SCHOOL BASED FACTORS INFLUENCING IMPLEMENTATION OF SECONDARY SCHOOL MATHEMATICS CURRICULUM IN LONDIANI DISTRICT, KENYA

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A Research Project submitted in partial fulfillment for the Degree of Master of Education in Curriculum Studies, University of Nairobi

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DECALARATION

This research project is my original work and has not been presented for a degree in any other university.

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This research project has been submitted with our approval as university supervisors.

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DEDICATION

This work is dedicated to my wife Agnes, my beloved children and the entire family.

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Lastly, my sincere and heartfelt gratitude goes to my family who encouraged me to work hard for the completion of the project. May Almighty God Bless you all abundantly.

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ABBREVIATION AND ACRONYMS

E F A	Education for all
GER	Gross Enrolment Rates
G O K	Government of Kenya
HOD	Head of Department
K.C.P.E	Kenya Certificate of Primary Education
K.C.S.E	Kenya Certificate of Secondary Education
KNEC	Kenya National Examination Council
M O E	Ministry of Education
SPSS	Statistical Package for Social Science
PIZA	Programme for International Students Assessment
SACMEQ	Southern and Eastern African Consortium for monitoring Education Quality
T.S.C	Teacher Service Commission
UNESCO	United Nations Education Scientific and Cultural Organization
U.S.A	United State of America
WEF	World Education Forum

ABSTRACT

This study investigated the school based factors influencing implementation of secondary school mathematics in Londiani district, Kericho County. This study was guided by four objectives; to determine the extent to which teaching methods influence the implementation of secondary schools Mathematics curriculum, analyze the extent which availability of textbooks influence the implementation of secondary school curriculum, to determine the extent to which teacher motivation influence the implementation of secondary school mathematics curriculum and to establish the extent to which mathematics language influences the implementation of secondary school mathematics curriculum. The Descriptive survey research design was used and data collected using questionnaires and an interview guide. The population consisted of 22 public secondary schools. The sample used in this study comprised of 22 principals, 314 students and 60 mathematics teachers making a total of 396 respondents. Data analysis was based on research questions and responses in questionnaires were tabulated, coded and processed and analyzed using Microsoft Excel program and presented in tables, graphs and pie-charts. The responses in open-ended items and interview were reported by descriptive narrative. The findings indicated that all schools principals had administrative training to carryout their administrative roles effectively.

The student: textbook ratio was found to vary between 2:1 up to 5:1 with an average of 3 students per book. In addition, large class size was found to influence mathematics curriculum implementation where the average teacher: student ratio for Londiani was found to be one mathematic teacher to 93 students. This indicated the schools suffered from shortage of mathematics teachers. There was also a wide variation in the head teacher perceptions regarding the meaning of mathematics curriculum implementation but majority of them thought the mathematics syllabus was being taught in their school at the right depth and width including the quality of coverage. Most schools also had effective or sufficient instructional supervision both from the principals and district school inspectors. School based actors such as teaching methods, resources; low teacher and student motivation, technical language used in mathematics were found to be key in explaining the unsatisfactory of the mathematics curriculum.

Teachers methodology dealing with mathematics curriculum implementation, availability of text books in relation to curriculum implementation teachers and learners motivation and technical language used in mathematics were found to negatively influence mathematics curriculum implementation in Londiani District. In view of this findings, the researcher recommended the introduction of students' friendly methods of instruction such as group discussion, mastery learning, experimental method, project method and mathematical games should be highly encouraged. There should be special mathematic days where all mathematics teachers and learners participate for collaboration purposes.

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

UNESCO (2000b) indicates that the World Education Forum (WEF) in Dakar-Senegal in 2000 adopted as one of the six goals to promote Education for All (EFA), improving all aspects of the quality of education and ensuring excellence of all so that recognized and measurable learning outcomes were achieved by all, especially in numeracy. UNESCO (2009) argued that science; technology and mathematics education (STME) is a global challenge that needs urgent local solutions. UNESCO (2007) noted that international, regional and national assessments conducted since 1999 show that learning outcomes in mathematics still characterize many countries worldwide.

UNESCO (2006) indicated that under achievement in mathematics is a concern not only in developing countries but also in central and Eastern Europe. Furthermore, the programme for international student Assessment (PISA) concurs with these results and showed that much remain to be done to improve mathematics achievement in middle-income countries such as Czech republic, Slovakia, Poland, Hungary and Latria.

In Europe and United States, higher education began with training in religion and philosophy, the component skills and pieces of number of knowledge that children must have if they are to succeed in formal mathematics. Many of the

components can be acquired before first grade. It's possible to explicitly teach the skills to children in their pre-school careers so that thy can benefit from mathematics instructions (Bruer, 1997). In U.S.A (1995) the results in performance shows that the fourth grade students performed above the international average in mathematics.

World Bank (1999) asserted that quality education requires efficient systems that would provide supportive learning environment, motivated staff with mastery of content, adequate access to resources, students who are health and ready to learn. It is only a combination of quality inputs and quality process that can produce quality outcomes.

UNESCO (1994) pointed out that general economic decline and widespread financial debt burden in most Africa countries has eroded the gains made to promote quality education. As a result, the condition of the school physical facilities instructional materials has had prominent influence on the quality of education and the achievement of students in African schools. In addition, a review of studies in Africa revealed that poor implementation of mathematics curriculum was due to the lack of well-trained and motivated teachers, inadequate supply of relevant equipments, negative attitude and lack of development of a mathematics culture (UNESCO 2009).

Wanjohi (2006) noted that mathematics is one of the core and compulsory subjects for all secondary school students in Kenyan's 8.4.4 system of

education. In addition, the compulsory nature and the proportion of time allocated to mathematics emphasize the major importance given to mathematics. The scenario does not differ significantly from practice in Britain and other African counties. The Southern and Eastern Africa Consortium for Monitoring Education Quality (SACMEQ) second survey on mathematics learning outcomes (2000-2002), showed that only slightly more than one third of Kenyan students who participated in the numeracy survey, reached one of the highest four levels of SACMEQ numeracy scale (UNESCO 2006).

The National Development Plans indicated that low Gross Enrolment Rates (GER) in Kenya's secondary schools is attributed to an overloaded curriculum that includes the mathematics curriculum. The government of Kenya (GOK) has therefore proposed enhancing the teaching of the mathematics as one strategy to achieve improved access equity , relevance and management in secondary education (Republic of Kenya, 2002 – 2008).

Eshiwani (1993) suggested that the unsatisfactory students performance in mathematics in Kenya is due to poor staffing situation in mathematics , unsatisfactory teaching methods in mathematics made worse by the shortage of text books, teaching materials and large classes found in many schools. The 2004 Kenya National Examination Council (KNEC) report emphasized that for many years, performance in mathematics has been declining. Hence, there is need for an immediate intervention.

The 2007 KNEC report added that many candidates still score zero in KCSE mathematics papers yet some of the questions are set from concepts drawn from primary school level. However with the replacement of the 7-4-2-3 system of education with the 8-4-4 curriculum, some mathematics content intended for the advanced or even the university level have been brought down to lower level, This indicates that some topics in secondary school mathematics were difficult for the level of learners . Maina (2002) emphasize that topics in secondary school mathematics are too abstract for teachers to give vivid examples. Robbers (1992) noted that some context areas in mathematics such as geometry, measurement, probability , statistics, algebra, patterns, relations and functions are seriously underrepresented in current mathematics curriculum.

Abagi, Wasuma, Sifuna, Ngome, Aduda and Karagu (2000) indicated that there is unhealthy competition in Kenya's education system because it over emphasized teaching for examinations rather than teaching for understanding. Additionally, there is a mismatch between the curriculum context and the time allocated to cover it.

In Kenya, mathematics has been recognized as one of the subjects which are vital in people's life, may it be in science, technology, business or in other walks of life. The major objectives of teaching mathematics at secondary school level in Kenya is to produce persons who will be numerate, orderly, logical, accurate and precise in thoughts. It emphasizes the mastery of specific

concepts and skills by secondary students. These contexts attributes are tested by the Kenya National Examination Council (KNEC) after four years (K.I.E 2002).

According to Benson (2011) poor performance in mathematics is caused by the following factors; teacher not using students-centred approaches, lack of experiments, conversion of units, milliliters to litres and practical modeling activities, and lack of professional exposures that could have articulated to the teaching of mathematics. In secondary schools, negative attitudes by the students, missing link between primary and secondary, lack of application of teaching including computer use, lack of parental support and lack of motivation by both teachers and students. Eshiwani (2001) points out that poor performance in mathematics in Kenya is due to poor teaching methods and acute shortage of text books.

Curriculum implementation is a key to school success in terms of its mission, goal and objectives. It is therefore imperative that Head of Institutions put in place mechanisms to ensure that syllabus is covered in their schools. However in Kenya secondary schools, there have been several factors that influence implementation of mathematics curriculum.

The sessional paper No.1 of Government of Kenya (2005) notes that secondary education has been characterized by poor performance in nation examinations, high pupil-book ratio in mathematics, a shortage of

mathematics teachers, over burdened curriculum, and teachers promotion based on qualification rather than performance.

Mathematics is inevitably utilized in many life activities and specialized activities, yet its still among the most poorly performed subjects at K.C.S.E level. In an attempt to improve performance, some parents arrange and pay for extra tuition for their children so that they may cover all topics within the curriculum, these topics include; Arithmetic, algebra, Geometry, Statistics, Navigation among others. Concepts in these topics are tested at K.C.S.E. Examinations.

Londiani was the second last position in mathematics performance out of the five districts in the County indicating a deficiency with mathematics curriculum implementation in the County.

Table 1.1 Kericho County KCSE performances per district (2012)

County	**Bureti**	**Kericho**	**Londiani**	**Kipkelion**	**Belgut**
M. Score	7.98	7.32	**6.17**	6.23	5.12

The county results for the year 2012, Londiani is part of Kericho County and these are the results for the five districts.

Table 1.2 KCSE County results for the year 2012

COUNTY/ 2012	AGR	CRE	B/S	HIST	BIO	CHEM	MATH	GEOG	ENG	KISW	WOOD/ WORK	PHY
Bureti	9.39	9.14	9.10	9.12	8.30	8.16	**7.92**	7.09	7.56	7.26	7.16	7.00
Kericho	7.90	8.74	8.24	6.51	6.62	7.16	**6.94**	7.25	7.13	7.36	7.24	7.47
Londiani	9.37	9.12	9.11	8.90	8.33	8.00	**6.17**	7.88	7.66	7.20	7.06	7.01
Kipkelion	8.21	8.78	6.92	6.08	5.21	5.46	**5.43**	5.46	6.59	7.05	6.47	4.82
Belgut	8.86	7.31	7.71	7.72	6.49	6.51	**6.14**	7.14	7.15	6.15	7.14	6.24

(Source County Education office (2013))

Mathematics in Londiani district has registered poor performances for many years and this calls for an immediate action. This indicates deficiency with mathematics curriculum implementation in the district.

Table 1.3 Londiani District performance in KCSE

SUBJECT /YEAR	AGR	CRE	B/S	HIST	BIO	CHEM	MATH	GEOG	ENG	KISW	WOOD/ WORK	PHY
2012	9.37	9.12	9.11	8.90	8.33	8.00	**6.17**	7.89	7.66	7.26	7.06	7.01
2011	8.68	8.50	8.91	7.63	6.73	5.39	**5.13**	7.92	6.69	6.84	7.80	6.33
2010	8.12	8.52	8.30	7.71	6.34	5.90	**5.27**	6.78	6.91	6.82	7.00	6.12

The source District Education office, Londiani district (2013)

1.2 Statement of the problem

In Londiani, performance in mathematics has been low compared to other subjects. Table 1.3 shows the distribution of performance in various subjects. Mathematics is one of the core subjects at the secondary level of education and a requirement in calculating the overall mean score for learners. Poor

performance in mathematics undermines learners' chances of joining certain courses at the high levels of learning and jeopardizes opportunity for job placement. Considering that school plays a major role in influencing the curriculum implementation process, there is need to examine school related factors that influence implementation of mathematics curriculum.

Eshiwani (2001) points out that poor performances in K.C.S.E in Kenya is due to acute shortage of textbooks or learning resources. Furthermore, dismal achievement in secondary mathematics has also been caused by teachers and learners commitment and motivation as cited by Tswani (2009). Various government and non-governmental organization efforts such as in servicing of teachers and provisional of resources to improve mathematics achievements did not seem to be bearing fruits. There still seem to be some deficiencies with mathematics curriculum implementation. It is in view of this that the researchers set to investigate the school based factors influencing implementation of secondary school mathematics curriculum in Londiani districts, Kericho County.

1.3 Purpose of the study

The purpose of the study was to investigate school based factors influencing implementation of secondary school mathematics curriculum in Londiani.

1.4 Research Objectives.

The study was guided by the following objectives:

a) To determine the extent to which teaching methods influence the implementation of secondary school mathematics curriculum.
b) Analyze the extent to which availability textbooks influence the implementation of secondary school mathematics curriculum.
c) To determine the extent to which teacher motivation influences the implementation of secondary school mathematics curriculum.
d) To establish the extent to which mathematics language influences the implementation of secondary school mathematics curriculum.

1.5 Research questions

In order to achieve the objectives of the study, the following questions were addressed;

a) To what extent do the teaching methods influence the implementation of secondary school mathematics curriculum?
b) To what extent do availability of textbooks influence the implementation of secondary school mathematics curriculum?
c) To what levels does teacher motivation influence the implementation of secondary school mathematics curriculum?
d) To establish the extent to which mathematics language influences the implementation of secondary school mathematics curriculum?

1.6 Significance of the study

The findings of the study, conclusion and recommendation may help MOE to find ways of intervening the factors influencing curriculum implementation in secondary schools.

The secondary school principals' in manning and managing the curriculum implementation at school in order to improve the performance. The mathematics HODS in making sure that mathematics curriculum is implemented at the right time to facilitate room for revision of areas that are deemed difficult by learners. This will improve the mean score of the school and eventually the mean score of the whole district.

The Kenya institute of curriculum development officers may get to know factors that influence implementation of mathematics curriculum and take measures to improve on the implementation by proving additional textbooks.

1.7 Limitation of the study

There is limited research done on school based factors influencing implementation of secondary school mathematics curriculum, Londiani being a new district has several challenges that relates to category of secondary schools. This means that the study cannot be generalized to all other districts in Kenya.

1.8 Delimitation of the study

Since secondary schools in Londiani District have similar characteristics the study was delimited to public secondary schools' Headteachers, Mathematics teachers and students in Londiani district the variables to captured are; methods of teaching, availability of textbooks, motivation and language.

1.9 Basic Assumption of the study

The respondents selected to participate in the study cooperated and gave honest and truthful responses to answer the research questions. Respondents were assumed to understand school based factors influencing implementation of secondary school mathematics curriculum.

1.10 Definition of Significant Terms.

Challenges Refers to a problem or difficulties encountered in the process of implementing mathematics syllabus which could negatively impact on quality of education.

Entry behavior An act of going into or getting into a learning institution, entry qualification or grades.

Head teacher Refers to the administrator of a school appointed by the Teachers Service Commission in accordance with Education Act Cap 211.

Mathematic curriculum implementation Refers to the process of teaching and learning of mathematics content

Mathematics language	refers to words which have different meaning when used in common day English language as compared to when they are used in mathematics
Performance	Refers to student's achievement in mathematics as indicated by his/her scores in an important school or national examination.
Resources	Something that can be used to help achieve an aim, especially a book, equipment e.t.c that provider information for teachers and students
School based factors	Refers to issues within the school that affects learning process either positively or negatively

1.11 Organization of the Study

The study is organized into five chapters. Chapter one introduced the study by giving background to the research problem, objectives and research questions, its significance, limitations, basic assumptions and definition of operational terms. Chapter two include literature review highlighting factors such as the meanings, rationale and outline school based factors influencing curriculum implementation in secondary school mathematics, these were the teaching methods, textbooks, parental support, motivation and language. It also provided a theoretical and conceptual framework of the study. Chapter three explains the research design, target population, sample size and sampling techniques, research instruments, instrument validity and reliability, data collection, procedures and data analysis techniques.

Chapter four consist of data analysis, interpretation and discussion of findings, Chapter five summary, conclusion and recommendation.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section began by reviewing school based factors. It examined implementation of secondary school curriculum with special reference meaning local and global perspective, policy guidelines and school base factors influencing implementation. These were; teaching methods, parental support, textbooks, language and motivation. It also provided a theoretical and conceptual framework for the study.

2.2 Methods of teaching and implementation of secondary school mathematics curriculum.

Mathematics has been recognized as one of the subject which is vital in peoples' life, may it be in science, technology, business or in other works of life. Limited background preparation by teachers in the teaching of mathematics, lack of mathematics teaching equipment and materials has been cited as factors contributing to poor performance in mathematics. Mathematics uses internationally accepted symbols systems that condensed meaning and is understood by many countries (Gathua, 2001). However, over the years, performance in mathematics has continued to show a downward spiral. Various researchers have identified factors that are attributed to poor performance (Miheso, 2012, Manoal 2011, Benson, 2011) this include; teachers not using student-centred approaches, lack of experiments and practical modeling activities and lack of professional exposures that could

have articulated the teaching of mathematics in secondary schools, lack of application of technology (Eshiwani, 2001).

Recent studies carried out to determine the relationship between teacher experience and students' performance in mathematics found that teachers experience and competence were the prime predictors of students' performance in all subjects in secondary schools.

Jones (1997) observed that teachers are key inputs and a force to reckon with in school. Sweeney (1998) made similar observation about schools in Mississippi, U S A that learners scored better in mathematics when taught by teachers with more years of teaching considering the common saying that experience is the best teacher.

In Singapore, the problems of teaching mathematics needed qualified teachers who are equipped with necessary skills and knowledge in presentation of mathematics concepts. Many students fail examination due to poor methods of teaching. Teachers who do not assess students' acquisition of knowledge in a course may not be able to judge the effectiveness of the approaches in teaching. Assessment of students' performance will therefore assist the teacher to modify the teaching strategy where necessary.

2.3 Text-books and implementation of secondary school mathematics curriculum.

Textbooks are vital in all learning institutions as they act as guides to what is to be learnt at all levels of learning. Eshwani (2001) points out that poor performance in Kenya is due to acute shortage of textbook or learning resources. The fact that many students would share one textbook in some schools makes it impossible for them to complete their homework.

As such follow up teaching is not built on the students' homework experience. This will inevitably delay the pace at which the curriculum will be covered leading to poor performance.

In South Africa many schools did not offer mathematics and those that offer did not have adequate facilities for effective teaching and learning. Pupils' text-books ratio has been high especially in rural and urban slums where students do not perform to expectations. A survey conducted by education insight (2005) in Kenya revealed that inadequate learning facilities are a common feature in many schools.

The principals of leading schools in Kenya noted that students fail in mathematics because they do not cover their syllabus and therefore unprepared for examination (Education Insight, 2005).

Boarding schools cover the syllabus in time and are exposed to more remedial exercise because they are ever in school as compared to day schools which are

characterized by absenteeism of both teachers and students which lead to non-completion of the syllabus in a given year. Schools with adequate facilities perform better in National Examination especially in core subject such as mathematics. Parents react differently to involvement in school management and this call for consideration in community environment, in the recent past, among community participation in education have been a desire to spread the burden of sourcing, improving the volume, relevance and impact of schooling. (Bray 2003).

Bray asserts that community participate in education by supplementing government efforts to provide school resource in public education system by buying books to cater for the shortages and will help teachers and students to implement mathematics curriculum at the right time and this will eventually improve the performance. Most of the parents fail to meet their obligations as parents and leave all the responsibilities to school. The parents should pay fees at the right to avoid students being send back home for the same and should also buy books for them and any other requirements.

2.4 Motivation and implementation of secondary school mathematics curriculum.

Motivation is the psychological process that arouses, directs and maintains behaviour towards a goal. Motivation is important in a learning situation because it determines how well the student / pupils learn. Motivation also determines the amount of effort students/pupils put in their learning.

Tswani (2009) notes that learners' and teachers' commitment and motivation, learners' career prospects, peers as well as teachers' perception affect persistence for achievement in mathematics overall, application of sound teaching and learning principles foster an environment where learners are motivated to achieve their full potential. Better understanding and perhaps improve the motivational approaches that you apply to school work and other achievements domains, relationships and so forth.

In South Africa, few students take mathematics and those who do so do not perform well because they are not motivated which ultimately may lead to mass failure. Yeya (2002) had similar views that many teachers, students' and parents have negative attitude towards the teaching and learning of mathematics.

Chiriswa (2003) agreed with the above view and recommended that mathematics teachers and students be given incentives to raise their morale for better grades in mathematics. Good performance by students on test and examination has proved by educators to be a motivation to them. Failure to do well in an examination may also create a sense of frustration to students.
They will work hard to improve performance in future examinations. It has been suggested that teachers' feedback will assist students to work hard.

2.5 Mathematics language and implementation of secondary school mathematics curriculum.

The issue of the technical language used in teaching mathematics has been cited as contributing to poor performance in the subject.

Wasike observes that poor performance is due to the difficult language used in the mathematics classrooms. He says there are words which have different meaning when used in common day English language compared to when they are used in mathematics. To improve performance, students need to understand the mathematical language in a simplified form. Negative attitude of students, teachers and parents also contribute to poor performance Githua, (2001) and Dzama (2006).

2.6 Summary of the literature review

This section has reviewed relevant literature on curriculum implementation of mathematics curriculum in particular with special reference to meaning, rationale and application both locally and internationally. It has also evaluated school based factors on mathematics curriculum implementation. Most of the empirical literature on implementation of mathematics curriculum in Kenya is however based on the ministry's policy with limited focus on the education sector. None so far has focused on Londiani district. It is against the backdrop of the above research gap that this study of the school based factors influencing implementation of secondary school mathematics curriculum, in Londiani district the researcher seeks to study.

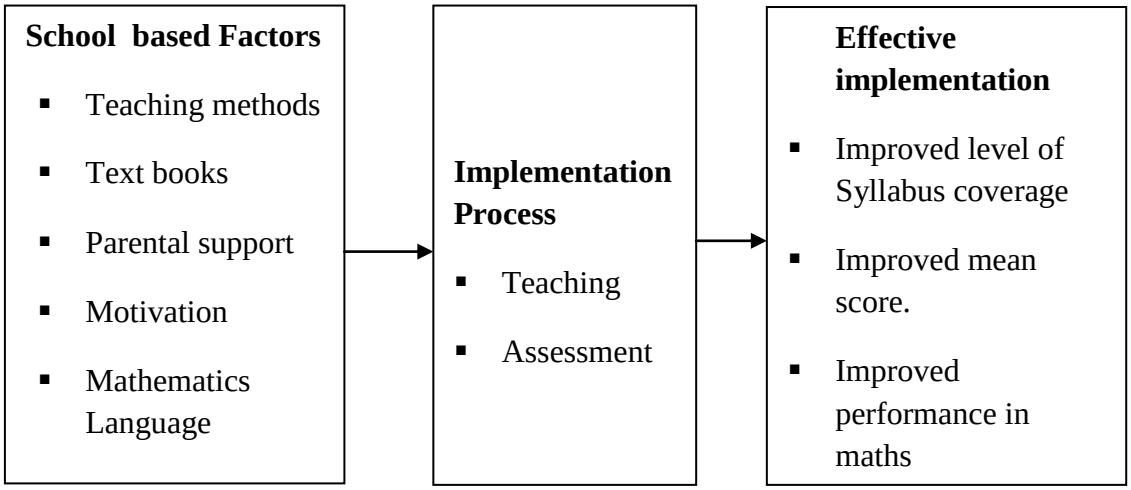
2.7 Theoretical framework

The study was guided by constructivists' theory. The proponent of the theory is Lerman. The proponent on the constructivism theory of learning uphold that knowledge is actively constructed by organizing subjects not passively received from the environment (Lerman 1987). They hold the theory that knowledge is constructed by the learner rather than transmitted by teachers. They view learners' activities as paramount in the learning process that begins with relevant experiences. Teaching under constructivists environments consider the learners to be engaged in a model construction process where prior knowledge is activated, combined, criticized and modified by learners in order to form new knowledge structure (Clement, 1991).

The theory is appropriate for the study in the sense that it addresses learning process in mathematics which is part of implementation of mathematics curriculum

2.8 Conceptual framework

Fig 2.1



CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This section provided the description of the process and method used in carrying out the research study. The section was organized along the following sub-headings namely: research design, target population, sample size and sampling technique, research instruments, instrument validity, instrument reliability, data collection procedure and data analysis techniques.

3.2 Research design

The research design adopted in this study was descriptive survey. According to Cohen and Manion (1994), this design determines and reports things the way they are, and commonly involves assessing attitudes, opinions and procedures. The study was mainly concerned with collecting data on views of the respondents on their experiences in school based factors influencing curriculum implementation, survey method was deemed suitable in achieving the objectives of the study.

3.3 Target population

Target population was defined as that population to which a researcher wanted to generalize the results of the study (Mugenda & Mugenda, 2003). According to the Ministry of Education (2010) there were 22 secondary schools in Londiani district. The study therefore targeted 22 principals, 60 mathematics teachers and 3142 students.

3.4 Sample size and sampling techniques.

According to Mugenda & Mugenda (2010), a sample size of 10% -30% of the target population is sufficient to form a study; therefore, the researcher worked out 10%(314) of the student's population while all the principals(22) and teachers(60) participated in the study given their small number. Sampling is a research procedure that is used for selecting a given number of subjects from the target population, as a representative of that population. Stratified sampling was used to take care of gender and then simple random sampling was used to select the respondents.

3.5 Research instruments.

The researcher used questionnaires and interview guide to collect data. According to Mugenda & Mugenda, (2010) a questionnaire is commonly used to obtain information about the population, with each item in the questionnaire addressing a specific objective. The questionnaire contained both structured and open ended questions that allowed more information to be solicited from respondents. The open ended questions related to experience of the respondents in the school based factors influencing implementation of secondary school mathematics curriculum, while the structured questions sought information such as demographic information and training background as well as their experiences in school factors influencing implementation of secondary school mathematics curriculum. The questionnaire was subjected to validity and reliability tests.

For this study, these set of questionnaires were used one set was administered to teachers and students. The interview guide targeted the principals. The researcher used the interview guide to get specific information from the respondents which were compared and contrasted with information gained from other interviews.

3.6 Instruments validity

Validity refers to the extent to which an instrument measures what it purports to measure. The questionnaire context validity was ascertained through an approval by the senior academic staff of the university of Nairobi Department of Education Administration and planning. A pilot study was also carried out involving staff who did not participate in the main study so that the areas of the questionnaire such as a language clarity, checking the time the questionnaire can be filled and the adequacy of the provided space was also be done.

3.7 Instrument reliability.

Reliability is a measure of degree to which a research instrument yields consistent results after a repeat trials (Mugenda & Mugenda, 2003) usually expressed as correlation co-efficiently. Reliability coefficient varies between -1.00 and +1.00 with reliability of 1.00 indicating perfect reliability (never attained in practice) and 00 indicating no reliability, -1.00 to 0 show negative reliability (Orodho, 2005). The coefficient indicates the extent to which a test is free from error of variance. The closer the reliability coefficient of a test is

the value of 1.00, the more the test is free from error of variance and is a measure of the differences among proportions in the dimension assessed by the test (Borg and Gall, 1989).

To establish the reliability of the instrument, a test-retest was done. The same test was administered at an interval of two weeks to the same group of respondents. Scores were correlated using the Pearson product moment Formula as follows;

$$r = \frac{\sum (x - \bar{x})(n - \bar{y})}{N\delta_x \delta_y} \quad \text{.....eqn 1}$$

Where X is the score of the respondent first test

Y is the score of the respondent re-test

$\bar{x}$ is the mean of X distribution

$\bar{y}$ is the mean of Y distribution

δ_x is the standard deviation of x scores.

δ_y is the standard deviation of y scores.

N is the number of scores within each distribution

$\sum$ is the summation sign

$$S_x = \frac{\sqrt{\sum (X - \bar{X})^2}}{N} = \frac{4486}{5} = 897.2$$

$$S_Y = \frac{\sqrt{\sum (y - \bar{y})^2}}{N} = \frac{1014.6}{5} = 202.9$$

$$r = \frac{\sum \left(x - \bar{x}\right)^2 \left(y - \bar{y}\right)^2}{N s_x s_y} = \frac{837473}{5(897.2)(202.9)}$$

$$r = \frac{837473}{910209.4}$$

$$r = \underline{\underline{0.92}}$$

Reliability = 0.92

According to Mugenda & Mugenda a coefficient value of 0.8 is acceptable. The researcher therefore accepted reliability of 0.8 and above.

3.8 Data collection procedures.

A permit was obtained from the National Council of Science and Technology. Copies of the permit were presented to District Commissioner and District Education Officer Londiani District who further issued authority to visit schools under their areas of jurisdiction. The research contacted the 22 principals through a letter and thereafter made arrangement for actual school visit. A copy of the letter was included in the appendix I. A self administered questionnaire was hand delivered to the respondents. The researcher ensured

all respondents of confidentiality by indicating in the questionnaire that they should not write their name or the name of their schools. Arrangements were made with concerned administrator on when to collect the completed questionnaire.

3.9 Data analysis techniques.

After data was collected, the researcher checked the instruments for completeness and clarity. Data was analyzed both quantitatively and qualitatively according to the study objectives.

Quantitative analysis was applied for closed ended question that provided respondents with alternative response from which to choose.

Descriptive statistics was used to summarize quantitative data. Analysis involved editing the questionnaire tabulating and coding the responses. Data was processed using the Statistical Package for Social Science (SPSS) computer software version 17.0. Frequency distribution, percentage, means scores and standard deviations was computed and entered into a table.

Qualitative analysis was used for open ended questions from questionnaires that require respondents to give their own opinions .Qualitative data was processed by first categorizing and discussing responses for each item according to themes (thematic analysis), before editing, coding and reporting through descriptive narrative of the views, experience and opinions of the respondents. Descriptive statistics namely frequency distributions and percentages was used to analyze the coded responses.

CHAPTER FOUR

DATA ANALYSIS, INTERPRETATION AND DISCUSSIONS.

4.1 Introduction

This chapter deals with data analysis and interpretation of findings from the study. It analyses the instruments return rates, the demographic information of respondents, school based factor influencing the implementation of mathematics curriculum in public secondary schools in Londiani District, Kericho County. Challenges experienced by schools when implementing mathematics curriculum, intervention measure to be put in place to have proper implementation of mathematics curriculum and suggestions that can be put in place to realize increased mathematics outcomes in secondary schools.

The finding of the study has been presented using table and graphs.

4.2 Instruments Return Rates

The target population for this study comprises of 22 public schools in Londiani district, Kericho County with a student enrolment of 3142, 60 mathematics teachers and 22 principals. The sampled used in this study constituted 22 principal, 56 mathematics teachers and 314 students making a total of 396 respondents. The increase in number of mathematics teachers was because of new mathematics students who were on teaching practice.

Upon embarking on the data collection exercise, the sampled school principals were interviewed and questionnaires were distributed to sampled students and mathematics teachers who later returned the duly completed questionnaires.

The instruments return rates is as shown in the table 4.2

Table 4.1 Instrument Return rates

Respondents	**Sample**	**Returned instruments**	**Return rate (%)**
Principals	22	22	100.0%
Mathematics teachers	60	54	90.0%
Students	314	300	95.54%
Total	**396**	**376**	**94.95%**

According to the information in the table 4.1, the research interviewed all the principals that represent a total of 100.0% success rate. There were 54 questionnaires for mathematics teachers and 300 students' questionnaires received back which represents a total of 90.0% and 95.54% return rate respectively.

The overall instrument return rate was 95.0%, which the researcher deemed a satisfactory representation of the target population.

4.3 Data analysis.

Data Analysis involved highlighting some major aspects of the target population of the study. This included examining the demographic information of the respondents. Data was reported according to the questions on research

instruments. The demographic aspects of concern included: respondents gender, age, major, minor and other teaching subjects, teaching experience, educational level and class size.

4.3.1: Demographic Data Analysis.

The gender of the respondent was considered to ensure conclusive information was obtained bearing in mind that some issues could vary from males to females. Khaduli (2005) found out that sex stereotyping negatively affected girls achievements in mathematics.

Table 4.2: Respondent's Gender.

Respondent	**Male**	**%**	**Female**	**%**	**Total %**
Principals	17	77.3	5	22.7	100.0
Maths teachers	34	64.3	20	35.7	100.00
Students	160	53.3	140	46.7	100.0
Total	**213**	**56.3**	**164**	**43.7**	

According to table 4.2, the majority of teachers 64% were male. There was a more number of male principals 77.3% who participated as compared the counterpart female 22.7% while male students who participated ion the study were slightly more than female.

The finding indicates a gender disparity between male and female principals and mathematics teachers and no such significant difference in gender

between male and female students. UNESCO (2004) indicates that teachers' gender has an impact on learning achievement. The fewer female mathematics teachers imply that girls have few role models and it also reinforces the dogma that mathematics is a men's subject. The significant difference in gender of mathematics teachers could be because female are less likely to pursue mathematics related courses because of the stereotype that mathematics is hard for women. The government should strive to ensure there are more female mathematics teachers to improve on the perception that girls have on mathematics as a subject.

4.3.2 Respondent Age

The researcher sought to establish the age of the teachers and students and the teachers work experience in mathematics that is tied to other factors such as commitment or enthusiasm and ability to deliver contact effectively. Older students are also known not to concentrate well on their studies as compared to younger ones. The age of the teachers and students is shown in the graphs below.

Figure 4.1 A Pie charts showing Teachers' age

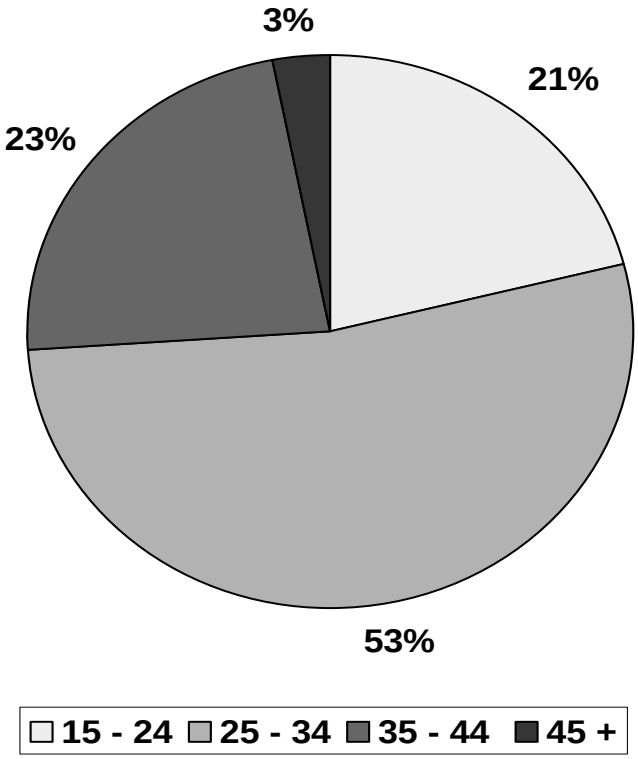


Figure 4.2 A pie chart showing Students' age

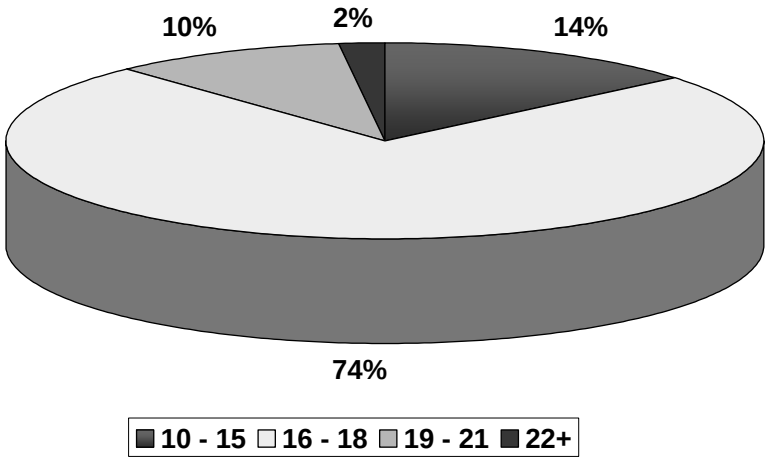


Figure 4.1 shows that majority of teachers, 53% are young aged between 25 – 34 years and can be considered young and energetic to work effectively. Those within 45years and over formed only 30%. Teachers between 35 – 44 years formed 23% while those less than 24years formed 21%.

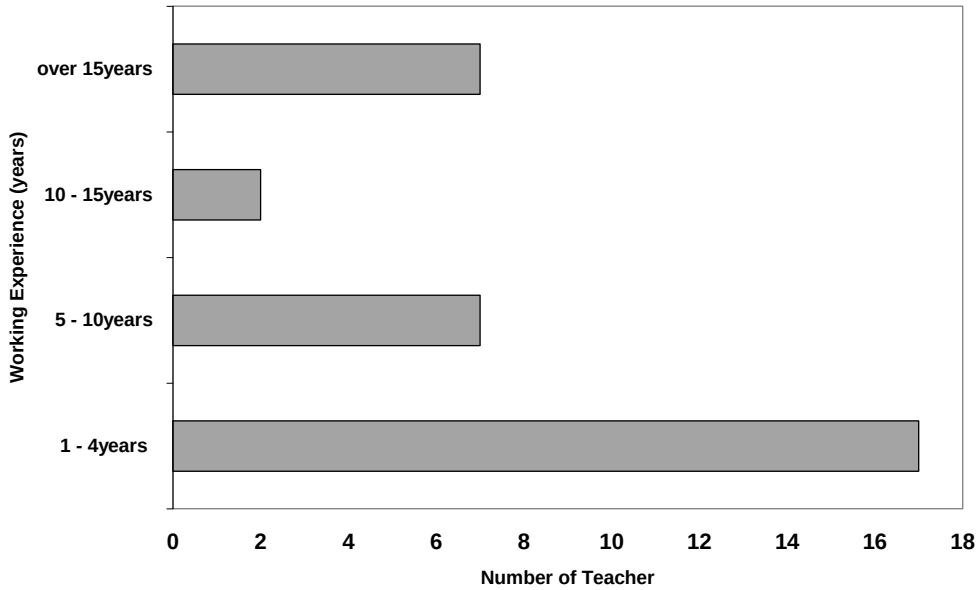
Gachenga (2007) noted that more elderly teachers are associated with more learner centred methods. This implies that teachers' age could be a factor that is influencing implementation of curriculum negatively or positively.

Jaji (1991) says that greater age among students is related to low achievements. Figure 4.2 shows majority of students, 74% lie in the appropriate age bracket for secondary schooling. Only 10% can be said to be a bit mature for that level of education.

4.3.3 Teachers work experience

The researcher sought to establish the teachers work experience in mathematics that is tied to other factors such as commitment and ability to deliver content effectively.

Figure 4.3 A Bar graph showing Teachers work experience



According to figure 4.3 majority of teachers 52% are of new teachers with a teaching experience of less than 4years, 21% of teachers have 5 – 9 years of experience, 6% have 10 – 14 years and only 21% have greater than 15years experience. Young teachers are more energetic and enthusiastic about their work but lack sufficient experience to teach mathematics well as compared to more experienced teachers. These young teachers also lack more learner centred activities and as such could negatively affect mathematics curriculum implementation Gachenga (2007).

The researcher also wanted to established work experience for principals .The information is presented in table 4.3

Table 4.3: Principals working experience

Year / Percentage	**0 – 2 years**		**3 – 5years**		**5yrs and over**		**Total**
	Years	%	Years	%	Years	%	
Overall experience	11	50	4	18.2	7	31.8	22
In current school	11	50	7	31.8	4	18.2	22

According to the table 4.3, half (50%) of the school heads have an overall experience of 5years and above and have stayed in their current stations for at least two years. This is in line with kimalu et al (2001) who says that more experience headteachers are associated with high students' achievement levels.

This is because they understand their current school well enough to experience proper management and running of the school.

4.3.4 Academic and professional Qualification

Regarding qualification, Republic of Nigeria (2007) says that trained teachers are more associated with better teaching approaches than untrained teachers. The research sought to find out whether teachers qualifications influenced mathematics curriculum implementation and found out the following result.

Table 4. 4 Teachers Academic and Professional Qualification.

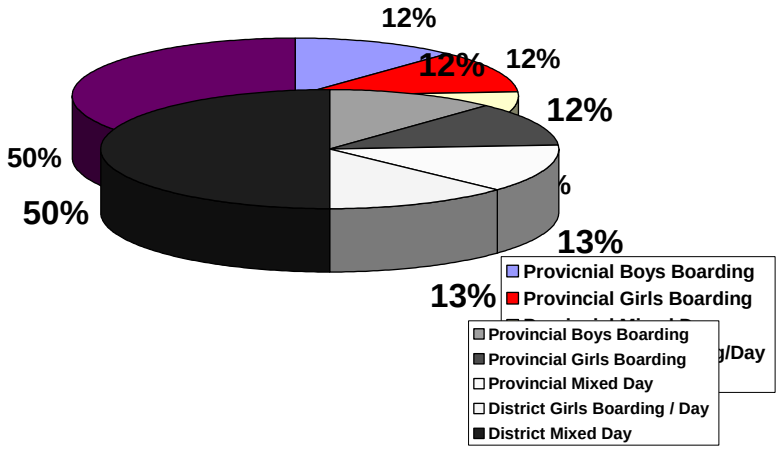
Response	**Academic Frequency**	**Qualification percentage**	**Professional frequency**	**Qualification Percentage**
O' level	-	-	-	-
A' level	-	-	-	-
Certificate	-	-	-	-
Diploma	6	11.1%	6	11.1%
B.ed	36	66.7%	36	66.7%
M.ed	12	22.2%	12	22.2%
Totals	**54**		**54**	

According to table 4.4, majority of teachers,66.7% are qualified with university degrees and hence can teach effectively in secondary schools. Teachers qualification is adequate to teach in secondary.

4.3.5 School type

Adede (2006) revealed that the type of school, whether single sex or mixed, day or boarding, influenced student's achievements in mathematics. The researcher considers school type because boarding implementation of mathematics curriculum could vary with school type whether mixed or pure gender and whether boarding or day schools. For example, boarding schools have more time where teachers could in the evening as compared to day schools.

Figure 4.4: Pie chart showing school type



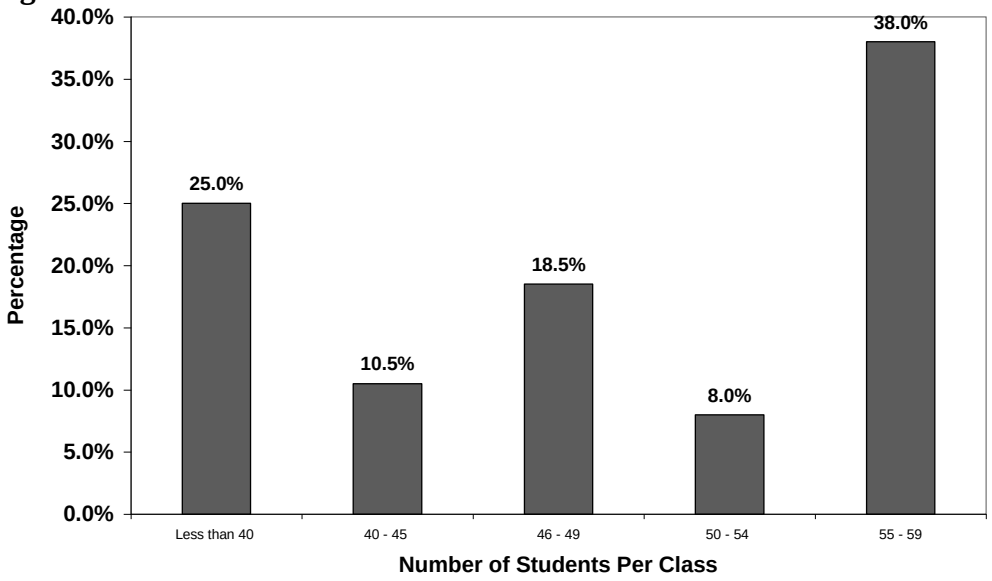
The study sampled various categories of schools. The figure 4.4 above shows that the majority of schools are mixed day schools. This could explain why these schools have fewer instructional times they devote to academics as compared to boarding counterparts which combined made up 37%.in addition, students indiscipline cases are more likely in day schools. This could explain the inadequate implementation of the curriculum in the schools.

4.3.6 Class size.

UNESCO (2009) notes that class size is a potential barrier to effective instruction such as large classes pose challenges to teachers who cannot pay individual attention to students needs. The researcher considers the class size since it influences teaching methods, class room management or discipline and the likelihood of teachers maintaining individual attention to students.

From the figure 4.5, majority of schools have a very large class size of 55 to 59 students as shown by a frequency 127 or 35%. In addition, it is noteworthy that only 25% of classes have 40 students and below which is as per the MOE recommendation.

Figure 4.5: Class size



The large class size could be a factor that influences mathematics curriculum implementation in public secondary schools in Londiani District Kericho County.

4.4 Analysis of research questions

Methods of teaching and implementation of secondary school mathematics curriculum

Bessoondyal (2005) says that teaching of mathematics is done mainly through traditional teacher centred methods that do not allow mastery and understanding of concepts. Mathematics curriculum can be implemented in various ways and the study sought to find out which methods of teaching were mostly used by teachers to teach mathematics. The results were tabulated by frequency of respondents given as indicated in table 4.5.

Table 4.5: Methods of teaching used by mathematics teachers

Response	Always	Very often	Occasionally	Rarely	Never	Total
Lecture	5 (17.2%)	3 (12.3%)	11 (37.9%)	7 (12.3%)	3(12.3%)	100.0
Demonstration	8(28.63%)	15 (53.6%)	5 (17.9%)	0 (0%)	0 (0%)	100.0
Practice / project	5 (16.7%)	8 (26.7%)	11 (36.7%)	4 (13.3%)	2 (6.7%)	100.0
Small group discussion	7 (21.2%)	13 (39%)	13 (39%)	0 (0%)	0 (0%)	100.0
Class discussion	8 (25.8%)	15 (48%)	7 (22.6%)	1 (3.2%)	0 (0%)	100.0
Team teaching	4 (3.3%)	7 (23.3%)	14 (46.7%)	4 (13.3%)	1 (3.3%)	100.0
Student peer teaching	3 (10%)	6 (20%)	7 (23.3%)	13(43.3%)	1 (3.3%)	100.0
Individual instruction	7 ((22.6%)	8 (25.8%)	10 (32.3%)	6 (19.4%)	0 (0%)	100.0

Mathematics games	1 (3.4%)	3 (10.3%)	10 (34.5%)	7 (24.1%)	8 (28%)	100.0
Experiential methods	2 (6.9%)	5 (17.2%)	9 (31%)	10(34.5%)	3 (10%)	100.0
Mastery learning	2 (6.7%)	14 (46.7%)	7 (23%)	3 (10%)	4 (13%)	100.0
Total	**52**	**97**	**104**	**55**	**22**	

The table 4.5 shows that teachers do not have a teaching method that they always use to teach mathematics but the majority of the teaching methods listed were successfully used. Demonstration (53.6%) class discussion (48.4%) and mastery learning methods (46.7%) were very often used and students peer tutoring and experiential methods were hardly used.

The occasional use of traditional lecture method to teach mathematics confounds Wasike (2006) who found lecture methods as the main method of teaching mathematics. Some methods such as peer teaching / tutoring are known to improve students' confidence and ability to solve mathematics problems. However, the methods were rarely used and this could explain why mathematics curriculum implementation is not satisfactorily. Methods commonly used by teachers are lecturer methods and small group discussions. The lecture method is commonly used due to large classes but it has a disadvantage of not accessing every individual in a learning process.

4.4.1 Factors affecting teaching – learning of mathematics in schools according to principals.

School factors accounted for majority, 57.1% of all factors mentioned while all the rest (42.9%) were students' factors. Negative attitude of students towards mathematics and limited resources were mentioned by 50% of all the principals as factors affecting mathematics teaching. Non-committed teachers, lack of mathematics contests, students absenteeism and poor academic tradition were mentioned by 25% of all the principals while gender stereotyping, large class size, little incentives to teachers, low student motivation, teachers gender, limited resources persons, poor teacher qualification and little emphasis on the importance of mathematics were mentioned by 12.5% of all the principals.

Table 4.6 Teaching methods and implementation of secondary school mathematics curriculum according to students.

Factors	Responses	F	Val %	Cum %
Teacher not using student content approaches influence implementation of mathematics	SA	77	59.8	69.8
	A	74	25.0	84.8
	UN	30	10.1	94.9
	D	10	3.48	98.3
	SD	5	1.7	100
	TOTAL	**296**	**100**	
Use of computer affect implementation of mathematics curriculum	SA	140	46.7	46.7
	A	100	33.3	80.0
	UN	40	13.3	93.3
	D	15	5.0	98.3

	SD	5	1.7	100.0
	TOTAL	**300**	**100**	
Teacher centred approaches influence implementation of mathematics curriculum	**SA**	151	50.7	50.7
	A	59	19.8	70.5
	UN	42	14.1	84.6
	D	28	9.4	94.0
	SD	18	6.0	100.0
	TOTAL	**298**	**100**	

Most of the students agreed that teachers' centred approach reduce the rate of learning as evident in 83.7% of the student who agreed, 16.0% who were undecided and 6.3% who disagreed. The approach should be changed to learner centred approach to enhance learning (Benson 2011).

According to the findings, most of the students agreed that use of the technology improves implementation of mathematics. This is proved by 80.0% who agreed, 13.3% were undecided while 6.7% disagreed.

Most of the students agreed with the fact that teachers centred approaches influence implementation of mathematics curriculum. This is evident in 50.7% who strongly agreed, 19.8% who agreed, 14.1% were undecided and 15.4% disagreed.

Table 4.7 Teaching methods and implementation of secondary school mathematics curriculum according to teachers

Factors	Responses	F	Val %	Cum %
Teacher not using student content approaches influence implementation of mathematics	SA	32	59.3	59.3
	A	18	33.3	92.6
	UN	2	3.7	96.3
	D	2	3.7	100.0
	SD	-	-	100.0
	TOTAL	**54**	**100**	
Use of computer affect implementation of mathematics curriculum	SA	22	40.7	40.7
	A	10	18.5	59.2
	UN	19	35.2	94.4
	D	3	5.6	100.0
	SD	0	0	100.0
	TOTAL	**54**	**100**	**71.2**
Teacher centred approaches influence implementation of mathematics curriculum	**SA**	36	73.0	73.0
	A	13	23.0	96.0
	UN	2	3.0	99.0
	D	1	1.0	100
	SD	-	-	100
	TOTAL	**52**	**100**	

Most of the teachers agreed that teachers' centred approach reduces performance since it does not allow all the learners to participate in the learning process. The teacher is the only source of information and render learners as passive listeners. This evident by 59.3% strongly agreed, 33.3% agreed, 3.7% were undecided while another 3.7% disagreed. (Gathua, 2001).

In addition, most of the teachers acknowledge the use of computers in the teaching and learning of mathematics would enhance the performance. This is

proven by 40.7% who strongly agreed, 18.5% agreed, 35.6% were undecided while 5.6% disagreed. This present world is marked by the technology, and mathematics teachers should embrace and use it to teach mathematics to improve performance (Eshwani 2001).

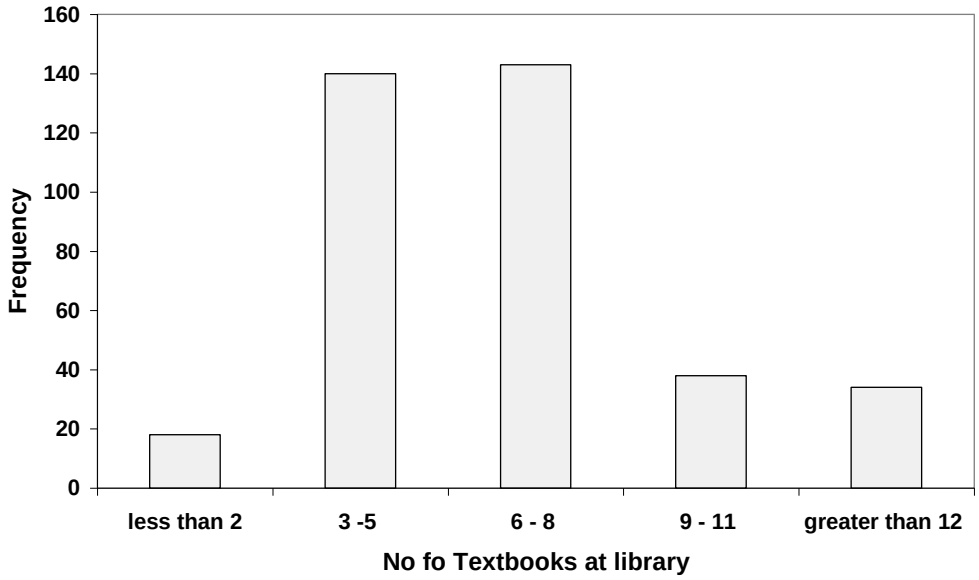
According to the findings, most of the teachers acknowledged that teachers centered approaches influence implementation of mathematics curriculum. This is proven by 73.0% who strongly agreed, 23.0% who agreed, 3.0% who were undecided and 1.0% who disagreed. This is a clear indication that teaching approaches and delivery is the most crucial aspect in teaching and learning process.

4.4.2 Availability of textbooks and implementation of secondary school mathematics curriculum.

Number of textbooks at school

Textbooks at school library are motivators for students to engage in personal study and hence improved outcomes in subjects such as mathematics UNESCO (2009).

Figure 4.6: Number of textbooks at library



The highest frequency of 143 (34.8%) and 140 (34.1%) indicate that most students have few copies of 6 – 8 and 3 – 5 textbooks to be used. The number of textbooks in use was found to be inadequate and could explain why most students do not do enough practice in mathematics as indicated in the reasons why students have difficulty in some topics and difficulty in mathematics language.

4.4.3 Average students – textbooks ratio according to principals

Adequate resources such as mathematics textbooks are crucial for proper implementation of mathematics curriculum. The researcher sought to find out students - textbooks ratios and found out that 12.5% of school had five students sharing a textbook, 25% had three students sharing a textbook and another 25% had two students sharing one textbook. Many of the schools (37.5%) had four students sharing one textbook. This finding is in line with

Maritim (2002) who found mostly between 3 – 6 students sharing one textbook. Majority of school had four more students sharing one textbook. This means that if one student carries the book home, three other cannot complete their assignments well and they scramble in class to have a glimpse of the content in the book. Therefore, inadequate textbooks were found to be a factor affecting mathematics curriculum implementation.

Most of the principals acknowledge that they procure books not frequently but when there is money and demand like in case of shortages. Most of them agreed that they have made less effort in buying supplementary books for mathematics.

Table 4.8 Textbooks as a factor influencing mathematics curriculum according to students

Factors	Responses	F	Val %	Cum %
Textbooks are key source of information	SA	12	70.7	70.7
	A	78	26.0	96.7
	UN	6	2.0	98.7
	D	4	1.3	100.0
	SD	-	-	100.0
	TOTAL	100	100	
There are enough textbooks in our library	SA	152	50.7	50.7
	A	96	32.0	82.7
	UN	50	16.7	99.4
	D	-	-	100.0
	SD	-	-	100.0
	TOTAL	300	100	

The ratio of textbook should be 1:2	SA	203	67.7	66.7
	A	97	32.3	100.0
	UN	-	-	100.0
	D	-	-	100.0
	SD	-	-	100.0
	TOTAL	300	100	
The ratio of textbook matters in the implementation of mathematics curriculum	**SA**	140	46.7	46.7
	A	99	33.3	80.0
	UN	41	13.3	93.3
	D	15	5.0	98.3
	SD	5	1.7	100
	TOTAL	300	100	

In addition, most of the students agreed that there were enough textbook in their school library. This is proven by 50.7% who agreed, 16.7% were undecided while 3.6 disagreed. This is in line with UNESCO (2007) which indicates that availability and use textbooks improves students learning but contradicts Maritim (2002) finding that there was a problem of textbooks in schools where one textbook was shared among 3 to 6 students.

In addition, most of students acknowledged that textbooks are key source of information in a learning process. It is evident in 96.7% who agreed, 2% were undecided while 1.3% disagreed. Since they are key sources they must be adequate and available at all times and within students reach. Their ratios also should be moderately shared among two students. This will improve accessibility of the book by the two partners. This is in line with Eshwani

(2001) who points out that poor performance is due to shortage of textbooks or learning resources.

In addition, most of the students agreed that the ratio of textbooks matters in the implementation of mathematics curriculum. This is evident in 46.7% who strongly agreed, 33.3% who agreed, 13.3% were undecided 5.0% who disagreed and 1.7% who strongly disagreed.

Table 4.9 Textbooks as a factor influencing mathematics curriculum according to teachers

Factors	**Responses**	**F**	**Val %**	**Cum %**
Textbooks are key source of information	SA	1	75.9	75.9
	A	11	20.4	96.3
	UN	2	3.7	100.0
	D	-	-	100.0
	SD	-	-	100.0
	TOTAL	54	100	
There are enough textbooks in our library	SA	37	71.2	71.2
	A	12	23.1	94.3
	UN	2	3.8	98.1
	D	1	1.9	100.0
	SD	-	-	100.0
	TOTAL	52	100	
The ratio of textbook should be 1:2	SA	24	44.4	44.4
	A	18	33.3	77.7
	UN	7	13.0	90.7
	D	3	5.6	96.3
	SD	2	3.7	100.0

	TOTAL	54	100	
The ratio of textbooks matters in the implementation of mathematics curriculum	**SA**	22	40.7	40.7
	A	10	18.5	59.2
	UN	19	35.2	94.4
	D	3	5.6	100
	SD	-	-	100
	TOTAL	54	100	

Most of the teachers agreed that there are enough textbooks in their school library. This is evident in 94.3% who agreed, 3.8% were undecided while 1.9% disagreed. This is in line with UNESCO (2007) which indicates that availability and use of textbooks improves students learning. The same findings contradict Maritims' (2002) findings that there was a problem of textbooks in schools where one textbook was shared among 3 to 6 students.

Most of the teachers agreed that the ratio of textbooks matters in the implementation of mathematics curriculum. This is evident in 40.7% who strongly agreed, 18.5% who agreed, 35.2% were undecided and 5.6% who disagreed. Textbooks act as a course guideline in all that is learned in every institution.

4.4.4 Motivation and implementation of secondary school mathematics curriculum.

Most of the principals agreed that they have not been motivating their teachers due to low finance in their schools. Tswani (2009) says that overall

achievement in mathematics is due to teachers and learners motivation through incentives.

Table 4.10 Motivation as a factor influencing implementation of secondary school mathematics curriculum according to students.

Factors	Responses	F	Val %	Cum %
Motivation is one of the driving force in learning	SA	151	50.7	50.7
	A	59	19.8	70.5
	UN	42	14.1	84.6
	D	28	9.4	94.0
	SD	18	6.0	100.0
	TOTAL	298	100	
Guardians expect their children to perform well in mathematics	SA	142	47.8	47.8
	A	98	33.0	80.8
	UN	37	12.5	93.3
	D	20	6.7	100
	SD	-	-	100
	TOTAL	297	100	
Teachers and learners who are not motivated are non-performers	SA	112	37.5	37.5
	A	100	33.4	70.9
	UN	48	16.7	87.0
	D	32	10.7	97.7
	SD	7	2.3	100.0
	TOTAL	299	100	
Rewarding of teachers and students helping in improving performance	SA	140	46.7	46.7
	A	100	33.3	80.0
	UN	41	13.3	93.3
	D	14	5.0	98.3
	SD	5	1.7	100
	TOTAL	300	100	

Most students are expected to perform well in mathematics by their parents and siblings. This was evident in 47.8% who strongly agreed, 33.0% who agreed, 6.7 who disagreed, and 12.5 who were undecided. This high expectation placed on students is necessary for enhanced academic performance (Kamuya, 2002).

Most students agreed motivation is one of the driving force in learning. This is proven by 50.7% who strongly agreed, 19.8% who agreed, 14.1% were undecided, 9.4% disagreed while 6.0% strongly disagreed. This agrees with Tswani (2009) who says that an overall achievement in mathematics is due to teachers and learners motivation through incentives. This will make the teachers and learners to continuously struggle to improvement.

According to the findings, most of the students agreed that rewarding of teachers and students improve implementation of mathematics curriculum. This is proven by 46.7% who strongly agreed, 33.3% who agreed, 13.3% who were undecided and 1.7% disagreed.

Table 4.11 Motivation as a factor influencing implementation of secondary school mathematics curriculum according to teachers.

Factors	Responses	F	Val %	Cum %
Motivation is one of the driving force in learning process	SA	27	57.4	57.4
	A	16	25.9	83.3
	UN	2	9.3	92.6
	D	3	3.7	96.3

	SD	2	3.7	100.0
	TOTAL	50	100	
Rewarding of teachers and students help in improving performance	SA	31	57.4	57.4
	A	14	25.9	83.3
	UN	25	9.3	92.6
	D	2	3.7	96.3
	SD	2	3.7	100.0
	TOTAL	54	100	
Teachers and learners who are not motivated are non-performers	SA	23	46.0	46.0
	A	19	38.0	84.0
	UN	2	4.0	88.0
	D	5	10.0	98.0
	SD	1	2.0	100.0
	TOTAL	50	100	

According to the findings, most teachers agreed that motivation is one of the driving force in the learning process. This is proven by 54.5% who strongly agreed, 32.0% agreed, 40% were undecided, 6.0% disagreed while 4.0% strongly disagreed. This is in line with Chiriswa (2003) agreed with the above view that mathematics teachers and students be given incentives to raise their morale for better grade in mathematics.

Rewarding of both teachers and learners for good performance will keep them struggling to retain the position or increase the performance. Rewarding is a form of recognizing people's effort in good results or achievement in a given examination.

Table 4.12 Mathematics language and implementation of secondary school mathematics curriculum according to students.

Factors	Responses	F	Val %	Cum %
Language is an important weapon in communicating information in a learning institution	SA	202	67.3	67.3
	A	58	193	86.6
	UN	21	7.0	93.6
	D	9	3.1	96.7
	SD	10	3.3	100.0
	TOTAL	300	100	
The language used in mathematics should be simple to understand	SA	121	40.9	40.9
	A	89	30.1	70.0
	UN	58	19.6	90.6
	D	16	5.4	96
	SD	12	4.0	100
	TOTAL	296	100	
Language used in mathematics is difficult to be understood by the learner	SA	91	30.7	30.7
	A	39	13.2	43.9
	UN	5	1.7	45.6
	D	91	30.7	76.3
	SD	70	23.7	100
	TOTAL	296	100	
Language used in mathematics should be simplified to reduce the difficult in the subject	SA	102	34	34
	A	72	24	58
	UN	48	16	74
	D	50	16.7	90.7
	SD	28	9.3	100
	TOTAL	300	100	
Language in mathematics should be simplified to fit the level of the learners	SA	78	59.8	69.8
	A	73	25.0	84.8

	UN	31	10.1	94.9
	D	9	3.5	98.3
	SD	5	1.7	100
	TOTAL	296	100	

According to the finding, the students also agreed that the language used in mathematics is difficult and should be simplified o the level of the learners. This is evident in 121 or 40.9% who strongly agreed 89 or 30.1% who agreed, 58 or 19.6% were undecided, 16 or 5.4% disagree while 12 or 4% strongly disagreed. This is in line with Wasike (2006) who observes that poor performance is due to the difficult language in mathematics, classroom which is difficult from the common day English language.

In addition, most of the students acknowledge that language in mathematics should be simplified to fit the level of the learners. It is evident in 59.8% who strongly agreed, 25.0% who agreed, 10.1% were undecided, 3.5% who disagreed and 1.7% who strongly disagreed.

Table 4.13 Mathematics Language and implementation of secondary school mathematics curriculum according to teachers

Factors	**Responses**	**F**	**Val %**	**Cum %**
Language is an important weapon in communicating information in a learning process	SA	19	36.7	36.7
	A	17	34.7	71.4
	UN	5	10.2	81.6
	D	5	10.2	9.8
	SD	4	8.2	100.0

	TOTAL	49	100	
Language used in mathematics is difficult to the learners	SA	14	28.0	28.0
	A	13	26.0	54.0
	UN	9	18.0	72.0
	D	9	18.0	90.0
	SD	5	10.0	100.0
	TOTAL	50	100	
Language used should be up to the level of learners	SA	27	50.9	50.9
	A	18	34.0	84.9
	UN	1	1.9	86.8
	D	5	9.4	92.6
	SD	2	3.8	100.0
	TOTAL	53	100	
Guardians expect their children to perform well in mathematics	SA	25	50.0	50.0
	A	18	36.0	86.0
	UN	2	4.0	90.0
	D	3	6.0	96.0
	SD	2	4.0	100.0
	TOTAL	50	100	
Language in mathematics should be simplified to fit the level of learners.	**SA**	36	71.2	71.2
	A	13	23.1	94.3
	UN	1	1.9	98.1
	D	2	3.8	100
	SD	-	-	100
	TOTAL	52	100	

Most of the teachers agreed that the language used in mathematics is difficult and should be simplified to fit the levels of the learners. This is evident in 36.7%, who strongly agreed, 34.7% who agreed, 10.2% were undecided,

10.2% who disagreed while 8.2% strongly disagreed. This agrees with Wasike (2006) who stated that poor performance is due to the technical language used in teaching of mathematics which is different from the common day English.

In addition, teachers accepted that language is an important weapon in communicating information in the learning process. This is proven by 37.3%, who strongly agreed, 29.4% agreed, 3.9% were undecided, 15.7% disagreed while 13.7% disagreed.

According to the findings from teachers, most students are expected to perform well in mathematics by their parents, sibling and relatives. This was evident in 50% who strongly agreed, 36.0 % who agreed, 4.0% were undecided, 6.0% disagreed. This high expectation placed on students is necessary for enhancement of academic performance (Kamuya, 2002).

According to the findings, teachers agreed that language in mathematics should be simplified to fit the level of learners. This is proven by 71.2% who strongly agreed, 23.1% who agreed, 1.9% were undecided, 3.8% who disagreed.

4.5 Recommendations to improve mathematics implementation in schools.

To continuously improve teaching, the following suggestions by [principals were being considered; workshops, seminars and in-servicing of teachers on current trends in mathematics education, increase students and counseling to change students attitude towards mathematics, introducing mathematics hours

on the school timetable and a mathematics day for students and teachers participation. The government to work closely with parents to ensure students has access to most of the learning facilities. Increase on the use of mathematics models to help students understand concepts easily, ensure frequent evaluation, emphasize student self and peer tutoring through discussion groups and students self assigned homework, encourage participation in mathematics symposia and contests, use of remedial teaching to help the weak students, increase the monitoring and supervision functions of the school administration, increase the student and teachers motivation when they excel in mathematics, invite mathematics specialists or role models to speak to set long range strategic plans or target each year and create consultation form which students will use to consult their teachers on certain problem areas.

4.6 Summary

According to the findings from the study, it is clear that major factors influencing implementation of secondary school mathematics curriculum is teaching method. The response from the instruments related to teaching methods was high according to every respondent. The other major factor was the textbook ratio in relation to learners' textbook ration. The respondents agreed that it should be 2:1.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter summarizes the findings of the study and presents conclusions and recommendation on the school based factors influencing implementation of secondary mathematics curriculum in Londiani district.

5.2 Summary of the study

This study sought to establish the school based factors influencing mathematics curriculum implementation in public secondary schools in Londiani district, Kericho County. It adopted the descriptive survey design which Jacobs & Rezarich (1996) defines as a technique where detailed information concerning social phenomena is collected by posing questions to respondents such that it becomes possible to find explanation to social phenomena in question. Data analysis was based on research question design at the beginning of the research. This was done by the frequency tables, percentages and means. Responses were tabulated and analyzed using micro-soft excels and word programmes. The responses on open-ended items and interviews were reported by descriptive narrative.

After in-depth search on information from the respondents, the researcher was able to establish that there is a large gender disparity between male and female mathematics teachers. In addition, most teachers are aged between 25 to

34years while majority students are in the right age bracket for secondary education at between 16 to 18years. The majority of teachers also have a working experience of 4years and below and that half of the head-teachers have an overall experience of 5years and above and have stayed in their current stations for at least two years.

The study also established that slightly move than 50% of mathematics teacher teach mathematics as their specialist subject. The majority of teachers are qualified to teach in secondary schools. There is also a wide variety of schools type or category with any combination of day, boarding, girls, boys, and mixed sex school. The class size is very large averaging between 55 to 59 students per class.

A great percentage of students lived with their parents due to the nature, school type. The number of textbooks student had ranged from three to five or eight textbooks. Therefore, mathematics teacher perception regarding the goal of mathematics curriculum implementation, methods of teaching, available textbooks, teachers and learners' motivation and technical language used in the teaching of mathematics were found to influence mathematics curriculum implementation in Londiani district.

According to the research findings, implementation of mathematics curriculum was not accomplished without its fair share of problem such as a high staff turnover, bad attitude towards mathematics by both teachers and

students, inadequate textbooks, students poor economic background cannot afford basic learning resources, inadequate teachers, lack of commitment on the side of teachers and negative influence of the parents on their children where children were not encouraged to work hard in academics.

5.3 Conclusions of the study

The study established that there are certain school based factors influencing mathematics curriculum implementation in Londiani district, Kericho County. This was supported by the fact that the data obtained implied that; the curriculum scope and process was done without consideration of some MOE policy guidelines. In addition, teaching methods, textbooks, motivation of both learners and teachers and the technical language were found to influence mathematics implementation. The study established that mathematics teacher in public secondary schools have diverse views as to the goal of mathematics curriculum implementation. The study also identified problem that teachers faced when implementing the mathematics curriculum and recommended solutions to these problems and give alternative policy options that the actors in education could employ.

5.4 Recommendation of the study

In light of the findings of the study, the researcher recommends that:-

1. Students' friendly methods of instruction such as group discussion, mastery learning, experimental method, project method, and mathematical games should be highly encouraged.

2. Schools must ensure that there is adequate teaching – learning resources and that these are maintained in good quality to ensure their effective utility in implementing of mathematics curriculum.
3. The principals should ensure effective supervision and motivate the best mathematics students and teachers adequately.
4. There should be enough work given to students on difficult language used in mathematics to improve their understanding and mastery of the same.

5.5 Suggestions for future research

The study recommended the following areas for further research.

1. Since the study was limited to Londiani district, there is need for replication of this study in other districts countrywide in order to elicit more accurate and representative perception on school based factors influencing mathematics curriculum implementation.
2. A similar study should be carried out incorporating private schools so that other comprehensive issues influencing mathematics implementation can be identified.

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APPENDIX I:

Letter of introduction.

Tuwei Sammy Kipyegon,
University of Nairobi,
Department of Educational
Administration and planning,
P.O Box 30197,
Nairobi.

THE PRINCIPAL,

Dear Sir/Madam,

REF: LETTER TO THE RESPONDENTS

I am a postgraduate student of the University of Nairobi pursuing a degree in Educational Administration and Planning. I am conducting a study on school based factors influencing implementation of secondary school mathematics curriculum and your school has been chosen to participate in this study. I am hereby requesting your assistance when collecting data in the school. The content of this data will be for academic purpose only. The confidentiality of the respondent identity will be highly respected.

Thank you in advance.

Yours sincerely,

Tuwei Sammy Kipyegon

APPENDIX II:

Questionnaire for mathematics teachers

This questionnaire is for the purpose of research only; please tick (√) in the appropriate bracket or fill in the information as your response to all the following questions. Do not write your name or the name of your school anywhere.

Part A: background information.

1) Which is your age bracket?

   a) 20– 24 years [ ] b) 25– 34 years [ ]

   c) 35 – 44 years [ ] d) Above 45 years [ ]

2) What is your highest academic qualification?

   a) Masters [ ] b) Bachelor [ ] c) Diploma [ ]

   d) Certificate [ ] e) Others (Please specify) _____

3) How many years have you been in the current station?

   a) Less than 5years [ ] b) 5 – 10years [ ]

   c) 10 – 15years [ ] d) Over 20years [ ]

4) Which category is your school?

   a) National School (girls) [ ] (boys) [ ]

   b) Provincial school (girls) [ ] (boys) [ ]

   c) District school (girls) [ ] (boys) [ ]

   d) District day school (girls) [ ] (boys) [ ]

   e) Mixed day [ ]

5) How old is your school? _____

6) What is the total number of the students in your school? _____

7) Please indicate the number of teachers in your school _____

Part B: Methods of teaching and implementation of secondary school mathematics curriculum.

8. On a scale of 1-5 below, rate the extent to which the teaching methods influence the implementation of secondary school mathematics curriculum.

1) To a very large extent 2) To a large extent 3) To some extent 4) Toa small extent 5) To no extent at all

Characteristics	**1**	**2**	**3**	**4**	**5**
Teacher not using students' centred approach influence implementation of mathematics curriculum					
Teacher centred approaches influence implementation of mathematics curriculum.					
Use of computer, technology affects the implementation of mathematics curriculum.					

Kindly indicate the methods you commonly use _____

Reasons for using the identified methods

_____

What challenges do you face when using the suggested teaching methods

_____

_____

Is there part of mathematic curriculum you are not adequately conversant with? Yes ☐ NO ☐

If yes, specify _____

Part C: Textbooks and implementation of secondary school mathematics curriculum.

9. Please indicate on the scale of 1-5 below how shortage of textbooks affects the implementation of secondary school mathematics curriculum.

1) Strongly agree 2) Agree 3) Indifferent 4) Disagree 5) Strongly disagree

Characteristics	**1**	**2**	**3**	**4**	**5**
Textbooks are key sources of information in learning institution					
The ratio of student textbooks matters in implementation of mathematics curriculum					
The ratio of students textbooks should be 1:2					

Which text books are available for use in your school?

_____

Are there other additional books that you may require to improve implementation of mathematics curriculum in your school?

_____

Part E: Motivation and implementation of secondary school mathematics curriculum.

10. Please indicate on the scale of 1-5 below, how motivation influences the implementation of secondary school mathematics curriculum.

    1) Strongly agree 2) Agree 3) Indifferent 4) Disagree 5) Strongly disagree

Characteristics	**1**	**2**	**3**	**4**	**5**
Motivation is one of the driving force in a learning process					
Rewarding of teachers & students help in improving performance					
Teachers & learners who are not motivated are non-performers					
Guardians expect their children to perform well in mathematics					

Are there particular concepts you don't understand in the teaching of mathematics? Yes ☐ NO ☐

If yes, specify _____

What are the motivating factors in the teaching and learning of mathematics?

_____

Part F: Mathematics language and implementation of secondary school mathematics curriculum.

11. On a scale of 1-5 below, please rate the extent to which language influence the implementation of secondary school mathematics curriculum.

    1) Strongly agree 2) Agree 3) Indifferent 4) Disagree 5) Strongly disagree

Characteristics	**1**	**2**	**3**	**4**	**5**
Language is an important weapon in communicating information in a learning institution					
Language used in mathematics is difficult to be understood by the learners					
Language used in mathematics should be simplified to reduce the difficulty in the subject.					

What is the average performance of mathematics in your school? _____

Give suggestions on measures that can be put in place to improve implementation of mathematics curriculum in your school?

_____

Thank you for taking time to fill the questionnaire

APPENDIX III:

Questionnaires for students

This questionnaire is for the purpose of research only; please tick (√) in the appropriate bracket or fill in the information as your response to all the following questions. Do not write your name or the name of your school anywhere.

Part A: Background information

1. Indicate your form

   a) Form 1 [ ] b) Form 2 [ ]

   c) Form 3 [ ] d) Form 4 [ ]

2. Which category is your school?

   a) National School (girls) [ ] (boys) [ ]

   b) Provincial school (girls) [ ] (boys) [ ]

   c) District school (girls) [ ] (boys) [ ]

   d) District day school (girls) [ ] (boys) [ ]

   e) Mixed day [ ]

3. How old is your school? _____

4. How old are you? _____

Part B: Methods of teaching and implementation of secondary school mathematics curriculum.

8. On a scale of 1-5 below, rate the extent to which the teaching methods influence the implementation of secondary school mathematics curriculum?

   1) To a very large extent 2) To a large extent 3) To some extent

   4) Toa small extent 5) To no extent at all

Characteristics	**1**	**2**	**3**	**4**	**5**
Teacher not using students' centred approach influence implementation of mathematics curriculum.					
Teacher centred approaches influence implementation of mathematics curriculum.					
Use of computer, technology affects the implementation of mathematics curriculum.					

Do you participate well during mathematics lesson?

_____

Part C: Textbooks and implementation of secondary school mathematics curriculum.

9. Please indicate on the scale of 1-5 below how shortage of textbooks affects the implementation of secondary school mathematics curriculum.

10. 1) Strongly agree 2) Agree 3) Indifferent 4) Disagree 5) Strongly disagree

Characteristics	**1**	**2**	**3**	**4**	**5**
Textbooks are key sources of information in learning institution					
The ratio of student textbooks matters in implementation of mathematics curriculum					
The ratio of students textbooks should be 1:2					

Which text books are available for use in your school?

_____

11. What are the factors that hinders parental support in a learning institution_____

Part E: Motivation and implementation of secondary school mathematics curriculum.

12. Please indicate on the scale of 1-5 below, how motivation influences the implementation of secondary school mathematics curriculum.

1) Strongly agree 2) Agree 3) Indifferent 4) Disagree 5) Strongly disagree

Characteristics	**1**	**2**	**3**	**4**	**5**
Motivation is one of the driving force in a learning process					
Rewarding of teachers & students help in improving performance					
Teachers & learners who are not motivated are non-performers					
Guardian expect their children to perform well in mathematics.					

What makes students fail to enjoy learning mathematics?

_____

Part F: Mathematics language and implementation of secondary school mathematics curriculum.

13. On a scale of 1-5 below, please rate the extent to which language influence the implementation of secondary school mathematics curriculum.

    1) Strongly agree 2) Agree 3) Indifferent 4) Disagree 5) Strongly disagree

Characteristics	**1**	**2**	**3**	**4**	**5**
Language is an important weapon in communicating information in a learning institution					
Language used in mathematics is difficult to be understood by the learners					
Language used in mathematics should be simplified to reduce the difficulty in the subject.					

Give suggestions on measures that can be put in place to improve implementation of mathematics curriculum in your school?

_____

Thanks you for taking time to fill the questionnaire

APPENDIX IV

INTERVIEW GUIDE FOR THE PRINCIPALS

1. How long have you been in the teaching profession?
2. How long have you been in the current station?
3. Which are the methods commonly used in the teaching of mathematics?
4. How often do you procure new mathematic text books?
5. How do you motivate mathematics teachers to implement secondary mathematics curriculum effectively?
6. Do students face difficulties in understanding mathematics language?

APPENDIX V: RESEARCH AUTHORIZATION LETTER

REPUBLIC OF KENYA

NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

Telephone: 254-020-2213471, 2241349, 254-020-2673550
Mobile: 0713 788 787 , 0735 404 245
Fax: 254-020-2213215
When replying please quote
secretary@ncst.go.ke

P.O. Box 30623-00100
NAIROBI-KENYA
Website: www.ncst.go.ke

Our Ref: **NCST/RCD/14/013/877** Date: **3rd June 2013**

Sammy Kipyegon Tuwei
University of Nairobi
P.O Box 92-0902
Kikuyu.

RE: RESEARCH AUTHORIZATION

Following your application dated **24th May 2013** for authority to carry out research on ***"School based factors influencing implementation of secondary school mathematics curriculum in Londiani District, Kenya."*** I am pleased to inform you that you have been authorized to undertake research in **Londiani District** for a period ending **31st December, 2013.**

You are advised to report to **the District Commissioner and District Education Officer, Londiani District** before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.

DR. M. K. RUGUTT, PhD, HSC.
DEPUTY COUNCIL SECRETARY

Copy to:
The District Commissioner
The District Education Officer
Londiani District.

APPENDIX VI : RESEARCH PERMIT

PAGE 2

PAGE 3

Research Permit No. *NCST/RCD/14/013/877*

Date of issue *3rd June, 2013*

Fee received *KSH. 1000*

THIS IS TO CERTIFY THAT:

Prof./Dr./Mr./Mrs./Miss/Institution

Sammy Kipyegon Tuwei

of (Address) University of Nairobi

P.O Box 92-0902, Kikuyu.

has been permitted to conduct research in

Londiani	Location
	District
Rift Valley	Province

on the topic: School based factors influencing implementation of secondary school mathematics curriculum in Londiani District, Kenya.

for a period ending: 31st December, 2013.

Applicant's Signature

For Secretary
National Council for
Science &Technology