RELATIONSHIP BETWEEN LOWER PRIMARY SCHOOL TEACHERS’ MATHEMATICS SELF-EFFICACY AND THEIR PUPILS’ PERFORMANCE IN MATHEMATICS IN KERICHO SUB-COUNTY, KENYA

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NOVEMBER, 2014
DECLARATION

Student’s Declaration
I confirm that this thesis is my original work and has not been presented in any other university /institution. The thesis has been completed by referenced sources duly acknowledged. Where text, data, graphics, pictures or tables have been borrowed from other works including the internet, the sources are specifically accredited through referencing in accordance with anti-plagiarism regulations.

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Department of Early Childhood Studies
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This work is dedicated to my family members and friends for their encouragement and support. My daughter Laura and son Tony, your embraced spirit and assuring words have always given me strength in these endeavors.
ACKNOWLEDGEMENT

I wish to acknowledge the support and assistance I received from my two supervisors, Dr. Nyakwara Begi and Dr. Racheal W. Kamau-Kang’ethe who with a lot of patience, encouraged and sustained my effort to complete this work.

To my family who have always been there for me. Providing love and support as well as freshly brewed cup of coffee. They have never doubted my ability and knowledge in the field of Early childhood Studies and encouraged me throughout my career to never lose sight of what I am passionate about (children).

Thank you and God bless you.
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<td>ECDE</td>
<td>Early Childhood Development and Education</td>
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<tr>
<td>K.C.P.E</td>
<td>Kenya Certificate of Primary Education</td>
</tr>
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<td>KIE</td>
<td>Kenya Institute of Education</td>
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<td>KCSE</td>
<td>Kenya Certificate of Secondary Education</td>
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ABSRACT

Mathematics is a very important component of human activities and survival. It is useful in science, technology, commerce, economics, and education. Research shows that the acquisition and development of basic mathematical concepts and skills during early years forms the foundation for future mathematics achievement. For many years the performance in mathematics at the Kenya Certificate of Primary Education (KCPE) and Kenya Certificate of Secondary Education (KCSE) has been low as compared to other subjects. However, most of the studies done in Kenya have focused on the factors affecting mathematics performance such as the methods used by teachers to teach mathematics, availability of text books, teaching apparatus used, class size, and assessment practices and not on teacher self-efficacy. The present study therefore aimed at investigating the level of lower primary school teachers’ mathematics self-efficacy and how it is related to their pupils’ mathematics achievement. The study also explored the relationship between teachers’ mathematics self-efficacy and factors such as type of school, teachers’ experience, and teachers’ performance in mathematics and professional qualifications. The study was guided by the Social Cognitive Theory by Bandura (1977). The research design that was used in this study was correlation design. The dependent variable was pupils’ achievement in mathematics, while the independent variables were teachers’ mathematics self-efficacy, teachers’ score in mathematics in KCSE examinations, teachers’ professional qualifications, type of school, and teaching experience. The study was carried out in primary schools in Kericho Sub-County. The population for this study consisted of lower primary school teachers teaching in primary schools in Kericho Su-County and their lower primary school pupils. Stratified random sampling technique was used to select 40 lower primary school teachers from 156 primary schools in the District. A questionnaire and interview schedule was used to collect data. Pilot study was undertaken in four primary schools in the sub-county. Reliability of the instruments was tested using test-retest method. Data was collected in three stages namely administration of questionnaires, conducting of interviews and administration of mathematics achievement tests. Data was analyzed using descriptive and inferential statistics. Null hypotheses H01 was tested using t-test for independent samples; while Null Hypotheses H02, H03, and H04 were tested using Pearson’s Product Moment Correlation at .05 level of significance. The results showed that lower primary school teachers’ mathematics self-efficacy was low (M=2.64). Results from t-test indicated that there was no significant difference in lower primary school teachers’ mathematics self-efficacy between public and private schools (t=1.817, df=2, p>0.05) at 0.05 significant level. There was a correlation between lower primary school teachers’ mathematics self-efficacy and pupils’ performance in mathematics. Lastly, Pearson’s Product Moment Correlation results indicated that there was a positive correlation between lower primary school teachers’ mathematics self-efficacy and teachers’ score in mathematics, teaching experience, and professional qualifications. It is recommended that there is need for concerted effort to enhance lower primary school teachers’ mathematics self-efficacy to improve mathematics performance in Kericho Sub-County.
CHAPTER ONE
INTRODUCTION AND CONTEXT OF THE STUDY

1.1 Introduction
This chapter presents introduction and context of the study which includes background of
the study, statement of the problem, purpose of the study, objectives of the study, research hypotheses, and significance of the study, delimitations and limitations of the
study, theoretical and conceptual frameworks, and operational definition of terms.

1.2 Background of the Study
Mathematics is a very important component of human activities and survival. It is useful
in science, technology, commerce, economics, and education. Research shows that the
acquisition and development of basic mathematical concepts and skills during early years
forms the foundation for future mathematics achievement. A study done by the National
Association for Education of Young Children (2002) affirmed that high quality,
challenging and accessible mathematics education for three to six years old children is
vital foundation for future mathematics learning. The association further reveals that
mathematics help children make sense of their world outside of school and help them
construct solid foundation for success in school. McKay (2002) argued that basic
numeracy skills acquired in early years have an impact in many facets of life such as
computer applications, space exploration, engineering, physics, economics, and
commerce among others.

Kenya Institute of Education Syllabus for pre-primary schools (2008) points out that a
young child should be introduced to basic mathematics concepts and skills such as
classification, number counting, number recognition, number value, number writing,
measurement, basic shape and basic computational skills such as addition, subtraction,
multiplication and division. Engaging children with a variety of measurement concepts is
a great beginning. For instance, children enjoy saying that they are bigger than their
sisters or brothers. Young children will also think that they have more in their cup simply
because their cup is taller. This type of language needs to be promoted and children need
teacher’s guidance to help them clear the misconceptions of these concepts through experimentation.

In Kenya, despite the importance of mathematics in school curricula and its applicability in many fields, many students have not found their feet in mathematics as a result of their perennial failure in the subject. The performance of students in mathematics at the Kenya Certificate of Primary Education (KCPE) and Kenya Certificate of Secondary Education (KCSE) has been low as compared to other compulsory subjects such as English and Kiswahili. According to Educational Network in Kenya (2011), mathematics is the most dreaded examination paper at KCSE examinations. In many schools, more than half of the students score grade “E” which represents total failure. The Education Network in Kenya (2011) further reveals that due to the poor results in mathematics; many students have developed a phobia for the subject to an extent that even when given simple examinations they fail.

The situation is not different in lower primary schools which form the basis for later mathematics learning and achievement. A survey conducted by Uwezo (2010) revealed that the majority of children in standard three in schools do not possess the mathematical skills required to enter that grade. The result further revealed that only 34% of the pupils in standard three can perform simple tasks that demonstrate numeracy and this may be attributed to teachers’ self-efficacy in mathematics. There was therefore, a need to establish teachers’ mathematics self-efficacy and find out whether pupils perform better in mathematics when their teachers’ mathematics self-efficacy is high or not.

Self-efficacy is how one feels about his/her ability to do his/her job (Richardson, 2011). Teacher self-efficacy is the teacher’s belief in his/her abilities to bring about desired outcomes of student engagement and learning (Tschannen-Moran and Wool, 2001). Teacher mathematics self-efficacy is the teacher’s confidence that he or she can help students to learn mathematics and achieve better scores. This study investigated lower primary school teachers’ mathematics self-efficacy and how it relates to their pupils’ mathematics performance in Kericho District.
Teacher mathematics self-efficacy may predict pupils’ achievement in mathematics. Research shows that teachers’ mathematics self-efficacy is a powerful predictor of how and whether he or she will act with students. Gibson & Dembo (1984) and Guskey (1988) report that teachers who have high self-efficacy tend to persist in failure situations, take more risks with the curriculum, use new teaching approaches to get better gains in children's achievement and have more motivated students. Research has also shown that teachers with high self-efficacy are capable of bringing about changes in pupils behavior, motivation, and learning which enables them to perform well in school (Richard, 2011).

This study investigated the relationship between teachers’ mathematics self-efficacy and pupils’ performance in mathematics and teachers’ mathematics self-efficacy.

Studies that have been done to assess teachers’ self-efficacy in mathematics show that it is affected by a number of factors such as teacher training, teaching experience, type of school and teachers’ score in mathematics at KCSE level. Ball, Lubienski and Mewborn (2001) found that teachers’ mathematics content knowledge as measured by his or her score in mathematics in school or college influenced their mathematics self-efficacy, with those who scored high grades being more efficacious towards mathematics than those who had low grades.

The Kenya National Examinations Council (2010) reports that performance in mathematics as a subject was poor due to teacher recruitment policy where some teachers who had failed mathematics in their KCSE are trained and employed in primary schools to teach mathematics. The teachers who failed in mathematics have low mathematics self-efficacy and will be incapable of bringing about changes in pupils behavior, motivation, and learning which will enable them to perform well in mathematics. This study investigated the relationship between lower primary school teachers’ mathematics self-efficacy and their pupils’ performance in mathematics in Kericho Sub-County, Kenya.
National Assessment System for Monitoring Learner Achievement (2010) found that pupils who were taught literacy by teachers with higher professional qualifications and many years of teaching experience performed better than pupils taught by teachers with lower professional qualifications and fewer years of experience. It was also revealed that pupils in private and urban schools tended to do better in both literacy and numeracy than those from public and rural schools. A study done by Education Quality Organization of the United States of America (2007) also showed that experienced teachers perform well than novice teachers in mathematics teaching.

Motivation of teachers and availability of teaching-learning resources leads to good academic performance. Mishra (2009) reveals that good working conditions and high motivation of teachers in private schools than in public schools make teachers in private preprimary schools to be more committed to their work in class leading to good academic performance. Ondimu (1988) investigated problems encountered by primary school teachers in teaching mathematics in lower primary classes in Migori Division. He found that some of the problems were over enrolment of pupils, lack of teaching and learning materials, and teachers were not offered refresher courses.

Another study by Wanyonyi (1987) on arithmetic computational errors made by class three, four and seven pupils in Webuye Division found that most computational errors were committed by class three primary school pupils. Irumbi (1990) investigated teachers’ and pupils’ characteristics that affect the performance of standard eight pupils in mathematics in Githunguri Zone and found that pupils’ performance in mathematics was not affected by teachers’ attitudes towards mathematics, qualifications (academic and professional) and teaching experience. None of the studies reviewed investigated teacher self-efficacy which was a very important variable in this study.

Although the above studies done in Kenya provide useful information on the factors affecting mathematics performance in Kenya, the studies did not consider a very important factor (teacher mathematics self-efficacy) which has been shown to be a very
important factor affecting learners’ performance in mathematics. This study therefore addressed the issue of teacher mathematics self-efficacy and how it relates to lower primary school pupils’ performance in mathematics.

1.2 Statement of the Problem
Mathematics is a core subject in the primary and secondary school syllabus. Studies reviewed have shown that the performance of mathematics as compared to other subjects has been poor at all levels of education in Kenya and due to the poor results in mathematics; many learners have developed a phobia for the subject which makes them to fail even in simple examinations.

Studies have also revealed that the majority of pupils in standard three in primary schools in Kenya do not possess the mathematical skills required to enter that grade (The Education Network in Kenya, 2011 and Uwezo, 2010). Research also has further shown that teachers with high mathematics self-efficacy are capable of bringing about changes in pupils behavior, motivation, and learning which enables them to perform well in school (Richardson, 2011). Despite the fact that there seems to be a connection between teachers’ self-efficacy in mathematics and pupils performance in mathematics, limited studies have been done in Kenya to investigate the relationship between lower primary school teachers’ mathematics self-efficacy and their pupils’ performance in mathematics.

Most of the studies done in Kenya have focused on the factors affecting mathematics performance such as the methods used by teachers to teach mathematics, availability of learning resources, teacher-pupil ratio, in-service training, and assessment practices (Wanyonyi, 1987; Irumbi, 1990). The present study therefore addressed the issue of teachers’ mathematics self-efficacy and investigated whether pupils perform better in mathematics when their teachers’ mathematics self-efficacy was high or not.
1.4 Purpose of the Study
The purpose of the study was to investigate the influence of lower primary school teachers’ mathematics self-efficacy on pupils’ mathematics achievement. It also explored the relationship between teachers’ mathematics self-efficacy and the factors which influence teachers’ self-efficacy. The factors that were investigated included type of school, professional qualifications, teaching experience, and mathematics score in KCSE examination.

1.5 Objectives of the Study
The objectives of the study were:

i) To find out the level of lower primary school teachers’ mathematics self-efficacy.

ii) To investigate the relationship between lower primary school pupils’ performance (achievement) in mathematics and their teachers’ mathematics self-efficacy.

iii) To determine the factors that may be influencing lower primary school teachers’ mathematics self-efficacy. The factors that were investigated were: Teaching experience, professional qualifications, type of school and score in mathematics in KCSE examinations.

1.6 Research Hypotheses
Ha1: There is a significant difference in teachers’ mathematic self-efficacy between public and private lower primary school teachers.

Ha2: There is a significant relationship between lower primary school pupils’ achievement in mathematics and their teachers’ mathematics self-efficacy.

Ha3: There is a significant relationship between lower primary school teachers’ mathematics self-efficacy and their mathematics scores in KCSE.

Ha4: There is a significant relationship between lower primary school teachers’ mathematics self-efficacy and their years of teaching experience.
Ha5: There is a significant relationship between lower primary school teachers’ mathematics self-efficacy and their professional qualifications.

1.7 Significance of the Study

The study provided very important information on the level of lower primary school teachers’ mathematics self-efficacy and how it relates to pupils’ performance in mathematics. The study also shed light on the factors which influence teachers’ self-efficacy in mathematics. School management may use the findings of the study to provide activities to improve teachers’ mathematics self-efficacy for example organizing seminars and workshops for teachers.

1.8 Delimitation and Limitations of the Study

They are described in the following sub-sections:

1.8.1 Delimitations of the Study

The study was done in Kericho Sub-County and targeted lower primary school teachers. There are many factors which may be contributing to poor achievement in mathematics in schools, this study was delimited to only teacher self-efficacy and how it relates to pupils’ achievement in mathematics. The factors influencing teachers’ self-efficacy that were addressed in this study were the type of school, professional qualifications, teaching experience, teacher training and teachers’ score in mathematics. The teachers’ mathematics score was limited to the grade the teachers’ scored in KCSE examinations.

1.8.2 Limitations of the Study

The major limitation of the study is that it was done with lower primary school teachers in Kericho Sub-county. The study was also focused evaluating teachers’ efficacy from their perspective.
1.9 Assumptions of the Study
The following assumptions guided this study: First, it was assumed that all lower primary school teachers in the district went through secondary education and possess KCSE certificate. Second, lower primary school teachers have positive attitudes towards mathematics and encourage pupils to do well in mathematics.

1.10 Theoretical and Conceptual Framework
The theoretical and conceptual frameworks of the study have been described in the following sub-sections.

1.10.1 Social Cognitive Theory (Bandura, 1977)
The Social Cognitive Theory was used to guide the study. According to Bandura (1986) two cognitive processes determine a person’s behavior. The processes are outcome expectancy and self-efficacy which is a variable in this study. Outcome expectancy influences one’s behavior and in this teachers’ behavior. On the other hand self-efficacy is one’s belief in his/her ability to perform the behavior in a given situation and when applied to this study it means that teacher’s belief that he/she can effectively teach mathematics. It also means that teachers who believe that they will successfully teach mathematics will be so compared to those who do not.

Bandura also reports that self-efficacy develops from four sources. The sources are: Enactive experience, vicarious experience, verbal persuasions, and physiological factors. In enactive experience, self-efficacy is attained by successfully performing the behavior during training. This means that teachers who are well trained on how teach mathematics will have high self-efficacy. Vicarious experience is obtained when teachers see model teachers successfully performing the behavior in this study teaching mathematics. Verbal persuasions develop self-efficacy when teachers are motivated to achieve better results. The physiological factors may promote or discourage teachers.
This theory was adopted for this study because of the concept of self-efficacy which is an independent variable in this study. The theory also helps one to understand human behavior. This means that teachers’ mathematics self-efficacy is influenced by teachers’ ability to use effective pedagogy to influence learners’ attitudes and interest towards mathematics. This study investigated the levels of lower primary school teachers’ mathematics self-efficacy.

1.10.2 Conceptual Framework

The literature reviewed points to some variables that are important in understanding teachers’ self-efficacy in mathematics. They are teacher training, professional qualifications, teaching experience, and score in mathematics. Figure 1.0 shown below illustrates some of the variables that are likely to influence teachers’ mathematics self-efficacy and subsequently impact on pupils’ achievement in mathematics.

Figure 1: Conceptual Framework Diagram
Figure 1 shows the factors which may be influencing teachers’ mathematics self-efficacy which include teachers’ professional qualifications, teachers’ mathematics score in KCSE, type of school and teachers’ teaching experience. Teacher self-efficacy in mathematics also impacts on children’s performance in mathematics.

1.11 Operational Definition of Terms

**Achievement in mathematics**: Pupils’ scores in mathematics in end of term examinations. The lowest mark will be 0, while the highest mark will be 100.

**Lower primary school**: Standard one to three.

**Mathematics score**: The grade a teacher scored in mathematics in KCSE examinations. The grades are: E, D-, D, D+, C-, C, C+, B-, B, B+, A-, A

**Self-Efficacy**: Belief in one’s ability to perform a task despite facing myriad of challenges.

**Type of school**: The type of sponsorship (public or private school, rural or urban).

**Teaching experience**: The number of years a teacher has been teaching.

**Teachers’ mathematics self-efficacy**: Teachers’ confidence that he or she can teach mathematics and help all pupils regardless of their learning ability to high scores in mathematics. Teachers’ beliefs on their abilities will range from nothing, very little, undecided, quite bit, and a lot.

**Teachers’ professional qualifications**: Highest level of professional training which includes; P1 certificate, Diploma in education, Bed, and Med.
CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction
In this chapter the literature reviewed relate to the study. First the teachers’ mathematics self-efficacy was discussed, followed by performance in mathematics, and teachers’ mathematics efficacy. Finally, the factors which may be influencing teacher efficacy in mathematics and studies done and their findings are discussed.

2.2 Teachers’ Mathematics Self-efficacy
According to Richardson (2011) efficacy has to do with how a teacher feels about his or her ability to do his/her job. Tschannen-Moran and Woolfolk (2001) define teachers’ efficacy as the teacher’s belief in his or her capabilities to bring about desired outcomes of student engagement and learning, even among students who may be difficult or unmotivated. Hackett and Betz (1989) defined mathematics self-efficacy as a situational or problem-specific assessment of an individual’s confidence in his or her ability to perform or accomplish a particular mathematics task or problem.

If a teacher feels confident that he or she can teach all students, regardless of their learning ability and achieve his/her objectives, then that teacher would be described as being highly efficacious (Cubukcu, 2008). Self-efficacy will be manifested in a teacher’s esteem and ability to effect positive change in the classroom (Osborne, Walker, & Rausch, 2002). According to Gordon (2001) and Scharlach (2008) highly efficacious teachers face their tasks with a great degree of optimism and are very confident in their ability to do that job well. They also have the ability to persist in difficult situations and turn the difficult situations around with successful results. This creates the need to investigate lower primary school teachers’ mathematics efficacy and how it relates with their pupils’ performance in mathematics.

Research has further shown that what teachers believe about their capability is a strong predictor of their effectiveness. Teachers who have high self-efficacy tend to persist in
failure situations through use of new teaching approaches (Gibson & Dembo 1984); take more risks with the curriculum (Guskey, 1988); make better gains in children’s achievement (Brookover et al 1979); and have more motivated students (Midgely et al, 1989). Gordon (2001) says that, teacher efficacy is sometimes considered to be an indicator or prediction of teaching effectiveness.

Henson (2001) argued that teacher efficacy is gaining renewed interest as an important psychological construct in understanding teacher motivation and teacher effectiveness. Peterson (1990) argued that the understanding of mathematics requires hard and concentrated work combined with acquisition of basic mathematical language and logical thinking skills. He added that the task of teaching mathematics requires teacher to build on what the children have acquired from home and facilitate the development of the concepts and skills by children through use of appropriate activities and materials hence the need for teachers to have high self-efficacy towards teaching mathematics in Kericho District.

Teachers’ self-efficacy towards mathematics has been shown to relate to teachers’ ability to use effective pedagogy to influence learners’ attitudes and interest towards mathematics. Pajares (1992) argued that teachers’ efficacy in mathematics is an important element in classroom mathematics learning and achievement because the beliefs that teachers hold about their mathematics abilities influence their perception and judgment, which in turn, affect their classroom behaviors when teaching mathematics. Wong and Lai (2007) added that teachers’ efficacy in mathematics influences the understanding on how teachers explain mathematics knowledge to learners, what they emphasize and what they do not and what methods they choose to help learners understand mathematics. While, Ernest (1991) argued that for learning in mathematics to be realized, children need to be actively engaged with mathematics, solving problems, discussing the mathematics in their own lives as well as broader social context.

Absence of teachers from school and lack of adequate teachers may be affecting pupils’ performance. According to a survey done by Uwezo (2010), in Kenya on any given day
13 out of 100 teachers are not in school and there is a shortage of four teachers per every public primary school in Kenya leading to high pupil-teacher ratio. The absence of teachers from school may be due to lack of motivation and low self-efficacy and this has a negative effect on children’s performance.

2.3 Teachers’ Mathematics Self-Efficacy and Pupils’ Performance in Mathematics
A number of studies that have been done to find out the relationship between teachers’ self-efficacy and pupils’ academic performance show that there is a strong and significant correlation between the two factors. Rimm-Kaufman (2004) observed that Teacher self-efficacy is a powerful construct that can influence student achievement as well as student motivation and student attitude towards learning. He added that a teacher’s self efficacy has a bearing on his or her effort, goals and aspirations which are closely related classroom behavior and practices as well as improved student performance.

Artistico, Cervone, & Pezzuti (2003) demonstrated that many cognitive domains and performances have proven to be significantly related to perceived self-efficacies. They reported that performance with computer-related tasks increased significantly with higher levels of self-efficacy and performance decreased significantly with lower self-efficacies. The study concluded that that perceived self-efficacy predicted results on problem solving tasks, even when comparing and considering young and older adults. It determined that participants with higher levels of self-efficacy outperformed other participants.

Teacher’s Self Efficacy has been shown to influence students to increase their learning motivations, to create a higher-level of sense of self and to develop better personal management skills (Tschannen-Moran & Hoy, 2007). Studies by Caparara, Barbaraneth, Steca & Malone (2006) and Özerkan (2007) asserted that teachers’ positive and high self-efficacy beliefs have impact on students' achievements and motivations. Ross (1998) added that Teacher’s self efficacy also contributes to promotion of student’s sense of efficacy, fostering their involvement in class activities and their efforts in facing
difficulties. While Guo, Piasta, Justice & Kaderavek (2010) showed that teachers’ self-efficacy has a positive and significant effect on children's vocabulary gains.

Adedeji (2008) did a study to examine the relationship between teachers’ self-efficacy, attitude, qualification, experience and pupils’ academic achievement in primary school mathematics. The participants in the study were 120 pupils and 254 primary school teachers selected through stratified random sampling technique from some primary schools in Ejigbo Local Government Areas of Osum State, Nigeria. The correlational analysis results showed that that among the teacher variables above, only teacher self-efficacy and teacher interest were significantly correlated with mathematics achievement outcomes (r=.267 and .313; P<.05, respectively).

In Kenya, a number of studies done show that there is poor performance in mathematics compared to other subjects across all school grades. A study commissioned by the Kenya National Examinations Council (KNEC, 2010) to monitor learner achievement for class three in literacy and numeracy revealed that only 52% of the standard three pupils were competent in solving mathematics problems. The KNEC report further reveals that both home and school environments contributed to the poor performance in mathematics and if the situation is not improved then there is a likelihood of continued poor performance in mathematics in later school life of the children. This is because educational skills are hierarchical and failure to acquire basic skills leads to failure in the acquisition of advanced skills.

Similarly, a study conducted by Uwezo (2010) showed that seven out of ten pupils in class three cannot do class two work and there was poor performance among lower primary school pupils in numeracy. The findings of the study showed that over 60% of standard three pupils in public schools do not have basic mathematics skills. The study further revealed that only 34% of pupils in standard three can perform simple tasks that demonstrate numeracy. Does lower primary school teachers’ mathematics self-efficacy
have a role to play in this trend? This is a question that remains unaddressed and forms the central theme of the present study.

2.4 Factors Influencing Lower Primary School Teachers’ Mathematics Self-Efficacy

Pajares (1992) stated that understanding the belief structures of teachers and teacher candidates is essential to improving their professional preparation and teaching practices” (p. 307). For all of these reasons, it is crucial that educational researchers further study the factors that influence teacher self-efficacy in order to determine what educators, colleges and others can do to help teachers gain a higher sense of teacher self-efficacy. Educational research in this field is not complete or as useful unless it provides insights into the relationship between teacher beliefs, teacher practices, teacher knowledge and student performance. This study therefore focused on understanding how factors such as teacher training, professional qualifications, teaching experience, type of school and teacher’s score in mathematics at KCSE level relate with lower teachers’ mathematics self-efficacy.

2.4.1 Teachers’ Professional Qualifications

There is a positive relationship between teachers’ professional qualifications and students’ performance in mathematics. Goldhaber and Brewer (2000) examined data on teacher qualification and their students' performance in mathematics and science. They observed a positive relationship between teachers' qualification and students’ performance in mathematics. They also found that students whose teachers were certified in mathematics but did not hold higher levels of professional qualification (post-secondary degree in mathematics) performed better than students whose teachers had low professional qualification (No post-secondary degree in mathematics). This study investigated teachers’ mathematics self-efficacy and teachers’ professional qualifications.

Similarly, A study done by Siegle and McCoach (2007) found that the provision of trained teachers has a direct relationship with increased students mathematics self-
efficacy leading to improved performance in mathematics. This is because teachers who are properly trained are capable of modifying their instructional strategies to produce more confident students not only more likely to attempt new tasks; they also work harder and persist longer in the face of difficulty. Sparks (1986) remark that peer observation training was more powerful at changing teacher’s behaviors than coaching or workshop-only activities.

Wenglinsky (2000) found that teachers with a major or minor in the subject area that they are assigned to teach produce greater gains in student achievement in both mathematics and science. This remained true even after controlling for teacher professional development, teacher classroom practices, class size, and student demographics. Interestingly, Hawk, Coble, and Swanson (1985) found that students with mathematics teachers assigned in-field scored higher and had greater gains than students with mathematics teachers’ assigned out-of-field which indicates a connection of content-knowledge, but not necessarily applying pedagogical knowledge to other content areas.

Despite the fact that the above studies showed that there was a strong positive correlation between teacher qualification and students performance in mathematics, a study by conducted by Hanushek & Luque (2000) disputed this notion. The study which surveyed the results of 113 studies on the impact of teachers’ qualifications on their students’ academic achievement showed that 85% of the studies found no positive correlation between the educational performance of the students and the teacher’s educational background. They added that only 7 % of the studies did find a positive correlation.

In Kenya, Irumbi (1990) did a study in Githunguri to compare teachers’ characteristics and class eight pupils’ performance in mathematics. The study showed that teacher’s qualification did not affect pupils’ performance in mathematics. In spite the fact that the study attempted to address how teacher qualification related to pupils performance in mathematics, the study did not show whether there was a relationship teachers’
mathematics self-efficacy and teacher’s professional qualification hence the need for the present study.

2.4.2 Teachers’ Teaching Experience

Teaching experience is one of the teacher characteristics which have been shown to have a lot of influence in the teacher’s ability to deliver content and ultimately affect learners’ achievement in school. A study by Greenwald, Hedges, and Laine (1996) showed that teaching experience had a positive and significant effect on student achievement. Busch (1995) showed that beginning teachers do not show more confidence as compared to experienced teachers in classroom instruction because the beginners are first and foremost concerned with issues of survival and adequacy and only later with mastery of teaching tasks. Similarly a study conducted by Education Quality Organization (2007) reported that experienced teachers were able to give their students more information and that the more experienced teachers were, the better they could keep the students in line and keep their attention focused on the work by making the students’ learning fun and purposeful.

However, a study by Hawkins, Stancavage, and Dossey (1998) showed that that although teaching experience appears to be related to student achievement, the relationship may not be linear because students whose teachers had fewer than five years of experience had lower levels of mathematics achievement, but there were no differences in mathematics achievement among students whose teachers had more than five years of teaching experience. This study was to investigate how teaching experience influence teachers mathematics self-efficacy. This trend was also observed by Education Quality Organization (2007). It argued that though teaching experience is an important characteristic of successful teachers, teachers with more teaching experience sometimes show burn outs associated with teaching the same things for many years and resistant to new methods.
In Kenya, Kang’ethe (1992) did a study to investigate teacher’s use of formal tests of achievement in mathematics in standard seven and eight of the primary schools in Githunguri Division, Kiambu County. The study was meant to provide information on how mathematical foundation was being established in primary schools and how the practice could be improved. The study revealed that despite their long teaching experience, teachers had language and mathematics difficulties in constructing tests.

2.4.3 Type of School
The type of school influences teacher’s motivation and ability to teach mathematics depending on resource allocation in the school, support given to the teachers, training opportunity provided, and job stability among other factors. According to Hackett and Betz (1989) The issues of ability of a school to have adequate resources for its programs, select and retain good teachers, use resources available effectively, define outcomes and expectations, be accountable to its clients in a competitive environment and entertain alternative curriculum have a great impact on the motivation and performance of the teacher in class. This therefore means that a school type with this ability can influence their teachers’ ability to deliver curriculum content and influence learners’ achievement.

Alijanian (2012) attempted to analyze the role of factors such as teachers’ working environment, experience, and gender on teachers’ beliefs about self-efficacy. For this purpose, 40 Iranian English as Foreign Language teachers (20 form public setting, and 20 from private setting) with different gender and work experience were chosen. A teacher self-efficacy scale and three open-ended questions were used to investigate the possible differences of teachers’ beliefs with respect to the variables mentioned. The results indicated that working environment, experience, and gender can effect teachers’ beliefs of self-efficacy significantly. On Work environment and self-efficacy comparison between teachers who taught at public schools and those in private institute showed that the difference between the means of these two groups was significant (p = .000).
A study done by Dwana (2009) to examine the difference in the effects of teacher efficacy on student achievement in Title I and Non-Title I schools. The correlation analysis results showed that there was a positive relationship between teacher efficacy and math scores and efficacy of instructional strategies and math scores. However, when the scores were subjected to t-test, the results indicated that there was no significant difference in the mean scores of Title I and Non-Title I teachers on the overall efficacy scale, nor in the three dimensions.

Despite the fact that the above studies showing some relationship between teacher efficacy and type of school, limited studies have been done in Kenya to find out whether there is a difference in lower primary school teachers’ mathematics self-efficacy between teachers from private and those from public schools. The present study attempted to address this research gap.

### 2.4.4 Teachers’ Score in Mathematics

The teachers’ scores in mathematics in secondary and college levels have been shown to demonstrate their knowledge and ability in the mathematics subject content matter. Ball (1991) and Shulman (1986) remark that mathematics content knowledge refers to the teacher’s mathematics achievement and courses taken in secondary and college levels. However, they observed that although many researchers assumed that teachers’ pedagogical content knowledge is influenced by their subject–matter knowledge, the interrelationship between the two is not clear enough.

Successful teachers have a vast repertoire of instructional strategies and techniques that reflect their knowledge of the subject. According to Slick (1995), successful teachers are those that consciously reflect upon, conceptualize, and apply understandings from one classroom experience to the next. Teaching of mathematics requires continuous reflection and decision making before, during, and after classroom instruction (Berliner and Biddle, 1995; Colton and Spark – Langer, 1993, Costa, 1995; Pultorak, 1996).
Though this study is beneficial to understanding one of the causes of poor performance in mathematics in Kenya, it was limited because it focused on primary level of education and was general. There is therefore need for a study to address the issue of whether teacher’s previous score in mathematics was related to teachers’ mathematics self-efficacy. The present study was therefore to find out whether teachers’ mathematics score in KCSE was related to teachers’ mathematics self-efficacy.

2.5 Summary of Literature Review

Studies reviewed have shown that Mathematics is important in many fields like in science, commerce, economics, education and humanities and it is all about finding solutions to problems. Research has shown that the acquisition and development of basic mathematical concepts and skills during early years forms the foundation for future mathematics performance and achievement.

The reviewed literature showed that despite the obvious importance of mathematics in school curriculum and its wide applicability in daily life activities, many pupils are still performing poor in mathematics. Researchers have over the years carried out researches on factors that contribute to poor performance in mathematics at primary and secondary schools. These factors range from shortage of qualified teachers, poor facilities, lack of equipment and instructional materials, assessment methods and negative attitudes towards mathematics. However, just a few studies have looked at teachers’ self-efficacy in mathematics and learner’s performance, hence the need for a study to investigate teachers’ mathematics self-efficacy and pupils’ performance in mathematics.

Research has also shown that teachers’ self-efficacy in mathematics is affected by several factors including the type of school, teachers’ mathematics content knowledge, teacher training and teaching experience. However, research particularly in the Kenyan context is being silent about how these factors relate to teachers’ self-efficacy in mathematics in lower primary schools. The choice of lower primary school culminated from the fact that it is the foundation of any advancement in mathematics and in the educational system.
CHAPTER THREE
METHODOLOGY OF THE STUDY

3.1 Introduction
This chapter presents the methodology that was used in this study. It includes research design, variables, location of the study, target population, sampling technique and sample size, research instruments, pilot study, data collection procedures, data analysis procedures, and logistical and ethical considerations.

3.2 Research Design
The study employed correlation design to measure the extent to which variables were related. The design was used to find out the relationship between the dependent variable (pupils’ achievement in mathematics) and the independent variables. The design was appropriate for the study as the researcher could not directly manipulate the independent variables to determine its effect on pupils’ achievement in mathematics.

3.3 Research Variables
In the present study, the research variables that were measured are described in the following subsections:

3.3.1 Independent Variables
The independent variables in this study were:

i. Lower primary school teachers’ mathematics self-efficacy: It refers to the teachers’ confidence that they can teach mathematics to all pupils regardless of their learning ability and achieve high scores in mathematics.

ii. Teachers’ mathematics scores: This was measured by determining the mathematics grade that the teacher scored in the Kenya Certificate of Secondary Education examinations. The normal grading system is in form of A, B+, B, B-, C+, C, C-, D+, D, D- and E.
iii. Type of school: This was determined by the sponsorship of the school: Public and private primary schools. Schools run by religious organizations were categorized as private.

iv. Teaching Experience: This was measured by determining the number of years that the teachers have taught. The range was five years and below, and six years and above.

v. Teacher professional qualifications: It refers to the teacher’s highest level of professional training. It includes p1 certificate, Diploma in education, Bed and Med.

3.3.2 Dependent Variable

The dependent variable for the study was lower primary school pupils’ performance (achievement) in mathematics or end of term scores in mathematics. It was measured by obtaining pupils average scores in end of term mathematics scores from class progress records. The mathematics test was district mock examinations which were done by all schools.

3.4 Location of the Study

The study was carried out in primary schools in Kericho District, in Kericho County. Kericho district is situated in the South Rift Valley and it borders Kipkelion District to the East, Kericho West District to the West, Bureti District to the South and Nandi District to the North.

The sub-county was chosen for the study because mathematics is poorly performed in both primary and secondary schools. The district has two divisions (Ainamoi and Soin divisions). There are a total of 152 primary schools in the district both private and public. Ainamoi as a division has 107 primary schools, while Soin division has 45 primary schools.
3.5 Target Population
The population for this study consisted of all lower pre-primary school teachers teaching in primary schools in Kericho District and their pupils. The target population was class three teachers and pupils in the district. There were a total of 456 lower primary school teachers in 152 primary schools in the district.

3.6 Sampling Technique and Sample Size
The sampling technique and sample size for the study are described below.

3.6.1 Sampling Technique
Purposive random sampling was used to select Kericho Sub-county. Stratified random sampling technique was used to select 25% of the primary schools in the sub-county to form the sample of the study. Before selecting the sample of the study, the researcher prepared a list of primary schools in the sub-county, showing public and private and local and urban. All class teachers and their pupils in the 25% of the school sampled were selected.

3.6.2 Sampling Size
The sample consisted of 40 standard three teachers in the selected primary schools in private and public, rural and urban primary schools in Kericho District. The sampling frame is presented in Table 3.1
Table 3.1 Distribution of Sample Size of Schools Per Division

<table>
<thead>
<tr>
<th>Division</th>
<th>Type of school</th>
<th>Total No. of Schools</th>
<th>No. of Lower primary school Teachers</th>
<th>No. of Schools selected for the study</th>
<th>No. of lower primary school teachers from selected schools</th>
<th>No. of Teachers Selected for the study</th>
<th>No. of Children in the selected lower primary classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ainamoi</td>
<td>Public (Rural and Urban)</td>
<td>62</td>
<td>186</td>
<td>15</td>
<td>45</td>
<td>15</td>
<td>335</td>
</tr>
<tr>
<td></td>
<td>Private (Rural and Urban)</td>
<td>45</td>
<td>135</td>
<td>11</td>
<td>33</td>
<td>11</td>
<td>248</td>
</tr>
<tr>
<td>Soin</td>
<td>Public (Rural and Urban)</td>
<td>38</td>
<td>144</td>
<td>12</td>
<td>36</td>
<td>12</td>
<td>326</td>
</tr>
<tr>
<td></td>
<td>Private (Rural and Urban)</td>
<td>7</td>
<td>21</td>
<td>2</td>
<td>6</td>
<td>3</td>
<td>83</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>152</td>
<td>456</td>
<td>40</td>
<td>120</td>
<td>40</td>
<td>992</td>
</tr>
</tbody>
</table>

Table 3.1 shows that a total of 40 lower primary school teachers were selected for the study. It also shows that 992 lower primary school pupils in the selected classes were also sampled.

3.7 Research Instruments
They have been described in the following sub-sections.

3.7.1 Questionnaire for Teachers
Section A of the questionnaire collected background information such as the type of school, teacher training, teaching experience and teacher mathematics score. Section B consisted of teachers’ mathematics self-efficacy scale.
3.7.1.1 Scoring of the Questionnaire
Section A of the instrument was analyzed using qualitative methods. The responses in section B were scored as follows: Nothing=1, Very little=2, Undecided=3, Quite bit = 4, A lot = 5. Teachers’ average scores in mathematics self-efficacy were calculated. There were a total of 14 items each with five points and thus to calculate average scores for each item were added and then divided by the number of respondents. Overall mean scores were finally calculated by adding the mean scores for all the items and then divided by the number of items in the instrument.

3.7.2 Interview Schedule for Teachers
Interview schedules for lower primary schools were used to collect data to verify information obtained through the questionnaire regarding teacher mathematics self-efficacy. The interview schedule consisted of two sections A and B. Section A collected background information, while section B collected information on what teachers do, to promote children’s performance in mathematics. The teachers with high and low mathematics self-efficacy were interviewed by the researcher to establish what they do when their pupils have not understood what they have taught, make pupils to believe they can do well in mathematics, help pupils to love mathematics, help pupils who fail in mathematics, assist families to help their children to do well in mathematics, and when pupils do not do homework. They were also asked to give reasons why children perform poor in mathematics. The data was analyzed using qualitative methods.

3.7.3 Pupils’ Achievement in Mathematics Proforma
Pupils’ achievement in mathematics was obtained from class progress records at the end of the school term. The mathematics scores were then recorded in the Proforma. The Proforma consisted of two sections A and B. Section A collected background information while section B collected pupils’ scores in mathematics.
3.8 Pilot Study
Pilot study was undertaken in four primary schools (two private and two public primary schools and also one rural and urban). The teachers in the pilot study were not included in the final list of teachers in the actual study. Pilot study was done to test the appropriateness of the test items and enhance the validity and reliability of the instruments.

3.8.1 Reliability of the Instrument
Reliability of the instruments was tested using test-retest method. The instruments were administered twice to the same teachers within duration of two weeks and the responses of the teachers were compared to determine if the two sets of scores were correlated. The reliability was calculated using Pearson Correlation and the accepted correlation coefficient was over 0.7.
Table 3.2 1Reliability Test Results

<table>
<thead>
<tr>
<th>Item No</th>
<th>Questionnaire Items</th>
<th>Pearson’s’ (r) First Test</th>
<th>Pearson’s’ (r) Second Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Getting pupils to follow classroom rules</td>
<td>+.737</td>
<td>+.738</td>
</tr>
<tr>
<td>2</td>
<td>Calming disruptive or noisy pupils</td>
<td>+.673</td>
<td>+.673</td>
</tr>
<tr>
<td>3</td>
<td>Responding to defiant pupils</td>
<td>+.596</td>
<td>+.598</td>
</tr>
<tr>
<td>4</td>
<td>Establishing routines for smooth mathematics activities</td>
<td>+.689</td>
<td>+.689</td>
</tr>
<tr>
<td>5</td>
<td>Providing alternative explanation/example to confused pupils</td>
<td>+.784</td>
<td>+.784</td>
</tr>
<tr>
<td>6</td>
<td>Responding to difficult questions from pupils</td>
<td>+.892</td>
<td>+.894</td>
</tr>
<tr>
<td>7</td>
<td>Adjusting mathematics lessons to individual pupil level</td>
<td>+.768</td>
<td>+.768</td>
</tr>
<tr>
<td>8</td>
<td>Gauging pupils’ understanding of what have been taught</td>
<td>+.743</td>
<td>+.743</td>
</tr>
<tr>
<td>9</td>
<td>Providing appropriate challenges to first learners</td>
<td>+.684</td>
<td>+.684</td>
</tr>
<tr>
<td>10</td>
<td>Getting pupils to believe that they can do well</td>
<td>+.755</td>
<td>+.756</td>
</tr>
<tr>
<td>11</td>
<td>Helping pupils to love mathematics</td>
<td>+.823</td>
<td>+.823</td>
</tr>
<tr>
<td>12</td>
<td>Motivating children to show interest in mathematics</td>
<td>+.756</td>
<td>+.756</td>
</tr>
<tr>
<td>13</td>
<td>Assisting families to help their children do well in mathematics</td>
<td>+.676</td>
<td>+.678</td>
</tr>
<tr>
<td>14</td>
<td>Improving the understanding of children who fail in mathematics</td>
<td>+.743</td>
<td>+.743</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td>+.736</td>
<td>+.738</td>
</tr>
</tbody>
</table>

Table 3.3 shows that the questionnaire was reliable with an average Pearson’s correlation coefficient of .74.
3.8.2 Validity of the Instrument
According to Best (1992), a test is valid if it measures what it claims to measure. Content validity was used to test the validity of the instruments. Content validity refers to the degree to which a test actually measures the traits for which it is designed measure. Content validity was achieved by ensuring that items of the instruments covered all variables and objectives of the study.

3.9 Data Collection Procedures

3.9.1 Administration of Research Instruments
The researcher after piloting the instruments administered the instruments in schools in three stages as follows:

Stage I: Administration of the questionnaire to lower primary school teachers in their respective schools. Before collecting the questionnaires, the researcher ensured that respondents provided all the information required.

Stage II: Interview teachers with high and low mathematics self-efficacy to establish what they do when their pupils have not understood what they have taught, make pupils to believe they can do well in mathematics, help pupils to love mathematics, help pupils who failed in mathematics, assist families to help their children to do well in mathematics, and when pupils don’t do homework. They were also asked reasons why children perform poor in mathematics.

Stage III: Obtaining Pupils’ Mathematics Achievement from class progress records.

Pupils’ scores were obtained from the class teachers and recorded in the Proforma for easy analysis.

3.9.2 Logistical and Ethical Considerations
The researcher obtained a letter from the office of the Dean Graduate School, Kenyatta University to take to the Ministry of Higher Education, Science and Technology. A research permit was obtained from the Ministry of Higher Education, Science and
Technology and then Kericho District Education Office was informed about the impending research and requested for permission to visit the selected schools to collect data from lower primary school teachers. Various head teachers and managers of selected private and public schools were informed about the research and their permission and co-operation sought. Confidentiality of teachers’ identity and information was strictly maintained and the information from this study was only used for research.

3.10 Data Analysis

Data was analyzed using descriptive and inferential statistics. Descriptive statistics that were to be calculated were frequencies, means and percentages. The inferential statistics used were t-test and Pearson’s Product Moment Correlation. The t-test was used to test whether the difference in teachers’ mathematic self-efficacy between public and private lower primary school teachers was significant. Pearson’s Product Moment Correlation was to measure the relationships between lower primary school pupils’ achievement in mathematics and their teachers’ mathematics self-efficacy. It was also to be used to measure the relationship between teachers’ mathematics self-efficacy and their scores in mathematics in KCSE, teaching experience, and professional qualifications. In H_{01} t-test for independent samples was used while in H_{02}, to H_{05} Pearson’s Product Moment Correlation was used.

3.10.1 Statistical Hypotheses

H_{01}: There is no significant difference in teachers’ mathematic self-efficacy between public and private lower primary school teachers. A t-test for independent variables was used to test the difference at 0.05 level of significance.

H_{02}: There is no significant relationship between lower primary school pupils’ achievement in mathematics and their teachers’ mathematics self-efficacy. A t-test for independent samples was used to test the difference at 0.05 level of significance.
\textbf{H}_{03}: There is no significant relationship between lower primary school teachers’ mathematics self-efficacy and their mathematics scores in KCSE. Pearson’s Product Moment Correlation was used measure the relationship at 0.05 level of significance.

\textbf{H}_{04}: There is no significant relationship between lower primary school teachers’ mathematics self-efficacy and their years of teaching experience. Pearson’s Product Moment Correlation was used measure the relationship at 0.05 level of significance.

\textbf{H}_{05}: There is no significance relationship between lower primary school teachers’ mathematics self-efficacy and their professional qualifications. Pearson’s Product Moment Correlation was used measure the relationship at 0.05 level of significance.
CHAPTER FOUR
DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction
This chapter presents summary of findings and discussions according to the objectives and hypotheses of the study. The objectives of the study were:

i) To find out the level of lower primary school teachers’ mathematics self-efficacy.

ii) To investigate the relationship between lower primary school pupils’ performance in mathematics and their teachers’ mathematics self-efficacy.

iii) To determine the relationship between lower primary school teachers’ mathematics self-efficacy and the factors that may be influencing teacher efficacy. The factors that were investigated were: Teaching experience, professional qualifications, and score in mathematics in KSCE examinations.

The demographic information of the respondents is presented first followed by descriptive and inferential results from data analysis which are presented and discussed in the following subsections.

4.2 Demographic Information
They are the number of respondents, professional qualifications, teaching experience, and mathematics grade in KCSE examinations. They are described in the following sections.

4.2.1 Number of Respondents
In this study, teachers in forty lower primary schools both public and private were sampled. The distribution of the respondents by school type was obtained. Table 4.1 shows that out of the 40 respondents, 67.5% of the respondents were from public lower primary schools while 32.5% were from private lower primary schools. The result shows that the majority of the respondents were teachers from public lower primary school.
Table 4.1 Number of Respondents by School Type

<table>
<thead>
<tr>
<th>School Type</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Public Rural</td>
<td>17</td>
<td>42.5</td>
</tr>
<tr>
<td>b) Public Urban</td>
<td>10</td>
<td>25</td>
</tr>
<tr>
<td>c) Total Public</td>
<td>27</td>
<td>67.5</td>
</tr>
<tr>
<td>d) Private Urban</td>
<td>09</td>
<td>22.5</td>
</tr>
<tr>
<td>e) Private Rural</td>
<td>04</td>
<td>10</td>
</tr>
<tr>
<td>f) Total Private</td>
<td>13</td>
<td>32.5</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100</td>
</tr>
</tbody>
</table>

4.2.2 Professional Qualifications

The teachers’ professional qualifications were also determined and results are presented in Table 4.2.

Table 4.2 Distribution of Lower Primary School Teachers’ Professional Qualifications

<table>
<thead>
<tr>
<th>Qualification</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certificate</td>
<td>26</td>
<td>65</td>
</tr>
<tr>
<td>Diploma</td>
<td>11</td>
<td>27.5</td>
</tr>
<tr>
<td>B.ED</td>
<td>03</td>
<td>7.5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>40</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4.2 shows that 65% of the teachers were certificate holders, 27.5% diploma holders, while 7.5% of the teachers were B.ED holders. Results reveal that the majority of the lower primary school teachers possessed Certificate in Education.
4.2.3 Teaching Experience
The numbers of years the teachers have served was also investigated and the result is presented in Table 4.3.

<table>
<thead>
<tr>
<th>Experience</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 5 Years</td>
<td>15</td>
<td>37.5</td>
</tr>
<tr>
<td>6-10 Years</td>
<td>12</td>
<td>30</td>
</tr>
<tr>
<td>11-15 Years</td>
<td>08</td>
<td>20</td>
</tr>
<tr>
<td>16-20 Years</td>
<td>05</td>
<td>12.5</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4.3 shows that 37.5% of the teachers involved in the study had teaching experience of below five years, 30% 6-10 years, 20% 11-15 years, while 12.2% of the teachers had 16-20 years of teaching experience. The results show that the majority of teachers had less than five years of teaching experience.

4.2.4 Mathematics Grade in KCSE Examinations
The teachers’ mathematics grade in KCSE examinations was obtained and the results are presented in Table 4.4.
Table 4.4 Distribution of Teachers’ Mathematics Grade in KSCE Examinations

<table>
<thead>
<tr>
<th>Grade</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>03</td>
<td>7.5</td>
</tr>
<tr>
<td>C+</td>
<td>05</td>
<td>12.5</td>
</tr>
<tr>
<td>C</td>
<td>08</td>
<td>20</td>
</tr>
<tr>
<td>C-</td>
<td>04</td>
<td>10</td>
</tr>
<tr>
<td>D+</td>
<td>10</td>
<td>25</td>
</tr>
<tr>
<td>D</td>
<td>03</td>
<td>7.5</td>
</tr>
<tr>
<td>D-</td>
<td>07</td>
<td>17.5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>40</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4.4 shows that 7.5% of the teachers scored B, 12.5% C+, 20% C, 10% C-, 25% D+, 7.5% D, while the remaining 17.5% had scored D-. The results show that the majority of the teachers scored grade C- and below.

4.3 Lower Primary School Teachers’ Mathematics Self-efficacy

The first objective of the study was to find out the levels of lower primary school teachers’ mathematics self-efficacy. The study investigated the level of lower primary school teachers’ mathematics self-efficacy in 14 areas of basic mathematics pedagogy. To establish the level of teachers’ mathematics self-efficacy, self-efficacy mean scores were calculated and results are presented in Table 4.5.
Table 4.5 Teachers’ Mathematics Self-efficacy

<table>
<thead>
<tr>
<th>EFFICACY AREAS</th>
<th>PRIMARY SCHOOL TEACHERS’ MATHEMATICS SELF EFFICACY</th>
<th>Frequency Obtained in a 5-Point Likert Scale</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Getting pupils to follow classroom rules</td>
<td></td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>Calming disruptive or noisy pupils</td>
<td></td>
<td>4</td>
<td>15</td>
</tr>
<tr>
<td>Responding to defiant pupils</td>
<td></td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>Establishing routines for smooth mathematics activities</td>
<td></td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>Providing alternative explanation/example to confused pupils</td>
<td></td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Responding to difficult questions from pupils</td>
<td></td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>Adjusting mathematics lessons to individual pupil level</td>
<td></td>
<td>4</td>
<td>13</td>
</tr>
<tr>
<td>Gauging pupils’ understanding of what have been taught</td>
<td></td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>Providing appropriate challenges to first learners</td>
<td></td>
<td>6</td>
<td>17</td>
</tr>
<tr>
<td>Getting pupils to believe that they can do well</td>
<td></td>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td>Helping pupils to love mathematics</td>
<td></td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>Motivating children to show interest in mathematics</td>
<td></td>
<td>5</td>
<td>14</td>
</tr>
<tr>
<td>Assisting families to help their children do well in mathematics</td>
<td></td>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>Improving the understanding of children who fail in mathematics</td>
<td></td>
<td>5</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>58</td>
<td>182</td>
</tr>
<tr>
<td>Overall Mean Score</td>
<td></td>
<td>4.1</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 4.5 shows that lower primary school teachers in Kericho District had low mathematics self efficacy (M=2.64). The table also shows the teachers’ self-efficacy levels varies with ability to respond to defiant children in mathematics lesson getting the highest score (M=2.95), while ability to establish routines for smooth mathematics activities and responding to difficult questions from pupils getting the lowest score at M=2.28 and M=2.24 respectively.
The findings of this study are inconsistent with a study done by Jaggernauth (2010) which was done to find out the relationship between mathematics anxiety, mathematics teachers self-efficacy and mathematics avoidance. The study showed that 97.9% of the teachers studied indicated that they continuously find better ways to teach mathematics while only 10.3% indicated that they believed that they did not know how to make students like mathematics. Additionally, the study showed that while 76.5% of the teachers agreed they believed that they had the necessary skills to teach mathematics, only 7.4% did not agree that they had the necessary skills. This means that in Jaggernauth (2010) study, most teachers who were studied had high mathematics self-efficacy.

4.4 Teachers’ Mathematics Self-Efficacy and Pupils’ Performance in Mathematics
The study intended to find out the relationship between lower primary school pupils’ performance (achievement) in mathematics and their teachers’ mathematics self-efficacy. To establish the relationship between lower primary school pupils’ performance in mathematics and their teachers’ mathematics self-efficacy, pupils’ average performance mathematics performance per school was calculated and presented alongside their teachers’ mathematics self-efficacy. Table 4.6 summarizes the findings.
Table 4.6 Overall Means of Lower Primary School Teachers’ Mathematics Efficacy And Pupils Performance By School

<table>
<thead>
<tr>
<th>School Code</th>
<th>Mean Score Teachers' Maths Self Efficacy</th>
<th>School Code</th>
<th>Mean Score Schools' Average Maths Score</th>
<th>School Code</th>
<th>Mean Score Teachers' Maths Self Efficacy</th>
<th>School Code</th>
<th>Mean Score Schools' Average Maths Score</th>
<th>School Code</th>
<th>Mean Score Teachers' Maths Self Efficacy</th>
<th>School Code</th>
<th>Mean Score Schools' Average Maths Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>1.29</td>
<td>46</td>
<td>2.37</td>
<td>67</td>
<td>2.57</td>
<td>74</td>
<td>3.00</td>
<td>64</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>02</td>
<td>2.36</td>
<td>60</td>
<td>2.42</td>
<td>60</td>
<td>2.50</td>
<td>72</td>
<td>3.43</td>
<td>75</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>03</td>
<td>2.21</td>
<td>65</td>
<td>2.21</td>
<td>59</td>
<td>2.71</td>
<td>69</td>
<td>3.21</td>
<td>70</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>04</td>
<td>1.57</td>
<td>54</td>
<td>2.50</td>
<td>71</td>
<td>2.54</td>
<td>66</td>
<td>3.14</td>
<td>69</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>05</td>
<td>2.07</td>
<td>63</td>
<td>2.28</td>
<td>70</td>
<td>2.71</td>
<td>64</td>
<td>3.57</td>
<td>66</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06</td>
<td>1.86</td>
<td>65</td>
<td>2.86</td>
<td>65</td>
<td>2.64</td>
<td>68</td>
<td>3.79</td>
<td>65</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>07</td>
<td>2.14</td>
<td>79</td>
<td>2.14</td>
<td>64</td>
<td>2.93</td>
<td>79</td>
<td>3.71</td>
<td>68</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>08</td>
<td>2.14</td>
<td>67</td>
<td>2.9</td>
<td>60</td>
<td>2.79</td>
<td>60</td>
<td>3.64</td>
<td>75</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>09</td>
<td>2.071</td>
<td>75</td>
<td>2.64</td>
<td>58</td>
<td>2.92</td>
<td>67</td>
<td>4.29</td>
<td>78</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>2.071</td>
<td>68</td>
<td>2.50</td>
<td>57</td>
<td>2.64</td>
<td>65</td>
<td>4.07</td>
<td>76</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>19.78</td>
<td>642</td>
<td>24.8</td>
<td>631</td>
<td>26.97</td>
<td>684</td>
<td>35.85</td>
<td>706</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MEAN</td>
<td>1.98</td>
<td>64.2</td>
<td>2.49</td>
<td>63.1</td>
<td>2.70</td>
<td>68.4</td>
<td>3.59</td>
<td>70.6</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 4.6 shows that in most schools, the higher the teachers’ mathematics self-efficacy, the higher the performance of pupils in mathematics. The results also show that whereas schools 039 and 040 whose teachers were highly efficacious in mathematics at M=4.27 and M=4.07 had high mathematics means score of 78% and 76% respectively. On the other hand schools 01 and 04 whose teachers had low self-efficacy in mathematics at M=1.29 and M=1.57 had mathematics means scores of 46% and 54% respectively. The results imply that there was an association between lower primary school teachers’ mathematics self-efficacy and pupils’ performance in mathematics.

Based on the study objectives, the study intended to establish whether there was a statistically significant relationship between lower primary school pupils’ achievement in mathematics and their teachers’ mathematics self-efficacy. The following hypothesis was formulated and tested:

\[ H_0: \text{There is no significant relationship between lower primary school pupils' achievement in mathematics and their teachers' mathematics self-efficacy.} \]

Chi-square was used to find out whether the relationship between lower primary school pupils’ achievement in mathematics and their teachers’ mathematics self-efficacy was significant. Table 4.7 shows the Chi-Square results.

Table 4.7: Chi-square results on the relationship between lower primary school teachers’ mathematics self-efficacy and pupils’ performance in mathematics

<table>
<thead>
<tr>
<th>Chi-square results</th>
<th>Relationship between Primary School Teachers’ mathematics self-efficacy and pupils’ performance in mathematics.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Square</td>
<td>4.789</td>
</tr>
<tr>
<td>Df</td>
<td>3</td>
</tr>
<tr>
<td>Assump. Sig</td>
<td>0.021</td>
</tr>
</tbody>
</table>

P<0.05
Table 4.9 shows that there was a significant relationship between pupils’ performance in mathematics and most lower primary school teachers’ mathematics self-efficacy areas with a high significant level found in teachers’ ability to establish routines for smooth mathematics activities (p=0.021, p<0.05). This implies that the null hypothesis that there is no significant relationship between pupils’ performance in mathematics and most lower primary school teachers’ mathematics self-efficacy was rejected.

From the analysis above, it can be concluded that the most influential teachers’ mathematics self efficacy characteristic to pupils achievement are establishing routines for smooth mathematics activities, adjusting mathematics lessons to individual pupil level and motivating children to show interest in mathematics.

The above research findings are consistent with the findings of Siegle & Coach (2007) who posited that the provision of trained teachers has a direct relationship with increased student’s mathematics self-efficacy leading to improved performance in mathematics. This is because teachers who are properly trained are capable of modifying their instructional strategies to produce more confident students not only more likely to attempt new tasks; they also work harder and persist longer in the face of difficulty. The study findings are also consistent with a study findings by Tsachannen-Moran and Hoy (2001) which discovered a correlation between teachers’ self-efficacy beliefs, effective teaching and improved students’ achievement. Gibson and Dimbo (1984) also affirmed that high self-efficacy in teachers positively influences children motivation and performance.

### 4.5 Lower Primary School Teachers’ Mathematics Self-Efficacy by School Type

The study intended to investigate how lower primary school teachers’ mathematics self-efficacy varied between teachers in private and public schools. The overall mean scores for teachers’ mathematics self-efficacy in public and private lower primary schools were calculated. The results obtained are presented in table 4.8.
Table 4.8: Overall Means of Lower Primary School Teachers’ Mathematics Self-Efficacy by School Type

<table>
<thead>
<tr>
<th>Efficacy Area</th>
<th>Public School</th>
<th>Private School</th>
</tr>
</thead>
<tbody>
<tr>
<td>Getting pupils to follow classroom rules</td>
<td>Min</td>
<td>Max</td>
</tr>
<tr>
<td>Calming disruptive or noisy pupils</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Responding to defiant pupils</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Establishing routines for smooth mathematics activities</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Providing alternative explanation/example to confused pupils</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>responding to difficult questions from pupils</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>adjusting mathematics lessons to individual pupil level</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>gauging pupils understanding of what have been taught</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>providing appropriate challenges to first learners</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>getting pupils to believe that they can do well</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>helping pupils to love mathematics</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>motivating children to show interest in mathematics</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>assisting families to help their children to do well in mathematics</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>improving the understanding of children who fail in mathematics</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td><strong>Overall Mean Score</strong></td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>
Table 4.8 shows that the overall mean score of lower primary school teachers’ mathematics self-efficacy in public lower primary schools was 2.63, while that of teachers in private lower primary schools was 2.81. From the results it can be concluded that private lower primary school teachers had slightly higher mathematics self-efficacy compared to public lower primary school teachers. The results also shows that the highest mean score for public and private lower primary school teachers’ mathematics self-efficacy were in responding to defiant pupils (M=2.93) and establishing smooth routines for mathematics activities (M=3.46) respectively. It also shows that the lowest score in public lower primary school teachers was in the area of responding to difficult questions from pupils and providing appropriate challenges to first learners (M=2.41); while the lowest score in private lower primary school teachers is in the area of providing appropriate challenges to first learners (M=2.30).

To understand whether there was a significant difference in teachers’ mathematic self-efficacy between public and private lower primary school teachers. The following hypothesis was generated and tested:

**H₀₂: There is no significant difference in teachers’ mathematics self-efficacy between public and private lower primary school teachers.**

The independent samples t-test was used to establish whether there was a difference in teachers’ mathematics self-efficacy between public and private lower primary school teachers. Table 4.9 presents the results.
Table 4.9 Independent Samples T-Test for Equality of Means

<table>
<thead>
<tr>
<th>Levene's Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>F  Sig.</td>
<td>t  df  Sig. (2-tailed)</td>
<td>Mean Difference</td>
</tr>
<tr>
<td>Equal variances assumed</td>
<td>4.06 .05 -1.82 26 .081 -.18 .10 -.39 .024</td>
<td></td>
</tr>
<tr>
<td>Equal variances not assumed</td>
<td>-1.82 18.58 .084 -.18 .010 -.39 .028</td>
<td></td>
</tr>
</tbody>
</table>
Table 4.9 shows that the difference in the means between public and private lower primary school teachers’ mathematics self-efficacy was 0.10 with -0.08 level of significance. This therefore implies that the null hypothesis which states that there is no significant difference in teachers’ mathematic self-efficacy between public and private lower primary school teachers was upheld.

These results are consistent with the findings of a study conducted by Jaggernauth (2010) which showed that although majority of the teachers (97.9%) had high mathematics self-efficacy, there was no significant difference in teachers’ mathematics self-efficacy between teachers by school type (F=1.539, p=.202).

The findings are also consistent with the results of a study done by Alijanian (2012) to analyze the role of factors such as teachers’ working environment, experience, and gender on teachers’ beliefs about self-efficacy. The study which selected sampled 20 teachers from public and 20 from private schools showed that Work environment and self-efficacy comparison between teachers who taught at public schools and those in private institute showed that the difference between the means of these two groups was significant (p = .000).

However, the findings are inconsistent with the results form a study done by Dwana (2009) to examine the difference in the effects of teacher efficacy on student achievement in Title I and Non-Title I schools. The results indicated that there was no significant difference in the mean scores of Title I and Non-Title I teachers on the overall efficacy scale, nor in the three dimensions.

4.6 Teachers’ Mathematics Self-Efficacy and their Mathematics Scores in KCSE
The study also intended to find out whether lower primary school teachers’ mathematics self-efficacy was correlated to their mathematics score in KCSE or equivalent. The mean
values for teacher self-efficacy against the mathematics grade obtained in high school were also computed to support. The results are shown in table 4.10.

Table 4.10 I Overall Means Of Lower Primary School Teachers’ Mathematics Self-Efficacy and Teachers’ Performance in Mathematics in KCSE

<table>
<thead>
<tr>
<th>Academic Grade In Maths</th>
<th>No. of Teachers</th>
<th>Self efficacy</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>03</td>
<td>4.41</td>
<td>.657</td>
</tr>
<tr>
<td>C+</td>
<td>05</td>
<td>3.46</td>
<td>.426</td>
</tr>
<tr>
<td>C</td>
<td>08</td>
<td>2.87</td>
<td>.434</td>
</tr>
<tr>
<td>C-</td>
<td>04</td>
<td>2.35</td>
<td>.269</td>
</tr>
<tr>
<td>D+</td>
<td>10</td>
<td>2.36</td>
<td>.274</td>
</tr>
<tr>
<td>D</td>
<td>03</td>
<td>1.86</td>
<td>.312</td>
</tr>
<tr>
<td>D-</td>
<td>07</td>
<td>2.15</td>
<td>.221</td>
</tr>
</tbody>
</table>

Table 4.0 shows that the overall mean scores of lower primary school teachers’ mathematics self-efficacy varied with the teachers’ performance in mathematics. The table shows that while those teachers who scored grade C+ and B had high mathematics self-efficacy; those lower primary school teachers who performed poorly in mathematics had low mathematics self-efficacy. This implies that high performance in mathematics at the secondary school level improves teacher’s ability and confidence to facilitate learning of mathematics in lower primary schools.

To determine the relationship between lower primary school teachers’ mathematics self-efficacy and their mathematics scores in KCSE examination, the following hypothesis was formulated and tested:

\[ H_0: \text{There is no significant relationship between lower primary school teachers’ mathematics self-efficacy and their mathematics scores in KCSE examination.} \]

Pearson’s product correlation was used to test whether there was a significant a relationship between teachers’ mathematics self-efficacy and their performance in KCSE examination. The result is presented in table 4.11 below.
Table 4.11 Correlations Coefficients for Teachers’ Mathematics Self-efficacy and Mathematics Grade in KCSE

<table>
<thead>
<tr>
<th>Relationship between Lower primary school teachers’ and teacher mathematics score in KCSE</th>
<th>N</th>
<th>Mean</th>
<th>STD</th>
<th>R</th>
<th>Sig</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson (r)</td>
<td>40</td>
<td>80.40</td>
<td>8.02</td>
<td>-0.10</td>
<td>0.00</td>
<td>Significant</td>
</tr>
</tbody>
</table>

Table 4.11 shows that there is a significant relationship between teachers’ mathematics self-efficacy and academic grade a teacher obtained in KCSE examinations (R=-.10, P=0.00, p<0.05).

From the above results it can be concluded that the grade a teacher scored in mathematics in examinations correlates with the teacher’s mathematics self-efficacy. The result thus implies that there was a strong positive correlation between lower primary teachers’ mathematics self-efficacy and teachers’ score in mathematics therefore the Null Hypothesis that there is no correlation between lower primary school teachers’ mathematics self-efficacy and their mathematics scores in KCSE examination was rejected.

These study findings are consistent with the findings by those reported by Ball (1991) & Shulman (1998) which showed that the teacher’s mathematics score in secondary and college levels have a lot of influence in his or her knowledge and ability in the mathematics subject content matter. Similarly, a study done by Siegle & McCoach (2007) found that the provision of trained teachers has a direct relationship with increased student’s mathematics self-efficacy leading to improved performance in mathematics. He contended that teachers who are properly trained are capable of modifying their instructional strategies to produce more confident students not only more likely to attempt new tasks and work harder and persist longer in the face of difficulty.
However, the findings are inconsistent with a study by Hanushek (2000) which surveyed the results of 113 studies on the impact of teachers’ qualifications on their students’ academic achievement. The study showed that 85% of the studies found no positive correlation between the educational performance of the students and the teacher’s educational background. He added that only 7% of the studies did find a positive correlation.

4.7 Teachers’ Mathematics Self-efficacy and Teaching Experience
This study intended to find out whether there was a correlation between lower primary school teachers’ mathematics self-efficacy and their years of teaching experience. Overall mean scores for teachers’ mathematics self-efficacy per years of service were calculated and results are presented in table 4.13

<table>
<thead>
<tr>
<th>Teaching Experience</th>
<th>No. of Teachers</th>
<th>Teachers’ Self Efficacy</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 or Less Years</td>
<td>15</td>
<td>2.09</td>
<td>.157</td>
</tr>
<tr>
<td>6-10 years</td>
<td>12</td>
<td>2.43</td>
<td>.194</td>
</tr>
<tr>
<td>11-15 Years</td>
<td>08</td>
<td>3.12</td>
<td>.212</td>
</tr>
<tr>
<td>16-20 Years</td>
<td>05</td>
<td>4.33</td>
<td>.553</td>
</tr>
</tbody>
</table>

Table 4.13 shows that teachers’ mathematics self-efficacy varied with the teachers’ years of service with the highest mean score realized by those teachers who have served for more than ten years (11-15 years, M=3.12; 16-20 years, M=4.33). This implies that the more years of service a teacher has taught, the highly self-efficacious he or she is in facilitating learning of lower primary mathematics.
To verify whether there was a correlation between lower primary school teachers’ mathematics self-efficacy and their teaching experience, the hypothesis below was formulated and tested:

**Ho:** There is no significant relationship between lower primary school teachers’ mathematics Self-efficacy and their years of teaching experience.

Pearson product moment correlation was used to determine the correlation between teachers’ mathematics self-efficiency and their teaching experience. The results of Pearson’s Product Moment Correlation indicated that teachers’ self-efficacy levels correlate well with their teaching experience as presented in Table 4.13 below.

**Table 4.13** Correlations Coefficients for Teachers’ Mathematics Efficacy and Teaching Experience

<table>
<thead>
<tr>
<th>Relationship between Lower primary school teachers’ and teaching experience</th>
<th>N</th>
<th>Mean</th>
<th>STD</th>
<th>R</th>
<th>Sig</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>40</td>
<td>57.94</td>
<td>9.90</td>
<td>-0.56</td>
<td>0.04</td>
<td>significant</td>
</tr>
</tbody>
</table>

Table 4.13 shows that there is a significant relationship between lower primary teachers’ mathematic efficacy and teaching experience (R = -0.56; p = 0.04, p < 0.05). The results imply that the Null Hypothesis that there is no correlation between lower primary school teachers’ mathematics Self-efficacy and their years of teaching experience was rejected.

One possible explanation for the above findings is that teachers with more years of teaching experience possessed significantly higher perceived utilization of special techniques and approaches than teachers with 5 or less years of experience. The first five
years of teaching profession is a period where teachers are in the beginning of experiencing the learning to teach and developing ideas about themselves as teachers.

The above study findings are consistent with the findings of Greenwald, Hedges, and Laine (1996) who reveals that teaching experience had a positive and significant effect on student achievement. A study done by Busch (1995) also showed that beginning teachers do not show more confidence as compared to experienced teachers in classroom instruction because the beginners are first and foremost concerned with issues of survival and adequacy and only later with mastery of teaching tasks.

The findings that experience had a lot of influence in teachers’ self-efficacy in mathematics is also confirmed by Education Quality Organization (2007) which reported that experience improved teachers ability to teach mathematics by improving their ability to give their students more information. The study also found that the more experienced teachers were, the better they could keep the students in line and keep their attention focused on the work by making the students’ learning fun and purposeful. The study further reveals that experienced teachers were better time managers as well as introducing more creativity in lesson plans, had better sense of controlling classrooms and dealing with many situations that arises.

Lastly, it is consistent with the findings of a study done by National Assessment System for Monitoring Learner Achievement (NASMLA, 2010) which showed that pupils who were taught literacy and numeracy by teachers with many years of experience performed better than pupils taught by teachers with lower professional qualifications and fewer years of teaching experience.

However, the study findings are inconsistent with a study done by Hawkins, Stancavage, and Dossey (1998) which found that although teaching experience appears to be related to student achievement, the relationship was not linear because students whose teachers
had fewer than five years of experience had lower levels of mathematics achievement, but there were no differences in mathematics achievement among students whose teachers had more than five years of experience. It is also inconsistent with the findings by Kang’ethe (1992) whose aim was to investigate teacher’s use of formal tests of achievement in mathematics in standard seven and eight of the primary schools in Githunguri Division, Kiambu County. The study was meant to provide information on how mathematical foundation was being established in primary schools and how the practice could be improved. The study revealed that despite their long teaching experience, teachers had language and mathematics difficulties in constructing tests.

4.8 Teachers’ Mathematics Self-Efficacy and Their Professional Qualifications

Lastly, the study was to find out whether lower primary school teachers’ mathematics self-efficacy was related to their professional qualifications. Based on the objective of the study, the following hypothesis was generated and tested:

\[ H_0: \text{There is no significant relationship between lower primary school teachers’ mathematics Self-efficacy and their professional qualifications.} \]

Pearson’s product correlation was used to calculate the correlation between lower primary school teachers’ self-efficacy and their professional qualifications. The degree of the level of mathematics self-efficacy was compared in the different levels of teachers’ qualifications which included those with certificates, diploma and bachelor’s degree in education. The results are presented in table 4.14.
Table 4.14 Correlations Coefficients between Teachers’ Mathematics Self-Efficacy Score and Professional Qualification

<table>
<thead>
<tr>
<th>Teachers Mathematics Self-Efficacy Items</th>
<th>Pearson Correlation coefficient (r)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certificate</td>
<td>Diploma</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td>1. Getting pupils to follow classroom rules</td>
<td>r=.951</td>
</tr>
<tr>
<td>2. Calming disruptive or noisy pupils</td>
<td>r=.986</td>
</tr>
<tr>
<td>3. Responding to defiant pupils</td>
<td>r=.971</td>
</tr>
<tr>
<td>4. Establishing routines for smooth mathematics activities</td>
<td>r=.985</td>
</tr>
<tr>
<td>5. Providing alternative explanation/example to confused pupils</td>
<td>r=.995</td>
</tr>
<tr>
<td>6. Responding to difficult questions from pupils</td>
<td>r=.998</td>
</tr>
<tr>
<td>7. Adjusting mathematics lessons to individual pupil level</td>
<td>r=.986</td>
</tr>
<tr>
<td>8. Gauging pupils understanding of what have been taught</td>
<td>r=.985</td>
</tr>
<tr>
<td>9. Providing appropriate challenges to first learners</td>
<td>r=.993</td>
</tr>
<tr>
<td>10. Getting pupils to believe that they can do well</td>
<td>r=.971</td>
</tr>
<tr>
<td>11. Helping pupils to love mathematics</td>
<td>r=.960</td>
</tr>
<tr>
<td>12. Motivating children to show interest in mathematics</td>
<td>r=.979</td>
</tr>
<tr>
<td>13. Assisting families to help their children to do well in mathematics</td>
<td>r=.982</td>
</tr>
<tr>
<td>14. Improving the understanding of children who fail in mathematics</td>
<td>r=.987</td>
</tr>
</tbody>
</table>

Table 4.14 shows that professional qualifications have a linear relationship with a teachers’ mathematics self-efficacy. The table shows that there is a moderate to strong
correlation between teachers who possess certificate \((r=+.687)\), diploma \((r=+.816)\) degree \((r=+.587)\).

When further analysis was done to find out whether the relationship between lower primary school teachers’ mathematics self-efficacy and their professional qualifications. The result in table 4.15 was obtained.

**Table 4.15: Results of Significant Relationship between lower primary school teachers’ mathematics self-efficacy and their professional qualifications**

<table>
<thead>
<tr>
<th>Relationship between Lower primary school teachers’ and Professional qualification</th>
<th>N</th>
<th>Mean</th>
<th>STD</th>
<th>R</th>
<th>Sig</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson ((r))</td>
<td>40</td>
<td>66.58</td>
<td>8.96</td>
<td>0.42</td>
<td>0.03</td>
<td>Significant</td>
</tr>
</tbody>
</table>

Table 4.15 shows that there is a significant relationship between lower primary school teachers’ mathematics self-efficacy and their professional qualifications \(R=0.42; p=0.03; p<0.05\). This implies that the Null hypothesis that there is no correlation between lower primary school teachers’ mathematics self-efficacy and their professional qualifications was rejected.

From the above analysis, it can be concluded that the degree of competency by mathematics teachers depend on the type of qualifications they possess. This may be partly explained by the fact that qualifications may dictate the type of approaches and techniques used in managing a class.

The above study findings are consistent with a study done by Goldhaber and Brewer (2000) which observed a positive relationship between teachers’ qualification and students’ performance in mathematics. They also found that students whose teachers were certified in mathematics but did not hold a postsecondary degree in mathematics did
not perform as well as students whose teachers held a postsecondary degree in mathematics.

The findings were also confirmed by Siegle & McCoach (2007) who found that teacher training had a lot of influence on teachers’ self-efficacy and produce more confident students not only more likely to attempt new tasks; they also work harder and persist longer in the face of difficulty. The study is also consistent with the findings by Hawk, Coble, and Swanson (1985), who found that students with mathematics teachers assigned in-field scored higher and had greater gains than students with mathematics teachers’ assigned out-of-field.

However, the above study findings are inconsistent with the findings of a study done by Irumbi (1990) on teachers’ and pupils’ characteristics that affect the performance of standard eight pupils in mathematics in Githunguri Zone. The study found out that that pupils’ performance in mathematics was not affected by teachers’ attitudes towards mathematics, academic qualifications and teaching experience.
CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction
In this chapter, the summary of the findings, conclusions drawn from the study and recommendations are discussed.

5.2 Summary of the Study Findings
The first objective was to establish the level of lower primary school teachers’ mathematics self-efficacy. The results of the study showed that lower primary school teacher in Kericho district had low mathematics self-efficacy. The overall teachers’ mathematics self-efficacy mean score was 2.64.

The results showed that there was a significant relationship between lower primary school teacher mathematics self efficacy and pupil’s performance in mathematics. The results also showed that there was no significant difference in lower primary school teachers’ mathematics self-efficacy between public and private lower primary schools. The mean difference between public and private lower primary school teachers’ mathematics self-efficacy was 0.10 with -.08 level of significance.

The study also found significant relationship between lower primary school teachers’ mathematics self-efficacy and teachers’ score in mathematics, teaching experience and teacher qualification.

5.3 Conclusions
Results from this study have shown that lower primary school teachers in Kericho district had low mathematics self-efficacy. It was also found that although teachers’ mathematics self-efficacy was low, it had a lot of bearing on learner’s achievement in mathematics. Finally, the study showed that lower primary school teachers’ mathematics self efficacy
is affected by type of school, teachers’ score in mathematics in KCSE, teaching experience and professional qualifications.

5.4 Recommendations
The stakeholders targeted include: Ministry of Education, school management, Teachers Service Commission and lower primary school teachers. The recommendations are:

i) Improvement of Teachers’ self Efficacy
The Ministry Of Education through the Directorate of Quality Assurance and Standard should strive to mentor teachers in the field to improve their mathematics self-efficacy. This can be done through organizing short courses and seminars at the District level. Teacher mentors should also be identified to motivate young and novice teachers develop positive attitude towards teaching of mathematics

ii) Professional Qualification
The Ministry of Education should consider the teachers’ mathematics score in their KCSE when recruiting teachers them to Teacher Training collages and deployment in lower primary classes. This will improve mathematics performance at this level hence prompting a strong foundation for mathematics in children. Priority should be given to those who score C+ and above in Mathematics. The Teachers Service Commission in conjunction with Kenya Educational Management Institute should work towards improving teachers’ mathematics content knowledge through provision of opportunities for Short Courses. Bridging Courses and advancing of level of Education should be given priority in teacher development strategies.

iii) Teacher Experience
School management should ensure that while allocating duties and subjects, the teachers to teach in lower primary school classes should be those with high qualifications and more experienced in handling key subjects such as mathematics. Coaching programme should also be instituted in schools to enable the novice teachers to gain experience through the tutelage of experienced teachers. Lower primary school teachers should also ensure that they keep abreast with the new pedagogical approaches in mathematics
teaching-learning. They should also attend courses and seminars to help them gain confidence in mathematics teaching. They should believe in their ability to teach mathematics to the young children.

iv) Improvement of Teaching-Learning Environment

There is need for improvement of learning environment and teacher motivation especially in public school. The Teacher Child Ration should be managed to ensure that the class sizes are appropriate for the teacher to handle effectively. This can be done by encouraging more teachers to support lower primary school teachers to reduce chances of burn-out. Teacher motivation strategies to be implemented should include provision of opportunities to further education, active parental engagement to appreciate the work done by teachers.

5.5 Suggestion for further Research

The study was conducted only in Kericho district. However, to help in generalization of the findings, a national survey should be done to find out the teachers’ mathematics self-efficacy in Kenya. This will provide useful information on formulation and implementation of mathematics syllabus for teachers and a national policy on mathematics teachers’ recruitment, training and deployment.
REFERENCES


Initiatives for State and Local Policymakers. *North Central Regional Educational Laboratory, Oak Brook, IL, pp. 35–51.*


Wong, Tak-Wah and Lai, Yiu-Chi (2007). Exploring Factors Affecting Mathematics Teaching Effectiveness among Pre-Service Primary Mathematic Student-Searchers, Department of Mathematics, Science, Social Science and Technology. Hong Kong: The Hong Kong Institute of Education.
APPENDICES

APPENDIX I: QUESTIONNAIRE FOR LOWER PRIMARY SCHOOL TEACHERS

Your opinions are very important in this study and will be held confidential and only used for the intended purpose. Thank you in advance for participation in this study.

Section A: Background Information

1. Name of your school-------------------------------------------------------------

2. Which type of school do you work in?
   - Public Rural ( )
   - Public Urban ( )
   - Private Rural ( )
   - Private Urban ( )

3. What is your highest level of professional Qualification
   a) Certificate ( )
   c) Diploma in Education ( )
   d) B.Ed ( )
   e) M.Ed ( )

3. How many years have you been teaching? -----------------------------------------

4. What grade did you score in Mathematics in the Kenya Certificate of Secondary Education or its Equivalent (Mathematics Grade in KCSE/EACE) -------------------
**Section B: Teachers’ Sense of Efficacy in mathematics Activities**

Please indicate your opinion about each of the statements below. Use the scales provided.

Nothing = 1, Very little = 2, Undecided = 3, Quite bit = 4, A lot = 5

<table>
<thead>
<tr>
<th>Teacher Beliefs</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How much can you do to get pupils to follow classroom rules during mathematics lesson?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. How much can you do to calm a pupil who is disruptive or noisy during mathematics lesson?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. How much do you do to respond to defiant pupils during mathematics lesson?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. How do you do to establish routines to keep mathematics activities running smoothly?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. To what extent can you provide an alternative explanation or example when pupils are confused in mathematics?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. How well can you respond to difficult questions from your pupils during mathematics lesson?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. How much can you do to adjust your mathematics lessons to the proper level for individual pupil?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. To what extent can you gauge pupil understanding of what you have taught in mathematics?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. How well can you provide appropriate challenges for first learners in mathematics?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. How much can you do to get pupils to believe they can do well in mathematics?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
11. How much can you do to help your pupils love mathematics?

12. How much can you do to motivate pupils who show low interest in mathematics?

13. How much can you assist families to help their children do well in mathematics?

14. How much can you do to improve the understanding of a pupil who is failing in mathematics?
APPENDIX II: INTERVIEW SCHEDULE FOR LOWER PRIMARY SCHOOL TEACHERS

Section A: Background Information

(i) Name of school

(ii) Type of school

(iii) Highest level of professional Qualification

(iv) Duration of teaching experience

(v) Grade scored in Mathematics

Section B: Activities Done By the Teacher to Promote Pupils Performance in Mathematics

1. Tell me what you do when pupils have not understood what you have taught.

2. Tell me what you do to make pupils to believe they can do well in mathematics.

3. Tell me what you do to help pupils to love mathematics.

4. Tell me what you do to help pupils who fail in mathematics.

5. Tell me what you do to assist families to help their children to do well in mathematics.

6. Tell me what you do when pupils don’t do homework.

7. Tell me some of the reasons why children perform poor in mathematics
## APPENDIX III: PUPILS PERFORMANCE IN MATHEMATICS PER SCHOOL

### PUPILS' MATHEMATICS PERFORMANCE PER SCHOOL

<table>
<thead>
<tr>
<th>SCHOOL CODE/ PUPILS CODE</th>
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<th>002</th>
<th>003</th>
<th>004</th>
<th>005</th>
<th>006</th>
<th>007</th>
<th>008</th>
<th>009</th>
<th>010</th>
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<th>012</th>
<th>013</th>
<th>014</th>
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</thead>
<tbody>
<tr>
<td>TOTAL NO. OF PUPILS</td>
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<td>25</td>
<td>34</td>
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<td>25</td>
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APPENDIX IV: PUPILS’ MATHEMATICS ACHIEVEMENT PROFORMA

Section A: Background Information

1. Name of School_________________________________________

2. Type of school__________________________________________

Section B: Pupils’ Average Scores in Mathematics

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</table>
KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke
Website: www.ku.ac.ke
P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 8710901 Ext. 57530

Our Ref: E55/10292/2008
DATE: 14th October, 2012

The Permanent Secretary,
Ministry of Higher Education, Science & Technology,
P.O. Box 50040,
NAIROBI

Dear Sir/Madam,

RE: RESEARCH AUTHORIZATION KANDIE FAITH JELAGAT– REG. NO.
E55/10292/2008

I write to introduce Ms. Kandie Faith Jelagat who is a Postgraduate Student of this
University. She is registered for M.Ed degree programme in the Department Early
Childhood Studies.

Ms. Jelagat intends to conduct research for a proposal entitled, “Relationship
between Lower Primary School Teacher’s Mathematics Efficacy and Pupils’
Performance in Kericho District, Kericho County, Kenya.”

Any assistance given will be highly appreciated.

Yours faithfully,

MRS. LUCY N. MBAABU
FOR: DEAN, GRADUATE SCHOOL

[Stamp]

15 OCT 2012
APPENDIX VI: RESEARCH AUTHORIZATION NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

Telephone: 254-020-2213471,2241349
254-020-310571,2213123, 2219420
Fax: 254-020-319245,319249
when replying please quote
secretary@ncst.go.ke

Our Ref: NCST/RCD/14/012/1522

Kandie Faith Jelagat
Kenyatta University
P.O.Box 43844-00100
Nairobi.

RE: RESEARCH AUTHORIZATION

Following your application for authority dated 26th October, 2012 to carry out research on “Relationship between primary school teachers’ mathematics efficacy and pupils’ performance in mathematics in Kericho District, Kericho County, Kenya,” I am pleased to inform you that you have been authorized to undertake research in Kericho District for a period ending 31st December, 2012.

You are advised to report to the District Commissioner and the District Education Officer, Kericho 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
Kericho District.

"The National Council for Science and Technology is committed to the promotion of Science and Technology for National Development."
APPENDIX VII: RESEARCH PERMIT

[Image of the research permit certificate]

THIS IS TO CERTIFY THAT:

[Name of individual] has been permitted to conduct research in the topic: Relationship between primary school teachers' mathematics efficacy and pupils performance in mathematics in Kericho District, Kericho County, Kenya for a period ending 31st December, 2012.

[Signature]

Applicant's Signature

[Signature]

Secretary, National Council for Science & Technology
APPENDIX VIII: AUTHORITY TO CONDUCT RESEARCH AT THE DISTRICT

OFFICE OF THE PRESIDENT
PROVINCIAL ADMINISTRATION AND INTERNAL SECURITY
KERicho DISTRICT

Telegram: ........................................
Telephone: Kericho 20131/2/4
When replying please quote
Ref No ADM 15/3 VOL VII/209

THE DISTRICT COMMISSIONER
KERicho DISTRICT
P.O. Box 19-20200
KERicho
12TH NOVEMBER, 2012

TO WHOM IT MAY CONCERN

RE: RESEARCH AUTHORIZATION
KANDIE FAITH JELAGAT

This is to confirm that the above named student who is from Kenyatta University has been authorized by the Kenya National Council for Science and Technology to carry out research on “Relationship between primary School teachers’ Mathematics efficacy and pupils’ performance in mathematics in Kericho district, Kericho County for the period ending 31st December 2012.

Any assistance accorded to him is highly appreciated.

W.N. KAKIMONI
Ag. DISTRICT COMMISSIONER
KERicho

CC
DISTRICT EDUCATION OFFICER
KERicho

DO AINAMOI

DO SOIN

O.C.P.D