picked randomly from every stratum up to a desirable sample size and then pooled together to form a study sample size of 41 and 82 respectively. This resulted to a total sample size of 164 respondents.

**Table 3.1 Sampling frame**

| <b>Category of respondents</b> | <b>Sample size</b> | <b>Sampling techniques</b> |
|--------------------------------|--------------------|----------------------------|
| School principals              | 41                 | Purposive sampling         |
| Form 4 mathematics teachers    | 41                 | Stratified random sampling |
| Form four students             | 82                 | Stratified random sampling |
| <b>Total</b>                   | <b>164</b>         |                            |

**Source:** Ministry of Education, Somalia (2019)

### **3.5 Research instruments**

In gathering information, the study used questionnaires, interviews and observation checklists. Questionnaires obtained data from four students from the principals of the school. They have been used because they effectively increase data collection on large groups of respondents. One set for principals and another set for students were two sets of questionnaires. Each set was divided into two sections; bio data was included in section 1 while questions in section 2 were taken from study goals. Interviews were performed on Form Four with questions focused on study goals for mathematics teachers. In relation to the study subject, they checked respondents for more data. The investigator used observation checklists to collect data from the learning facilities attended by instructors and learners.

### **3.6 Validity of research instruments**

Validity of instruments refers to the capability of research instrument measuring what it is supposed to measure (Orodho, 2008). Content validity was observed by the supervisors appraising research items in questionnaires and interviews to see if they



would appropriately produce results to answer research questions. The researcher also consulted his supervisors on usefulness of the chosen instruments to enhance face validity.

### 3.7 Reliability of research instruments

For the study instruments to be reliable, they have to produce consistent results on repeated trials over same group of respondents and in the same environment but at different times (Mugenda, 2008). Reliability of instruments was achieved by the researcher employing test re-test method. Piloting was carried out. This was done by collecting data using study instruments on the same respondents but who were not on the main study at two different times. Thereafter, the researcher used Pearson's moment correlation coefficient formula to compute the collected data scores whereby the ideal reliability coefficient was 0.85 of which according to Kothari, (2011) a reliability of more than 0.7 is accepted.

$$r = \frac{N\sum xy - (\sum x)(\sum y)}{\sqrt{[N\sum x^2 - (\sum x)^2][N\sum y^2 - (\sum y)^2]}}$$

In which,

N= Number of pairs of scores

$\sum xy$ = Sum of the products of paired scores

$\sum x$ = Sum of x scores

$\sum y$ = Sum of y scores

$\sum x^2$ = Sum of squared x scores

$\sum y^2$ = Sum of squared y scores.

### **3.8 Data collection procedures**

The data collection procedures started with seeking authority to conduct research from Ministry of Education, Somalia. This was followed by presenting the approval authority to Banadir education regional offices to get consent to conduct the study. The schools were visited by the researcher to book appointments and later conduct the actual study using questionnaires, interviews and observation checklist. Questionnaires were dropped to the respondents and picked later after completing filling them. Interviews were conducted face to face with the researcher noting down responses from participants. The researcher also used observation checklist to collect data based on research objects.

### **3.9 Data analysis techniques**

The researcher then analyzed data in order to make it more meaningful (Yin, 2014). This began with arranging the data in an orderly manner for easy analysis. The arrangement was based on the related data so as to make it easy for the researcher to analyse it. Based on research questions, the quantitative data was arranged and analysed with aid of SPSS and then presented using frequencies and percentages. On the other hand, qualitative data obtained from open questions and interview were analysed thematically based on the objectives of the study before their presentation.

### **3.10 Ethical considerations**

Study respondents were assured of their confidentiality and privacy. Respondents were protected against any incident that may expose them to any harm. Study participants were also allowed to participate in the study voluntarily and not through force. In order to make study legal and acceptable, the researcher first obtained a research permit that enabled him to conduct his research accordingly. This was an assurance to the ministry of education and study respondents that he has been authorized to collect data on the given research topic.

## CHAPTER FOUR

### DATA ANALYSIS, PRESENTATION AND INTERPRETATION

#### 4.1 Introduction

This chapter presents data analysis, presentation and interpretation of the findings. Presented are the findings from the field. This chapter introduces the data analysis section which comprises of the instrument return rate, demographic information of the respondents, data analysis and interpretation. The findings are given according to the objectives of the study which include; influence of teaching and learning facilities, students' attitude towards mathematics, teaching methods, influence of teacher training on students' performance in mathematics in secondary schools in Banadir region. Data was analysed by use of Statistical Package for Social Sciences (SPSS) computer programme.

#### 4.2 Instruments Return Rate

The questionnaires were administered to Principals, teachers and students. Table 4.1 shows the response return rate.

**Table 4.1: Questionnaire return rate**

| Type of instrument      | Number administered | Number returned | %return rate |
|-------------------------|---------------------|-----------------|--------------|
| Teacher interview guide | 41                  | 36              | 98.9%        |
| Principal questionnaire | 41                  | 33              | 80.5%        |
| Students' questionnaire | 82                  | 81              | 87.7%        |

Table 4.1 shows that the response rate was high at 98.9% for the teachers' interview guide while principals was 80.5% and students questionnaires was 87.7% that were returned. According to Kothari (2004) a return rate of 60% and above is acceptable.

### 4.3 Background information of Respondents

The study sought to establish the demographic information such as gender, age, professional qualification, working experience, and in-service course attended. Information that was needed included the principals' gender, age, working experience and highest professional qualification. Information that was needed for teachers included teachers' gender, age, working experience, level of education and in-service course attendance. Table 4.2 shows the Background information of principals and students involved in the study.

**Table 4.2: Principals gender**

| <b>Principals</b> | <b>F</b>  | <b>%</b>     |
|-------------------|-----------|--------------|
| Male              | 28        | 84.8         |
| Female            | 5         | 15.2         |
| <b>Total</b>      | <b>33</b> | <b>100.0</b> |

Table 4.2 shows that majority 84.8% of the principals who participated in the study were male. The female principals were represented by 15.2%. This shows that the male principals were more than the female principals hence depicting disparity in gender representation.

**Table 4.3 Principal's Age**

| <b>Age</b>   | <b>F</b>  | <b>%</b>     |
|--------------|-----------|--------------|
| 31-40 years  | 4         | 12.1         |
| 41-50 years  | 10        | 30.3         |
| 51-60 years  | 19        | 57.6         |
| <b>Total</b> | <b>33</b> | <b>100.0</b> |

The findings in Table 4.3 show that 57.6% of the principals' age was between 51-60 years while 30.3% were in the range of 41-50 years. The age of respondents was found to be reasonable for responding to research questions appropriately since they were found to be mature enough to understand questions well.

**Table 4.4: Principal's work experience**

| <b>Years</b>   | <b>F</b>  | <b>%</b>     |
|----------------|-----------|--------------|
| Below 5 years  | 13        | 39.4         |
| 5-10 years     | 13        | 39.4         |
| Above 10 years | 7         | 21.2         |
| <b>Total</b>   | <b>33</b> | <b>100.0</b> |

Working experience is the accumulated years gathered practically by the study participants. According to table 4.4, the working experience majority of principals 39.4% had a working experience of below 5 years and 5-10 years respectively while 21.2% were above 10 years. This showed that majority of principals had worked for a few years hence had limited experience in the teaching profession since they were still young. This also shows that majority of the principals had served for less years in their schools and this might be attributed to the recent transfers done of head teachers. Kabala (2012) says that good supervision of teaching and learning activities and resources leads to good performance. This may mean that a principal who has

worked for few years may not have gained enough experience on how to supervise these activities and resources leading to poor performance among learners. However, there was a significant inclusion of all years of experience.

**Table 4.5: Principal’s Professional Qualification**

| <b>Level</b>      | <b>F</b>  | <b>%</b>     |
|-------------------|-----------|--------------|
| Diploma           | 3         | 9.1          |
| Bachelor’s Degree | 25        | 75.8         |
| Master’s Degree   | 5         | 15.2         |
| <b>Total</b>      | <b>33</b> | <b>100.0</b> |

On the professional qualification of the principals as shown in table 4.5, majority 75.8% of the principals had a Bachelor’s degree while 15.2% had masters. This showed that majority of principals had the required qualification in teaching in secondary schools. Simiyu (2013), reveals that a well-trained teacher possesses good professional qualifications that enables him to contribute positively to academic performance of his students. This means that all principals in the schools under investigation qualified professionally to produce good results.

**Table 4.6: Principal’s In-service Training**

|              | <b>F</b>  | <b>%</b>     |
|--------------|-----------|--------------|
| Yes          | 24        | 72.7         |
| No           | 9         | 27.3         |
| <b>Total</b> | <b>33</b> | <b>100.0</b> |

Jerry (2018), observed that most teachers do not upgrade their skills and knowledge through in-service training and development and this affect their performance. In-service courses were used in the study to know whether the people who participated in the study had ever attended an in-service course or not. On the aspect of in-service course in table 4.6, 72.7% of the principals agreed that they had attended an in-service course while 27.3 said they had not attended an in-service course. This shows that they were well equipped in terms of improvement on professional development.

**Table 4.7: Students Gender**

| <b>Gender</b> | <b>F</b>  | <b>%</b>     |
|---------------|-----------|--------------|
| Male          | 69        | 85.2         |
| Female        | 12        | 14.8         |
| <b>Total</b>  | <b>81</b> | <b>100.0</b> |

Table 4.7 on students' gender showed that 85.2% of the students were male while 14.8% were female. This revealed that form four classes in the region were dominated by male leaders who scored a higher percentage over female counterparts. The findings confirm the assertions of Banerjee (2016), that poor attitude towards learning; discrimination such as gender discrimination among other factors contributes to poor performance in mathematics of students.

**Table 4.8: Students' Age**

| <b>Age</b>     | <b>F</b>  | <b>%</b>     |
|----------------|-----------|--------------|
| Below 20 years | 66        | 81.5         |
| Above 20 years | 15        | 18.5         |
| <b>Total</b>   | <b>81</b> | <b>100.0</b> |



Age was established in order to know whether all the age groups were represented. Table 4.8 shows majority 81.5% of the students were below the age of 20 years while 18.5% were above 20 years. This shows that majority of students were at their rightful age in school. Similarly, Waiganjo and Waiganjo (2018), noted that infusing different aspects of teaching methods enhances learners' abilities and interest in learning which may lead to good especially for young learners. This study has found that majority of learners are below 20 years making it an appropriate age for learning.

#### **4.4 Teaching and learning facilities and students' performance in mathematics**

According to Khan and Igbal (2012) adequate and quality school facilities are basic ingredients of quality education and to achieve the intended goal of the school program. They also strengthen the idea by emphasizing that learning is a complex activity that requires students and teachers' motivation, adequate school facilities such as standardized buildings and classrooms with their facilities, instructional materials and equipment's for child development. Sampson (2011) found that only a study effort from a student, regardless enough learning facilities, can make a student performance well in education. Findings from interviews showed that majority of respondents amounting to 65% viewed that educational facilities are not adequate to support good performance in mathematics while 35% of respondents acknowledged that those resources were adequate to enhance good performance in mathematics in national examinations. Findings from observation checklist revealed that instructional resources were inadequate in most schools accounting for around 70%,

20% of schools had fairly adequate resources while 10% had adequate resources. Table 4.9 shows principals response on provision of teaching and learning resources where QA=Quite Adequate, A=Adequate, I=Inadequate, QI=Quite Inadequate, NA=Not Applicable.

**Table 4.9: Principals response on provision of teaching and learning resources**

| <b>Facilities and Resources</b>                      | <b>QA<br/>f<br/>%</b> | <b>A<br/>f<br/>%</b> | <b>I<br/>f<br/>%</b> | <b>QI<br/>f<br/>%</b> | <b>NA<br/>f<br/>%</b> | <b>Mean</b> | <b>SD</b> |
|--|-----------------------|----------------------|----------------------|-----------------------|-----------------------|-------------|-----------|
| Teachers mathematics reference books and guide books | 4<br>12.1             | 16<br>48.5           | 10<br>30.3           | 3<br>9.1              | 0<br>0.0              | 2.36        | 0.82      |
| Students textbooks                                   | 10<br>30.3            | 8<br>24.2            | 13<br>39.4           | 2<br>6.1              | 0<br>0.0              | 2.21        | 0.96      |
| Classroom Spaces                                     | 7<br>21.2             | 10<br>30.3           | 7<br>21.2            | 8<br>24.2             | 1<br>3.0              | 2.58        | 1.17      |
| Teaching Aids  | 3<br>9.1              | 10<br>30.3           | 13<br>39.4           | 7<br>21.2             | 0<br>0.0              | 2.73        | 0.91      |

Table 4.9 shows data on Teaching and learning of mathematics resources. Majority 48.5% of the principals said that teachers' mathematics reference books and guides were adequate while 30.3% said they were inadequate. On student textbooks 39.4% said they were inadequate while 30.3% said they were quite adequate. On classroom spaces majority 30.3% of the principals said they were adequate while 24.2% said they were quite inadequate. On teaching Aids majority 39.4% said it was inadequate while 30.3% said it was adequate. Classroom spaces had a highest mean of 2.58 and a standard deviation of 1.17. Muindi (2011), noted that success of students in their academic performance is greatly attributed to adequacy of physical facilities and

teaching and learning materials like text books, stationery, exercise books and teaching aids. The results obtained from this study on the aspect of teaching and learning resources shows that even though these resources were available, they were not adequate enough to produce excellent academic results.

Table 4.10 shows students response on provision of teaching and learning facilities where SD=Strongly Disagree, D=Disagree, N=Neutral, A=Agree, SA=Strongly Agree

**Table 4.10: Students response on provision of teaching and learning facilities**

| <b>Facilities and Resources</b>   | <b>SD<br/>f<br/>%</b> | <b>D<br/>f<br/>%</b> | <b>N<br/>f<br/>%</b> | <b>A<br/>f<br/>%</b> | <b>SA<br/>f<br/>%</b> | <b>Mean</b> | <b>SD</b> |
|---|-----------------------|----------------------|----------------------|----------------------|-----------------------|-------------|-----------|
| There are enough mathematics reference books and guide books for teachers | 15<br>18.5            | 42<br>51.9           | 7<br>8.6             | 14<br>17.3           | 3<br>3.7              | 1.00        | 0.00      |
| All students have textbooks and calculators                               | 14<br>17.3            | 44<br>54.3           | 6<br>7.4             | 14<br>17.3           | 3<br>3.7              | 2.36        | 1.09      |
| There are chalkboards in every class                                      | 15<br>18.5            | 22<br>27.2           | 10<br>12.3           | 25<br>30.9           | 9<br>11.1             | 2.89        | 1.33      |
| Classrooms are spacious enough to accommodate students well               | 18<br>22.2            | 19<br>23.5           | 6<br>7.4             | 21<br>25.9           | 17<br>21.0            | 3.00        | 1.50      |

Table 4.10 provides results on; There are enough mathematics reference books and guide books for teachers, majority 51.9% of the students Disagreed while 18.5% Strongly Disagreed. On all students have textbooks and calculators 54.3% Disagreed while 17.3% Strongly Disagreed and Agreed respectively. On there is chalkboards in every class majority 30.9% Agreed while 27.2% Disagreed. On classroom are spacious enough to accommodate students well majority 25.9% of the students

Agreed while 23.5% Disagreed. Classroom are spacious enough to accommodate students with a highest mean of 3.00 and a standard deviation of 1.50. These results are in line with Muindi (2011), views that students' success in academic performance is greatly attributed to adequacy of physical facilities and teaching and learning materials.

As noted from the above table, majority of these resources are not good enough impacting negatively on students' mathematics performance. Table 4.11 shows teachers interview response on provision of teaching and learning facilities.

**Table 4.11: Teachers response on provision of teaching and learning facilities.**

| Facilities and Resources   | Yes |      | NO |      | Total |       |
|--|-----|------|----|------|-------|-------|
|  | f   | %    | f  | %    | f     | %     |
| Students have enough mathematics textbooks, calculators, revision books and other teaching aid | 17  | 47.2 | 19 | 52.8 | 36    | 100.0 |
| Classroom space is big enough to accommodate all students in your school                       | 14  | 38.9 | 22 | 61.1 | 36    | 100.0 |
| Teachers have enough mathematics guide books   | 25  | 69.4 | 11 | 30.6 | 36    | 100.0 |

Table 4.11 provides interview results on; Students have enough mathematics textbooks, calculators, revision books and other teaching aid that majority 52.8% of the teachers said No while 47.2% said Yes. On classroom space is big enough to accommodate all students in your school 61.1% said Yes while 38.9% said No. On teachers have enough mathematics guidebooks majority 69.4% said Yes while 30.6% said No respectively.

#### **4.5 Students' attitudes and students' performance in mathematics**

Owo and Ikwut (2015) in their study on performance of students revealed that notion by students, parents and community at large towards mathematics as a very difficult subject is an obstacle to good performance in this subject. This led to students losing interest and concentration to study it. Similarly, teachers failed to concentrate and put maximum efforts when solving mathematics assignments, dealing with class exercises or even setting and marking tests. This greatly led to poor performance among students.

Table 4.12 shows principals response on student attitude towards mathematics where NA=Not at all, IE=little extent, ME=Moderate Extent, LE=Large Extent, VLE=Very Large Extent

**Table 4.12: Principals' response on student attitude towards mathematics**

| <b>Facilities and Resources</b>  | <b>NA</b> | <b>IE</b> | <b>ME</b> | <b>LE</b>  | <b>VLE</b> | <b>Mean</b> | <b>SD</b> |
|--|-----------|-----------|-----------|------------|------------|-------------|-----------|
|  | <b>f</b>  | <b>f</b>  | <b>f</b>  | <b>f</b>   | <b>f</b>   |             |           |
|  | <b>%</b>  | <b>%</b>  | <b>%</b>  | <b>%</b>   | <b>%</b>   |             |           |
| Students attitude towards mathematics affect their performance in that subject | 0<br>00.0 | 0<br>00.0 | 4<br>12.1 | 12<br>36.4 | 17<br>51.5 | 4.39        | 0.70      |
| Most students feel uneasy and see mathematics as a hard subject to perform     | 0<br>00.0 | 0<br>00.0 | 0<br>00.0 | 15<br>45.5 | 18<br>54.5 | 4.55        | 0.51      |
| Students naturally don't like mathematics                                      | 0<br>00.0 | 0<br>00.0 | 4<br>12.1 | 14<br>42.4 | 15<br>45.5 | 4.33        | 0.70      |

Table 4.12 shows on Students attitude towards mathematics affect their performance in that subject majority 51.5% of the teachers said it affects at a very large extent while 36.4% said at a large extent. On Most students feel uneasy and see mathematics as a hard subject to perform 54.5% said at a very large extent while 45.5% said large extent. On Students naturally don't like mathematics majority 45.5% said very large extent while 42.4% said large extent respectively.

Most students feel uneasy and see mathematics as a hard subject to perform had the highest mean of 4.55 and Standard deviation of 0.51. Table 4.13 shows student response on students attitude towards mathematics where NA=Not at all, IE=little extent, ME=Moderate Extent, LE=Large Extent, VLE=Very Large Extent

**Table 4.13: Student response on students' attitude towards mathematics**

| <b>Facilities and Resources</b>  | <b>NA</b> | <b>IE</b> | <b>ME</b> | <b>LE</b> | <b>VLE</b> | <b>Mean</b> | <b>SD</b> |
|--|-----------|-----------|-----------|-----------|------------|-------------|-----------|
|  | <b>f</b>  | <b>f</b>  | <b>f</b>  | <b>f</b>  | <b>f</b>   |             |           |
|  | <b>%</b>  | <b>%</b>  | <b>%</b>  | <b>%</b>  | <b>%</b>   |             |           |
| Students with negative attitudes towards mathematics fail                    | 0         | 5         | 10        | 50        | 16         | 3.95        | 0.76      |
|  | 00.0      | 6.2       | 12.3      | 61.7      | 19.8       |             |           |
| Those who feel uneasy with mathematics perform poorly                        | 0         | 2         | 2.5       | 9         | 38         | 4.23        | 0.75      |
|  | 00.0      |           |           | 11.1      | 46.9       |             |           |
| Positive attitudes towards mathematics by students leads to good performance | 1         | 1.2       | 1         | 1.2       | 14         | 4.21        | 0.86      |
|  |           |           |           |           | 17.3       |             |           |
| Students naturally hate mathematics and perform poorly                       | 0         | 5         | 6.2       | 10        | 30         | 4.20        | 0.89      |
|  | 00.0      |           |           | 12.3      | 37.0       |             |           |
|  |           |           |           |           | 44.4       |             |           |

Table 4.13 shows on Students with negative attitudes towards mathematics fail majority 61.7% of the students said it affects at a large extent while 19.8% said at a very large extent. On Those who feel uneasy with mathematics perform poorly 46.9% said at a large extent while 39.5% said a very large extent. On Positive attitudes towards mathematics by students leads to good performance majority 44.4% said at a very large extent while 35.8% said large extent. On Students naturally hate mathematics and perform poorly majority 44.4% said at a very large extent while 37.0% said large extent respectively. Those who feel uneasy with mathematics perform poorly had the highest mean of 4.23 and Standard deviation of 0.75. Table 4.14 shows teachers' interview response on students' attitude towards mathematics.

**Table 4.14: Teachers' response on students' attitude towards mathematics.**

| <b>Students attitude</b> | <b>Frequency</b> | <b>Percentage</b> |
|--------------------------|------------------|-------------------|
| Difficult subject        | 24               | 66.7              |
| Boring subject           | 5                | 13.9              |
| Scared subject           | 5                | 13.9              |
| Okay subject             | 2                | 5.6               |
| <b>Total</b>             | <b>36</b>        | <b>100.0</b>      |

Table 4.14 shows majority 66.7% of the teachers said students see mathematics as a difficult subject while 13.9% said it was a boring and scaring subject respectively. Mutondi and Ngirande, (2014), observed that most students view mathematics and sciences to be difficult and boring subjects making them to develop negative attitudes towards those subjects and leading to poor performance. This is confirmed from the current study findings that shows a large percentage of students (66.7%) noting that mathematics is a difficult subject.

#### **4.6 Teaching methods and students' performance in mathematics**

Zakaria, Chin & Daud (2010) specified that teaching should not merely focus on dispensing rules, definitions and procedures for students to memorize, but should also actively engage students as primary participants. Nkeng and Mambeh (2008) viewed teaching methods as those techniques and strategies used by teachers in their efforts to facilitate students learning. It is an activity that translates curriculum goals and objectives into experience that students acquire during their interaction with their teacher.



Table 4.15 shows principals response on teaching methods where VI=Very Ineffective, I=Ineffective, SE=Somehow Effective, E=Effective, VE=Very effective

**Table 4.15: Principals' response on teaching methods**

| Teaching methods           | VI<br>f<br>% | I<br>f<br>% | SE<br>f<br>% | E<br>f<br>% | VE<br>f<br>% | Mean | SD   |
|----------------------------|--------------|-------------|--------------|-------------|--------------|------|------|
| Lecture Method             | 9<br>27.3    | 11<br>33.3  | 5<br>15.2    | 6<br>18.2   | 2<br>6.1     | 2.42 | 1.25 |
| Problem solving<br>Method  | 3<br>9.1     | 9<br>27.3   | 6<br>18.2    | 6<br>18.2   | 9<br>27.3    | 3.27 | 1.38 |
| Group discussion<br>Method | 0<br>00.0    | 0<br>00.0   | 3<br>9.1     | 12<br>36.4  | 18<br>54.5   | 4.45 | 0.67 |
| Questioning                | 0<br>00.0    | 1<br>3.0    | 3<br>9.1     | 13<br>39.4  | 16<br>48.5   | 4.33 | 0.78 |
| Demonstration              | 0<br>00.0    | 0<br>00.0   | 6<br>18.2    | 17<br>51.5  | 10<br>30.3   | 4.12 | 0.70 |

Table 4.15 shows on Lecture Method majority 33.3% of the principals said Ineffective while 27.3% said Very Ineffective. On Problem solving Method 27.3% said Ineffective and Very Effective respectively while 18.2% said Somehow Effective and Effective respectively. On Group Discussion Method majority 54.5% said Very Effective while 36.4% said Effective. On Questioning Method majority 48.5% said Very Effective while 39.4% said Effective. On Demonstration method majority 51.5% said Effective while 30.3% said Very Effective. Group Discussion Method had the highest mean of 4.45 and Standard deviation of 0.67. Table 4.16 shows students response on teaching methods.

**Table 4.16: Students' response on teaching methods**

| Teaching Methods             | Yes |      | NO |      | Total |       |
|------------------------------|-----|------|----|------|-------|-------|
|                              | f   | %    | f  | %    | f     | %     |
| Lecture Method               | 20  | 24.7 | 61 | 75.3 | 81    | 100.0 |
| Student Participation Method | 45  | 55.6 | 26 | 44.4 | 81    | 100.0 |
| Demonstration                | 40  | 49.4 | 41 | 50.6 | 81    | 100.0 |
| Group Discussion Method      | 51  | 63.0 | 30 | 37.0 | 81    | 100.0 |
| Questioning                  | 28  | 34.6 | 53 | 65.4 | 81    | 100.0 |

Table 4.16 shows on Lecture Method majority 75.3% of the students said No it was not relevant while 24.7% said Yes it was relevant. On Student Participation Method 55.6% said It was relevant and while 44.4% said It was Not relevant. On Demonstration method majority 50.6% said No it was not relevant while 49.4% said Yes it was relevant. On Group Discussion Method majority 63.0% said. It was relevant while 37.0% said No it was not relevant. On Questioning Method majority 65.4% said No it was not relevant while 34.6% said Yes it was relevant. Table 4.17 shows teachers interview responses.

**Table 4.17: Teachers’ response on teaching methods.**

| <b>Teaching Methods</b> | <b>Frequency</b> | <b>Percentage</b> |
|-------------------------|------------------|-------------------|
| Demonstration Method    | 8                | 22.2              |
| Group discussion Method | 15               | 41.7              |
| Questioning Method      | 8                | 22.2              |
| Experimentation Method  | 5                | 13.9              |
| <b>Total</b>            | <b>36</b>        | <b>100.0</b>      |

Table 4.17 shows that majority 41.7% of the teachers said Group Discussion Method was the best way used in teaching mathematics while 22.2% said Demonstration and Questioning Method respectively.. The findings are aligned to those of Struyven and De Meyst (2010) and Maganga (2013) who recommended teachers to use various teaching methods in order to improve performance of mathematics among students. This should be done based on their appropriateness to students as well as in consideration with available time.

#### **4.7 Teacher training and students’ performance in mathematics**

Training is an action of teaching a person a particular skill to perform their roles effectively and efficiently. Training is a vital part of the human resource development. Most employees have some weaknesses in their organizational skill(Muralidharan & Sundararaman, 2010; Navarro, Zervas, Gesa, & Sampson, 2016). Like employees in any organization teachers also need training to enhance their teaching skills(Noah & Olusola, 2015; Schroeder & Adesope, 2015). Training not only helps teacher performance but also the students’ learning out comes. Training framework is designed in educational institutions to facilitate

the teachers' skill (Navarro et al., 2016). Deficiency among teachers' skill leads towards the deficiency among students learning behavior and outcomes leading to shortcomings in overall organizational performance (Chen-Chung, Kuan-Hsien, Leon Yufeng, & Chin-Chung, 2016). Table 4.18 shows the principals response on teachers training where SD=Strongly Disagree, D=Disagree, N=Neutral, A=Agree, SA=Strongly Agree

**Table 4.18: Principals' response on teachers training.**

| <b>Teacher Training</b>  | <b>SD</b><br><b>f</b><br><b>%</b> | <b>D</b><br><b>f</b><br><b>%</b> | <b>N</b><br><b>f</b><br><b>%</b> | <b>A</b><br><b>f</b><br><b>%</b> | <b>SA</b><br><b>f</b><br><b>%</b> | <b>Mean</b> | <b>SD</b> |
|--|-----------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|-------------|-----------|
| Mathematics teachers frequently undertake in-service training              | 6<br>18.2                         | 18<br>54.5                       | 1<br>3.0                         | 7<br>21.2                        | 1<br>3.0                          | 2.36        | 1.11      |
| Trained mathematics teachers are enough in this school                     | 6<br>18.2                         | 19<br>57.6                       | 0<br>00.0                        | 6<br>18.2                        | 2<br>6.1                          | 2.36        | 1.17      |
| Trained teachers are able to manage students' needs appropriately          | 0<br>0.0                          | 0<br>00.0                        | 1<br>3.0                         | 19<br>57.6                       | 13<br>39.4                        | 4.36        | 0.55      |
| Trained teachers record high mean scores as compared to untrained teachers | 9<br>27.3                         | 8<br>24.2                        | 1<br>3.0                         | 10<br>30.3                       | 5<br>15.2                         | 2.82        | 1.51      |

Table 4.18 shows that on Mathematics teachers frequently undertake in-service training majority 54.5% of the principals Disagree while 21.2% Agree. On Trained mathematics teachers are enough in this school 57.6% Disagree while 18.2% Strongly Disagree and Agree respectively. On Trained teachers are able to manage students' needs appropriately majority 57.6% Agree while 39.4% Strongly Agree.

On Trained teachers record high mean scores as compared to untrained teachers majority 30.3% of the principals Agree while 27.3% Strongly Disagree. Trained teachers are able to manage students' needs appropriately had a highest mean of 4.36 and a standard deviation of 0.55. Table 4.19 shows students response on teachers training.

**Table 4.19: Students' response on teachers training**

| Teacher Training   | Yes |      | NO |      | Total |       |
|--|-----|------|----|------|-------|-------|
|  | f   | %    | f  | %    | f     | %     |
| Teachers don't further their studies after employment              | 56  | 69.1 | 25 | 30.9 | 81    | 100.0 |
| Those who don't further their studies record poor performance      | 44  | 54.3 | 37 | 45.7 | 81    | 100.0 |
| The quality of training given to teachers is not good enough       | 43  | 53.1 | 38 | 46.9 | 81    | 100.0 |
| Poor performance is only recorded by untrained teachers            | 33  | 40.7 | 48 | 59.3 | 81    | 100.0 |
| Trained teachers are more competent compared to untrained teachers | 71  | 87.7 | 10 | 12.3 | 81    | 100.0 |

Table 4.19 shows on Teachers don't further their studies after employment majority 69.1% of the students said Yes while 30.9% said No. On those who don't further their studies record poor performance 54.3% said Yes while 45.7% said No. On The quality of training given to teachers is not good enough majority 53.1% said Yes while 46.9% said No. On Poor performance is only recorded by untrained teachers majority 59.3% said No while 40.7% said Yes. On Trained teachers are more competent compared to untrained teachers majority 87.7% said Yes while 12.3%

said No. Table 4.20 shows teachers interview responses on whether mathematics teachers are trained as teachers.

**Table 4.20: Teachers’ response on whether mathematics teachers are trained as teachers.**

| <b>Mathematics teachers are trained</b> | <b>Frequency</b> | <b>Percentage</b> |
|---|------------------|-------------------|
| Yes                                     | 10               | 27.8              |
| No                                      | 26               | 72.2              |
| <b>Total</b>                            | <b>36</b>        | <b>100.0</b>      |

Table 4.20 shows that majority 72.2% of the teachers said that not all mathematics teachers are trained while 27.8% said Yes. Table 4.21 shows teachers interview responses on teachers go for further training to achieve more knowledge and skills.

**Table 4.21: Teachers’ response on teachers go for further training to achieve more knowledge and skills.**

| <b>Teachers going for further training to achieve more Knowledge and skills</b> | <b>Frequency</b> | <b>Percentage</b> |
|---|------------------|-------------------|
| Yes   | 21               | 58.3              |
| No  | 15               | 41.7              |
| <b>Total</b>  | <b>36</b>        | <b>100.0</b>      |

Table 4.21 shows that majority 58.3% of the teachers agreed teachers go for further training to achieve more knowledge and skills while 41.7% said No. Table 4.22 shows principals response on contribution of poor performance in schools

**Table 4.22: Principals' response on contribution of poor performance in schools**

| <b>Contribution of poor performance in schools</b> | <b>Frequency</b> | <b>Percentage</b> |
|--|------------------|-------------------|
| Learners attitude                                  | 9                | 27.3              |
| Lack of qualified teachers                         | 8                | 24.2              |
| In-service training for teachers                   | 1                | 3.0               |
| Poor behaviours                                    | 10               | 30.3              |
| Student laxity                                     | 5                | 15.2              |
| <b>Total</b>                                       | <b>33</b>        | <b>100.0</b>      |

Table 4.22 shows that majority 30.3% of the principals said it was due to bad behavior while 27.3% said it was because of learners attitude and 24.2% was lack of qualified teachers. Table 4.23 shows students response on contribution of poor performance.

**Table 4.23: Students response on contribution of poor performance in schools.**

| <b>Contribution of poor performance in schools</b> | <b>Frequency</b> | <b>Percentage</b> |
|--|------------------|-------------------|
| lack of textbooks                                  | 15               | 18.5              |
| poor attitude towards mathematics                  | 44               | 54.3              |
| Insecurity   | 4                | 4.9               |
| Poverty  | 3                | 3.7               |
| Indiscipline                                       | 15               | 18.5              |
| <b>Total</b>                                       | <b>81</b>        | <b>100.0</b>      |

Table 4.23 shows majority 54.3% of the students said poor attitude towards mathematics was the major contribution of poor performance in schools while 18.5%

said it was lack of textbooks and indiscipline respectively. Table 4.24 shows Principals response on improvement of mathematics performance.

**Table 4.24: Principals response on factors on improvement of mathematics performance.**

| <b>Factors on improvement of mathematics performance.</b> | <b>Frequency</b> | <b>Percentage</b> |
|---|------------------|-------------------|
| Counseling learners                                       | 10               | 30.3              |
| Rewarding best learners                                   | 5                | 15.2              |
| Employing more teachers                                   | 8                | 24.2              |
| Conducting extra teaching                                 | 4                | 12.1              |
| Provide motivation for teachers                           | 6                | 18.2              |
| <b>Total</b>  | <b>33</b>        | <b>100.0</b>      |

Table 4.24 shows majority 30.3% of the principals said through counselling learners we could improve performance of mathematics while 24.2% said employing more teachers and 18.2% said providing motivation for teachers. Table 4.25 shows students response on factors on improvement of mathematics performance.

**Table 4.25: Students response on factors on improvement of mathematics performance.**

| <b>Factors on improvement of mathematics performance</b> | <b>Frequency</b> | <b>Percentage</b> |
|--|------------------|-------------------|
| Buy more textbooks                                       | 16               | 19.8              |
| Counselling students                                     | 40               | 49.4              |
| Enhance security   | 4                | 4.9               |
| increase funding   | 6                | 7.4               |
| hiring more qualified teachers                           | 15               | 18.5              |
| <b>Total</b>   | <b>81</b>        | <b>100.0</b>      |



Table 4.25 shows majority 49.4% of the students said counselling students was the major factor on improvement of mathematics performance while 19.8% said buying more textbooks and 18.5% said hiring of more qualified teachers respectively. Table 4.26 shows teachers response on factors on improvement of mathematics performance.

**Table 4.26: Teachers’ response on factors on improvement of mathematics performance.**

| <b>Factors on improvement of mathematics performance.</b> | <b>Frequency</b> | <b>Percentage</b> |
|---|------------------|-------------------|
| In-service training                                       | 10               | 27.8              |
| Motivation  | 14               | 38.9              |
| Bench marking exercises                                   | 3                | 8.3               |
| Rewarding performers                                      | 6                | 16.7              |
| Enough teaching and learning resources                    | 3                | 8.3               |
| <b>Total</b>  | <b>36</b>        | <b>100.0</b>      |

Table 4.26 shows that majority 38.9% of the teachers said motivation is a major factor on improvement of mathematics performance while 27.8% said In-service training and 16.7% said rewarding performers.

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1 Introduction**

This chapter summarizes and concludes the research with a set of recommendations drawn from the outcomes. The aim of the study was to investigate factors influencing students' performance in mathematics in national centralized examination in secondary schools in Banadir region, Somalia.

#### **5.2 Summary**

The research sought to investigate factors influencing students' performance in mathematics in national centralized examination in secondary schools in Banadir region, Somalia. Four research objectives were developed which were: to establish the influence of teaching and learning facilities on students' performance in mathematics, to examine the influence of students' attitude towards mathematics on their performance in national centralized examinations, to establish the extent to which teaching methods influence students' performance in mathematics in national centralized examinations and to determine the influence of teacher training on students' performance in mathematics in secondary schools in Banadir region, Somalia from which four research questions were conveyed to guide the research. Related literature to factors influencing students' performance in mathematics was reviewed. A theoretical and conceptual framework was provided.

The research utilized descriptive survey design. A sample size of 41 principals, that's (one from each school), 41 Form four mathematics teachers, (one from each school) and 82 form four students totaling to 164 respondents. The study chose 41 out of 410 schools. Purposive sampling was used to select school principals. Stratified random sampling was used in selection of form four mathematics teachers and form four students. Form four mathematics teachers and form four students were picked randomly from every stratum up to a desirable sample size and then pooled together to form a study sample size of 41 and 82 respectively. Questionnaires and interview guide were both used to gather data were validated and tested were administered and received back.

Qualitative data was analyzed qualitatively i.e. data from individual interview and open-ended queries through content analysis and outlines consistent to research questions. This enabled the researcher to categorize the data. Codes and themes were given manually by the researcher while statistical information which is quantitative data was analyzed by the help of SPSS which is convenient in handling a large quantity of data. Frequency Distributions, means and percentages which is descriptive statistics was run on all the data. The following were the results of the study.

### **5.2.1 Provision of teaching and learning facilities and students' performance in mathematics**

The first object sought to establish the influence of teaching and learning facilities on students' performance in mathematics majority 48.5% of the principals said the facilities were adequate while 30.3% said they were inadequate. On student textbooks 39.4% said they were inadequate while 30.3% said they were quite adequate. On classroom spaces majority 30.3% of the principals said they were adequate while 24.2% said they were quite inadequate. On teaching Aids majority 39.4% said it was inadequate while 30.3% said it was adequate.

Majority 51.9% of the students Disagree There are enough mathematics reference books and guide books for teachers while 18.5% Strongly Disagree. On all students have textbooks and calculators 54.3% Disagree while 17.3% Strongly Disagree and Agree respectively. On there is chalkboards in every class majority 30.9% Agree while 27.2% Disagree. On classroom are spacious enough to accommodate students well majority 25.9% of the students Agree while 23.5% Disagree. Classroom are spacious enough to accommodate students well had a highest mean of 3.00 and a standard deviation of 1.50.

Majority 52.8% of the teachers said No on Students have enough mathematics textbooks, calculators, revision books and other teaching aid while 47.2% said Yes. On classroom space is big enough to accommodate all students in your school 61.1%

said Yes while 38.9% said No. On teachers have enough mathematics guidebooks majority 69.4% said Yes while 30.6% said No respectively.

### **5.2.2: Students' attitudes and students' performance in mathematics**

The second objective sought to examine the influence of students' attitude towards mathematics on their performance in national centralized examinations on Students attitude towards mathematics affect their performance in that subject majority 51.5% of the teachers said it affects at a very large extent while 36.4% said at a large extent. On Most students feel uneasy and see mathematics as a hard subject to perform 54.5% said at a very large extent while 45.5% said large extent. On Students naturally don't like mathematics majority 45.5% said very large extent while 42.4% said large extent respectively. Most students feel uneasy and see mathematics as a hard subject to perform had the highest mean of 4.55 and Standard deviation of 0.51. Majority 61.7% of the students said on Students with negative attitudes towards mathematics fail It affects at a large extent while 19.8% said at a very large extent. On Those who feel uneasy with mathematics perform poorly 46.9% said at a large extent while 39.5% said a very large extent. On Positive attitudes towards mathematics by students leads to good performance majority 44.4% said at a very large extent while 35.8% said large extent. On Students naturally hate mathematics and perform poorly majority 44.4% said at a very large extent while 37.0% said large extent respectively. Those who feel uneasy with mathematics perform poorly had the highest mean of 4.23 and Standard deviation of 0.75. Majority 66.7% of the teachers

said they see mathematics as a difficult subject while 13.9% said it was a boring and scaring subject respectively.

### **5.2.3: Teaching methods and students' performance in mathematics**

The third objective sought to establish the extent to which teaching methods influence students' performance in mathematics in national centralized examinations. Majority 33.3% of the principals said Lecture Method is Ineffective while 27.3% said Very Ineffective. On Problem solving Method 27.3% said Ineffective and Very Effective respectively while 18.2% said Somehow Effective and Effective respectively. On Group Discussion Method majority 54.5% said Very Effective while 36.4% said Effective. On Questioning Method majority 48.5% said Very Effective while 39.4% said Effective. On Demonstration method majority 51.5% said Effective while 30.3% said Very Effective. Group Discussion Method had the highest mean of 4.45 and Standard deviation of 0.67.

Majority 75.3% of the students said No on Lecture Method hence it was not relevant while 24.7% said Yes it was relevant. On Student Participation Method 55.6% said It was relevant and while 44.4% said It was Not relevant. On Demonstration method majority 50.6% said No it was not relevant while 49.4% said Yes it was relevant. On Group Discussion Method majority 63.0% said It was relevant while 37.0% said No it was not relevant. On Questioning Method majority 65.4% said No it was not relevant while 34.6% said Yes it was relevant.

Majority 41.7% of the students said Group Discussion Method was the best way used in teaching mathematics while 22.2% said Demonstration and Questioning Method respectively. This was also supported by all teachers who were asked whether students are involved in teaching methods.

#### **5.2.4: Teacher training and students' performance in mathematics**

The fourth objective sought to determine the influence of teacher training on students' performance in mathematics in secondary schools in Banadir region, Somalia on Mathematics teachers frequently undertake in-service training majority 54.5% of the principals Disagree while 21.2% Agree. On Trained mathematics teachers are enough in this school 57.6% Disagree while 18.2% Strongly Disagree and Agree respectively. On Trained teachers are able to manage students' needs appropriately majority 57.6% Agree while 39.4% Strongly Agree. On Trained teachers record high mean scores as compared to untrained teachers majority 30.3% of the principals Agree while 27.3% Strongly Disagree. Trained teachers are able to manage students' needs appropriately had a highest mean of 4.36 and a standard deviation of 0.55.

Majority 69.1% of the students said Yes on Teachers don't further their studies after employment while 30.9% said No. On those who don't further their studies record poor performance 54.3% said Yes while 45.7% said No. On The quality of training given to teachers is not good enough majority 53.1% said Yes while 46.9% said No. On Poor performance is only recorded by untrained teachers majority 59.3% said No

while 40.7% said Yes. On Trained teachers are more competent compared to untrained teachers majority 87.7% said Yes while 12.3% said No.

Majority 72.2% of the teachers said that not all mathematics teachers are trained while 27.8% said Yes. Table 4.15 shows teachers response on teachers go for further training to achieve more knowledge and skills. Majority 58.3% of the teachers agreed teachers go for further training to achieve more knowledge and skills while 41.7% said No.

### **5.3 Conclusion**

The researcher concluded mathematics performance in national centralized examinations was influenced by factors namely; teaching and learning facilities, students' attitudes, teaching methods and quality of teacher training. Teaching and learning facilities influences students' performance in mathematics by recording poor performance and this could be accredited to lack of students having enough textbooks, revision books and other teaching aids that affected their mathematics performance in national examinations. The researcher concluded that students' attitude towards mathematics influences their performance in national centralized examinations. Students with negative attitude towards mathematics fail their examination so they should always have a positive attitude to achieve better results. The researcher also concluded that teaching methods influence students performance in mathematics and it was found out that Student participation Method and Group Discussion method were the most favourable in improving performance. The



researcher finally concluded that Teacher training influences student performance and this could be attributed to them attending in-service training and improving their level of competence in terms of teaching mathematics. Trained teachers were also discovered to produce high mean scores

#### **5.4 Recommendations**

Based on the findings the following recommendations were made:

- i. The Ministry of Education should ensure that each school has enough facilities like books and teachers to foster good student performance.
- ii. The Principals in school should encourage and motivate both learners and teachers to improve their attitudes on Mathematics.
- iii. The Ministry of Education should advice the principals and teachers to use teaching methods that are favourable to student to foster good performance.
- iv. The teacher education curriculum should be revised to make it more relevant to equip them with useful and up to date content

#### **5.5 Suggestion for further Research**

The study suggested the following areas to be considered by future researchers;

- i. The influence of Teachers professional development on student performance in secondary schools in Banadir Region, Somali
- ii. The factors influencing discipline on student performance in secondary schools in Banadir Region, Somali
- iii. The influence of insecurity on student performance in secondary schools in Banadir Region, Somali

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**APPENDICES**  
**Appendix I: Letter of introduction**

Said Mohamed Abdirahman

University of Nairobi,

P.O. Box92- 30197,

Nairobi

Ministry of Education,

Banadir Region,

Somalia.

Dear Sir/Madam

**RE: PERMISSION TO CONDUCT RESEARCH WORK**

I am a postgraduate student at the University of Nairobi, Kenya, pursuing a Masters in Curriculum Studies in Education. I plan to conduct a study in Banadir Region, Somalia, on Factors Influencing Student Performance in Mathematics in National Centralized Examinations in Secondary Schools. Therefore during my study time, I request your assistance and cooperation.

Thank you in advance.

Yours Sincerely,

Said Mohamed Abdirahman

## Appendix II: Questionnaire for Principals

This questionnaire intends to gather data on Factors Influencing Students' Performance in Mathematics in National Centralized Examinations in Secondary Schools in Banadir Region, Somalia. Kindly tick (✓) the appropriate response or give responses as indicated.

### SECTION A

#### Background Information

1. What is your gender?

Male  Female

2. How old are you?

Below 30 years

31-40 years

40 -49 years

,

41– 50 years  51 –60 years

3. What is your highest professional qualification?

PhD  Masters  Bachelors  Diploma

Other, specify .....

4. How long have you served as the school principal?

Below 5 years  5-10years  above 10 years

5. Have you ever attended in-service course?

Yes  No



**SECTION B**

**(a) Provision of teaching and learning facilities**

Kindly show the adequacy of provision of the following teaching and learning facilities in your school. The options are; Quite adequate-QA, Adequate-A, Inadequate –Id, Quite Inadequate-QI and Not applicable –NA

| Facilities and Resources |  | QA | A | I | QI | NA |
|--------------------------|--|----|---|---|----|----|
| 1                        | Teachers mathematics reference books and guide books |    |   |   |    |    |
| 2                        | Students’ textbooks                                  |    |   |   |    |    |
| 3                        | Classroom spaces                                     |    |   |   |    |    |
| 4                        | Teaching aids  |    |   |   |    |    |

**(a) Students’ attitudes towards mathematics**

Please indicate your views regarding the following aspects in relation to students’ attitudes towards mathematics. 1 Stands for Not at all, 2 for little extent, 3 for Moderate extent, 4 for large extent and 5 for very large extent.

|   |   | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| 1 | Students' attitudes towards mathematics affect their performance in that subject. |   |   |   |   |   |
| 2 | Most students feel uneasy and see mathematics as a hard subject to perform        |   |   |   |   |   |
| 3 | Students naturally don't like mathematics   |   |   |   |   |   |

**(b)Teaching methods**

By use of a tick, rate the effectiveness of the following teaching methods. 1 stands for Very ineffective, 2 for ineffective, 3 for somehow effective, 4 for effective and 5 for very effective.

|   |                         | 1 | 2 | 3 | 4 | 5 |
|---|-------------------------|---|---|---|---|---|
| 1 | Lecture method          |   |   |   |   |   |
| 2 | Problem solving method  |   |   |   |   |   |
| 3 | Group discussion method |   |   |   |   |   |
| 4 | Questioning             |   |   |   |   |   |
| 5 | Demonstration           |   |   |   |   |   |

**(d) Teacher’s training**

This section intends to gather data on frequency of teachers’ training in your school in relation to mathematics performance. Kindly respond appropriately.

|   |   | Strongly disagree | Disagree | Neutral | Agree | Strongly agree |
|---|---|-------------------|----------|---------|-------|----------------|
| 1 | Mathematics teachers frequently undertake in-service training               |                   |          |         |       |                |
| 2 | Trained mathematics teachers are enough in this school                      |                   |          |         |       |                |
| 3 | Trained teachers are able to manage students’ needs appropriately           |                   |          |         |       |                |
| 4 | Trained teachers record high mean scores as compared to untrained teachers. |                   |          |         |       |                |

What do you think has greatly contributed to poor performance in mathematics in your school in previous years?

.....  
 .....

Please suggest what can be done to improve performance of mathematics in your school

.....

.....

.....

.....

**Thank you.**

### **Appendix III: Questionnaire for Form four students**

This questionnaire intends to collect information from your school on Factors Influencing Students' Performance in Mathematics in National Centralized Examinations in Secondary Schools in Banadir Region, Somalia. Kindly provide honest responses as requested.

#### **SECTION A**

##### **Background Information**

1. State your gender?  
Male   
Female
  
2. What is your age?  
Below 20years ,  
Above 20 years
  
3. Is Mathematics taught in your school?  
Yes   
No

## SECTION B

### (a) Provision of teaching and learning facilities

In the table below, tick the appropriate response as provided in the spaces.

|   |   | Strongly<br>disagree | Disagree | Neutral | Agree | Strongly<br>agree |
|---|---|----------------------|----------|---------|-------|-------------------|
| 1 | There are enough mathematics reference and guide books for teachers |                      |          |         |       |                   |
| 2 | All students have text books and calculators                        |                      |          |         |       |                   |
| 3 | There's chalk boards in every class                                 |                      |          |         |       |                   |
| 4 | Classrooms are spacious enough to accommodate students well         |                      |          |         |       |                   |

**(b) Students' attitudes towards mathematics**

In the table below, please indicate your views by ticking the appropriate answer in relation to how students' attitudes towards mathematics affect performance.

|   |  | Not at<br>all | Little<br>extent | Moderate | Large<br>extent | Very<br>large<br>extent |
|---|--|---------------|------------------|----------|-----------------|-------------------------|
| 1 | Students with negative attitudes towards mathematics fail                    |               |                  |          |                 |                         |
| 2 | Those who feel uneasy with mathematics perform poorly                        |               |                  |          |                 |                         |
| 3 | Positive attitudes towards mathematics by students leads to good performance |               |                  |          |                 |                         |
| 4 | Students naturally hate mathematics and perform poorly                       |               |                  |          |                 |                         |

**(c) Teaching methods**

Kindly tick all the methods of teaching which seem to be relevant to you.

|   | <b>Teaching methods</b>      |  |
|---|------------------------------|--|
| 1 | Lecture method               |  |
| 2 | Student participation method |  |
| 3 | Demonstration                |  |
| 4 | Group discussion method      |  |
| 5 | Questioning                  |  |

**(d) Teachers' training**

According to you, what are your opinions towards teachers' training and performance of mathematics in your school?

|   |   | Yes | No |
|---|---|-----|----|
| 1 | Teachers don't further their studies after employment               |     |    |
| 2 | Those who don't further their studies record poor performance       |     |    |
| 3 | The quality of training given to teachers is not good enough        |     |    |
| 4 | Poor performance is only recorded by untrained teachers.            |     |    |
| 5 | Trained teachers are more competent compared to untrained teachers. |     |    |



What can you attribute to poor mathematics performance in your school?

.....  
.....  
.....  
.....  
.....

What do you think can be done to improve performance of mathematics in your?

.....  
.....  
.....  
.....  
.....

**Thank you**

#### **Appendix IV: Interview guide for Form four mathematics teachers**

1. Do students have enough mathematics text books, calculators, revision books and other teaching aids in your schools?
2. According to your opinion, is the classroom space big enough to accommodate all students in your school?
3. Do teachers have enough mathematics guide books?
4. How do students feel towards mathematics subjects? Do they see it as a difficult subject to understand or how are their feelings?
5. Are students involved in teaching and learning process? For instance, through discussions, demonstrations, questions and answers?
6. Which better ways do you think should be used in teaching mathematics to make students perform well?
7. Are all mathematics teachers in your school trained as teachers?
8. Do teachers go for further training to acquire more knowledge and skills in your school?
9. What can be done to make mathematics teachers enhance good performance among students?

**Thank you**

## Appendix V: Observation Checklist

The category of the school

Public----- Private -----

A stands for available, NA for not available, AD for adequate, NAD for not adequate, AP for appropriate and NAP for not appropriate.

---

| <b>Teaching and Learning facilities</b> | <b>A</b> | <b>NA</b> | <b>AD</b> | <b>NAD</b> | <b>AP</b> |
|---|----------|-----------|-----------|------------|-----------|
|---|----------|-----------|-----------|------------|-----------|

**NAP**

---

Classroom spaces

Adequacy of Furniture

Sitting Arrangement

Class size

Lighting

Classroom Ventilation

Library ventilation

Text books

Chalk boards

---

## Appendix VI: Authorization Letters

JAMHUURIYADDA FEDERALKA SOOMAALIYA  
Wasaaradda Waxbarashada, Hiddaha  
iyo Tacliinta Sare



جمهورية الصومال الفيدرالية  
وزارة التربية والثقافة والتعليم العالي  
مكتب المدير العام

Xafiiska Agaasimaha Guud Somali Federal Republic  
Ministry Of Education, Culture & Higher Education  
Office of the Director General

Ref: WWHTS/1447/10/2020

Date: 19/10/2020

To whom it may concern,

Subject: permission letter of research

Dear **Said Mohamed Abdirahman**

Following your application dated Saturday 17<sup>th</sup> October 2020. Regarding the authority to carry research on: *FACTORS INFLUENCING STUDENTS' PERFORMANCE IN MATHEMATICS IN NATIONAL CENTRALIZED EXAMINATIONS IN SECONDARY SCHOOLS IN BANADIR REGION. SOMALIA.*

The Ministry of Education Culture and Higher Education is very pleased to inform that you are fully authorized to carry out research in the location of Banadir region, from the date signed this later you can go ahead to carry out all your topic research activation on ethical manner in the area mentioned above.

Your advised to report the above mentioned direction communication and direct education officers before you start the work after you have done it. We really appreciate the good work that you have done during the course work.

Yours sincerely

Ahmed Hassan Yusuf  
Director General

E-mail: [dg@moe.gov.so](mailto:dg@moe.gov.so) / Website: [www.moe.gov.so](http://www.moe.gov.so)



UNIVERSITY OF NAIROBI  
COLLEGE OF EDUCATION AND EXTERNAL STUDIES  
SCHOOL OF EDUCATION  
DEPARTMENT OF EDUCATIONAL ADMINISTRATION AND PLANNING

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Telephone: 020-2701902  
dept-edadmin@uonbi.ac.ke

P.O. BOX 30197  
OR P.O. BOX 92 -00902  
KIKUYU

September 24, 2020

OUR REF: UON/CEES/SOE/A&P/1/4


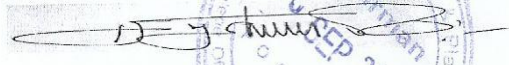
TO WHOM IT MAY CONCERN

Dear Sir/Madam,

RE: SAID MOHAMED ABDIRAHMAN – REG NO. E55/12253/2018

This is to confirm that **Said Mohamed Abdirahman** is a Master of Education student in the department of Educational Administration and Planning of the University of Nairobi. He is currently working on his research proposal entitled "**Factors Influencing Students' Performance in Mathematics in National Centralized Examinations in Secondary Schools in Banadir Region Somalia**". His area of specialization is Curriculum Studies.

Any assistance accorded to him will be highly appreciated



PROF. JEREMIAH M. KALAI  
CHAIRMAN  
DEPARTMENT OF EDUCATIONAL ADMINISTRATION AND PLANNING