INFLUENCE OF SCHOOL BASED FACTORS ON IMPLEMENTATION OF GRADE ONE TO FOUR MATHEMATICS IN RACHUONYO EAST SUB-COUNTY, HOMABAY COUNTY 

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A Research Project Submitted in partial Fulfillment of the Requirement for the Award of the Degree of Masters of Education in Curriculum Studies

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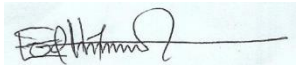
DECLARATION

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



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I dedicate this work to my wife Herine, my brothers Geoffrey and Jared, my sisters Edith and my mother Salome.

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Firstly, I recognize the immense guidance, support and mentorship from my two supervisors, Dr. Mercy Mugambi and Dr. Rosemary Imonje both of Department of Educational Management , Policy and Curriculum Studies , University of Nairobi. They offered constructive criticisms, recommendations and suggestions that were invaluable in producing this scholarly work. Secondly, this project could would not have come to the successful stage without the moral and financial support from my family. Thirdly, I cannot fail to appreciate the encouragement from colleagues in the Master of Education, who shared with me valuable experiences in carrying out research, and constantly inspired me to finish the course. Finally, I am thankful to the head teachers, teachers and pupils from the public primary schools in Rachuonyo East Sub County, who voluntarily participated in the study and provided truthful information based on their perspectives on the study questions.

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ABBREVIATIONS AND ACRONYMS

EGMA	Early Grade Mathematics Assessment
KPEDP	Kenya Primary Education Development Project
NACOSTI	National Commission for Science, Technology and Innovation
PISA	Programme for International Student Assessment
SPSS	Statistical Package for Social Sciences

ABSTRACT

The study set out to look at the impact by school based factors towards the implementation of grade 1 to 4 mathematics in Rachuonyo East Sub-County, Homabay County. Among the determined objectives leading the study are; to determine the influence of teaching and learning resources, teacher training, head teacher instructional supervision and teachers' motivation on the implementation of early grade mathematics in Rachuonyo East Sub-County. The study adopted descriptive research design and targeted 102 head teachers, 429 early grade mathematics teachers, 3366 Grade 1 Pupils, 3264 Grade 2 Pupils, 2754 Grade 3 Pupils and 2856 Grade 4 Pupils, in public primary schools in Rachuonyo East Sub-County, Homabay County. The sample size constituted of 31 head teachers, 128 early grade mathematics teachers, 336 Grade 1 Pupils, 326 Grade 2 Pupils, 275 Grade 3 Pupils and 285 Grade 4 Pupils. Data collection tools were questionnaires, an interview and focused group discussion guide. By asking university supervisors for their expert opinion, the validity of the instrument was ensured. The test-retest method was used to assess the reliability of the instrument. Analysis of quantitative and qualitative data, including mean and standard deviation, findings reported in frequencies and percentages, was done using descriptive and inferential statistics, which included correlation and regression. The version 23.0 of the Statistical Package for Social Sciences was used to analyze the data. According to the study's first goal, it was determined that resources for teaching and learning have an impact on how grades 1-4 mathematics is implemented. Based on the second objective of the study, it was established that teacher training influence implementation of the early grade mathematics. Based on the third objective of the study, it was established that head teacher instructional supervision influence implementation of early grade mathematics in Rachuonyo East Sub-County. Based on the fourth objective of the study, it was established that teacher motivation influences the implementation of grade 1-4 mathematics in Rachuonyo East Sub-County. This study concludes that implementation of grade 1-4 mathematics in Rachuonyo East Sub-County were jointly influenced by teaching and learning resources, teachers training, teachers motivation, and instructional supervision. This study concludes that the teaching and learning materials are relevant for the current early grade mathematics programme. The study further concludes that teachers training are important in implementation of grade 1 to 4 mathematics. The study recommends that, the government, through the Ministry of Education, should supply the schools with adequate teaching and learning resources to intensify their use through supervision by quality assurance and standard officers. At the Kenya Institute of Curriculum Development, teachers should receive specialized training in mathematics to serve as resource people for schools. All teachers should be required by TSC to complete in-service competency training every three years before being permitted to advance to the next grade upon promotion. They would be able to do this to improve their content knowledge and instructional techniques for teaching mathematics.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Towards the involvement in the academic world as well as the intensity of contemporary economy, mathematical literacy, mathematical competencies, and scientific comprehension are essential. A highly essential skill enabling individual satisfaction as well as engagement in education, the community and the business world in the current world is mathematics (European Commission, 2011). It serves as a crucial indicator academically for learners' future learning paths (Pitsia et al., 2017).

It is crucial to comprehend the variables influencing pupils' math proficiency. According to the linked literature, earlier research tended to concentrate on the effects of various personal aspects (Lee et al., 2014; Lu et al., 2011; Semeraro et al., 2020). However, the most recent study has broadened the focus to include student, family, school contexts, and the nuanced interactions among them, in addition to the individual level. According to the studies, there is broad consensus about the influence of school-related, family-related, and student-related factors on accomplishment (Ataç, 2019; Ker, 2016; Takashiro, 2017).

South Korea is renowned worldwide for its highly performing pupils. However, some features of the education system have attracted criticism nationally and globally. For instance, the normal school day comprises of long study hours, the system is exam driven, expensive private tuition classes, and the pupils often performing poorly in the affective domain. Besides, students from multicultural backgrounds have been noted to perform poorly (Kim, 2013).

In Peru, the government came to the realization that the learning institutions had huge learner numbers without elementary understanding of literacy skills and maths. In 2009, the country took part in PISA (Programme for International Student Assessment) exams where it finished last. Alarmed, the government initiated results based budgeting programme for student learning termed: Education Programme for Learning Achievements to improve learning outcomes (World Bank, 2019).

In 2009 Kenya adopted the Early Grade Mathematics Assessment (EGMA) tool to test the mathematics performance of pupils, more so at lower primary school level. The initial findings indicated that, while students were learning the mathematical concepts, they acquired the concept at a later age than they were expected which meant a delay in the acquisition of the desired mathematical concepts for their grade and age. Disturbingly, it was revealed that grade 3 students could barely manage to solve 40% of the missing number questions and only 47% correctly solved word problems. Correspondingly, Uwezo Kenya (2016) indicate that proportion of learners, aged between 7 and 13 years, who were able to solve grade two numeracy and literacy tests stood at 40% in 2011, 37% in 2012, 41% in 2013 and 39% in 2014. This indicated that there were serious challenges facing the standards of learning advanced to learners.

To address the aforementioned shortfalls, the Ministry of Education in partnership with the Global Partnership in Education came up with the Kenya Primary Education Development Project (KPEDP) in 2015 with the aim improving early grade mathematical abilities within students (CEMASTEA, 2015). Further, this would be achieved through the following objectives: enhancing the competencies of teachers in developing Early Grade Mathematics numeracy skills at grade 1 and 2; provision of instructional materials;

enhancing teacher instructional supervision, Mainstreaming Early Grade Mathematics methodologies in Pre-service teacher education; and Early Grade Mathematics management and coordination.

For instance, a study by Uwezo Kenya between 2010 and 2014 indicate that pupils' performance in mathematics in the lower grades were significantly lower than the set ministry standards (Uwezo, 2016). In the study only 47.1% of class three pupils are able to correctly solve class two mathematics tasks. Besides, only 45.2% of boys and 49% of girls in class three can solve the same tasks (Uwezo, 2016). Hence, it is an indication that a majority of class three pupils could successfully complete learning tasks they were meant to have mastered a year earlier. Consequently, given the gaps noted in early grade mathematics, the Ministry of Education came up with the Primary Education Development Project in 2015 with the main aim of enhancing early grade mathematics competencies among pupils and teachers (Center, 2015). In particular, the provision of teaching and learning materials has been noted to contribute to lower student performance. Rachuonyo East Sub-County is among those implementing the early grade mathematics programmes. A call has been placed to look at the impact by institutional related aspects towards the implementation of the early grade mathematics programme in the Sub-County.

Piper and others (2016) carried out a study to assess the status of the mathematics programme in Kenya. They discovered that the early grade mathematics programme had a significant impact on the conceptual component of mathematics but little impact on the procedural component. The study further indicated that there were challenges noted in the implementation of the early grade mathematics programme. For instance, teachers

were found to have challenges in implementing higher order mathematics concepts such as asking “how” and “why” questions. Therefore, the strategy seeks to retool teachers on how they teach to enable them present content to learners in the most appropriate way. Through peer research, teachers prepare lessons together and make mock presentations before offering peer critic to help identify problems early enough and addressing the problems before actual lessons are presented to learners. Through action research, teachers evaluate a problem in class and identify its cause with the aim of resolving it while through virtual communities enables teachers to collaborate beyond their locale and share working approaches towards implementation of the early grade mathematics.

The approach has been boosted by the government’s provision of textbooks that have achieved a 1:1 book ratio (Kenya News Agency, 2021). A baseline survey at the beginning of the SBTS approach indicated that 50% of learners were able to score 79% in their mathematics tests. However, after implementing the SBTS, learners’ score in the early grade mathematics programme has improved to 81.9% (Kenya News Agency, 2021). The improvements underscore the continuous monitoring of the programme and introduction of new interventions to address challenges that have been identified to face the early grade mathematics programme.

Implementing the curriculum effectively is essential for achieving the mission, goal, and objectives of the institution. Therefore, it is essential that Heads of Institution put in place procedures to guarantee that the curriculum is covered in their institutions. However, there have been a number of issues that have affected how the early grade mathematics curriculum has been implemented in Rachuonyo East Sub-County, Homabay County. In

light of this, it was necessary to determine how Rachuonyo East Sub-county, Homabay County's early grade mathematics curriculum was affected by school-based issues.

1.2 Statement of the Problem

In the Kenya, the Government of has continuously strived to enhance the quality of learning in the country (Ondieki & Orodho, 2015). Besides, it has made concerted efforts to better learning standards by the provision of educational utilities. However, studies (Ruth et al., 2021; Onyambu, 2014; Chesire, 2018) indicate low performance in early grade mathematics which in turn impacts on the student's consequent performance in other grades. Currently, schools across the nation are implementing the early grade mathematics programme. However, no study has been carried out in Rachuonyo East sub-county to look at the impact by school based factors on adoption of the early grade mathematics programme since the sub-county was formed in 2016. There have been concerns about delays in disbursement of funds, intended for the programme's implementation from the national government. There have also been concerns about delays and adequacy of teaching and learning resources which must have had an effect on the implementation of the early grade mathematics programmes. There are also concerns about the quality of in-service training offered to teachers to meet the programme with claims that the training was not adequate. Research on the implementation of other mathematics programmes across the country have established that teacher motivation is a serious concern in the implementation of the mathematics programme; hence, there is need to establish of teacher motivation has had an effect on the implementation of the early grade mathematics programme in Rachuonyo East Sub-county (Ruth et al., 2021; Onyambu, 2014; Chesire, 2018). Hence it is against this background that there was need

to look at the impact by institutionally related aspects on the adoption of early grade mathematics in Rachuonyo East sub-county, Homabay County.

1.3 Purpose of the Study

The purpose of this study was to investigate the influence of school based factors on the implementation of grade 1 to 4 mathematics in Rachuonyo East Sub-County, Homabay County.

1.4 Objectives of the Study

The study sought to:

1. To determine the influence of teaching and learning resources on the implementation of early grade mathematics in Rachuonyo East Sub-County;
2. To establish the influence of teacher training on the implementation of the early grade mathematics in Rachuonyo East Sub-County;
3. To assess the influence of head teacher instructional supervision on the implementation of early grade mathematics in Rachuonyo East Sub-County; and
4. To establish the extent to which teacher motivation influences the implementation of early grade mathematics in Rachuonyo East Sub-County.

1.5 Research Questions

The research sought to answer the following questions:

1. How do the teaching and learning resources influence the implementation of early grade mathematics in Rachuonyo East Sub-County?
2. To what extent does teacher training influence the implementation of the early grade mathematics in Rachuonyo East Sub-County?

3. In which ways does teacher instructional supervision influence the implementation of early grade mathematics in Rachuonyo East Sub-County?
4. To what extent does teacher motivation influence the implementation of early grade mathematics in Rachuonyo East Sub-County?

1.6 Significance of the Study

Information garnered from this work could significantly complement the work of Lower Primary Mathematics teachers who may learn the factors that influence pupils' performance, the successes and lessons on how to address challenges in the same area. Further, the anticipation is that the awareness generated from the study may support the work of policy makers to device ways of replicating the successes in other institutions, while mitigating the challenges that may be causing the poor performance in elementary Mathematics at different levels. Moreover, it is anticipated that the research findings may agitate more thoughts for further study towards establishing ways of improving pupils' performance not only in Mathematics.

1.7 Limitation of the Study

The primary limitation of the study was unwillingness of school administrators divulging their academic results. To avert the challenge, the researcher informed all everyone involved that the research findings would used only for scholarly work and that all those taking part in the study that it was the investigator's intention to ensure confidentiality would be observed. It was also anticipated that geographical distances would challenge. To mitigate this challenge, the researcher recruited and trained experienced research assistants to help in the collection of the data. They were thoroughly briefed on the

specific data they are expected to collect, from whom and the expectation on their conduct. Thereafter, the researcher collated the collected data and carry out an analysis.

1.8 Delimitation of the Study

Focus by the study was on primary schools in Rachuonyo East Sub-County Homabay County. It was this way since institutions are busy adopting the early grade mathematics programme. The respondents of the study were early grade mathematics teachers because they are directly implementing the programme and public primary school teachers who supervise the implementation of the early grade mathematics in their schools. The study was delimited to lower primary learners because they are impacted by the early grade mathematics program.

1.9 Assumptions of the Study

The main assumption of this study is that respondents would truthfully answer all research questions and positively participate as they are well versed in the area under study. Another assumption is that respondents would provide honest responses. Moreover, there is an assumption that institutionally related elements impact the adoption of early grade mathematics in public primary schools in Rachuonyo East Sub-County.

1.10 Organization of the Study

There are five chapters in this research study. The backdrop of the study, the statement of the research problem, the purpose of the investigation, the research objectives and questions, the restrictions and delimitations of the study, the significance of the study, the definition of terminology, and the structure of the study are all included in chapter one. The study's literature review is covered in chapter two. It looked at the body of research on the KPDEP program's early grade mathematics implementation and aspects related to

schools. A survey of the literature, a theoretical framework, and a conceptual framework are also included.

The third chapter discusses research technique. This section covers a variety of topics, including the research design, target population, sample size and sampling strategies, data collection instruments, data gathering protocols, data processing methodologies, and ethical considerations.

The study's fourth chapter discusses the presentation of the data, its interpretation, and its conclusions. The study's summary, conclusion, recommendations, and ideas for additional research are all included in chapter five.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter introduces the early grade mathematics programme. It also reviews literature relating to the availability of educational items as well as their impact on the performance of early grade mathematics programmes. It looks into how teacher training influences the implementation of early grade mathematics programmes. In particular, it evaluates in-service training of teachers, refresher courses and mentorship on how they impact on delivery of education programmes. Further, the section reviews the role of supervision in implementation of early grade mathematics programmes. The section includes a summary of the literature review. It also includes a theory on which the current study is grounded. There is a conceptual framework that shows how variables are related.

2.2 The Concept of Early Grade Mathematics

The concept of early grade mathematics refers to the mathematics programs offered to learners in the lower primary classes. The early grade mathematics programme is concerned with enabling learners to acquire numeracy and problem solving skills. To achieve this, the programme seeks to equip early grade mathematics tutors will important competence and awareness required for this level and area of learning. Besides, the programme seeks to ensure there is adequate supply of teaching and learning materials that will ensure the programme is implemented as expected (Stipek & Valentino, 2015).

early childhood mathematics learning is formed with the sole desire of providing learners with abilities deepening their awareness and growth in mathematical principles and

challenges. It is obtained by providing stimulation events and study settings enabled by tutors and other key players. Children between the ages of three and six are often included in early childhood mathematics education, however in many nations even the smallest toddlers attend early care centers (Butterworth, 2005).

The scientific field of mathematics education research only emerged in the past century (Kilpatrick, 2014). Much later in the development of this field, research into the teaching and learning of mathematics to young children was added. The study of early mathematics in children has long been a focus of cognitive and developmental psychology. There has been learning on the effect by working memories as well as attention period towards mathematical problem-solving from studies in these fields (Passolunghi and Costa, 2016; Stipek and Valentino, 2015), as well as on the importance of innate numerical awareness skills in children's arithmetic results (Butterworth,2005)

2.3 Teaching and Learning Resources and Implementation of the Early Grade Mathematics Project

Learning process can only be meaningful if the required resources are available and adequate (Ann & Mwangi, 2019). The quality of learning heavily relies not only on the presence of educational utilities but also the quality of resources provided to learners and teachers. In addition, it can only be effective if the physical facilities that include the classrooms, workshops and the learning environment are well taken care of (Mwihia & Ongek, 2019). The physical facilities should meet quality standards set by education agencies and enough to accommodate the available number of learners.

Ministry of education reported that a lot of resources had been provided for the selected schools but yet the targeted impact had not been achieved (Maoulidi, 2008). Before the

implementation of the project, most of the text books and learning materials were not heavily taxed (Ndolo, et al., 2011). This means they were affordable and much was to be bought for the schools. Omogi, 2019 reported that the costs of learning materials in Kenya was very expensive compared to the previous years. Sije & Ochieng (2013) adds that the high taxation in Kenya has made the costs of learning materials to be higher as compared to the surrounding countries. This means the project cost estimation for provision of learning materials had to change from time to time due to the consistent increase in taxes (Hazzan, 2002).

Availability of the resources is another key factor. The production of materials to meet the demands of the education system in Kenya has been deficient (Mege, 2014). The number of learners is increasing every day and thus straining on the available resources. Production in Kenya is affected by the enabling environment which is mostly affected by education policies and taxation (Omogi, 2019). As of such, there is no sometimes continuous production or producing a little bit which cannot satisfy the market (Nyakongo, 2015). As a result, the project has been facing a challenge of providing enough materials to the learners to meet the needs of the projects. Also, the provided resources are limited and cannot be provided in time (Ochieng, 2015). Inadequate resources and not getting the resources in time have been a set back of the project (Ministry of education, 2019). This current review intends to look at the impact by educational utilities towards the adoption of grade 1 to 4 mathematics in Rachuonyo East Sub-County, Homabay County.

2.4 Teacher Training and Implementation of the Early Grade Mathematics Programme

Teachers are an important resource in school that provide children with an opportunity in learning by equipping the pupils with knowledge, skills and also motivation to study (Birungi et al., 2015). Training of teachers to prepare them for their teaching experiences is required especially for the new early grade mathematics programme. Some institutions adopt staff trainings through conferences and inductions for purposes of appraising the available staffs'experiences. In-service training of teachers enhances their competencies and quality of teaching. Ashrafuzzaman (2018) established that in-service training of primary teachers met 80% of their professional needs which enhanced their competencies. Through the training, teachers were able to interact with other teachers from whom they acquired new skills on lesson preparation, lesson delivery, and classroom management.

Mentorship of new teachers would enable them acquire competencies on the instruction of early grade mathematics teachers. New teachers in every school should be assigned to a mentor who will guide the apprentice teacher to acquire the competencies required in lesson preparation, execution, evaluation, and preparation and use of learning and teaching materials. Bowman (2014) avers that teachers 'mentorship within schools enhances their consistency and teacher retention at the school. Besides, mentoring programmes enhance teacher job satisfaction which enhances their delivery. Besides, when teachers share ideas and knowledge within the school, standards of education improves which benefits the teachers, students, and the school at large. A study in Kenya established that teacher mentorship improves teacher classroom practices, hence should

be integrated into the formal school programmes (Daniel & Esther, 2020). Hence mentorship should not be limited only to new teachers but also among other teachers who would share skills and experiences.

Training of teachers through refreshers courses enables them to face new challenges in the teaching profession. Omar (2014) posits that refresher courses act as a catalyst for teachers'' effectiveness. It also acts as a way of updating teacher skills and knowledge which in turn improves teaching and learning leading to better performance. Besides, refresher courses enable teachers to adjust to new professional demands and to embrace changes in the education field. Refresher courses through in-service training enables teachers to improve their professionalism and directly apply the newly acquired skills in their instructional practices. This study investigated the influence teachers' curriculum training on the implementation of grade 1 to 4 mathematics in Rachuonyo East Sub-County, Homabay County.

2.5 Instructional Supervision of Mathematics Teachers and Implementation of the Early Grade Mathematics Programme

The Kenya Primary Education Development Project aimed to enhance the academic supervision of teachers so as to enhance mathematics performance. Moreover, academic supervision refers to a variety of activities that enable teachers to foster the proficiencies to manage the learning process and also attain the learning objectives (Rahabav, 2016). Moreover, academic supervision seeks to develop, the growth, development, and commitment to build the capacity of teachers.

In Finland, an analysis on the contribution by academic supervision on teacher performance established that supervision enabled teachers to cope with and control their workloads better, which in turn enhanced student performance (Alila et al., 2015). Also, through supervision teachers got an opportunity to compare their methodologies with other pedagogical methods and discover their strengths and weaknesses. Besides, they were able to acquire new methodologies for handling specific curriculum topics in a unique way that enabled students to comprehend more and improve on their performance. Further, the study revealed that supervision was significant as it enhanced teachers' professional growth and it helped them to recognize their improvements which greatly boasted their self-esteem.

In Malaysia, a study seeking to establish the link between academic supervision and teacher satisfaction in their academic work revealed that there is a strong link between the frequency and quality of supervision and teacher performance in their academic work (Hamzah et al., 2013). Therefore, the study suggested that school administrators should promote curriculum supervision to support teachers in enhancing their pedagogical skills. Further, the study established that the weakest point of curriculum supervisors was their motivating and organizing factors. Also, the supervisors were blamed of following highly bureaucratic structures which demotivated teachers.

In Kenya, an analysis set out to look at the effect by instructional supervision towards curriculum implementation. The study revealed that teachers received regular communication from their supervisors which enhanced their instructional competencies (Wanzare, 2011). Therefore, the study revealed that if academic supervisors had regular communication with teachers on their instructional duties, it would improve their

academic performance. However, the study discovered that academic supervisors rarely held post-observation conferences with teachers. Therefore, the study recommended that supervisors should hold post-observation conferences with teachers to enable them discover their weak and strong points. This current review intends to look at the impact school heads' instructional supervision has towards the adoption of grade 1 to 4 mathematics in Rachuonyo East Sub-County, Homabay County.

2.6 Teacher Motivation and the Implementation of Early Grade Mathematics Programme

Teacher motivation has a major contribution towards the adoption of educational programs. Kihara (2018) avers that, various elements of teacher motivation influence their instructional activities. The elements include empowerment, appreciation, collaboration, and self-efficacy. He notes that motivation enhances the quality of teaching and learning, which in turn enhances student performance.

A study in Nyamaseke, Rwanda established that teacher motivation significantly influenced teachers' implementation and achievement of educational goals. The study indicated that extrinsic and intrinsic had 0.742 Pearson correlation coefficient to their performance (Esdras & Andala, 2021). The study concluded that teacher performance improved by 80% when they were motivated (Esdras & Andala, 2021). This underscores the significance of extrinsic and intrinsic motivation of teachers to enhance their implementation of educational programs. The study will seek to establish if teacher motivation influences the implementation of mathematics programs in Rachuonyo East Sub-County.

A study in Brazil establish a strong correlation between teacher motivation and work performance. The study indicated that factors that would enhance teacher motivation include timely feedback about teacher performance and enhancement of interpersonal teacher relationships at school. The study indicates that factors which can enhance teacher motivation for improved performance are improved professional development, creating better working conditions, greater autonomy in roles undertaken, and decrement of job based negativity (João et al., 2016). However, the study indicated that money or salary was not a major motivator on teacher performance.

A study carried out in Rachuonyo South Sub-County, Kenya revealed that teacher motivation played a critical role in enhancing teachers' commitment to job performance. The study indicated that teacher motivation in Rachuonyo South Sub-County was low which had a negative effect on teacher performance. Correspondingly, the study recommended that there is need to implement teacher motivation strategies to enhance teacher job performance, suggested strategies include numerous staff trainings, consistent promotions and basic improvements of the job setting (Nyakongo, 2015). The study also recommends that schools should have internal teacher motivation policies aimed at enhancing their implementation of educational programmes. The present study investigated the influence teachers' motivation on the implementation of grade 1 to 4 mathematics in Rachuonyo East Sub-County, Homabay County.

2.7 Summary of Literature

The literature review establishes that the availability of educational items and utilities will significantly influence the delivery of educational programmes. Having enough teaching and learning materials positively affects implementation of educational

programmes as it minimizes delays and cancellation of classes. It also motivates learners and teachers. Having quality materials enables teacher to deliver relevant instruction and learners to acquire relevant skills. The training of teachers is significant as it enables teachers to refine their competencies and acquire new skills that enable them to deliver quality instruction. Training enables teachers to adapt to new changes in the education sector. Also training enables teachers to learn new skills from other teachers. Mentorship of teachers is not limited to new teachers bit enables all teachers to learn from each other on how to enhance their professional competencies. Regular training of teachers is significant in retention of teacher competencies. Supervision of educational programmes enables supervisors to identify instructor weaknesses. This enables them to identify areas that teachers should be trained on to enhance their performance. Supervision also enables supervisors identify if teaching resources are enough and being used as required. When supervision is positively done, teachers are motivated and instructional practices improve which enhances performance of learners. Teacher motivation is a significant factor that influences the implementation of the early grade mathematics. As other studies have indicated, teachers who are intrinsically and extrinsically motivated are better placed at implementing the early grade mathematics program and post better results in job performance and student outcomes.

2.8 Theoretical Framework

The study was guided by Michael Fullan's change theory that was first presented in 1991 (Fullan, 2016). According to the theory, four stages in the transformation process exist, and they are; the initiation phase, the adoption phase, the continuation level and the outcome stage. Fullan avers that there are several factors that affect change at the

initiation stage. The factors include the availability and the quality of existing technologies to support the proposed changes. In the mathematics curriculum, these technologies include all the teaching and learning resources required to implement the mathematics programme. The other factor deals with accessibility to innovations, the national government's advocacy, the teaching staff advocacy and other players input. Already, there has been concerted efforts from various stakeholders who include teachers, the government and external agents like parents, employers, and non-governmental organizations requiring a change to the mathematics curriculum to align it to current needs**.**

At the implementation phase, Fullan (2016) identifies three areas that should be addressed that is: local characteristics, the changes feature and aspects existing externally. Among the features making up change are; change desire, objectives and want clarity, the degree of change desired, and the standards and viability of a programme. Thirdly, the external factors that would influence the implementation refer to external players like the government, researchers, employers, and donors. Already the government has been actively supporting the implementation of the early grade mathematics programme including financially and the ratification of policies that support the programme. Other external stakeholders like researchers and donors have presented their input and financial support that has made it possible for the continued implementation of the early grade mathematics programme. This is the most important phase of the programme as what happens or does not happen at this stage would determine if the programme would achieve the intended goals. It requires close supervision, adequate allocation of requisite resources, and regular assessment to establish what is being

achieved or what is derailing the implementation process. It is the component of this theory that best supports the goal of this research.

2.9 Conceptual Framework

This is an elaboration of the existing association among different variables in an analysis. Here, the development of the conceptual framework by the investigator is to indicate the association among the independent variables, the intervening variable and dependent variables. Forming the independent ones include: effect of teaching and learning resources, influence of teacher training, role of instructional supervision, and influence of utilization of teaching and learning materials on early grade mathematics.

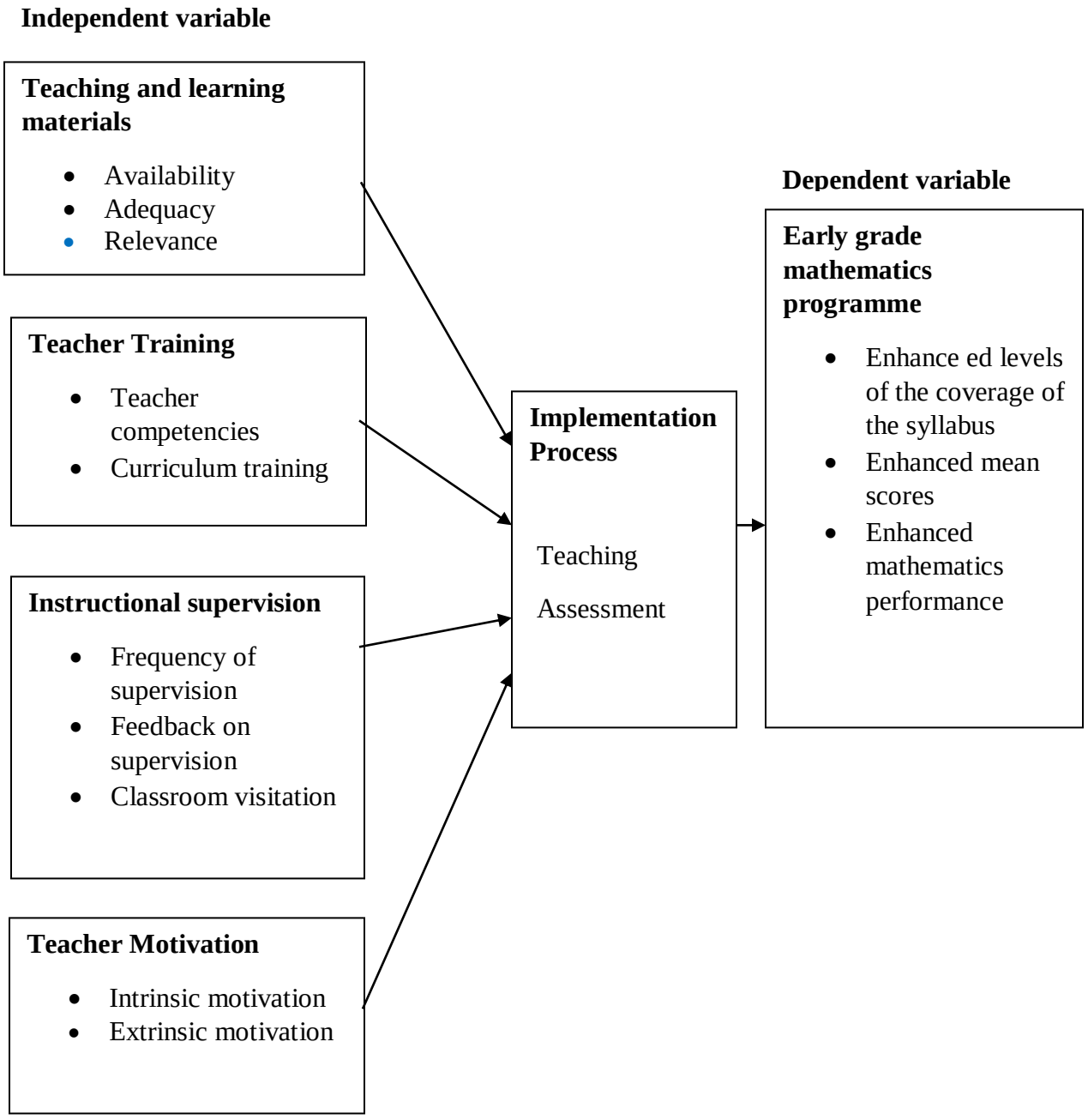

Figure 2. 1: Conceptual Framework

The conceptual framework is based on the influence of school based factors on the implementation of early grade mathematics. Teaching and learning materials as an independent is indicated by availability of learners guide and teachers guide. Their

availability influences student performance and teachers' ability to instruct learners. Teacher training is a significant independent variable that influences the implementation of the early grade mathematics programme. Competent teachers enhances the quality of teaching which in turn positively influences student performance. The use of instructional materials to aid student performance also depends on teacher competencies. Instructional supervision influences the implementation of the early grade mathematics programme since it ascertains the quality of teaching and learning. Therefore, frequent and regular supervision, provision of feedback and regular class visits helps identify weak areas for improvement. It also identify the quality and quantity of learning materials for remedial action which leads to enhanced student performance.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

Forming the study areas in this section include processes enabling determination of findings. The areas covered include; the study's model, territorial position, the study's population, the sampling unit and sampling approaches, the study instruments and their pretesting, validity and reliability, approaches to data collection, data analysis formula and ethical considerations.

3.2 Research Design

According to Orodho (2005), it can be regarded as a framework or an outlined concept that seeking to get evidences to the research problem being studied and generating relevant and appropriate answers. a descriptive survey study model was used here. This was important since it was influenced by the provision of an in-depth information about the area of research through ascertaining values and opinions from respondents. It was undertaken by collecting data under an identified number of primary early grade mathematics teachers and pupils at a given time. The data intended to determine the impact by teaching and learning of early grade mathematics on pupil performance in Rachuonyo East Sub-County, Kenya.

3.3 Target Population

The study took place in Rachuonyo East Sub-County of Homabay County. The target population for the study was the lower primary pupils (grade 1- 4) and early grade mathematics teaching staff in every public primary schools in the 5 wards of Rachuonyo East Sub-County in Homabay County.

Table 3. 1 Target Population

Category	Target population
Head teachers	102
Early grade mathematics teachers	429
G 1 Learners	3366
G 2 Learners	3264
G 3 Learners	2754
G 4 Learners	2856

3.4 Sample Size and Sampling Procedures

A sample size will be any representation of an entire group. Also, this deals with processes enabling derivation of a sample unit from a certain identified group with the goal of having a participation in a study (Kothari, 2014). Moreover, Kothari (2014) posits that a sample size of 30% is representative enough of the entire population. Rachuonyo East Sub-County has a total of 102 public primary schools. Therefore, 31 schools was selected to represent the population sample. The study targeted early grade mathematics teachers, specifically grade three. Therefore, 31 mathematics teachers were selected for the study.

Table 3. 2 Sample Size

Study population	Target population	Sampling method	Sample size	Data collection instruments
Head teachers	102	Purposive sampling	31	Interview guide
Early grade mathematics teachers	429	Purposive sampling	128	Questionnaire
G 1 Learners	3366	Simple Random sampling	336	Focused Group Discussion guide
G 2 Learners	3264	Simple Random sampling	326	Focused Group Discussion guide
G 3 Learners	2754	Simple Random sampling	275	Focused Group Discussion guide
G 4 Learners	2856	Simple Random sampling	285	Focused Group Discussion guide

The study employed stratified proportionate random sampling procedure to select six schools from each of the five divisions existing wards in Rachuonyo East Sub-County. There was the use of simple sampling approach in the selection of participants of the study from each of the sample school. There was also the application of stratified random sampling was employed since it produces an elaborate representation from the whole population whereas the stratified proportionate random sampling was used in order to reduce chances of failure to comprise individuals of the target population since the classification process with characterizing each stratum was easily estimated whereas the simple random sampling results data that was generalized into a larger population.

3.5 Instruments of Data Collection

Truman (2008), data collection is the structured process employed in collection and quantification of information depending on the variables of research in a manner that's systemically conventional to allow the researcher answer the study questions specified. Therefore, the study collected data from early grade mathematics teachers using questionnaires and interview schedules collected data from school head teachers who represented the schools. The questionnaire was used to collect quantitative data in regards to the study whereas interview schedules collected qualitative data from school head teachers.

Questionnaires were administered to early grade mathematics teachers. The questionnaires is divided into two main categories. Part A of the questionnaire collected the respondents' demographic data: such as the respondent's title, gender, age bracket, years served in leadership position, the number of years the respondent had been at the current duty station. Part B of the questionnaire collected information on the factors affecting the implementation of early grade mathematics. To evaluate the responses, the questionnaire used a Likert scale with a five-point scale to measure the responses, that is, strongly agree, agree, neutral, disagree, and strongly disagree. A focused group discussion guide was used to gather information from the grade 1-4 pupils. The questionnaires were administered to sampled teachers, while an interview guide was used to collect data from head teachers; focused group discussion guide was used to gather information from pupils.

3.5.1 Validity of Instruments

Houser (2016) avers that instrument validity gives an indication of the extent any research instrument collects the expected data. Therefore, validity indicates that an instrument measured what it is intended to measure. According to Connely (2008) a sample of 10% from the sample is sufficient for the pilot study to test the validity of the instruments. Therefore, to test the validity of the instruments they were administered to fourteen early grade mathematics teachers and three head teachers from the area of study but who did not participate in the final study. Consequently, the results were scrutinized to check out for clarity, accurateness and appropriateness of the instruments. Any weaknesses that were noted in the instruments were rectified as appropriate. Further, the instruments were shared with the supervisors who gave their input on how best to structure them to match the study objectives.

3.5.2 Reliability of Research Instruments

Reliability of any instrument is the capacity of the research tool to dependably assess measurement features. Thus, the investigator applied the test-retest approach in the determination of reliability. According to Creswell (2012), pretest approach involves the administration of an instrument to measure the consistency of the collected data. If the instrument consistently collects similar data, then it has high reliability. To establish instrument reliability. data was analyzed and a reliability level of above r=0.7 was an indication that the instruments are highly reliable (Kothari, 2012).

Reliability Analysis

Determinant	No of items	Cronbanch's	Verdict
Teaching and learning resources	5	. 824	Reliable
Teacher training	5	. 753	Reliable
Teacher instructional supervision	5	. 801	Reliable
Teacher motivation	5	. 762	Reliable
Implementation	5	. 779	Reliable

From the detailed Cronbach's Alpha scores, indicate that data collection instrument was reliable since the figures exceeded the ideal score of 0.7 and above.

3.6 Data collection procedures

The researcher sought clearance from NACOSTI to enable him embark on the study. Further, permission was sought from the target sample school administration to enable for data collection from the schools. Moreover, there was clearance obtained from the University of Nairobi faculty of education to commence the study. Then, the questionnaires were administered with the assistance of trained research assistants to help respondents complete them. The respondents were given a time frame within which they were required to answer the various questions given. The research assistants collected the questionnaires upon completion alongside determining thorough completion rate with the return of the already completed questionnaires.

The secondary data entailed collection of data from other past research that have been conducted in that area of study which were tabulated either into graphs and charts. The key information from the reference materials with the same type of data formed the basis of this research study. Also collection of secondary data was obtained from desk research that were either from external and internal sources. The external sources comprise of; libraries, publication press, newspapers and various related research.

3.7 Data Analysis

The filled questionnaires were checked twice for completeness. First, the data research assistants verified that the questionnaires were finished, and then they were sent to the researcher for a final check. This made sure that any observed inconsistencies were fixed right away before the respondent's questionnaires were collected. Upon successful collection of data, the next stage was data analysis.

Field notes containing qualitative data obtained by interviewing sessions as well as focused group discussions were edited to remove ambiguities before being condensed. Data categories were arranged into themes and patterns, and concepts were then developed and coded. After utilizing SPSS to analyze and interpret the coded categories, narrative generalizations and inferences were made. Pearson The link between the independent factors and the dependent variable was evaluated using moment correlation. At a 5% level of significance, regression coefficients were calculated to determine the influence of the link between the research variables.

3.8 Ethical Consideration

The leading intention of research ethics in studies lies with the prevention of anyone from incurring negativity as a result of the study activity. The graduate school of the university

and the National Commission for Science, Technology, and Innovation provided a permission permit, which was then submitted to the local authority to inform them of the intent of the research in the area of study due to the frequently sensitive relationships between the respondents and the researcher. Additionally, the researcher treated the data she gathered during the study time with the utmost confidence and used it only for academic purposes. In this study, the researcher also made sure that respondents had autonomy

CHAPTER FOUR

DATA PRESENTATION, INTERPRETATION AND DISCUSSION

4.1 Introduction

The findings obtained as a result of analysis in the preceding chapter are presented here. These include the study's response rate, the study's demographic details for participants, data presentation, and lastly discussion as per the study's objectives.

4.2 Questionnaire Return Rate

Below is Table 4.1 giving the study's questionnaire return rate.

Table 4.1: Questionnaire Return Rate

Respondents category	Number	Number	Percentage Returned

	Administered	Returned	
Teachers	128	97	76

The return rate for teachers was 76 percent. Kothari (2008) asserts that scores of more than 50% is suitable for descriptive studies. Due to the researcher's capacity to undertake visitations to learning institutions personally, ensure distribution to participants, and lastly the collection of them immediately, the return score was desirable. Based on their hectic schedules and other obligations outside of the classroom, some teachers, unfortunately, were unable to complete the questionnaires in a timely manner

4.3 Demographic Information

Each respondent's unique characteristics are listed in this part, including their years, sex, schooling level and employment duration. The findings on the demographic data were used to determine if the respondent was qualified to take part in the study since they had the opportunity to interact with the variables under investigation. Questionnaires were used to determine the demographic information for teachers.

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4.3.1 Gender Distribution of Respondents

Towards the establishment of the sexes involvement in the teaching of mathematics in grades one through four, it was considered necessary in this study to ascertain the gender distribution among teachers. Below is table Table 4.2 detailing everything

Table 4.2 Gender Distribution

	Teachers	
Gender	**F**	**%**
Female	69	71%
Male	28	29%

According to Table 4.2, a huge percentage of the teachers were women, while the minority were men. Because of this marginalization, the majority of males in grades one through four were not involved in the teaching of mathematics. However, it was highlighted that the composition teachers had not adhered to the one-third criterion of either gender as established in the Basic Education Act of 2013 and the Kenyan Constitution of 2010

4.3.2 Age Distribution of Teachers

The study set out to have a determination of the distributions by age of the teaching staff. Below is Table 4.3 presenting outcomes.

Table 4.3 Distribution of Respondents' Age

	Teachers	
Age bracket	**F**	**%**
21-30 years	17	18%
31-40 years	49	50%

41-50years	20	21%
Above 50years	11	11%

According to Table 4.3, 49 percent of teachers fell between the 31–40 year age range. This suggested that the teachers were adults who had attained the minimum conceptual and professional skills necessary for teaching mathematics to students in grades one through four

4.3.3 Respondents' Academic Qualifications

The study set out to have a determination of the schooling levels of the teaching staff. Below is Table 4.4 presenting the outcomes.

Table 4.4 Distribution of Respondents' Academic Qualifications

Academic	**Teachers**	
Qualifications	**F**	**%**
Diploma	57	59
Degree	31	32
Masters	9	9

The majority of teachers possessed diplomas, as shown in Table 4.4. it presents the suggestion that the teaching staff in Rachuonyo East Sub-County, Homabay County were professionally prepared and intellectually capable to oversee the implementation of mathematics in grades one through four in that county

4.3.4 Years of Service

The study set out to have a determination of the teaching staffs' employment duration. Below is Table 4.5 detailing everything

Table 4.5 Years of Service

	Teachers	
Years	**F**	**%**
Less than 6	16	18%
6-10 years	59	61%
11-15years	11	11%
16-20years	11	11%

From the determinations above, the majority of the teachers have been in the teaching profession for between 6 and 10 years, which means they have had enough exposure to the activities of math implementation in grades one through four in Rachuonyo East Sub-County to be able to perform their role as math teachers in grades one through four. The bulk of the teachers said they had been teaching for between six and ten years. This suggests that they were well-aware of the difficulties associated with teaching mathematics to students in grades one through four

4.4 Teaching and Learning Resources and Implementation of grade 1-4 Mathematics

The study's initial goal was to determine how educational utilities affected the adoption of mathematics in grades 1 through 4 in Rachuonyo East Sub-County. Mean and standard deviation, as well as inferential statistics such as correlation and regression analysis, were successfully used in the analysis to display measures of dispersion and central tendency

4.4.1 Teachers Responses on Implementation of grade 1-4 Mathematics

The study went out to determine teachers' opinion on the implementation of grade 1-4 Mathematics. Below is Table 4.6 giving the teachers' responses.

Table 4.6: Teachers Response on Teaching and Learning Resources and Implementation of grade 1-4 Mathematics

Statements	SA		A		UD		D		SD		Mean	Stdv
	F	%	F	%	F	%	F	%	F	%		
There are adequate	49	33	8	8.2	8	8.2	32	33	-	-	3.76	1.36
There are sufficient	57	59	-	-	-	-	40	41	-	-	3.35	1.97
The teaching and learning	73	75	8	3.2	-	-	16	17	-	-	4.42	1.11
Teachers are able	49	51	-	-	-	-	48	49	-	-	3.51	1.50
The school regularly	49	51	-	-	-	-	48	49	-	-	3.51	1.50
(n=97, Average Mean=3.71)												

From the determinations above, 81(78.2%) of the teachers agreed that the teaching and learning materials are relevant for the current early grade mathematics programme (M=4.42, SD=1.11). it could also be that these school heads have been consistently provided teaching and learning materials are relevant for the current early grade mathematics programme. Further 57(41.2%) of the teachers indicate that there are adequate teaching materials for early grade mathematics programme. This may be inferred that on average the head teachers have are adequate teaching materials for early grade mathematics programme (M=3.76, SD=1.36). Moreover, 49(51%) of the teachers indicated that Teachers are able to design required teaching and learning materials at

school using materials like charts and pictures (M=3.51, SD=1.50). This indicates that another 49% of the teachers are not able to design required teaching and learning materials at school using materials like charts and pictures. This fact indicates that they influence implementation of grade 1 to 4 mathematics negatively. This findings implies that teachers should be trained on designing required teaching and learning materials at school using materials like charts and pictures. Further there are inadequate teaching materials for early grade mathematics programme. This could be attributed to limited budgetary allocations for curriculum implementation.

4.4.2 Teachers Response Correlation Analysis

The study went out to have a determination on the link among teaching and learning resources and implementation of grade 1-4 mathematics applying Pearson correlation. Below is Table 4.7 giving the findings

Table 4.7: Correlation Analysis Teaching and Learning Resources and Implementation of grade 1-4 Mathematics

		IMPLE	TEACH
IMPLE	Pearson Correlation	1.000	.719
	Sig. (2-tailed)		.000
	N	97	97
TEACH	Pearson Correlation	.719	1
	Sig. (2-tailed)	.000	
	N	97	97

**. Correlation is significant at the 0.01 level (2-tailed).

The correlation coefficient r(97) = 0.719, p (0.000) <0.5. the implication is that a major positive link exists among teaching and learning resources and implementation of grade 1-4 mathematics. This conclusion implies that teaching and learning resources is important in implementation of grade 1-4 mathematics.

4.4.3 Teachers' Response Regression Analysis

There was the use of Simple Linear regression in the determination of the predictive power of teaching and learning resources towards implementation of grade 1-4 mathematics. Below is Table 4.8 giving the findings

Table 4.8: Model Summary

.Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.719[a]	.517	.512	.75972

a. Predictors: (Constant), Teaching and Learning Resources

From above Table 4.8, R Square=0.517 meaning teaching and learning resources is determined 51.7% variation in implementation of grade 1-4 mathematics. Further ANOVA analysis of P-value of 0.00>0.05 meaning teaching and learning resources is a significant predictor of implementation of grade 1-4 mathematics.

Table 4. 9: Relationship between Teaching and Learning Resources and Implementation of grade 1-4 Mathematics

ANOVA[a]

Model	Sum of Squares	Df	Mean Square	F	Sig.

1	Regression	58.791	1	58.791	101.860	.000[b]
	Residual	54.831	95	.577		
	Total	113.622	96			

a. Dependent Variable: Implementation of grade 1-4 Mathematics

b. Predictor: Teaching and Learning Resources

The probability value of p<0.00gives an indication of a regression association with significance in the prediction of the manner educational resources impact adoption of grade 1-4 mathematics.

The investigator additionally intended to have a determination of the degree introduction of teaching and learning resources influences implementation of grade 1-4 mathematics. The results are shown in Table 4.10.

Table 4. 10: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	**Std. Error**	**Beta**	**T**	**Sig.**
1	(Constant)	1.740	.223		7.804	.000
	Teaching and learning resources	.569	.056	.719	10.093	.000

a. Dependent Variable: Implementation of grade 1-4 Mathematics

The determinations above in Table 4.10 results, the observation was that keeping educational resources to a constant zero, implementation of grade 1-4 mathematics would

be at 1.740. Thus any unit increase in teaching and learning resources leads to an increase implementation of grade 1-4 mathematics by 0.569 units.

The school heads had to indicate the challenges they impede the implementation of the early grade mathematics programme.

"I think one of the things is making materials available to [the teachers]," a head teacher retorted. Personally, I believe those are the most beneficial, along with pointing someone in the right direction who may be a staff member who has perhaps used the material in the past or even connecting with a local individual who may have done so and can serve as a resource. Making a variety of items available, in my opinion, [would be beneficial]

The findings are in tandem with Mege, (2014) availability of the resources is another key factor. The production of materials to meet the demands of the education system in Kenya has been deficient. The number of learners is increasing every day and thus straining on the available resources. Production in Kenya is affected by the enabling environment which is mostly affected by education policies and taxation (Omogi, 2019). As of such, there is no sometimes continuous production or producing a little bit which cannot satisfy the market (Nyakongo, 2015). As a result, the project has been facing a challenge of providing enough materials to the learners to meet the needs of the projects. Also, the provided resources are limited and cannot be provided in time (Ochieng, 2015). Inadequate resources and not getting the resources in time have been a set back of the project (Ministry of education, 2019).

4.5 Teacher Training and Implementation of Grade 1-4 Mathematics

The second goal intended to have a determination of the effect teacher preparation has towards the adoption of mathematics in grades 1–4 in Rachuonyo East Sub-County. Mean and standard deviation, as well as inferential statistics, regression, and correlation analysis, were successfully used in the analysis to demonstrate measures of dispersion and central tendency.

4.4.1 Teachers' Responses

The study set out to collect individual opinions of the teaching staff on the impact by teacher towards the adoption of grade 1 to 4 mathematics in Rachuonyo East Sub-County. Below is Table 4.11 giving the outcomes.

Table 4. 11: Teacher Training and Implementation of Grade 1-4 Mathematics

	SA		A		UD		D		SD			
Statements	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**	**Mean**	**Stdv**
The school regularly	24	24.7	11	11.3	-	-	46	47.4	16.5	16.5	2.80	1.49
The school sponsors	-	-	35	36.1	22	22.7	2	10	40	41.2	2.53	1.34

New teachers receive	35	36.1	-	-	-	-	16	16.5	46	47.4	2.60	1.84
In-service training	81	83.5	-	-	-	-	16.5	16.5	-	-	4.50	1.11
The school has	8	8.2	89	91.8	-	-	-	-	-	-	4.91	0.27
(n=97,Average Mean=3.47)												

Table 4.11 indicates that an overwhelming 81(83.5%) of the teachers agreed that in-service training activities on early grade mathematics programmes are carried out regularly (M=4.50, SD=1.11). Further 97(100%) of the teachers indicate that the school has an in-service training policy for early grade mathematics teachers (M=4.91, SD=0.27). This may be inferred that there policy for early grade mathematics teachers (M=4.52, SD=0.92). Moreover, 62(60%) of the teachers disagreed that the school regularly conducts in-service training activities for teachers such as conferences and workshops within the school for early grade mathematics teachers (M=2.80, SD=1.49).This implies that absence of training affects implementation of grade 1 to 4 mathematics in Rachuonyo East Sub-County. The findings suggest that there could be trainings but they are not attended by all teachers. Therefore, the head teachers should ensure that teachers attend these trainings to enhance levels of implementation of grade 1 to 4 mathematics in Rachuonyo East Sub-County.

4.4.2 Teachers' Response Correlation Analysis

The goal of the study was to determine how teacher preparation and math instruction for grades 1 through 4 relate to one another. Pearson correlation is used. The study attempted

to investigate the relationship between teacher preparation and the implementation of mathematics for grades 1 through 4 using the p-value calculated from the correlation. Below is Table 4.12 showing the outcomes.

Table 4. 12: Correlation Analysis Teachers Training and Implementation of grade 1 to 4 Mathematics

		IMPLE	TRAIN
IMPLE	Pearson Correlation	1	.888
	Sig. (2-tailed)		.000
	N	97	97
TRAIN	Pearson Correlation	.888	1
	Sig. (2-tailed)	.000	.
	N	97	97

**. Correlation is significant at the 0.01 level (2-tailed).

The correlation coefficient r = 0.888, p (0.000) <0.5. The implication is that a major positive link exists among teachers training and implementation of grade 1 to 4 mathematics. This conclusion implies that teachers training are important in implementation of grade 1 to 4 mathematics.

4.5.3 Teachers' Response Regression Analysis

There was the use of Simple Linear regression in the determination of the predictive power of teachers training on implementation of grade 1 to 4 mathematics as shown in Table 4.13

Table 4. 13: Model Summary

.Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.888[a]	.789	.787	.50200

a. Predictors: Teachers Training

From the above Table 4.13, R Square =0. 789 meaning teachers training had a 78.9% variation in the implementation of grade 1 to 4 mathematics. Additionally ANOVA analysis gave a P-value=0.00>0.05 translating to teachers training is significant predictor of implementation of grade 1 to 4 mathematics.

Table 4. 14: Relationship between Teachers Training and Implementation of grade 1 to 4 Mathematics

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	89.682	1	89.682	355.881	.000[b]
	Residual	23.940	95	.252		
	Total	113.622	96			

a. Dependent Variable: Implementation of grade 1 to 4 Mathematics

b. Predictor: Teachers Training

The probability value=p<0.00 gives an indication that the regression relationship had significance in the prediction of the manner teachers' training influences adoption of grade 1 to 4 Mathematics.

The investigator additionally set out to have a determination of the degree teachers training influences Implementation of grade 1 to 4 Mathematics. Below is Table 4.15 showing the outcomes.

Table 4. 15: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	**Std. Error**	**Beta**	**T**	**Sig.**
1	(Constant)	.657	.177		3.718	.000
	TRAIN	.919	.049	.888	18.865	.000

a. Dependent Variable: Implementation of grade 1 to 4 Mathematics

Determination above in Table 4.15 gives an observation that keeping teachers training to a constant 0, Implementation of grade 1 to 4 Mathematics would be at .919. Thus, any unit increase in teachers training leads to increase in Implementation of grade 1 to 4 Mathematics by 0.919 units.

From the interviews, the determination was that the mathematics teachers themselves appeared to be the most significant contributors to their students' successful learning of mathematics, with the school environment or the school administration having a little effect. In other words, excellent classroom management, in-depth topic knowledge, and awareness of what maximizes student learning are all necessary for effective Mathematics instruction.

This determinations aligns with an earlier analysis by Stronge (2010), who showed how crucially vital instructors are to students' lives. There are many factors in schools, but among them, "no more powerful influence on student success than the teacher" is true in

relation to institutional performance and learner outcomes (Stronge, 2010). Findings from the study's focused group discussions with students revealed that teachers' instructional strategies regularly possessed major influence on the affective consequences of students' mathematics learning

This determinations aligns with an earlier analysis by Bowman (2014) avers that teachers ’mentorship within schools enhances their consistency and teacher retention at the school. Besides, mentoring programmes enhance teacher job satisfaction which enhances their delivery. Besides, when teachers share ideas and knowledge within the school, educational standards improves which benefits the teachers, students, and the school at large. A study in Kenya established that teacher mentorship improves teacher classroom practices, hence should be integrated into the formal school programmes (Daniel & Esther, 2020). Hence mentorship should not be limited only to new teachers but also among other teachers who would share skills and experiences.

4.6 Teacher Motivation and the Implementation of Grade 1-4 Mathematics

The third research goal was to determine how much teacher motivation affects how arithmetic is taught in grades 1-4 in Rachuonyo East Sub-County. Here, there was the application of correlation and regression analysis to determine the independent variables' capacity for prediction as well as mean and standard deviation to illustrate measures of dispersion and central tendency

4.6.1 Teachers’ Responses

The study set out to have a determination of the opinions of the teaching staff in relation to the manner teacher motivation impacts the adoption of early grade mathematics in Rachuonyo East Sub-County. Below is Table 4.16 giving the determinations.

Table 4. 16: Teachers' Response on teachers' motivation influences the implementation of grade1-4 mathematics

	SA		A		UD		D		SD			
Statements	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**	**Mean**	**Stdv**
Personal motivational	57	59	8	8	8	8	24	25	-	-	4.01	1.29
A pay rise	-	-	73	75	-	-	8	8	8	8	3.50	0.95
Recognition and appreciation	-	-	81	84	16	17	-	-	-	-	4.67	0.74
Working in a conducive	-	-	73	75	8	8	8	8	8	8	3.50	0.95
Having an opportunity	57	59	8	8	8	8	24	25	-	-	4.01	1.29
(n=97, Average Mean=3.94)												

Determinations above in Table 4.16 show that majority 81(84%) agreed that recognition and appreciation for my achievements motivate me to implement the early grade mathematics programme (M=4.67, SD=0.74). Further 65(67%) of the teachers agreed that personal motivational factors like achievement, passion for mathematics motivate me to implement the early grade mathematics programme (M=4.01, SD=1.29); same as

65(67%) of the teachers, agreed that having an opportunity to express myself motivates me to implement the early grade mathematics programme (M=4.01, SD=1.29).

4.6.2 Teachers' Response Correlation Analysis

The study se out to have a determination of the association among teacher motivation and the adoption of early grade mathematics by Pearson correlation method. With a p-value from the correlation computation, there was testing of the correlation among teacher motivation and the adoption of early grade mathematics. Below is Table 4.17 showing the outcomes.

Table 4. 17: Correlation Analysis between Teacher Motivation and Implementation of Early Grade Mathematics

		IMPLE	MOT
IMPLE	Pearson Correlation	1	.980**
	Sig. (2-tailed)		.000
	N	97	97
MOT	Pearson Correlation	.980**	1
	Sig. (2-tailed)	.000	
	N	97	97

**. Correlation is significant at the 0.01 level (2-tailed).

The correlation coefficient r = 0.980, p (0.000) <0.5. Thus, the implication is that a major positive link exists among teacher motivation and the adoption of early grade mathematics. It therefore means that teacher motivation positively influences implementation of early grade mathematics.

4.6.3 Teachers' Response Regression Analysis

Testing by Simple Linear regression was done to have a determination of the teachers motivation predictive power on the adoption of early grade mathematics. As shown in Table 4.18

Table 4. 18: Model Summary

.Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.980[a]	.960	.959	.22400

a. Predictors: (Constant), Teacher Motivation

From the above Table 4.18, R Square=0.960 meaning teacher's motivation determines 96 variations in implementation of early grade mathematics. Additional ANOVA analysis gave a P-value=0.00>0.05 meaning teachers motivation is a significant determinant of implementation of early grade mathematics.

Table 4. 19: Relationship between Teachers Motivation and Implementation of Early Grade Mathematics

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	109.107	1	109.107	2295.721	.000[b]
	Residual	4.515	95	.048		
	Total	113.622	96			

a. Dependent Variable: Implementation of Early Grade Mathematics

b. Predictor: Teachers Motivation

The probability value of p<0.00 gives an indication that the regression relationship had significance in the prediction of the manner teachers motivation influence implementation of early grade mathematics. The investigator additionally set out to have a determination of the degree introduction of teachers' motivation influence implementation of early grade mathematics. Below is Table 4.20 giving the findings.

Table 4. 20: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	**Std. Error**	**Beta**	**T**	**Sig.**
1	(Constant)	-.713	.098		-7.292	.000
	Teachers motivation	0.821	.024	.980	47.914	.000

a. Dependent Variable: Implementation of early grade mathematics

Determinations above from Table 4.20 give an observation that keeping teachers' motivation to a constant 0, implementation of grade 1-4 mathematics would be at 0.894. Thus any unit increase in teachers' motivation leads to increase of implementation of grade 1-4 mathematics by 0.821 units.

Findings from focused group discussion indicate that "Mathematics is a scoring subject. My teacher teaches us so well. She always motivates us to learn, but I do not know the basics. When now I am eager to study, I still find mathematics going over my head. I can answer few simple questions but when it comes to complex exercises, I just lose hope again." Student FG 19.

Teacher motivation critically support the adoption of educational programs. Kihara (2018) avers that, various elements of teacher motivation influence their instructional activities. The elements include empowerment, appreciation, collaboration, and self-efficacy. He notes that motivation enhances the quality of teaching and learning, which in turn enhances student performance.

A study in Nyamaseke, Rwanda established that teacher motivation significantly influenced teachers' implementation and achievement of educational goals. The study indicated that extrinsic and intrinsic had 0.742 Pearson correlation coefficient to their performance (Esdras & Andala, 2021). The study concluded that teacher performance improved by 80% when they were motivated (Esdras & Andala, 2021). This underscores the significance of extrinsic and intrinsic motivation of teachers to enhance their implementation of educational programs.

4.7 Head teachers' Instructional Supervision and the Implementation of Grade 1-4 Mathematics

The fourth research goal was to determine how much instructional supervision by head teachers affects how early grade mathematics is taught in Rachuonyo East Sub-County. Here, there was the use of correlation and regression analysis in the determination of the independent variables' capacity for prediction as well as mean and standard deviation to illustrate measures of dispersion and central tendency

4.7.1 Teachers' Responses

The study set out to have a determination of the teaching staff opinion in relation to the manner school heads' instructional supervision impacts the adoption of early grade mathematics in Rachuonyo East Sub-County. Below is Table 4.21 presenting the outcomes.

Table 4. 21: Teachers' Response on head teachers' instructional supervision influence on implementation of grade1-4 mathematics

	SA		A		UD		D		SD			
Statements	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**	**Mean**	**Stdv**
Supervision of the	73	75	8	8	-	-	8	8	-	-	4.58	.86
Teachers received	35	36	11	11	-	-	8	8	-	-	3.31	1.41
Supervisors inspect	89	92	-	-	8	8	-	-	-	-	4.84	0.55
Head teachers conduct	65	67	8	8	8	8	8	8	8	8	4.17	1.34
Head teachers hold	35	36	1	1	-	-	35	36	16	17	3.14	1.60
(n=97, Average Mean=4.00)												

Determination above in Table 4.21 gives an indication that a huge percentage 89(92%) agreed that supervisors inspect teaching and early grade mathematics learning and teaching materials (M=4.84, SD=0.55). Further 81(83%) of the teachers agreed that supervision of the programme is done regularly by the head teacher (M=4.58, SD=0.86).Moreover 73(75%) of the teachers, agreed that head teachers conduct regular

classroom visitation during supervision of early grade mathematics programmes (M=4.17, SD=1.34).

4.7.2 Teachers' Response Correlation Analysis

The study set out to have a determination of the association existing among school heads' instructional supervision and implementation of early grade mathematics by the use of Pearson correlation. With the p-value from the correlation computation, the intention was to determine correlation among head teachers' instructional supervision and implementation of early grade mathematics. Below is Table 4.22 indicating the findings.

Table 4. 22: Correlation Analysis Between Head teachers' Instructional Supervision and Implementation of Early Grade Mathematics

		IMPLE	SUPER
IMPLE	Pearson Correlation	1	.960**
	Sig. (2-tailed)		.000
	N	97	97
SUPER	Pearson Correlation	.960**	1
	Sig. (2-tailed)	.000	
	N	97	97

**. Correlation is significant at the 0.01 level (2-tailed).

The correlation coefficient r = 0.960, p (0.000) <0.5. The translation is that a major positive association exists among school heads' instructional supervision and implementation of early grade mathematics. This implies that as head teachers'

instructional supervision positively influences implementation of early grade mathematics.

4.7.3 Teachers' Response Regression Analysis

Determination by Simple Linear regression took have to establish the school heads' instructional supervision predictive power in relation to the adoption of early grade mathematics as detailed below in Table 4.23

Table 4. 23: Model Summary

.Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.960[a]	.922	.921	.30537

a. Predictors: (Constant), instructional supervision

From the above Table 4.23, R Square=0.922 translating to school heads' instructional supervision determines 92.2% variation in implementation of early grade mathematics. Additional ANOVA analysis gave a P-value=0.00>0.05 translating to school heads' instructional supervision is a significant determinant of implementation of early grade mathematics.

Table 4. 24: Relationship between head teachers' instructional supervision and Implementation of Early Grade Mathematics

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	104.763	1	104.763	1123.437	.000[b]
	Residual	8.859	95	.093		
	Total	113.622	96			

a. Dependent Variable: Implementation of Early Grade Mathematics

b. Predictor: Head Teachers' Instructional Supervision

The probability value=p<0.00 gives an indication that the regression relationship has significance in the manner school heads' instructional supervision influence implementation of early grade mathematics. The investigator additionally set out to have a determination of the degree introduction of school heads instructional supervision impact the adoption of early grade mathematics. Below is Table 4.25 detailing outcomes.

Table 4. 25: Coefficients[a]

		Unstandardized Coefficients		**Standardized Coefficients**		
Model		**B**	**Std. Error**	**Beta**	**T**	**Sig.**
1	(Constant)	-.33.	.129		-2.568	.012
	Instructional supervision	0.943	.031	.960	33.518	.000

a. Dependent Variable: Implementation of early grade mathematics

Determinations above from Table 4.25 give an observation that keeping school heads' instructional supervision to a constant 0, the adoption of grade 1-4 mathematics would be at 0.894. Thus, any unit increase in head teachers' instructional supervision leads to increase of implementation of grade 1-4 mathematics by 0.821 units.

Wanzare (2011) the study revealed that teachers received regular communication from their supervisors which enhanced their instructional competencies. Therefore, the study revealed that if academic supervisors had regular communication with teachers on their instructional duties, it would improve their academic performance. However, the study discovered that academic supervisors rarely held post-observation conferences with teachers. Therefore, the study recommended that supervisors should hold post-observation conferences with teachers to enable them discover their weak and strong points.

The head teachers had to indicate the issues impeding the adoption of the early grade mathematics programme.

"Students have a preconceived idea that mathematics is difficult. Till we change their attitude, we will never be able to achieve a better result in mathematics. Mathematics has to be made compulsory along with English in order to make them realise that they have to study and pass the subject if they want to achieve something in life".

"Students' interest in learning Mathematics is the main problem as well as students' poor Mathematics background" and one advanced "Most students of Years 9 and 10 those I taught this year got very weak foundation of basic Mathematics skills especially

simplifying algebraic expression, equation and several word problems due to their literacy skills". A teacher had the belief that "the students hated Mathematics so much and the results are very bad". A participants also presented something in relation to concerns brought about by learners by advancing "Students' attitudes towards learning [and]. Students' mindset [are the few factors influencing the effectiveness of Mathematics teaching and learning]. Some thought that they never passed any Mathematics test or exams, so they do not want to try again".

For teachers to have an increasingly more expanded mix of learners towards a largely demand work for determining concerns; the determination, integration and synthesis of information; and the creation newer interventions, there is the need for significantly more awareness and varied expertise

"I was really doing well in mathematics till year 4. Then I was taught by a teacher who always confused me. The explanations were not clear and understandable. The same teacher taught me in year 5 and from then I have lost interest in the subject." Student FG 2.

4.8 Teachers' Response on Implementation of Grade 1-4 Mathematics

The study went out to collect teachers' opinion on the implementation of grade 1-4 mathematics (the study's dependent variable). Below is table 4.26 presenting the findings

Table 4. 26: Teachers' Response on Implementation of Grade 1-4 Mathematics

Statements	N	Mean	Std dv
There is improved performance in mathematics in our school	97	3.30	1.41
I normally cover mathematics syllabus in time	97	4.25	1.30
Mean score in mathematics are rising steadily	97	3.42	1.03
Teachers compete to produce good results is mathematics	97	4.50	1.11
Pupils are motivated to participate in mathematical lessons	97	3.76	1.48

Determinations from above Table 4.26 give an indication that a huge percentage of the teaching staff scoring top means of (M=4.50,SD=1.11) suggesting that Teachers compete to produce good results is mathematics. This was followed by I normally cover mathematics syllabus in time (M=4.25, SD=1.30).This was closely followed with by pupils are motivated to participate in mathematical lessons (M=3.76,SD=1.48). Pupils are motivated to participate in mathematical lessons (M=3.42,SD=1.03).

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The work's intention was fundamentally the coverage of the impact by institutionally related elements towards the adoption of grade 1 to 4 mathematics in Rachuonyo East Sub-County, Homabay County. Here what will be detailed will include; the study's findings, its conclusions, the advanced recommendations and finally proposals for future analyses.

5.2 Summary of the Study

The study examined the impact by institutionally related aspects of institutional aspects towards the adoption of grade 1 to 4 mathematics in Rachuonyo East Sub-County, Homabay County. Among the variables forming the study's variables include; a determination of the impact by educational utilities on the adoption of early grade mathematics; a determination of the impact by teacher training toward the adoption early grade mathematics; a determination of the impact by school heads instructional supervision towards the adoption of early grade mathematics; and lastly an establishment of the degree teacher motivation impacts the adoption of early grade mathematics in Rachuonyo East Sub-County. The research was guided by Michael Fullan's change theory that was propounded by (Fullan, 1991). There an elaboration of the conceptual framework which was meant to present the associations among the study's independent and dependent elements. The preferred descriptive study was had increased significance

as it enables one to obtain information explaining a phenomenon through presentation of questions enquiring on different topics.

The study's target participants included 102 head teachers, 429 early grade math instructors, 3366 first-graders, 3264 second-graders, 2754 third-graders, and 2856 fourth-graders. For the study, schools were chosen using stratified sampling. 1381 respondents made up the entire sample for this study, which also included 31 head teachers, 128 early grade math instructors, 336 first-graders, 326 second-graders, 275 third-graders, and 285 fourth-graders.

To increase their dependability, the research tools underwent repeated testing. By asking the opinion of university supervisors, validity was ensured. To sample teachers, stratified random sampling was utilized. Because SPSS Computer Software version 23.0 is effective and efficient at analyzing massive amounts of data, it was used for data analysis. The following sub sections provide a summary of the results depending on each target..

5.2.1 Influence of Teaching and Learning Resources on the Implementation of Grade 1-4 mathematics in Rachuonyo East Sub-County.

To determine the impact by educational materials towards the adoption of grade 1-4 mathematics in Rachuonyo East Sub-County was the study's primary goal. A statistical significance level of 0.05 was determined (M=3.71, r=0.719, r2=0.50). The analysis found out 81(78.2%) of the teachers gave a confirmation that educational materials are relevant for the current early grade mathematics programme (M=4.42, SD=1.11).Further 57(41.2%) of the teachers indicate that there are adequate teaching materials for early grade mathematics programme.

5.2.2 Influence of Teachers' Training on the Implementation of Grade 1-4 Mathematics in Rachuonyo East Sub-County.

The study's second goal was to determine how teacher preparation affected the implementation of early grade mathematics in Rachuonyo East Sub-County. Teachers determined that it was statistically significant (M=3.47, r=0.88, r2=0.78; p0.05). It was established that overwhelming 81(83.5%) of the teachers agreed that in-service training activities on early grade mathematics programmes are carried out regularly (M=4.50, SD=1.11). Further 97(100%) of the teachers indicate that the school has an in-service training policy for early grade mathematics teachers (M=4.91, SD=0.27).

5.2.3 Influence of Head teacher Instructional Supervision on the Implementation of Grade 1-4 Mathematics in Rachuonyo East Sub-County.

The third goal of the study was to evaluate how early grade mathematics was implemented in Rachuonyo East Sub-County in relation to head teacher instructional supervision. The statisticians determined it to be statistically significant (M=4.00, r=0.96, r^2=0.92; p<0.05). The study has established that overwhelming 89(92%) agreed that supervisors inspect teaching and early grade mathematics learning and teaching materials (M=4.84, SD=0.55). Further 81(83%) of the teachers agreed that supervision of the programme is done regularly by the head teacher (M=4.58, SD=0.86).

5.2.4 Influence of Teacher Motivation on the Implementation of Grade 1-4 Mathematics in Rachuonyo East Sub-County.

The study's fourth goal was to determine how much teacher motivation affects how mathematics is taught in grades 1-4 in Rachuonyo East Sub-County. Teachers discovered that it was statistically significant (M=3.94, r=0.98, r^2=0.96; p<0.05). The study established that overwhelming 81(84%) agreed that recognition and appreciation for my achievements motivate me to implement the early grade mathematics programme (M=4.67, SD=0.74). Further 65(67%) of the teachers agreed that personal motivational factors like achievement, passion for mathematics motivate me to implement the early grade mathematics programme (M=4.01, SD=1.29).

5.3 Conclusion

The study's research questions and findings led to the following inferences:

This study concludes that implementation of grade 1-4 mathematics in Rachuonyo East Sub-County were jointly influenced by teaching and learning resources, teachers training, teachers motivation, and instructional supervision. This study concludes that the teaching and learning materials are relevant for the current early grade mathematics programme. The study further concludes that teachers training are important in implementation of grade 1 to 4 mathematics.

5.4 Recommendation

Connecting with the review’s determinations, the following suggestions were offered;

The government should provide sufficient teaching and learning resources to the schools through the Ministry of Education so that quality assurance and standard officers can increase their utilization.

i. Kenya Institute of Curriculum Development should provide teachers with specialized training in mathematics so they may serve as resource people for schools.

ii. Head teachers should enhance individual instructional supervision capabilities by securing leadership courses offered by KEMI along with other workshops and seminars. This should help in maintaining and/or improving implementation of grade 1 to 4 mathematics.

iii. Varied motivational strategies should be employed by school head teachers on both teachers and pupils so as to achieve the desired goals, that is, improvement implementation of grade 1-4 mathematics.

5.5. Suggestion for Further Study

With relation to the implementation of grade 1-4 mathematics, this study aims to promote advanced studies in the following areas:

i) The impact of curriculum support activities on math learning.

ii) Parents influence in the learning of mathematics in primary schools.

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APPENDICES

APPENDIX 1: LETTER OF INTRODUCTION

Elly Odhiambo Okongo

Department of Educational Administration and Planning
University of Nairobi

P.O. BOX 30197

Nairobi

Dear Sir/Madam,

REQUEST FOR COLLECTION OF RESEARCH DATA

I am a Master of Education (M.Ed.) student at the University of Nairobi. As part of the requirement for the award of the degree, I am expected to undertake a research study. I am requesting for your participation in a study that examines "**INFLUENCE OF SCHOOL BASED FACTORS ON IMPLEMENTATION OF EARLY GRADE MATHEMATICS IN RACHUONYO EAST SUB-COUNTY, HOMABAY COUNTY**". Please fill in the questionnaires. The research results will be used for academic purposes only and information provided will be treated with confidentiality.

Your co-operation will be appreciated.

Yours sincerely,

Elly Odhiambo Okongo

APPENDIX II: QUESTIONNAIRE FOR THE EARLY GRADE MATHEMATICS TEACHERS

This questionnaire seeks to collect data on the influence of school based factors on the implementation of the early grade mathematics programme in Rachuonyo East Sub-county, Kenya. You have been randomly selected to participate in this study. To protect your privacy, please do not write your name in any part of this questionnaire. Kindly, give your opinion to the best of your knowledge. Please answer the questions by ticking (√) or filling in the blank spaces as appropriate.

Section A: Demographic Data

1. Gender: male [ ] female [ ]
2. What is your age bracket? 21-30 years [] 31-40 years [] 41-50 years [] above 50 years []
3. For how many years have you been a mathematics teacher? Below 6 years [] 6-10 years [ ] 11-15 years [] above 15 years []
4. For how many years have you been a mathematics teacher in this school? Below six years [] 6-10 years [] 11-15 years [] above 15 years []
5. What is your highest teaching professional qualification? Diploma [] B.Ed. [] M.Ed. [] Ph.D. [] other_____(specify)

SECTION B:

6. Please indicate by ticking the grid below the statement which best describes safety practices and activities at your school. Note that SA=strongly agree, A=agree, NO=no opinion, D=disagree, and SD=strongly disagree.

1	**Teaching and learning resources**	**SA**	**A**	**NO**	**D**	**SD**
I	There are adequate teaching materials for early grade mathematics programme					
Ii	There are sufficient learning materials for the early grade mathematics programme					
iii	The teaching and learning materials are relevant for the current early grade mathematics programme					
Iv	Teachers are able to design required teaching and learning materials at school using materials like charts and pictures					
V	The school regularly budgets for and procures early grade mathematics teaching and learning resources with the input from teachers					
2	**Supervision**	**SA**	**A**	**NO**	**D**	**SD**
I	Supervision of the programme is done regularly by the head teacher					
ii	Teachers received feedback about the supervision process					

	of the early grade mathematics programme					
iii	Supervisors inspect teaching and early grade mathematics learning and teaching materials					
Iv	Head teachers conduct regular classroom visitation during supervision of early grade mathematics programmes					
V	Head teachers hold post conferences to discuss the outcome of the early grade mathematics supervision					
3.	**Early grade mathematics training programmes**	SA	A	NO	D	SD
I	The school regularly conducts in-service training activities for teachers such as conferences and workshops within the school for early grade mathematics teachers					
Ii	The school sponsors teachers to attend in-service programmes for early grade mathematics programmes outside the school					
iii	New teachers receive mentorship on early grade mathematics programme					
Iv	In-service training activities on early grade mathematics programmes are carried out regularly					
V	The school has an in-service training policy for early grade mathematics teachers					
4.	**Teacher motivation**	**SA**	**A**	**NO**	**D**	**SD**
I	Personal motivational factors like achievement, passion for mathematics motivate me to implement the early grade mathematics programme					
Ii	A pay rise motivates me to implement the early grade mathematics programme					
iii	Recognition and appreciation for my achievements motivate me to implement the early grade mathematics programme					
Iv	Working in a conducive environment motivates me to implement the early grade mathematics programme					
V	Having an opportunity to express myself motivates me to implement the early grade mathematics programme					
5	**Implementation of early grade mathematics**	**SA**	**A**	**NO**	**D**	**SD**
I	There is improved performance in mathematics in our school					
Ii	I normally cover mathematics syllabus in time					
iii	Mean score in mathematics are rising steadily					
Iv	Teachers compete to produce good results is mathematics					
V	Pupils are motivated to participate in mathematical lessons					

Thank you for your time and participation

APPENDIX III: INTERVIEW SCHEDULE FOR SCHOOL HEAD TEACHER

1. How are the early grade mathematics teachers trained to offer the early grade mathematics programme under the new curriculum?
2. How often is class supervision carried out in early grade mathematics classes?
3. Are there enough teaching and learning materials to support the early grade mathematics programme?
4. Are there enough physical facilities to support the early grade mathematics programme?
5. What challenges impede the implementation of the early grade mathematics programme?
6. Which are the methods commonly used in the teaching of mathematics?
7. How often do you procure new mathematic text books?
8. How do you motivate mathematics teachers to implement early grade mathematics curriculum effectively?
9. Which difficulties do pupils face difficulties in understanding mathematics language?

APPENDIX IV: FOCUSED GROUP DISCUSSION GUIDE SCHEDULE FOR PUPILS

1. Describe how pupils participate in answering questions during mathematics lessons
2. What are the teaching and learning materials to support the early grade mathematics programme?
3. Which challenges do you face in learning mathematics?
4. How do fellow pupils evaluate teacher's methodology of teaching mathematics?
5. Describe the availability of mathematical textbooks and whether they are interactive.

APPENDIX V: RESEARCH PERMIT

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This is to Certify that Mr.. Elly Odhiambo Okongo of University of Nairobi, has been licensed to conduct research in Homabay on the topic: INFLUENCE OF SCHOOL BASED FACTORS ON IMPLEMENTATION OF GRADE ONE TO FOUR MATHEMATICS IN RACHUONYO EAST SUB-COUNTY, HOMABAY COUNTY for the period ending : 09/May/2023.

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