Impact of the Pre-School Programme on Mathematics Performance in Lower Primary Schools of the Makuyu Zone, Murang’a South District

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DECLARATION

This research project is my original work and has not been submitted for an award of degree in any other institution.

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

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DEDICATION

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ABBREVIATIONS AND ACRONYMS

CBOs- Community Based Organizations

DEO- District Education Officer

DICECE-District Centre for Early Childhood Education

ECDE centres –Early Childhood Development and Education centres

ECDE –Early Childhood Development and Education

FBOs- Faith Based Organizations

NGOs-Non-Governmental Organizations

UNICEF-United Nations International Children’s Education Fund
ABSTRACT

The purpose of this study was to investigate the impact of the pre-school mathematics programme on mathematics performance in the Lower Primary Schools of the Makuyu Zone, Murang’a South District. The difficulties and problems hindering good performance in mathematics by Lower Primary school children in the Makuyu Zone seemed to emanate from some parents’ tendency to ignore taking their children for pre-school education. The effect of that could result in denying children a precious start to their future mathematics performance. The objectives of this study were:- to investigate continuity of teaching methods from pre-school to lower primary school; to compare the relationship between performance in mathematics of children who had had pre-school education with those who had not; and to evaluate the teachers’ perception on the value of pre-school mathematics; and to evaluate the children’s perception with regard to mathematics learning. This study used a descriptive survey design to achieve the set objectives. In the Makuyu zone there are 31 public primary schools with a population of 3,593 boys and 3,404 girls, making a total of 6,997 pupils at the lower primary level. In these primary schools there were 15 male teachers and 25 female teachers, making a total of 40. The 31 primary schools had a total of 31 head teachers. A sample population of 60 pupils, 30 teachers and 10 head teachers was chosen for the study, which used open-ended questionnaires and interview schedules for data collection. The data collected was coded and analyzed using descriptive statistics and the results presented in tables and charts. The study found a persistent indication that a discontinuity exists between pre-school learning methods and those in the lower primary schools. The study recommends that the teaching methods of the lower primary should be amended to make allowance for the stages of a child’s development and provide opportunities to encourage children to improve in their ability to understand and apply mathematical concepts.
CHAPTER ONE
INTRODUCTION

1.1 Background to the study

Sherman (1979) has argued persuasively that education is an effective weapon to fight the war against ignorance, poverty and disease, which are the root cause of many of the world's problems. A country without an educated population has no future. As an example of the importance placed on education by politicians in the Developed World, the Prime Minister of England, when asked ‘what are the priorities of your government for the twenty-first century?’ said "Education, Education, Education". His emphasis was that his country needed educated and competent people to ensure that England could survive in a highly-competitive world. Ogutu and Wandibba (1987) have defined education as a process by which people acquire knowledge, skills, habits, values or attitudes. In a world where 'knowledge is power', it is important that a country's citizens should have the ability to compete with other nations, in order to become prosperous and enjoy all the benefits of life.

The purpose of early education is to foster competence in children from a young age, when their minds are more receptive to teaching, and competence should be thought of as relating to all aspects of the self (Bruner, 1974) – learning to live comfortably with others, learning to master one’s feelings and to express them safely, whilst learning to enjoy life and welcoming new experiences. Such a well-rounded education will foster competence in dealing with the many problems that there are in life. The function of a school is to be a place where all children can achieve their full potential, and not based on the idea that they are all of the same ability, but accepting that they are all different (Loris Malaguzi, 1946). It is therefore in a school environment where children’s individual differences should be taken care of, in order to maximize their potential.
KIE (1999) also emphasised the point that early childhood education is crucial in laying a good foundation for children. The pre-school years are very important in the life of an individual. The foundation for learning and for basic attitudes is laid during the first five years of life. Froebell (1782-1852) stated that early nurture determines a child’s personality, intellectual capacities, personal abilities and general dexterity in life. Performance in a given subject is the most reliable method of checking the absorption of taught knowledge in the teaching/learning process (Michael, 1987).

Beach and Marshall (1993) advanced the view that general poor performance is due to the poor instructional methods used by the teachers, and the negative attitude of children. Butler (1989) had asserted earlier that a teacher needed a good knowledge of the ways learners understood the function of mathematics, while Johnson and Ripping (1972) even earlier had stated that a teacher should accept that low achievers are still teachable, and do their utmost to motivate them.

The KIE (2008) also stated that pre-school mathematics objectives needed to develop interest and positive attitudes towards mathematics, to develop early mathematical concepts and skills, to develop ability to think and reason logically, and to stress the benefits of mathematics in daily life. Pre-school years are regarded as extending from about 3-5 years of age (Herome Kagan), but some children joined their age group in standard one without having received any pre-school education. Some in fact tended to be over-age when joining standard one, causing the question to be raised of why they didn’t attend pre-school.
1.2 Statement of the Problem

Taiwo (1974) stated that mathematics is a way of thinking and reasoning which enhances the education of Man, no matter what his place is in society. Poor performance in mathematics in national examinations is a cause of concern for many educationalists and does not augur well for many children’s, or for Kenya's, future (Kyungu, 1998). The importance of mathematics is further emphasized when the future employment of a child is being considered, with parents almost unanimously wanting their children to succeed in the subject (Orton and Frobisher, 1986). All children, therefore, need to be equipped with the essential tools of knowledge, according to the varying extent of their abilities so that, as adults, they can make a contribution to the economy and the government of their community. That will also improve their quality of life and self-fulfilment (Taiwo, 1974).

In the previous five years, Makuyu zone has been registering a consistent deterioration in mathematics performance in its lower primary schools every year. This has been a cause of worry and a source of anxiety on the part of parents who have been seeing their children as a window of their future hope. This, therefore, necessitates investigation of impact of the pre-school programme on mathematics performance in lower primary schools of the Makuyu Zone, Murang’a South District. This study aims at unearthing the mystery surrounding the issue with the aim of finding a lasting solution to the phenomenon.

1.3 Purpose of the Study.

The purpose of this study was to investigate impact of the pre-school programme on mathematics performance in lower primary schools of the Makuyu Zone, Murang’a South District.
1.4 Research Objectives

This research study was guided by the following objectives:

1. To investigate continuity of teaching methods from pre-school to lower primary school.
2. To investigate the relationship between preschool attendance and mathematics’ performance in lower primary school.
3. To evaluate the teachers’ perception on importance of preschool mathematics.
4. To evaluate the children’s perception on mathematics learning.

1.5 Research Questions

1. What was the continuity of teaching methods from pre-school to lower primary school?
2. What was the relationship between preschool attendance and mathematics’ performance in lower primary school?
3. What was teachers’ perception on importance of preschool mathematics?
4. What was children’s perception on mathematics learning?

1.6 The Significance of the Study

Whilst the hope was that access to this information would result in a hundred percent enrolment rate for pre-school learning, any marked improvement in the take-up rate was to enhance a child's ability to move from pre-school to primary school with maximum benefit to the child. The study aimed at providing recommendations resulting from the findings, that the government could use to benefit the parents, teachers, community, policy makers, curriculum developers and other pre-school education stakeholders, such as Faith Based Organizations (FBOs), Community Based Organizations (CBOs), and Non-Governmental Organizations (NGOs) among others. Parents should be the ones most interested in the ECDE programme.
This study advises them on the importance of early education and the role they can play in the development and education of their children. Most ECDE centres were supported in various ways by the community, either financially or by providing the volunteers needed to run them. When the community had received information on which they can make a decision, they were more likely to be sensitive to those issues relating to children, and so be more likely to initiate and implement a more inclusive ECDE programme.

The policymakers should identify areas of concern, and address them in the best interest of the child. The curriculum developers should identify the loopholes that are present in the pre-school Mathematics curriculum and likewise address them. NGOs, FBOs, CBOs also could assist by sponsoring the training of pre-school teachers, either for in-service mathematics long courses or for short courses, to deliver quality mathematics education to pre-school children. Other development partners such as the United Nations International Children Education Fund (UNICEF), World Bank (WB) and the International Monetary Fund (IMF) could be asked to assist financially, where necessary.

1.7. Limitations of the Study.

This study is limited by the survey design which was used to collect data. Particularly, it is hard to know if responses are a true reflection of reality. Further, teachers’ responses were suspicious of the true aim of the researcher. Children also had a problem of remembering facts, say, of attendance and the researcher had to confirm with their teachers. Teachers were reassured of the academic nature of the research and efforts made to make items in the questionnaires rather clear. The study was taken only in Makuyu zone and, therefore, others should replicate the same in other areas. The researcher is not very sure whether the findings of this research study
can be generalized to other areas other than Makuyu zone. If it happens, it must be done with a caution.

1.7.1 Delimitations of the Study

The study was limited to the children sampled in classes one, two and three of Lower primary schools in the Makuyu zone of Murang’a South District. Some of their teachers were chosen to ensure adequate data collection. All head teachers of the sampled primary schools were included as respondents in the research study.

1.7.2 Basic Assumptions

The study adopts the following assumptions: -

1 All pre-schools taught mathematics for the same length of lesson time, that is,
   30 minutes as a single period.

2 All pre-schools followed the Ministry of Education’s guideline/syllabus in terms of content taught within a stipulated length of time.

3 All pre-schools used the same language as a medium of instruction.

4 All pre-schools were evenly staffed and teacher/pupil ratio was the same.

5 All pre-school instruction was carried out by trained teachers.

1.8 Organization of the Study

This study is organized in five Sections. Section One contains the background of the study, statement of the problem, purpose of the study, objectives of the study, research questions, justification of the study, limitations of the study, delimitations (scope of the study), basic assumptions, organization of the study and definition of the operational terms. Section Two contains literature review, theoretical framework and the conceptual framework (how various
variables in the research study relate).

Section Three discusses the research design, research population, sample population sampling procedures, research instruments, validity and reliability of the research instruments, procedures for data collection and data analysis. Section Four discusses the research findings. The data is presented in tables, pie charts, frequency and bar graphs. Section Five includes a summary of the research study; the conclusions arrived at from the research study, and the recommendations of the researcher.

1.9 Definition of Operational Terms

Achievement – Level of attainment of mathematics’ skills.

Instructional methods – Approaches, styles or strategies adopted in teaching mathematics

Manipulative materials – Concrete (the practical) learning resources used during the instructional process to reinforce the understanding of concepts

Mathematics – the science of numbers, quantity, space and their interrelationships

Method – An orderly system of presenting instruction.


Performance – Actual accomplishment of children as measured by marks obtained in a test.

Pre-school – pre-primary classes and lower primary classes that included standards one, two and three.

Pre-school Programme – Mathematics taught to children in preschool.
CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This Chapter reviews the literature that related to the research study. Thus it thoroughly sets out the importance of mathematics learning in the early years of a child's life, and what educators and theorists have discovered about how young children should be taught, in order to improve their ability to understand and apply mathematical concepts. Also, it sets out the role of teachers and parents in assisting in the development of a child's understanding of mathematics; as well as the ultimate performance in provision of early education to children.

2.1 Continuity of Teaching Methods

Wachiye (1996) stated that the use of resources involves the use of more than one of the human senses, during the learning process. The World Bank Development Report (1993) in investigating education included having educational systems working towards maximum efficiency in the use of available resources to improve the quality of education. According to Wachiye (1996), different human senses account for varying percentage of learning, and he estimated that sight accounts for 83%, Smell accounts for 3.5%, touch 1.5%, and taste 1%. It is believed that 50% of what is seen is retained, and 20% of what is heard is retained. Consequently, there is a need for visual teaching aids and for active participation in lessons by pre-schoolchildren.
The definition of Instructional methods refers to a broad set of teaching approaches, practices, techniques, procedures, routines and rules used by teachers in an attempt to facilitate learning (Curzon, 1990). This should involve the selection and arrangement of the elements of the curriculum, and the various ways in which they are introduced to the pupils (Pinset, 1962). Educators, researchers and scholars have consistently challenged methodology on mathematics in Kenyan schools. Eshiwani (1984) criticized teachers for using out-dated approaches to teaching. He recommended the application of productive methods of teaching as opposed to learning by rote (repeating words but not understanding the meaning). The methods used should not ignore learner-based activities and participation. The Education Commission (1964) challenged teachers of academic subjects, including mathematics, to take full advantage of practical activities, such as the making of models to illustrate the concepts they taught.

Michael (1987) indicated that new teaching methods should move in a continuous way, from the old teaching methods of the expository kind to the new child-centred method. To achieve this, mathematics teachers should use such techniques as the lecture, the discussion of mathematical concepts, group work (to aid understanding of manipulating numbers), text book reading, games involving numbers and slides. The aim is to improve numeracy (the ability to use numbers in arithmetical calculations).

Mathematical modelling (practical representation of mathematics), the use of resource people (experts who can help in making mathematics concepts to be understood), and experiments with numbers, are amongst other suggestions he made to increase children's understanding and interest in mathematics. The choice of instructional method depends on the strategy to be used, and that will depend on the intended content and objectives of the lesson (Mutunga and Breakell, 1992).
The difficulties and problems hindering good performance in mathematics by pre-school children in the Makuyu zone seem to emanate from parents’ tendency to ignore taking their children for pre-school education, because they weren't interested, or because they couldn’t afford it. They waited for their children to reach school age and then took them straight to primary school instead. This denied children a precious start to their future mathematics performance, and the problem was investigated in this project and was fully researched.

Farant (1997) have argued that the instructional methods contribute towards success in teaching a subject, and that also applies where mathematics is concerned. In his recommendation of discovery methods of teaching mathematics, Bruner (1965) argued that discovery methods are known to keep learners motivated and aroused, so aiding understanding and enhancing retention of the instruction given. By using these techniques, a learner is capable of applying them to develop a wide range of learning. In the discovery methods, learners are involved in the obtaining of information and the understanding of it, by being able to integrate it with their existing knowledge. Discovery learning has much to do with activity methods.

In opposition to this, Edger (1994) in his investigations noted that many teachers forget, or are unaware, that learners require psychomotor (motivation and effective) skills. He considered that problems of motor learning are often overlooked by teachers, including pre-school teachers. In Kenya's present education system, it could be that many teachers have never been taught adequately how to teach, and so know nothing about how to motivate pupils. These skills can only be developed by the application of a variety of teaching methods.
Blumenfeld (1981) have stated that transition in education is the movement from one stage of learning to another. For most children, entering standard one signal a change from being a pre-school learner to becoming a primary school child, and in that new environment, they experience new roles and obligations. The school should provide children with a rich source of new ideas to develop their sense of self.

2.2 Relationship in Performance

According to NACECE (2002) the training that teachers themselves have received affects the way in which pre-school children are taught and learn, and that includes mathematics performance. Trained teachers have learned skills that enable them to relate well with children, with parents, and with community and school committees. They also have learned to make good use of learning resources and materials, as well as guiding children better, and stimulating them in learning, so resulting in a better academic performance by their pupils. Teacher training is needed after a person has achieved academic qualifications, which are a prerequisite to ensure a teacher’s competency.

When a pre-school child has been taught by a qualified and competent teacher, it is likely that such a child will be more likely to benefit from subsequent education than one who hasn’t received pre-school teaching. In stating the need to evaluate when a child has received good teaching, MOEST (2000) defined evaluation as a systematic method of determining the success of the set objectives of pre-school education. It gave direction on the way forward for the achievement of the intended results. Purposeful evaluation should be considered in order to determine efficiency, effectiveness, impact, sustainability and relevance of the set objectives for the successful running of the pre-school programme. Assessment of the successful impact of an agreed plan of children’s learning and achievement should be done, in order to determine such
matters as mathematical skills and a child's readiness for Lower Primary education.

The consistent use of norm-referenced evaluation, instead of criterion-referenced evaluation in pre-schools, has resulted in many children feeling hopeless when comparing themselves with others whom they call 'clever'. The result is that these children carry a low concept of self – esteem to primary school and even into adult life, so it is important that this adverse effect should be eliminated.

Orton and Frobisher (1996) stated that Mathematics should be regarded as one of the most important subjects in the school curriculum, whilst Mutunga and Breakell (1992) defined mathematics as an organized body of knowledge, where ideas, principles and concepts involving numbers are built up logically. Halmos, as cited by Johnstone-Wildre (1996) in his book ‘Learning to Teach Mathematics,’ likens mathematics to such concepts as security, certainty, truth, beauty, insight, structure and architecture. Weddy and Catherine (1992) considered that there are several aspects to be considered for determining a learner’s performance in a mathematical context. These include the attitude of the mathematics instructor, the teaching methods employed, the content of the syllabus, and the attitude of the parents. All these aspects influence a learners’ attitude towards mathematics and so, consequently, mathematics performance.

As pre-school teaching becomes formal, the children’s interests, ideas, and ability to absorb knowledge, should remain at the centre of providing early mathematics education. Most pupils regard mathematics as the most difficult and unpleasant subject in the school's curriculum, and yet are forced to study it (Maxwell, 1983). After much effort under the present system, some pupils master a few of the basic concepts and learn to use them, and eventually the more able of them manage to pass the examination. It is important, therefore, that changes are made so that
mathematics education can become more meaningful and profitable to children. Since there is a close relationship between teaching methods and a pupil's performance, the methods used in teaching mathematics are important to ensure that a learner will understand what is being taught (Keith, 1992).

Stebbins (1971) asserted that pre-school programmes had been shown to produce measurable, very long-term changes in the intelligence quotient of children receiving education from such programmes. Borrowman (1979) believed that children's success in school was greatly influenced by their early educational experiences. Children, who developed an interest in learning, before they entered primary school, are more likely to do well in school than those who have not developed such an interest. Poverty has been shown to contribute greatly to the poor cognitive development of pre-school children. Parents opt to pay for their children's education only in the upper levels of learning, and so fail to send their pre-school children for the early education that they need (Colleta, 1996).

Because most parents can’t afford to pay the pre-school fees, this leaves children from poor families vulnerable to poor performance in the lower primary level. Halpen and Myers (1985) through their research study felt strongly that the first two years of primary school education presents too radical a departure from previous experience for many children in the 4-7 years age group. They considered that such education would work only if an independent unit linked to, but with some independence from, the Ministry of Education, could be established.
2.3 Teachers’ perception on preschool mathematics

Alexander (1988) maintained that the first year of school is identified as a period of considerable importance in shaping subsequent achievement in performance. Borrowman (1979) believed that children’s success in school is greatly influenced by their early educational experiences. Children who develop an interest in learning before they enter primary school are more likely to do better at school than those who have not had the opportunity to receive pre-school education.

According to Hausfather (1996) guided instruction involves both teacher and students exploring mathematics problems together, and then sharing their different problem-solving strategies in an open dialogue. Winkins (1975) believed that the teacher should have only one concern – the academic development of the children under his/her care, in order to promote their growth and achievement. He believed that teaching involves the interaction of so many personal and professional elements that is impossible to separate them.

As cited by Johnstone-Wilder (1986) Margaret observed that it is critical for the mathematics’ teacher to have an understanding of the manipulation of teaching/learning materials, and to have a positive attitude towards teaching the bigger mathematical concepts, rather than just simple arithmetic. Both pre-school teachers and lower primary school teachers should be orientated to understand the methods they use when teaching children mathematical concepts (Eshiwani, 1984). By so doing that would change their beliefs and attitudes, as well as the perspective they currently use in the pre-school programme. Many parents, and those in the community involved in education, are concerned about the current low level of achievement in mathematics in lower primary schools. Maranga (1983) has pointed out that an acceptable performance in education, including mathematics, is wanting.
2.4 Pre-school Children and their Perception towards Learning of Mathematics

As pre-school becomes formal (done according to accepted rules), children’s interests, ideas, and strategies (useful and right plans for fulfilling educational purposes) should remain at the centre of early mathematics education. Most pupils regard mathematics as the most difficult and unpleasant subject in the curriculum and yet are forced to study it (Maxwell, 1983). After much effort, they may master a few basic skills and learn some concepts, so that a minority may subsequently manage to pass the relevant examination.

2.5 Theoretical Framework

Improving the standard of the learning mathematical concepts is of great concern to educators and policymakers. Because early experiences have an effect on young children, providing them with learning opportunities based on research, is likely to result in increased achievement in mathematics, literacy, and work skills at this critical period in their lives. Vygotsky’s Social Development Theory argues that social interaction precedes development; consciousness and cognition, and is the end product of socialisation and social behaviour.

He considered that social interaction played a fundamental role in the process of cognitive development and believed that social learning precedes development. He stated: “Every function in the child’s cultural development appears twice: first on the social level and later on the individual level; first between children (inter-psychological) and then inside the child (intra-psychological)” (Vygotsky, 1978). A teacher, a coach, or an older adult, as well as peers, a younger person, or even computers could be the child’s aid in development, referred to as his 'scaffolding', and bridging of the Zone of Proximal Development (ZPD).

The ZPD is defined as the distance between a student’s ability to perform a task under adult guidance and/or with peer collaboration, and the student’s ability in solving a problem
According to Vygotsky, learning occurs in this zone, and he believed that the assimilation of these tools led to higher thinking skills. Davydov and Kerr believed that Vygotsky asserted that "...specific functions are not given to a person at birth, but are only provided as a result of cultural and social patterns..." Vygotsky saw "intellectual abilities as being much more specific to the culture in which the child was reared."

Through observation and study, Vygotsky came to understand that people adapted to their surrounding environment, based on their interpretation and individual perceptions of it. Thus, he believed that humans are not born with knowledge, nor are knowledge-independent of a social context. Rather, a child gains knowledge as he/she develops as a result of social interaction with peers and adults. For him, knowledge is obtained through past experiences and social situations, as well as one's general environment. In a similar manner, beliefs are instilled into an individual via culture and parental upbringing.

Human beings are differentiated from animals by their ability to develop psychological tools that are "used to gain mastery over one's own behaviour and cognition that other forms of life are not capable of developing". He listed some psychological tools to include: "language, different forms of numeration and counting, mnemo-techniques (aids to remembering), algebraic symbolism, works of art, writing, schemes, diagrams, maps, and blueprints". He said that the zone of proximal development works in conjunction with the use of a method referred to as scaffolding, stating that "Scaffolding is a six-step approach to assisting the learning and development of individuals within their zone of proximal development. He defined those who are able to teach as the "More Knowledgeable Other" (MKO).

Vygotsky's findings suggested methodological procedures for the classroom and in his view the ideal role of the teacher is that of providing scaffolding (collaborative dialogue) to assist
students on tasks within their zones of proximal development.” During the building of this scaffolding, the first step is to build interest and engage the learner in the subject being taught. Once the learner is actively participating, the given task should be simplified by breaking it into smaller sub-tasks. During this activity, the teacher needs to keep the learner focused, whilst concentrating on the most important ideas of an assignment. One of the most essential steps in scaffolding consists of keeping the learner from becoming frustrated. The final task associated with scaffolding involves the teacher modelling (explaining/discussing) possible ways of completing a task, which the learner can then imitate and eventually learn and repeat without further reminder. Vygotsky then suggested that the pre-school curriculum should be designed so that it was organized to "ease a child's transition from drawing things to drawing speech."

To summarise, Vygotsky's findings suggest that the curriculum should generally challenge and stretch a learner's competence. The curriculum should provide many opportunities to apply previous skills, knowledge and experiences, with "authentic activities connected to the real-life environment.” Since children learn much through interaction, curricula should be designed to emphasize interaction between learners and their learning tasks.” The physical classroom, based on Vygotsky's theory, would provide clustered desks or tables and work space for peer instruction, collaboration, and small group instruction. Like the environment, the instructional design of material to be learned would be structured to advance and encourage student interaction and collaboration. Thus, the classroom becomes a community of learning.

All these suggestions are interesting and perhaps true, but many of these books have been written by theorists and educators who probably did not need to consider the financial implications of their recommendations to Kenya. These ideas could be applied in an affluent society but not in Kenya. According to Cheboi (2010) the Ministry of Education is now locked in negotiations with
the Treasury over the possibility of employing one teacher for each of the more than 18,000 Early Childhood Development centres attached to public primary schools. 1.6 billion shillings would be required to pay these teachers – an amount that either seems not to be available, or the Kenyan government is not willing to fund the additional cost.

Rotich (2010) says that, according to the Ministry of Education, the aim of integrating ECDE into Free Primary Education is to create reception classes for the 4-5 year olds for preparing them for entering school, to increase transition from ECDE centres to primary schools, to improve the learning environment, and to enhance their participation in primary education. She continues by saying it is generally agreed that the problems afflicting the education system, in terms of quality, stems from poor foundation. This can be addressed through making ECDE part of the mainstream education system, instead of treating it as less important. In addition to negotiating for employing more teachers, the Ministry is also exploring the possibility of funding the ECD programme along the lines of Free Primary Education (FPE) through investing in teaching-learning facilities and in learning-play equipment.

2.6 Conceptual Framework

According to the researcher, learner’s personality traits are a key factor in mathematics’ performance. These include nature of the child, his/her attitude towards mathematics’ learning, self learning motivation, cognition of what is taught and retention of the learnt concepts. This concurs with Descartes (1596-1650) that, general mental ability is largely inherited and is slightly affected by the environment.

The school environment again becomes a strong influence on the child’s intelligence (nature). When the child is exposed to factors like mathematics instructor’s attitude, teaching methods, content being taught and stimulation the end product is either good or poor
performance in mathematics. The teacher, therefore, remains at the centre in that he/she merges the two categories of factors to facilitate the child’s acquisition and retention of mathematics’ concepts. This he/she does by adopting appropriate educational experiences (teaching/learning activities). This agrees with Owen (1971) that an individual difference among children is caused by both heredity and environment working together. Heredity limits what environment can do in influencing the child’s development and performance; therefore it takes both nature and nurture to develop the child into what he/she becomes in terms of academic performance. As shown in the figure below, the child’s characteristics, school related factors and educational experiences are the independent variables that affect/determine the child’s mathematics’ performance, which is the dependent variable in this case.
Figure 1: Interrelationship of the variables

**School related factors**
- Instructor’s attitude towards mathematics,
- Teaching/learning activities,
- Content,
- Stimulation

**Child’s characteristics**
- Nature of the child (IQ)
- Attitude,
- Motivation
- Cognition,

**Individual differences of the child**

**Good Mathematics’ Performance in lower primary school**

**Poor Mathematics’ Performance in lower primary school**
CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter discusses research methodology, being research design, population, sample size and sampling procedures, research instruments, validity, reliability, data-collection procedures and data analysis.

3.1 Research Design

The research design used in this study was survey/descriptive. It enabled the researcher in studying the situation and to explain the relationship between variables. The study therefore, applied descriptive designs to gather data, since it accurately portrayed the profile observed in the pre-school learners’ performance. This was crucial for the interpretation of the results. It facilitated the achievement of the objectives of the study. The design was not only appropriate for data that was obtained by the use of a questionnaire, observational checklists and interview schedules, but it was also an appropriate mode of enquiry for making inferences about the large group of people from the data drawn on the relatively small number of individuals from the group (Leedy, 1980).

The survey also enabled the researcher to study the individual teacher's attitude towards pre-school mathematics (Babbie, 1989). The fact that this research design helped the researcher to collect a relatively large data from many people in a short period of time was another significant reason why it was the most appropriate method to use. In addition, it was less costly. This research design acted as the plan and structure of investigation so conceived as to obtain accurate answers to research questions. This plan was the overall scheme or program of the research, as suggested by Cooper & Schinder (2003).
Being a social research in a human context, as set out by Sell tz, Jahoda, Deutsch and Cook (1959), this design enabled the researcher to arrange the conditions for the collection and analysis of data in a way that combined their relationship with the purpose of the research. As a descriptive study, the research intended to portray as accurately as possible a profile of children in the Makuyu Zone with regards to their pre-school attendance status, and their subsequent performance in mathematics at lower primary school.

3.2 Target Population

In Makuyu zone there were 31 public primary schools. All the 31 primary schools had a population of 3,593 boys and 3,404 girls making a total of 6,997 pupils at the lower primary level. Among these children there were only 57 who hadn’t attended pre-school education, and these included of both boys and girls. In these primary schools there were 15 male teachers and 25 female teachers, making a total of 40 at the lower primary level. The 31 primary schools had a total of 31 head teachers who also supervised the entire schools. In total, standard ones had a population of 1,240 boys and 1,197 girls making a total of 2,437, whilst standard twos had 1,158 boys and 1,144 girls giving a total of 2,302, and standard threes had 1,195 boys and 1,063 girls giving a total of 2,258. This was the target population from which the researcher generalized the results of the study (Mugenda, O and Mugenda, A, 2003).
Table 3.1: Enrolment in the Sampled Schools

<table>
<thead>
<tr>
<th>School</th>
<th>Head teachers</th>
<th>Enrolment</th>
<th>Children</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Males</td>
<td>Females</td>
<td>Total</td>
</tr>
<tr>
<td>Gathungururu</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Huho-ini</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Kiambamba</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Kihara</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Kiugu-ini</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Maranjau</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Marura</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Mihang’o</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Ndera</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Pundamilia</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>10</td>
<td>0</td>
<td>10</td>
</tr>
</tbody>
</table>

(Data Source: District Education Office Murang’a South.)

The above Table 3.2.1 shows the summary distribution of head teachers, teachers and children who attended preschool in the sampled schools in the zone.

### 3.3 Sample Size and Sampling Procedure

The researcher selected two children from each class in standards one, two, and three, because ECDE extends up to standard three. This is the level where early education should be given to young children. Ten schools were sampled by the researcher on the basis of; economic status (Maranjau, Kiugu-ini and Kiambamba), transport network (Marura, Huho-ini, Kihara, Maranjau, Kiambamba, Ndera and Kihara), tribal setting (Maranjau and Ndera) and children population (Pundamilia, Mihang’o, Kihara and Gathungururu).

In standards one, two and three of each of the sampled schools, the researcher, with assistance of teachers in each school, purposively (deliberately) chose three children who had
received pre-school education and three who had not been given such education. These children were to be of the same age form each class. In addition, 10 head teachers were chosen through appointment (deliberate sampling). These were the respondents who assisted the researcher in collecting the study data. In the 10 teachers, it’s one teacher in every class who was a respondent. Where there were be more than one teacher, a lottery (random choice) method of sampling was done to identify the respondent. This sample gave an adequate representation of the target population.

### Table 3.2: Sample Population

<table>
<thead>
<tr>
<th>Category</th>
<th>Population</th>
<th>Sample</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children who had attended pre-school</td>
<td>2087</td>
<td>30</td>
<td>1.44</td>
</tr>
<tr>
<td>Children who hadn’t attended</td>
<td>57</td>
<td>30</td>
<td>53</td>
</tr>
<tr>
<td>Teachers</td>
<td>40</td>
<td>30</td>
<td>75</td>
</tr>
<tr>
<td>Head teachers</td>
<td>30</td>
<td>10</td>
<td>33</td>
</tr>
</tbody>
</table>

(Source: Researcher)

The table above shows the summary of the sample population in the research study.

### 3.4 Instruments Used to Obtain Data

The researcher used an open-ended questionnaire to collect data from the selected teachers and head teachers and it was given to them to answer on their own. This was to allow the respondents freedom to select the most accurate answers, thereby enabling the researcher to analyse the responses and produce a result that was significant and true. The researcher collected the questionnaires on the same day that they were completed, and checked that all the questions had been answered, whilst the respondent was still present.

The questionnaire was intended to ensure the quick collection of data, and to obtain it at a cheaper cost than any other method (Njenga and Kabiru, 1997).

For the children’s responses, an interview schedule was used to ensure that there was a
response to all questions. By using a face-to-face session, on a one-to-one basis with the selected children, the researcher was more likely to collect accurate data by clarifying the meaning of questions that may have been ambiguous to the children. He was also be able to gather other data about the respondents and their environment, which was useful in the research (Machakanja, P. and Mamimine, P., 1999). The completed questionnaire were signed by the child’s interviewer to give the survey more credibility.

3.5 Validity

The researcher was able to ensure the accuracy and meaning of any inferences (in the absence of a clear answer) which otherwise would have affected the basis of the research results. This improved the degree of accuracy of the data obtained in the research and confirms how well the study had represented any of the variables. Consequently, as the data was more likely to be a true reflection of the variables, any inferences which the researcher had to make were as accurate and meaningful as possible (Mugenda, O and Mugenda, A, 2003). To test the construct validity of the research instruments, the researcher used 'split-half' to verify that it was to produce the same results each time. This was to ensure that the correct interpretation of the answers had been made, and enabled the researcher to find out the extent to which the measuring instruments used had provided accurate results of the survey (Kothari, 2004).

3.6 Reliability

The researcher verified the research instruments’ reliability by the use of the 'split-half' method. He gave the research instruments to a group of people (respondents) who were not to be in the sampled groups of respondents. He then correlated scores from the test. To eliminate the chance of error due to differing test conditions, the researcher also used 'split-half method. After
giving the total test to the appropriate group, the scored items were divided into two groups, one having odd numbers together and the other even numbers together. The two groups of scores were then checked for correlation from the two groups of items for all the subjects done. The data with a high split-half reliability needed to have a high correlation co-efficient (Mugenda and Mugenda, 2003). The consistency of the results obtained from the research instruments was tested to make sure that the transient and situational factors were not contradicting each other.

The test aimed at verifying if the results obtained were consistent with repeated measurements of the same respondents with the same instruments. To improve the reliability of the instruments, the researcher intended to standardize the conditions under which the measurements took place, and also to make sure that he conducted the research –himself (Kothari, 2004). A high coefficient implied that the items correlated accurately with themselves (homogeneity of data).

The researcher pilot-tested the questionnaire with a small representative group from the population. This was to identify any ambiguity in the instructions. The respondents completed the questionnaire, and then discussed the answers with the researcher in order to ensure that the wording of the questions was clear. If they were not, he made any amendments necessary to include any omissions or to avoid unanticipated answers in multiple choice or ranking questions. After the pilot testing, the researcher reviewed the verbal and written comments, the questionnaires, the interview schedule's responses, and then evaluated their effectiveness. Where required, the researcher revised the instruments and, if major changes were necessary, a second test would have been carried out (Gary Anderson, 1998).
3.7 Procedure for Data Collection

The researcher applied for an authorization permit from the Ministry of Higher Education, Science and Technology to carry out the research. He took a copy of the permit to the District Commissioner and District Education Officer, Murang’a South. These wrote to their respective junior officers and advised them of the intention to carry out the research study, so that the researcher could get their co-operation and assistance in the exercise. The District Commissioner wrote to District Officer – Makuyu Division, the Chief – Kambiti Location, Assistant Chiefs – Maranjau, Makuyu, Gitura, Pundamilia, Mihang’o, Mwitumberia, Kirimiri, Kitune and Karia-ini sub-locations.

The District Education Officer wrote to the Area Education Officer – Makuyu Division, Zonal Quality Services Assurance and Standards, and the Teacher Advisory Centre Tutor – Makuyu zone. The researcher went to the schools and gave copies of the questionnaire to the intended respondents (teachers and head teachers). He then explained any misunderstanding they had of the intention of the study, giving any elaboration needed as they answered the questions. The completed questionnaires were then collected (Njenga and Kabiru, 2008).

The researcher allowed for the collection of as much relevant data as necessary, through the interview schedule for learners, which included relevant issues that were not included in the interview guide, but arose during the process of conducting the personal interviews. The information was noted down, as well as the answers to impromptu supplementary questions, considered necessary by the researcher to clarify any uncertainties. Respondents’ personal data was included in the interview schedule, in order to improve the possible explanation of concepts, thematic patterns, the relationship between respondents’ preferences and other factors related to the characteristics of the sample taken, as well as other aspects that arose during the interview.
(Nkosha, D.C., 1995)

It was in those same schools that he collected the necessary data from the archival documents (marks lists for a year prior to the study) that revealed information relevant to the research study. He completed the observational lists in the school’s respective classes and acquired any other necessary documents (mark lists).

3.8 Data analysis

The data collected was analysed, using frequency counts and percentages. It was presented in tables, bar graphs, pie charts, histograms and doughnuts as necessary to present a better picture of the findings. The information was categorized into themes, based on objectives and was interpreted qualitatively (Chirwa, 1999).
CHAPTER FOUR
FINDINGS AND DISCUSSIONS

4.0 Introduction

The purpose of this study was to investigate the reason why there was a poor performance in mathematics by the children in the Makuyu zone of the Murang’a South District. The objectives of the study were investigating continuity of teaching methods from pre-school to lower primary, comparing the relationship between performance in mathematics of children who have had pre-school education with those who have not, evaluating the teachers’ perception on the value of pre-school mathematics, evaluating the children’s perception with regard to mathematics learning. This chapter put forward the findings of the study and discussions.

4.1 The Response Rate

The researcher targeted a sample of 100 respondents composed of head teachers, teachers, and children. The researcher got responses from 99 of these respondents and this represented an average response rate of 99%. One teacher did not respond (that indicated 3.3% less in the category). According to Babbie (2002) any response of 50% and above is considered adequate for analysis.

4.2 Demographic Data

There were 10 head teacher respondents, and all of them were male. This represents 100% of the respondents as shown in Table 4.1 and Figure 2 below.
Table 4.1  Head Teacher's Gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>Number</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>10</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Female</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

At some point, it’s good to incorporate some woman head teachers for affirmative action. This will give a chance for children to get some role models, especially girl child. The majority of head teachers were in the age bracket of 41-50 years (50%), followed by those in the age bracket of 51-60 at 30%, whilst those in the age bracket of 31-40 were only 20%. The findings are shown in the Table and in Figure 3 below.

Figure 2 : Head teachers’ age Bracket

Of their academic qualification, the majority of the head teachers were at KCE level (60%). Those who had EACE were 20% whilst those with B.Ed or KCSE level were 10% each. These findings are summarized in the table below.
Table 4.2 Head teachers’ Academic Qualification

<table>
<thead>
<tr>
<th>Qualification</th>
<th>Number</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>KCSE</td>
<td>1</td>
<td>10.0</td>
<td>10.0</td>
</tr>
<tr>
<td>KCE</td>
<td>6</td>
<td>60.0</td>
<td>70.0</td>
</tr>
<tr>
<td>EACE</td>
<td>2</td>
<td>20.0</td>
<td>90.0</td>
</tr>
<tr>
<td>B.Ed</td>
<td>1</td>
<td>10.0</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>10</td>
<td><strong>100.0</strong></td>
<td></td>
</tr>
</tbody>
</table>

Most of the head teachers (70%) had no ECDE professional qualification, with only 30% indicating that they had a professional qualification. Those who had ECDE short course were 20% and those with ECDE diploma were 10%. These findings are summarized below.

Table 4.3 Head teachers’ ECDE Professional Qualification

<table>
<thead>
<tr>
<th>Qualification</th>
<th>Number</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECDE Short Course</td>
<td>2</td>
<td>20.0</td>
<td>20.0</td>
</tr>
<tr>
<td>ECDE Diploma</td>
<td>1</td>
<td>10.0</td>
<td>30.0</td>
</tr>
<tr>
<td>No ECDE Qualification</td>
<td>7</td>
<td>70.0</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>10</td>
<td><strong>100.0</strong></td>
<td></td>
</tr>
</tbody>
</table>

Lack of ECDE professionalism and practice of teaching may affect the performance of the children in mathematics. Teachers, who include the head teachers, should be equipped with ECDE methodology of teaching (Mutunga and Breakell, 1992). On headship experience, the majority of the respondents (60%) had 6 years or more and only 40% indicated that they had had 5 years or less experience. The findings are shown in the table below.
Table 4.4 Headship Experience

<table>
<thead>
<tr>
<th>Years of Experience</th>
<th>Number</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – 5</td>
<td>4</td>
<td>40.0</td>
<td>40.0</td>
</tr>
<tr>
<td>6 – 10</td>
<td>2</td>
<td>20.0</td>
<td>60.0</td>
</tr>
<tr>
<td>11 – 15</td>
<td>2</td>
<td>20.0</td>
<td>80.0</td>
</tr>
<tr>
<td>16 – 20</td>
<td>2</td>
<td>20.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Where the management of preschool may have been suffering, children’s performance may have been negatively affected. This may be seen especially where the experience of head teachers may limit their competence in dealing with school’s supervision and management matters. More experienced head teachers may guarantee some competent performance in school management and supervision.

The researcher targeted 30 teachers who responded to the questionnaire. The respondents were male and female in almost equal measure, with female respondents being 55.2% and 44.8% being male respondents. However, their ages varied, with majority of the respondents (57.1%) being in the 41-50 years age bracket, followed by 35.7% being 31-40 years. Only 7.1% stated that they were 51 years and above. These findings are summarized in the tables below.

Table 4.5 Teacher's Gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>Number</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>13</td>
<td>43.4</td>
<td>43.4</td>
</tr>
<tr>
<td>Female</td>
<td>16</td>
<td>56.6</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.6 Teacher's Age Bracket

<table>
<thead>
<tr>
<th>Age Bracket</th>
<th>Number</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>31 – 40</td>
<td>11</td>
<td>36.7</td>
<td>36.7</td>
</tr>
<tr>
<td>41 – 50</td>
<td>16</td>
<td>56.7</td>
<td>93.4</td>
</tr>
<tr>
<td>51 and above</td>
<td>2</td>
<td>6.6</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>
The researcher wanted to know the academic, as well as professional, qualifications of the teachers. The majority of the respondents had KCSE or KCE being 48.3% and 31% respectively. Those with KJSE or EACE were 2% and 4% respectively. On their professional qualification, the majority of the respondents (70%) had a P1 qualification, as compared to 30% who had ECDE Diploma qualification. These findings are presented in the tables below.

**Table 4.7 Teachers’ Academic Qualification**

<table>
<thead>
<tr>
<th>Qualification</th>
<th>Number</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>KJSE</td>
<td>2</td>
<td>6.8</td>
<td>6.8</td>
</tr>
<tr>
<td>KCSE</td>
<td>14</td>
<td>48.3</td>
<td>55.1</td>
</tr>
<tr>
<td>KCE</td>
<td>9</td>
<td>31.0</td>
<td>86.1</td>
</tr>
<tr>
<td>EACE</td>
<td>4</td>
<td>13.8</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>29</strong></td>
<td><strong>100.0</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Table 4.8 Teachers’ Professional Qualification**

<table>
<thead>
<tr>
<th>Qualification</th>
<th>Number</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECDE Diploma</td>
<td>6</td>
<td>20.7</td>
<td>20.7</td>
</tr>
<tr>
<td>P1</td>
<td>13</td>
<td>44.8</td>
<td>65.5</td>
</tr>
<tr>
<td>None or no reply</td>
<td>10.0</td>
<td>34.4</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>29</strong></td>
<td><strong>100.0</strong></td>
<td></td>
</tr>
</tbody>
</table>

Just as it was cited on the head teachers, lack of ECDE professionalism and practice of teaching may have affected the performance of the children in mathematics. Teachers should be equipped with ECDE methodology of teaching to ensure the continuity of teaching methodology that had been introduced to the children at the preschool level. This would ensure that transition is smoothly done from preschool to primary school- agreeing with Borrowman (1979).

On their teaching experience, all the respondents indicated that they had had 11 years teaching experience or more. Those with 11-15 years experience comprised 30%, whilst 36.6% had had 16-20 years and those with 21 years or more comprised 33.4%. These findings are
summarized in the table below.

**Table 4.9 Teaching Experience**

<table>
<thead>
<tr>
<th>Year Bracket</th>
<th>Number</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>11 - 15</td>
<td>8</td>
<td>27.6</td>
<td>27.6</td>
</tr>
<tr>
<td>16 - 20</td>
<td>11</td>
<td>37.9</td>
<td>65.5</td>
</tr>
<tr>
<td>21 and above</td>
<td>10</td>
<td>34.5</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Less teaching experience (sometimes due to inconsistency) can be a factor working against the children’s performance. More often transition becomes wanting (Alexander, 1988). This is because a teacher can be in classes four - eight last year, be in class three this year and in class one next year. This is due to instability of staffing situation in the schools in the zone. This gives the teacher no ample time to master most of things that affect children’s mathematics performance. It would be ideal for a teacher to teach children form when they are admitted in standard one from preschool, continue with them in class two and class three before handing them over to upper primary level of education.

The researcher conducted an interview with both children who had attended pre-school education and those who had not. The results of those interviews are presented in this section. The children were distributed equally in classes 1, 2 and 3, as shown in Figure 9 below.
Figure 3: Children's Responses to Questionnaire by Class.

Their ages ranged from 5 to 10 years. The majority (70.0%) were between 9-10 years, with only 6.6% between 5-6 years whilst the rest (23.4%) were 7-8 years old. The following table summarizes these results.

Table 4.10  Children’s Age Distribution

<table>
<thead>
<tr>
<th>Ages</th>
<th>Number</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 - 6</td>
<td>4</td>
<td>6.6</td>
<td>6.6</td>
</tr>
<tr>
<td>7 - 8</td>
<td>14</td>
<td>23.4</td>
<td>29.9</td>
</tr>
<tr>
<td>9 - 10</td>
<td>42</td>
<td>70.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

These children were almost equally from each gender, with boys at 55.6% and girls at 44.4%. When asked if they had brothers, 90% of the children indicated that they had, whilst, for sisters, 89.9% of them had one or more sisters. These children were almost equal from each gender with boys at 55.6% and girls at 44.4%. While asked whether they have brothers, 90% of
the children indicated they had as compared to 10% who did not. Equally the children were asked whether they had sisters and 89.9% of them responded positively as compared to 11.1% of the children who indicated they did not have sisters.

The number of overage children for the classes (69.5%) more than doubles the number of appropriate age children for those classes (29.5%). This is a research concern (Herome Kagan). Enough creation of awareness should be done on the side of parents and caregivers so that they can understand the rationale for taking children to preschool for learning at the appropriate age (KIE, 1999). This is the age when they are more receptive to learning instructions (Bruner, 1974).

### 4.3 Preschool attendance

The researcher sought to know whether the children attended preschool education. Majority of the children indicated they had attended preschool education as represented by 60% of the respondents as compared to 40% of the respondents who indicated they did not. These findings are presented in the graph below. 10% of those who said had attended preschool education had been identified by their teachers as hadn’t gone to preschool. The probability was that they had once enrolled in preschool just to drop a little later without adequately completing the course. This may be the case as cited by Kabiru, M. and Njenga, A. (1997).
The above figure shows children’s opinion concerning whether they regard themselves as having attended preschool or not.

4.4 Children’s perception on mathematics learning.

The researcher sought to establish whether the children like mathematics. Based on the findings of this study, children like mathematics as confirmed by 78.3% of them who indicated that they like mathematics quite much and 18.3% who indicated they like mathematics very much. Only 1.7% indicated not as much and not at all each. These results are as shown below.

Table 4.11 Child’s liking of mathematics

<table>
<thead>
<tr>
<th>Status</th>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Not at all</td>
<td>1</td>
<td>1.7%</td>
<td>1.7%</td>
</tr>
<tr>
<td></td>
<td>Not as much</td>
<td>1</td>
<td>1.7%</td>
<td>3.3%</td>
</tr>
<tr>
<td></td>
<td>Quite much</td>
<td>47</td>
<td>78.3%</td>
<td>81.7%</td>
</tr>
<tr>
<td></td>
<td>Very much</td>
<td>11</td>
<td>18.3%</td>
<td>100.0%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>60</td>
<td>100.0%</td>
<td></td>
</tr>
</tbody>
</table>
It’s surprising to see that there are some children who would say that they don’t like mathematics. Though a small percentage, this group is still a subject to learning mathematics. They need to perform better in mathematics not only to complement their final grades (Okumbe, 1998) but also to make sense out of mathematics in their day to day lives (Ogutu and Wandiba, 1987). A means should be devised to win this group of learners to a meaningful mathematical learning and performance.

Children were asked how often their teacher went absent and responses varied with majority (32.1%) indicating one lesson per week, 30.4% saying two lessons per week and 17.9% indicating more than two lessons per week. Only 17.9% indicated that their teacher went absent rarely. These results are as shown below.

<table>
<thead>
<tr>
<th>Status</th>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>One lesson</td>
<td>18</td>
<td>32.1</td>
<td>32.1</td>
</tr>
<tr>
<td></td>
<td>Two lessons</td>
<td>17</td>
<td>30.4</td>
<td>62.5</td>
</tr>
<tr>
<td></td>
<td>More than two lessons</td>
<td>11</td>
<td>19.6</td>
<td>82.1</td>
</tr>
<tr>
<td></td>
<td>Rarely</td>
<td>10</td>
<td>17.9</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>56</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

The researcher wanted to know what the child does when the mathematics teacher is absent. Majority of the children (64.4%) indicated that they do other things as compared with only 18.6% of the children who said they do mathematics on their own. The results are summarized in the table below.
Table 4.13 What children do when the teacher is absent.

<table>
<thead>
<tr>
<th>Status</th>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Do mathematics on my own</td>
<td>11</td>
<td>18.6</td>
<td>18.6</td>
</tr>
<tr>
<td></td>
<td>Read other things</td>
<td>38</td>
<td>64.4</td>
<td>83.1</td>
</tr>
<tr>
<td></td>
<td>Alternative teacher teaches</td>
<td>10</td>
<td>16.9</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>59</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Asked what they felt when their mathematics teacher was absent, 88.9% indicated that they felt bad as compared to 3.7% who said they felt good. The table below presents the findings.

Table 4.14 Children’s feeling on teacher’s absence

<table>
<thead>
<tr>
<th>Status</th>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Good</td>
<td>2</td>
<td>3.7</td>
<td>3.7</td>
</tr>
<tr>
<td></td>
<td>Fairly good</td>
<td>1</td>
<td>1.9</td>
<td>5.6</td>
</tr>
<tr>
<td></td>
<td>Not good</td>
<td>3</td>
<td>5.6</td>
<td>11.1</td>
</tr>
<tr>
<td></td>
<td>Bad</td>
<td>48</td>
<td>88.9</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>54</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

An element of absenteeism is evident on teachers. Whether acute or chronic it’s explicit that mathematics lessons have been suffering. It’s clear on the side of children that they have not been happy about it but still, it’s worrying to see a segment of children saying that they feel good when their mathematics teacher is not present. This indicates that some children are ‘traditional enemies’ to mathematics. That’s why they do other things other than mathematics when their teacher is not in. this opposes Winkin’s (1975) contribution.

It also implies that quite a number of learners, on being nurtured; they can grow a faster positive attitude towards mathematics. Teachers are charged with the sole responsibility of
affecting this in their mathematics classes. Parents also can’t avoid their part on the same according to Narayan and Nyaweya (1995).

4.5 Teachers’ perception on importance of preschool mathematics

The respondents were asked their opinion on whether mathematics should be taught in lower primary school. The respondents were unanimously in agreement that mathematics should be taught in the lower primary where 100% of the respondents indicated yes and none of them indicated no. These findings are summarized in the table below.

<table>
<thead>
<tr>
<th>Status</th>
<th>Variable</th>
<th>Frequency</th>
<th>Valid Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Yes</td>
<td>27</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

As a must be taught subject, mathematics, especially at this level, if not made fun in terms of its teaching; it likely to that teaching it formerly to children will be forcing it into them so long as their interests, ideas, and strategies are not set at the centre of understanding early mathematics education. Most of them will still perpetuate the notion that mathematics is a difficult and unpleasant subject in the school’s curriculum and yet are forced to study it (Maxwell, 1983).

Pre-school mathematics teaching was rated very highly by 38.5% of the respondents while 23.1% of the respondents rated it as highly and relatively high each. Only 15.4% rated it as lowly. These findings are presented in the table below.
Table 4.16 Rating of pre-school mathematics teaching by teachers

<table>
<thead>
<tr>
<th>Status</th>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Very highly</td>
<td>10</td>
<td>38.5</td>
<td>38.5</td>
</tr>
<tr>
<td></td>
<td>Highly</td>
<td>6</td>
<td>23.1</td>
<td>61.5</td>
</tr>
<tr>
<td></td>
<td>Relatively high</td>
<td>6</td>
<td>23.1</td>
<td>84.6</td>
</tr>
<tr>
<td></td>
<td>Lowly</td>
<td>4</td>
<td>15.4</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>26</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

4.6 Continuity of mathematics teaching methods

For those that attended preschool education the researcher wanted to know whether former teacher was a man or a woman. Based on the findings majority of the preschool teachers were women. This finding was confirmed by 94.1% of the respondents who indicated that their former preschool teacher was a woman as compared to 5.9% of the respondents who indicated that their former preschool teacher was a man. These results are summarized in the table below.

Table 4.17 Former preschool teacher’s gender

<table>
<thead>
<tr>
<th>Status</th>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Man</td>
<td>2</td>
<td>5.9</td>
<td>5.9</td>
</tr>
<tr>
<td></td>
<td>Woman</td>
<td>28</td>
<td>94.1</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>30</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

At the time of research study, 63.2% of the mathematics teachers were women while only 36.8% were men. On being asked the gender of mathematics teacher they would prefer, 60% of the respondents indicated they liked a woman to be their mathematics teacher as compared to 40% who said they liked a man. The summary of these results are presented in the tables below.
Table 4.18 Current mathematics teacher’s gender

<table>
<thead>
<tr>
<th>Status</th>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Man</td>
<td>21</td>
<td>35.0</td>
<td>35.0</td>
</tr>
<tr>
<td></td>
<td>Woman</td>
<td>36</td>
<td>60.0</td>
<td>95.0</td>
</tr>
<tr>
<td>Invalid</td>
<td></td>
<td>3</td>
<td>5.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>60</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.19 Mathematics teacher child likes

<table>
<thead>
<tr>
<th>Status</th>
<th>Variable</th>
<th>Frequency</th>
<th>Valid Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Man</td>
<td>22</td>
<td>36.7</td>
<td>36.7</td>
</tr>
<tr>
<td></td>
<td>Woman</td>
<td>33</td>
<td>55.0</td>
<td>91.7</td>
</tr>
<tr>
<td>Invalid</td>
<td>Undecided</td>
<td>5</td>
<td>8.3</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>60</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Some children seem to be comfortable with their current mathematics teachers. Others seem to be not comfortable with them whereas, still some were not sure. The ultimate call here is to have every mathematics teacher to become tender to the learners, alert to their needs and desires, creative to win them in his / her pedagogical practices and resourceful in mastery of the content. This is because children would cite some of their reasons of favouring one gender of a teacher over the other as it are not harsh and /or has adequate knowledge of mathematics. This will ensure smooth transition as suggested by Blumefeld (1981).

When asked whether they are given mathematics homework 63.3% of the children indicated yes as compared to 36.7% who indicated no. The researcher followed with a question seeking to establish where the child does their homework. Majority of the children (71.1%) indicated that they did their homework at home as compared to 28.9% of the respondents who indicated they did it at school. These results are summarized in the table below.
Table 4.20 Place where a child does his/her homework

<table>
<thead>
<tr>
<th>Status</th>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Home</td>
<td>27</td>
<td>71.1</td>
<td>71.1</td>
</tr>
<tr>
<td></td>
<td>School</td>
<td>11</td>
<td>28.9</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>38</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Children were asked to indicate who helped them in their homework. Interestingly, 50% of the children indicated that their mother helped them with their homework. Only 20% of the respondents indicated that their father helped them with their homework while 30% indicated other persons like cousins, aunts, brothers and sisters. These findings are summarized below.

Table 4.21 Helps with homework

<table>
<thead>
<tr>
<th>Status</th>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Father</td>
<td>4</td>
<td>20.0</td>
<td>20.0</td>
</tr>
<tr>
<td></td>
<td>Mother</td>
<td>10</td>
<td>50.0</td>
<td>70.0</td>
</tr>
<tr>
<td></td>
<td>Other Person</td>
<td>6</td>
<td>30.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>20</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Adequate homework should be given to children often. This would give a chance for more knowledgeable others to come in and participate in the child’s mathematics learning. This is because a child may understand a concept when being helped by someone at home whereas, may be; he/she may not have understood it at school (Vygotsky. L, 1962). Parents and caregivers should also be deliberately involved in the children’s assignments and remedial teaching.

The researcher established whether the children were given mathematics games to play. Majority of the children (81%) indicated they did not as compared to 19% who said they did. The table below summarizes these findings.
Table 4.22 Mathematics’ games and play

<table>
<thead>
<tr>
<th>Status</th>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Yes</td>
<td>11</td>
<td>19.0</td>
<td>19.0</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>47</td>
<td>81.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>58</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Even those who said that they are given, they couldn’t give examples of the games and plays they were given by their teachers. Games and sports would provide a natural and automatic avenue for voluntary learning in children. This would make learning fun and hence not only enticing but also interesting to them. This provides a golden opportunity for them to learn at the best of their interest. This can best be initiated by teachers as well as the caregivers, something that can be possible only if they are not only doing it to stimulate the learners but also having positive attitude towards mathematics. This agrees with Edger (1994)

The researcher made some observations in the respondents’ classrooms to establish availability and level of improvisation of learning materials, learners’ motivation to participate in mathematics learning activities and how children were encouraged to compete and establishing children’s work display. Generally, there were very inadequate learning materials in those classes, with some classes having none at all. Majority of the classes where were some, they were in form of charts. A few classes had learning corners like; shop corner, nature garden, nature corner and models. The researcher agreed with Wachiye (1996) that use of learning resources enhances acquisition of concepts. Therefore, no better performance can be realized in mathematics performance in lower primary schools in Makuyu zone due to lack of involvement of many senses (through manipulation of learning resources) during learning.
Table 4.23 Availability of learning materials in classes

<table>
<thead>
<tr>
<th>Status</th>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Yes</td>
<td>4</td>
<td>13.8</td>
<td>13.8</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>25</td>
<td>86.2</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>29</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

On improvisation, majority of the classes observed improvised highly as compared to 3.8% where improvisation was done any how. The results are presented below.

Table 4.24 Improvisation of the learning materials

<table>
<thead>
<tr>
<th>Status</th>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Done anyhow</td>
<td>1</td>
<td>3.8</td>
<td>3.8</td>
</tr>
<tr>
<td>Improvised</td>
<td></td>
<td>19</td>
<td>73.1</td>
<td>76.9</td>
</tr>
<tr>
<td>Highly improvised</td>
<td></td>
<td>6</td>
<td>23.1</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>26</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Based on the findings of this study, children work was not displayed to encourage competition. This was confirmed by 86.2% of the classes observed as compared to 13.8% of those that did. And on how children’s work is displayed 100% of the observed classes were at the learners’ eye level. The results are presented in the tables below.

Table 4.25 Children’s work display in the classes

<table>
<thead>
<tr>
<th>Status</th>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>At the learners’ eye level</td>
<td>15</td>
<td>50.0</td>
<td>50.0</td>
</tr>
<tr>
<td></td>
<td>None at all</td>
<td>15</td>
<td>50.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>30</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

To enhance the child’s retention, the teacher must use learning aids (whether visual, audio, tactile or audiovisual). This is according to Wachiye (1996). This will help them form mental images and hence facilitate proactive learning. In addition, children’s work display
initiates competition and appreciation of their own learning efforts as they manifest their prowess. On the process of learning from one another on how one did a certain task competently, children initiate collaborative learning. Here peer teaching effectively takes root and eventually the classroom becomes a community of learning. It’s the maximum efficiency use of available resources to improve the quality of education that would work if mathematics learning system will work on our learners (World Bank Development Report, 1993).

The researcher sought to know whether the teachers thought whether there were enough reference materials for mathematics. On this, there was no clear cut indication whether they felt there is or no adequate reference materials for mathematics in class. Those who indicated there are adequate reference materials were 51.7% followed closely by those who indicated there are no adequate reference materials. The results are presented in the graph below.

**Figure 5: Adequacy of reference materials/books**

![Graph showing adequacy of reference materials/books](image)

The researcher asked the head teachers how they rated preparation of schemes of work, lesson plans, and progressive records in their lower primary. Based on the findings the head
teachers were satisfied with preparations of schemes of the work with 60% of them rating it as adequate and 40% as very adequate. These findings are presented in the graph below.

**Figure 6: Preparation of schemes of work**

![Bar graph showing preparation of schemes of work](image)

Lesson plans, the head teachers were equally satisfied with it with majority (50%) of them rating it as adequate and 30% rating them as very adequate. Only 20% of the respondents rated lesson plans as less adequate. These findings are summarized in the table below.

**Table 4.26 Preparation of lesson plans**

<table>
<thead>
<tr>
<th>Status</th>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Less adequate</td>
<td>2</td>
<td>20.0</td>
<td>20.0</td>
</tr>
<tr>
<td></td>
<td>Adequate</td>
<td>5</td>
<td>50.0</td>
<td>70.0</td>
</tr>
<tr>
<td></td>
<td>Very adequate</td>
<td>3</td>
<td>30.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>10</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Progressive records were rated as adequate by 50% of the respondents while 40% rated them as very adequate. Only 10% of the respondents rated progressive records as less adequate.
These findings are shown in the graph below.

**Figure 7: Preparation of progressive records**

![Graph showing preparation of progressive records](image)

The researcher wanted to know how often the professional documents were certified for approval by the head teachers’ office. On this, 70% of the respondents indicated very often while 30% indicated often. These findings are presented in the table below.

<table>
<thead>
<tr>
<th>Status</th>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Often</td>
<td>3</td>
<td>30.0</td>
<td>30.0</td>
</tr>
<tr>
<td></td>
<td>Very often</td>
<td>7</td>
<td>70.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>10</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Lesson plans were approved often and this was confirmed by 80% of the respondents. Those that indicated that lesson plans were approved very often were 20% of the respondents. The summary of these findings is presented in the table below.
Table 4.28 Lesson plans

<table>
<thead>
<tr>
<th>Status</th>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Often</td>
<td>8</td>
<td>80.0</td>
<td>80.0</td>
</tr>
<tr>
<td></td>
<td>Very often</td>
<td>2</td>
<td>20.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>10</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

On progressive records, majority of the respondents indicated that they were approved often while 30% indicated that progressive records were approved less often whilst 60% indicated that they were approved often. Only 10% of the respondents indicated that progressive records are approved very often. These findings are presented in the table below.

Table 4.29 Progressive records

<table>
<thead>
<tr>
<th>Status</th>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Less often</td>
<td>3</td>
<td>30.0</td>
<td>30.0</td>
</tr>
<tr>
<td></td>
<td>Often</td>
<td>6</td>
<td>60.0</td>
<td>90.0</td>
</tr>
<tr>
<td></td>
<td>Very often</td>
<td>1</td>
<td>10.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>10</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

No attribution that can be made to the children’s failure with regards to mathematics teachers not making schemes of work, lesson plans or progressive monitoring of the children’s achievement. Their certification confirms that they are the right instruments for the right purpose and hence this cannot be cited as the cause of the children’s poor performance in mathematics. A scheme of work appeared to be the most emphasized for its importance in organizing the content to be taught in a period of time. Lesson plan that the teacher uses to organize the content to be taught in a particular lesson was equally emphasized. Progressive records are mostly substituted by occasional evaluations commonly done at zone level, divisional level and so on. This doesn’t concur with Winkins (1975).
The researcher asked the respondents to indicate how many times in the last five years they had attended a seminar, workshop or in-service training for teaching mathematics. Majority of the respondents (46.4%) indicated that they had never attended while 21.4% of the respondents attended once. Those who had attended more than once were 17.9% who attended only twice and 7.1% who attended thrice and four times each. These findings are summarized in the graph below.

**Table 4.30 Seminar, workshop or in-service training**

<table>
<thead>
<tr>
<th>Status</th>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Never attended</td>
<td>14</td>
<td>46.4</td>
<td>46.4</td>
</tr>
<tr>
<td></td>
<td>One Time</td>
<td>6</td>
<td>21.4</td>
<td>67.8</td>
</tr>
<tr>
<td></td>
<td>Two Times</td>
<td>5</td>
<td>17.9</td>
<td>85.7</td>
</tr>
<tr>
<td></td>
<td>Three Times</td>
<td>2</td>
<td>7.1</td>
<td>92.8</td>
</tr>
<tr>
<td></td>
<td>Four Times</td>
<td>2</td>
<td>7.1</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Total Times</td>
<td>29</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Those that had a chance of attending a seminar, workshop or in-service training for teaching mathematics were asked to rate it and 66.7% rated it as very useful while 33.3% said it was useful. Half of the respondents, 50%, didn’t respond to this question. The findings are presented in the table below.

**Table 4.31 Seminar/workshop/in-service course ratings by the teachers**

<table>
<thead>
<tr>
<th>Status</th>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Very useful</td>
<td>10</td>
<td>33.3</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td>Useful</td>
<td>5</td>
<td>16.7</td>
<td>50.0</td>
</tr>
<tr>
<td>Invalid</td>
<td>Ufilled</td>
<td>15</td>
<td>50.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

There is lack of adequate seminar/workshop/in-service courses on appropriate methods of teaching preschool mathematics. These are the only avenues where teachers can get awareness and learn the required psychomotor (motivation and effective) skills. Teachers, including
preschool teachers seem to be overlooking this (Edger, 1994). In Kenya's present education system, Makuyu zone included, it could be that many teachers have never been taught adequately how to teach preschool and lower primary school mathematics, and so know nothing about how to motivate pupils to learn mathematics.

Lack of adequate in-servicing of mathematics teachers leaves the teacher with only the traditional methods of teaching. Some of these are obsolete and do not address the current challenges of lower primary school mathematics. These approaches lead the child learner to boredom and hate of mathematics (Eshiwani, 1984).

Teachers were asked to indicate whether the time allowed for mathematics was adequate. The respondents differed on this with 51.9% indicating that it was adequate as compared to 48.1% who felt the time allocated for mathematics was not adequate. These findings are summarized in the table below.

**Table 4.32 Adequacy of time allocated for mathematics**

<table>
<thead>
<tr>
<th>Status</th>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Yes</td>
<td>14</td>
<td>51.9</td>
<td>51.9</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>13</td>
<td>48.1</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>27</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Respondents were asked to rate their completion of mathematics syllabus and majority (76.9%) of the respondents indicated that it was less adequate. Only 15.4% indicated that it was adequate while 7.7% said that they had not completed it at all. A summary of these findings is presented in graph below.
Time should be created to enforce mathematics concepts both to teachers and children. The teacher should be given time to complete mathematics syllabus whereas children should be introduced to participatory methods of learning mathematics, as suggested by Michael (1987). This would make sure that they maximize their own time to spontaneously and voluntarily internalize the taught the concepts. This is only possible when this is done in play form. To create more time, teachers can use their free time to freely engage children in mathematics games and plays that will go a long way in reinforcing what they have taught. These games and plays can be a greater part of outdoor lessons, music lessons, and creative lessons besides mathematics lessons. The faster the concepts taught are internalized by children, the faster the teacher can adequately complete the syllabus.

The researcher sought to know how often the respondents gave their learners mathematics homework. Majority of the respondents (62.1%) indicated that they gave their learners mathematics homework daily. Only 3.4% indicated that they gave their learners mathematics homework once in two weeks while 20.7% and 13.8% indicated they gave their
learners mathematics homework once weekly and twice weekly respectively. The findings are presented in the table below.

Table 4.33 Mathematics Homework for children

<table>
<thead>
<tr>
<th>Status</th>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Daily</td>
<td>18</td>
<td>60.0</td>
<td>60.0</td>
</tr>
<tr>
<td></td>
<td>Twice weekly</td>
<td>4</td>
<td>13.3</td>
<td>73.3</td>
</tr>
<tr>
<td></td>
<td>Once weekly</td>
<td>5</td>
<td>20.1</td>
<td>93.4</td>
</tr>
<tr>
<td></td>
<td>Once in two weeks</td>
<td>1</td>
<td>3.3</td>
<td>96.7</td>
</tr>
<tr>
<td>Invalid</td>
<td></td>
<td>1</td>
<td>3.3</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>29</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

The researcher asked the respondents to indicate the percentage of pupils who completed their homework. Based on the findings 51-75% of the pupils completed their homework. This finding was confirmed by 55.2% of the respondents while 20.7% of the respondents indicated that 26-50% of the pupils completed their mathematics homework.

Only 10.3% of the respondents indicated that 25% and below of the pupils completed their homework as compared to 13.8% of the respondents who indicated that 76-100% of the pupils completed their homework. These findings are presented in the table below.

Table 4.34 Percentage of pupils who complete their mathematics’ homework

<table>
<thead>
<tr>
<th>Status</th>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>0-25%</td>
<td>3</td>
<td>10.3</td>
<td>10.3</td>
</tr>
<tr>
<td></td>
<td>26-50%</td>
<td>6</td>
<td>20.7</td>
<td>31.0</td>
</tr>
<tr>
<td></td>
<td>51-75%</td>
<td>16</td>
<td>55.2</td>
<td>86.2</td>
</tr>
<tr>
<td></td>
<td>76-100%</td>
<td>4</td>
<td>13.8</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>29</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>
The researcher sought to know how soon the respondents gave back the learners’ books after marking. Majority of the respondents (85.2%) indicated that they gave back the books after each session as compared to 14.8% of the respondents who indicated that they gave back the books after a day. These findings are presented in the table below.

### Table 4.35 Give back books after marking

<table>
<thead>
<tr>
<th>Status</th>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>After each session</td>
<td>23</td>
<td>85.2</td>
<td>85.2</td>
</tr>
<tr>
<td></td>
<td>After a day</td>
<td>4</td>
<td>14.8</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>27</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Homework assignment, completion and feedback after marking seem not to be a problem that might have been a factor of poor performance. Educational activities can be the key issue and addressing it would see the learners’ nurture towards mathematics affecting their parents’ attitude towards mathematics. This will consequently yield to the learners’ better performance (Weddy and Catherine, 1992).

### 4.7 mathematics’ performance in lower primary school

Children who attended preschool in most cases have a trend of attaining higher marks than their counterparts who did not attend preschool. Only 5 children who did not attend preschool, for instance, managed to get 100% marks as compared to 11 who attended preschool and managed to score 100%. There is a clear difference of about 5 marks in the mean standard score of the marks acquired by the two categories. This is because the child has formed the required learning prerequisites and positive interest towards learning. Stebbins (1971) asserts that
this produces very long-term changes in the intelligence quotient. However, the difference is not significant as can be illustrated by the table and figure below.

Table 4.36  Relationship between performance in mathematics of children who have had preschool education with those who had not.

<table>
<thead>
<tr>
<th>Children who attended preschool</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>91-100</td>
<td>15</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>81-90</td>
<td>1</td>
<td>3.3</td>
<td>53.3</td>
</tr>
<tr>
<td>71-80</td>
<td>8</td>
<td>26.7</td>
<td>80</td>
</tr>
<tr>
<td>61-70</td>
<td>2</td>
<td>6.7</td>
<td>86.7</td>
</tr>
<tr>
<td>51-60</td>
<td>2</td>
<td>6.7</td>
<td>93.4</td>
</tr>
<tr>
<td>41-50</td>
<td>1</td>
<td>3.3</td>
<td>96.7</td>
</tr>
<tr>
<td>0-40</td>
<td>1</td>
<td>3.3</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Children who didn’t attend preschool</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>91-100</td>
<td>10</td>
<td>33.3</td>
<td>33.3</td>
</tr>
<tr>
<td>81-90</td>
<td>3</td>
<td>10</td>
<td>43.3</td>
</tr>
<tr>
<td>71-80</td>
<td>12</td>
<td>40</td>
<td>83.3</td>
</tr>
<tr>
<td>61-70</td>
<td>0</td>
<td>0</td>
<td>83.3</td>
</tr>
<tr>
<td>51-60</td>
<td>0</td>
<td>0</td>
<td>83.3</td>
</tr>
<tr>
<td>41-50</td>
<td>2</td>
<td>6.7</td>
<td>90</td>
</tr>
<tr>
<td>0-40</td>
<td>3</td>
<td>10</td>
<td>100</td>
</tr>
</tbody>
</table>
CHAPTER FIVE
SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

The study set out to discover why there is a poor performance in mathematics by the children in the Makuyu zone of the Murang’a South District. It has been concluded that there are several aspects contributing to the problem, but to solve many of them needs money and this does not seem to be readily available. If there is a national commitment to improving all aspects of education for Kenya's future citizens and workforce, then a phased system of introducing the recommendations in this study should be devised, agreed and then acted on.

5.1 Summary

This study established that the preparation of teaching documents is regarded highly by the majority of the head teachers. Perhaps that is the reason why these documents are submitted for approval so often. The importance of these documents seems to vary, with Scheme of Work being considered the most important, with Lesson Plans the next in importance, and Progressive Records not so important.

On seminar, workshops or in-service training attended in the last five years, the majority of teachers had never attended them, but those few who had had an opportunity to do so reported that they were very useful. On the allocated time for mathematics, the slightly-larger majority of respondents indicated that the amount was not adequate, and they cited the long time that some learners took before they grasped concepts. The level of disagreement with those who said it was adequate was significant, indicating a need to discover the reason for the different attitudes.

Completion of the mathematics syllabus seemed to be a major problem, as the majority of
the respondents indicated that completion was not possible in view of the insufficient time allowed for teaching. The main reason cited for not completing the syllabus, was that many teachers were not able to deal with a large class of learners who had different levels of ability to understand mathematical concepts. The study findings revealed that an adequate amount of homework was given by the teachers. Equally, the majority of the pupils completed their homework and the teachers' prompt return of books after marking indicating a commitment of both staff and pupils to mathematics learning.

All the teachers agreed that mathematics should be taught in the Lower Primary school, but their attitude to pre-school mathematics varied. Although the majority (84.6%) of respondents rated it as Very Highly, Highly, or Relatively Highly, a significant percentage of the respondents (15.4%) considered pre-school mathematics as not very important. The majority of the children stated that they had attended pre-school, so the indications are that their weakness in mathematics could be due to a poor level of teaching at pre-school.

On mathematics reference materials and books, the response was largely that they were inadequate, with the result that teachers had to improvise with varying degrees of success, but showing the desire of the teachers to do the best for their pupils. Lack of reference materials therefore could be one of the main causes for poor performance in mathematics. Most children indicated a preference for a woman teacher, probably because most pre-school teachers are women, and children felt the need for continuity from pre-school to lower primary education. Lack of this continuity could have affected their performance in mathematics in lower primary schools. When asked where they did their homework, the majority indicated that they did it at home, although a considerable percentage did it at school. The reason why it was done at school could be due to lack of the necessary support from the parents or guardians.
It could also be due to lack of adequate lighting at home, as well as a general lack of a supportive learning environment. For those who did homework at home, they usually had the benefit of assistance from their mothers, fathers, brothers, sisters, aunts or cousins. For the children's liking of mathematics, the majority did, and they felt bad when the teacher was absent. It was interesting to note that the majority of children did other constructive things when the teacher was absent. That seemed to indicate that children liked mathematics but always needed the help or someone to guide them in their learning.

The majority of children indicated that they were not given mathematics games as a means of improving their understanding of mathematical concepts. This could mean that the continuity that these children need from the pre-school to lower primary education is lacking, and so could have resulted in their continuing poor performance in mathematics. On improvisation, the majority of the classes observed used highly improvised means to augment the available learning aids. It was also noted that in many cases the children's work was not displayed as a means of encouraging enthusiasm for mathematics in a competitive manner.

5.2 Conclusion

There was a persistent indication that a discontinuity existed between preschool and lower primary school learning methods. Almost all the elements familiar to the children when they were in pre-school seemed to have disappeared when they got to the lower primary level. However, the majority of children seemed to miss most of all being taught by a woman teacher. In the early development stage of the child, learning aids are very crucial but at the lower primary level they are slowly disappearing. Equally, children at this age require considerable opportunity to play. It is therefore alarming that the teachers were unable or unwilling to use mathematics games as a means of stimulating their pupils to enjoy mathematics. A child when at
play can learn a great deal about various aspects of life, and games are an opportunity for them to learn mathematical concepts. Sadly, this is not the case at present in Makuyu Zone. This seems to be negatively affecting mathematics’ performance in lower primary school in the zone.

5.3.1 Recommendations for implementation

This study recommends that visual aids and learning materials should be provided to enhance mathematics performance. This study also recommends that a guide should be issued on how children should be given mathematics plays. This will enhance children learning at play. To avoid discontinuity this study recommends that in the lower primary male and female teachers should alternate to make the learners get used to male teachers. More male teachers should also get to teach in the preschool level.

The ECDE National Syllabus that seems to be satisfactory and covers all aspects of the learning of the basics of mathematics should be exhaustively covered. All schools in the zone should be advised to follow it and complete it in each academic year. Then a decision must be made about the amount of time to be allocated in the weekly lessons and enforced. Finally, the learning methods of the lower primary should be prepared with the stages of child development in mind and opportunities where children can improve in mathematics should be utilized.

For the teaching of mathematics at pre-school age, again a decision needs to be made about its benefits and, if agreed, then steps should be taken to make this the first step in implementing improvements, since pre-school education forms the foundation of a child’s later mathematics’ learning. Parents’ and guardians’ participation should be encouraged to help in the teaching. Most teachers were seen to be committed to helping their pupils to succeed in their mastery of mathematics, but if their natural ability is hindered by lack of training, then every effort should be made to help them to obtain at least minimum academic and professional
qualification. For that reason, paid study leave/time should be provided so that the existing workforce does have the necessary knowledge to teach effectively. Only where existing staff refuse to study to achieve a minimum qualification and/or to attend In-Service training, should termination of their employment be considered – especially so if they are, say under 45 years of age. Those staff who has attended courses reported that they were found to be useful or very useful, indicating that the courses were fulfilling a needed function of improving the quality of teaching. This necessitates frequent seminars, workshops/in-service training for lower primary mathematics’ teachers. For new employees, the promotion of staff after an agreed date, it should be a requirement that they hold, or are studying for, at least the minimum agreed qualifications, both academic and professional. If the calibre of applicants is low, then a decision is needed about the minimum salary to be paid to the teachers and head teachers.

5.3.2 Recommendations for further research

Further research is recommended to establish the level of learning achievement children get from preschool level. The status of preschool teachers’ training, content delivery methodology and thoroughness in syllabus completion should also be investigated in order to establish the root cause of poor mathematics results in Makuyu zone’s lower primary schools. Parents’ and guardians’ participation in children’s mathematics learning should also be found out. Further research should be undertaken to establish the level of learning achievement of pre-school children, and qualifications of the teachers and the teaching given. Since this study was carried out in Makuyu zone, the researcher recommends the same research study to be replicated in other areas of the country.
BLIOGRAPHY


Kimberley Brenneman, et al. (No Date). Mathematics and Science in Preschool: Policy and Practice.


1. Put together and add: ☺☺ ☺☺☺☺
2. Add: 4 + 1 =
3. How many are left? ♣♣♣♣♣ ♣♣♣♣♣ - ♣♣♣♣♣ =
4. Take away: 5 - 3

5. How many balls are these? ●●●●●●●
6. Write number 7 in words: ___________________________ ___________________________
7. Take away: 2 – 2 =
8. What number is missing? 1 2 3 5 6 7 8
9. Add: 1 + 2 + 3 =
10. Name this shape █
11. Fill in the blank: 7 + ___ = 10
12. Add: 8 + 5 + 3

13. 14 - 9

14. 50 + 10 =
APPENDIX B

Standard Two Achievement Test

1. Write the missing numbers: 33, 34, ____ , ____ , 37, 38, 39, 40

2. 59 = ____ tens + ____ ones

3. Fill-in the missing symbol: eight __________________________

4. Fill-in the missing word: 8 __________________________

5. Write in words: 57 ________________________________ __

6. Write in symbols: forty two

7. Add 2
   +5
   ______
   ______

8. Subtract: 7
   -5
   ______
   ______

9. Fill in the missing numbers: 6 + ____ = 19

10. Add: 60
        -30
        ______

16. Add: 45
        +13
        ______

11. What’s the next number in the pattern? 1, 3, 5, 7, 9, ____?

12. What’s the next number in the pattern? 15, 12, 9, 6, ____?

13. 43 - 4=  

14. 5 × 3=

66
APPENDIX C

Standard Three Achievement Test

1. How many hundreds, tens and ones are in 289? _______________
2. Write the following numbers in words: 508 _______________
3. Write the following numbers in figures: four hundred and nineteen. __________
4. Fill in the blanks with greater than or less than:
   (i) 45 is _______ 54,
5. Order the following numbers below form the smallest to the greatest:
   56, 80, 60, 49, 71, and 28.
6. What numbers follow 699?
7. Fill in the missing numbers: 9021, 9022, 9023, __, __, __, __, __, __, 9029, __.
9. Which is the seventh day of the week? __________
10. Order the following from the greatest to the smallest: 18,75,42,20,56,34,13,69,85,50.
11. What is ⅛ of 40? ______________
12. 135 + 32
   13. 2777 + 44 =
14. Korogocho factory processed 3978Kg of nuts in one day. It processed 2653Kg in the following day. How many kilogrammes n nuts did the factory process in the two days?
15. 399 -398
   16. 241 - 80 =
   17. 5×6=
18. In a tree nursery 2855 seeds were planted. 2745 seeds germinated. How many seeds did not germinate? __________
19. Eva uses 8 litres of water to bath every day. How many litres of water does she use in 7 days?
20. 6√36
21. 49 ÷ 7=
22. 4 x ___=28
23. Twelve oranges were shared equally among four girls. How many oranges did each girl receive?

24. \( \frac{3}{4} + \frac{1}{4} + \frac{3}{4} = \)

25. \( \frac{3}{8} - \frac{3}{8} = \)

26ss. There was a half full bucket of water. A cow drank all the water. What fraction of water was left?
APPENDIX D

General Objectives of Early Childhood Development and Education

1. To provide education geared towards development of the child’s mental capabilities and physical growth.

2. To enable the child to enjoy living and learning through play.

3. To develop the child’s self-awareness, self-esteem and self-confidence.

4. To enable the child develop understanding and appreciation of his/her culture and environment.

5. To foster the child’s exploration, creativity, self-expression and discovery skills.

6. To identify the child with special needs and align him/her with existing services.

7. To enable the child build good habits and acquire acceptable values and behaviours for effective living as an individual and a member of a group.

8. To foster the spiritual and moral growth of the child.

9. To improve the status of the child’s health, care and nutritional needs, and link him/her with health services such as immunization, health check ups and growth monitoring.

10. To enrich the child’s experiences to enable him/her to cope better with primary school life.

11. To develop the child’s aesthetic and artistic skills.
Dear Pupil,

I would like you to help me by answering some questions about mathematics in your school.

**Please tick the appropriate answer.**

**Section A**

1 a) School.......................................................................................................................

b) Class: Std1 (   ) Std 2 (   ) Std 3 (   )

c) Age: 5-6 (   ) 6-7 (   ) 7-8 (   )

d) Are you a Boy (   ) Girl (   )

e) How many brothers do you have?.................and Sisters?.................................

**Section B**

2 a) Did you attend pre-school education? Yes (   ) No (   )

b) If no, please state why....................................................................................................

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

c) If yes, was your former teacher? A man (   ) A Woman (   )

d) What gender is your current mathematics teacher? Male (   ) Female (   )

e) What kind of mathematics’ teacher would you like to teach you? Man (   ) Woman (   )

Please state why?...................................................................................................................

3. a) Does your teacher give you mathematics homework? Yes (   ) No (   )

b) If yes, please state where you do it? Home (   ) School (   ) Elsewhere (specify)............

........................................................................................................................................
c) Please state who helps you to do your homework at home?

Father ( ) Mother ( ) Brother or Sister ( )
Other person please specify)................................................................................................................

d) How do you like mathematics?

Very much ( ) Quite a lot ( ) Not as much ( ) Not at all ( )

4. a) How often is your math’s teacher absent from the math’s lesson per week?

One lesson ( ) Two lessons ( ) More than two lessons ( )

b) What do you do when he/she is absent?

Play ( ) Make noise ( ) Do mathematics on my own ( ) Read other things ( )

c) How do you feel when your mathematics teacher is not in for a mathematics lesson?

Very good ( ) Good ( ) Fairly good ( ) Not good ( ) Bad ( )

Section C

5. a) Are you given mathematics games to do in class? Yes ( ) No ( )

If Yes, please state which ones?...........................................................................................................
........................................................................................................................................................

b) What game activities are you involved in during a mathematics lesson?.........................
........................................................................................................................................................
........................................................................................................................................................

c) What books and stationery do you have for your mathematics learning?.........................
........................................................................................................................................................

Interviewer’s signature………………………………........... Date………………………………
APPENDIX F

Questionnaire for Teachers

Dear Teacher,

I hope that you will be willing to co-operate to enable an accurate picture to be obtained about the impact of the pre-school mathematics learning programme on the performance of mathematics in your school. Please give your honest response to the questions, so that the researcher can make a truthful assessment of the value of this programme. All responses will be treated as highly confidential and no individual school will be identifiable when the responses are analysed.

Please tick the appropriate answer where it applies.

Section A

1. a) School……………………………………………………………………………………………………

   b) Your Gender: Male ( ) Female ( )

   c) Age: …………Years

2 a) What is your academic qualification?

   KCPE ( ) KJSE ( ) KCSE ( ) KCE ( )

   b) What is your professional qualification?

   ECDE Short Course ( ) ECDE 2 Years’ Certificate ECDE Diploma ( )

   If any other, please specify………………………………………………………………………………

   c) How long have you been teaching (teaching experience)?…………………………Years.
Section B

3. a) How many times in the last five years have you attended a seminar, workshop, or in-service course for teaching mathematics? 1(  ) 2(  ) 3(  ) 4(  ) 5(  )

More than 5(  ) Not at all (  ).

b) If yes, please state for how long it/they lasted........................................................................................................

c) How did you rate it? Very useful (  ) Useful (  ) No help (  )

4. a) Do you think the time allocated to you for mathematics teaching is adequate?

Yes (  ) No (  )

Please state why..............................................................................................................................................................

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

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

b) How well have you been able to complete the teaching of every topic in the mathematics syllabus? All covered (  ) Most covered (  ) About half done (  ) None done (  )

5. a) How often do you give your learners mathematics’ homework?

Daily (  ) twice weekly (  ) Once weekly (  ) Once in two weeks (  ) Once in a month (  )

Please state why..............................................................................................................................................................

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

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

b) What percentage of pupils completes their homework?

0-25% (  ) 26-50% (  ) 51-75% (  ) 76-100% (  )

c) Do you know the reason why?........................................................................................................................................

......................................................................................................................................................................................
d) How soon do you give back books after marking?
   - After each mathematics session ( )
   - After a day ( )
   - After some days ( )

6.a) Do you think mathematics should be taught in lower primary school?
   - Yes ( )
   - No ( )

b) If no, please state why........................................................................................................
   ...........................................................................................................................................
   ...........................................................................................................................................

c) How do you rate pre-school mathematics teaching?
   - Very highly ( )
   - Highly ( )
   - Relatively high ( )
   - Lowly ( )
   - Very lowly ( )

**Section C**

7. a) How many children in your class attended pre-school?....................................................
   How many did not...................................................................................................................
   ...............................................................................................................................................
   ...............................................................................................................................................
   ...............................................................................................................................................
   b) If you know, please state why some didn’t attend pre-school............................................
   ...............................................................................................................................................
   ...............................................................................................................................................
   ...............................................................................................................................................

8.a) What methods do you apply in your mathematics teaching?..........................................
   ...............................................................................................................................................
   ...............................................................................................................................................
   ...............................................................................................................................................
   b) What are the learning aids you use when teaching?.........................................................
   ...............................................................................................................................................
   ...............................................................................................................................................
   ...............................................................................................................................................
   c) What learning activities do you use for your class when teaching mathematics?..............
   .................................................................................................................................................
d) Do you consider that your class has adequate mathematics reference materials/books?
Yes (  ) No (  ) Please specify the ratio
Any comments about the provision of them?

9. a) What do you think is the relationship in performance between learners who have attended pre-school education and those who have not?

b) Can you explain any factors that affect the mathematics performance in your class?

c) What measures do you think should be taken to improve mathematics performance in your class?

Respondent’s signature………………………………… Date……………………
APPENDIX G

Head teacher’s Questionnaire

Dear Head teacher,

I hope that you will be willing to co-operate in a survey to enable an accurate picture to be obtained about the impact of the pre-school mathematics learning programme on the performance of mathematics in your school. Please give your honest response to the questions, so that the researcher can make a truthful assessment of the value of this programme. All responses will be treated as highly confidential and no individual school will be identifiable when the responses are analysed.

Please tick the appropriate answer where it applies.

Section A

1. a) School……………………………………………………………………………………………………

   b) Your Gender: Male ( ) Female ( )

   c) Age: …………..Years

2 a) What is your academic qualification?

   KCPE ( ) KJSE ( ) KCSE ( ) KCE ( )

   b) What is your professional qualification?

   ECDE Short Course ( ) ECDE 2 Years’ Certificate ECDE Diploma ( )

   Any other, please specify)………………………………………………………………………………

   c) How long have you been a head teacher (headship experience?) ………………….Years.
Section B

3. How do you rate your lower primary teachers’ preparation of the following teaching documents?

a) Schemes of work: Very good ( ) Satisfactory ( ) Poor ( ) Never done ( )

b) Lesson plans: Very good ( ) Satisfactory ( ) Poor ( ) Never done ( )

c) Progressive records: Very good ( ) Satisfactory ( ) Poor ( ) Never done ( )

4. How often are the teaching documents certified for approval by your office?

a) Schemes of work: Daily ( ) Twice weekly ( ) weekly ( ) Monthly ( ) Never done ( )

b) Lesson plans: Daily ( ) Twice weekly ( ) weekly ( ) Monthly ( ) Never done ( )

c) Progressive records: Daily ( ) Twice weekly ( ) Weekly ( ) Monthly ( ) Never done ( )

Respondent’s signature………………………….. Date……………………………..
APPENDIX H

Observer's Checklist

(Where applicable, ticking the appropriate answer will be done by the observer.)

Please tick the appropriate answer where it applies.

Section A

1 School .................................................................

2. Class .................................................................

3 Number of children……(……) Boys …(……)Girls……(……) Total

4 Teacher’s gender: Male (   ) Female (  )

Section B

5. Level of improvisation of the available learning aids

   Highly improvised (   ) Improvised (   ) Done anyhow (   ) haphazardly done (   )

6. Learners’ level of motivation in participating in mathematics’ learning activities:

   Very high (   ) High (   ) Low (   ) Very low (   )

7. Is Children’s work displayed to encourage competition and co-operation, as well as an
   appreciation of their own efforts?   Yes (   ) No (   )

8. If yes, how is it displayed?

   At the learners’ eye-level (   ) High above the learners’ eye-level (   )

Section C

9. Methods applied in teaching mathematics by the teacher or peers..............................

10 Categories of learning resource materials used or found in the classroom learning corners or
    wall displays........................................................................................................................................

Observer’s signature.......................... Date.................................
APPENDIX I
Letter to Head Teachers from the Researcher

University of Nairobi,
P.O.Box 92,
KIKUYU,
15/06/2010

The Head teacher,
(Name of School, Address)
Makuyu Zone

Dear Head Teacher,

RE: RESEARCH STUDY
I am carrying out a research study that is purely an academic exercise. It is meant partially to fulfill my university’s requirement for the award of a Master of Education degree. That necessitates my visit to your school to collect data. Your school has been randomly chosen; therefore it doesn’t imply any kind of failure in the teaching of mathematics. Please be assured that, when the data analysed, no school will be identifiable. Any information collected will be processed to give a generalized picture of mathematics education.

I thank you in advance for your co-operation to assist me as much as you are able.

Yours faithfully,

(Signature)

Kamau Bonface
(Researcher)
Phone: 0725272465
Email: bonface_kamau@yahoo.com