EFFECTS OF INSTRUCTIONAL MATERIALS ON CHILDREN'S PERFORAMNCE IN SCIENCE IN PRE-SCHOOLS IN MUGUGA DIVISION, KIKUYU DISTRICT, KENYA

BORO ALICE WANJIRU M

A Research Project Submitted in Partial Fulfillment of the Requirement for the Award of the Degree of Master of Education in Early Childhood Education in the Department of Educational Communication and Technology of the University of Nairobi

2011.

Declaration

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

Boro Alice Wanjiru M

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

Dr. Bonface Ngaruiya
Lecturer
Department of Education
Communication and Technology
University of Nairobi.

Mr. Evanson Mureithi
Lecturer
Department of Education
Communication and Technology
University of Nairobi.

Dedication

This work is dedicated to my beloved mother Janet Njoki, my sisters Rose Wanjiku, Joyce, Beth and Shiku, my brothers Francis, David, Joseph and Josphat for their support and encouragement during this very difficult time. Their prayers and financial support has brought me this far. They acted as a springboard for me to reach the academic alter.

Acknowledgment

I thank the almighty God for the gift of life and good health and for sustaining me throughout my studies at the University of Nairobi. Your praise will always be on my lips.

I owe my gratitude to Dr. Bonface Ngaruiya, Mr. Evanson Muriithi, professor Digolo the Department chairman, Dr. Gatumu the Department coordinator and all the lecturers in the ECE department who impacted knowledge that made the project work manageable.

Special thanks goes to my husband Joel, my children Kelvin, Melvin and Janet. My mother, brothers and sisters. I appreciate my family's patience during my absenteeism in my endeavours to seek knowledge. They acted as a springboard for me to reach the academic alter. To my children this is indeed a great challenge thrown to them.

Other special thanks goes to the head teacher Kanjeru primary, my friends Lucy, Diana, Cecilia, Jane and Magdaline and the typist Mr. Moses who gave me both moral, material support and encouragement on this study.

May God bless you all.

Abstract

The purpose of this study was to investigate the effects of instructional materials on children's performance in science in pre-schools in Muguga division. This research was carried to find out if there is any relationship between instructional materials and children performance in science. The objectives of this study were; to assess the adequacy of instructional materials, to determine types of instructional materials and investigate how instructional materials are utilized in pre-schools in Muguga. The data was collected using teacher's questionnaire and observation schedules which were administered to seventeen pre-schools and seventeen pre-school teachers .Own made science test was given to 150 pre-school children. The researcher used survey research study design. The study findings were analyzed using descriptive statistics to determine the mean, mode, frequency, and percentages. The findings were calculated using tables and figures. The study findings revealed that instructional materials have a positive influence on children performance in science. The findings of this study can be applied by pre-school teachers so as to improve the learning of science as a subject for good performance. The results can also be used as the basis for further research on the difficulties experienced by children in pre-school in the science subject.

Abbreviation and Acronyms

ECE	Early Childhood Education
ECD	Early Childhood Development
NGO	Non Governmental Organization
KIE	Kenya Institute of Education
NACECE	National Centre for Early Childhood Education
UNESCO	United Nation's Educational, Scientific and Cultural Organization

TABLE OF CONTENTS

List of Tables

List of Figures

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Education is a process of systematic training and instruction designed to transmit knowledge and acquisition of skill, potentials and abilities which will enable an individual to contribute efficiently to the growth and development of his society and nation. It involves all round development of an individual physically, socially, morally, intellectually, and mentally, (Osakwe 2006). The Kenyan educational system starts from pre-primary level, primary, secondary and university level.

Pre-primary education is the education meant for children between the ages of 3 to 6 years. That is to say that early education is a special kind of education provided in an institution for children, prior to their entering the primary school. Early childhood education, in the context of formal education can be said to be "a formalized educational process to which children between the ages of three through five plus are subjected to in designated pre-school institutions" Mezieobi (2006).

According to Getao (1996), pre-primary school is expected to provide an opportunity for a child to develop social relations with children and adults outside the family confines. It should help the child to mature emotionally through different activities like painting, modeling, rhythms, dramatization and poetry and to provide the child with opportunities to explore his or her feelings by talking to others. A good pre-primary school provides environment which is homely. In the learning environment the teacher should make sure that there are materials that children will use to enhance learning and thus good performance. This helps the child to develop good habits along with preparing for academic pursuits.

According to Feeney et al., (1987), early childhood education is an asset of immense value in the later academic pursuit of a child and much more lately in life. This early experience exposes the child to all fields (including science) which make him more apt to learn in the primary level as the confidence in his learning capabilities which he acquired from the pre-primary school is lifted to the primary school. This eventually aids and facilitates his learning. The early childhood institution aims at developing the cognitive and affective potential at an early age. Anderson (2002) is of the view that when children are exposed to early childhood education, they develop superior communication skills, necessary physical ability and social unity needed in adult life and an increased cognitive and effective educational balance. Hence a good foundation at pre-primary school is very important since it has implications for current and future performance of the child in all fields, including science.

Science is the foundation upon which the bulk of present day technological breakthrough is built. Nowadays, nations are striving hard to develop technologically and scientifically, since the world is turning scientific and all proper functioning of lives depend greatly on science. Owolabi (2004) defined science as an integral part of human society. Its impact is felt in every sphere of human life, so much that it is intricately linked with a nation's development.

Science as a subject is activity oriented and this suggests that the mastery of science concepts cannot be fully achieved without the use of instructional learning materials. The teaching of science without learning materials will certainly result to poor performance. Franzer et al. (1992) stressed that; a professionally qualified science teacher no matter how well trained would be unable to put his ideas into practice if the

school setting lacks the equipment and materials necessary for him or her to translate his competence into reality.

Experience over the years has shown that teachers have been depending on excessive use of words to express, to convey ideas or facts in the teaching-learning process. This practice is termed the "chalk-talk" method. Today, advances in technology have made it possible to produce materials and devices that could be used to minimize the teachers talking and at the same time, make the message clearer, more interesting and easier for the learners to assimilate Onasanya et al. (2008).

Instructional materials are tools or equipments that can help the teacher effectively in theory teaching classroom or in practical assessment. They are also defined as materials that are used to aid in the transference of information from one person to another. For example, a teacher may use instructional materials to aid in the learning of subject matter for a class. These instructional materials could include power point presentations (Visual aid), books, articles, and graphics among others.

Instructional materials which are educational inputs are of vital importance to the teaching of any subject in the school curriculum. Wales (1975) was of the opinion that the use of instructional resources would make discovered facts glued firmly to the memory of students. Savoury (1958) also added that, a well planned and imaginative use of visual aids in lessons should do much to banish boredom, supplement inadequacy of books as well as arouse students' interest by giving them something practical to see and do, and at the same time helping to train them to think things out themselves.

Savoury (1958) suggested a catalogue of useful visual aids that are good for teaching i.e. pictures, post cards, diagrams, maps, filmstrips and models. He said that

selection of materials which are related to the basic contents of a course or a lesson, helps deepen understanding of such a lesson by the students in that they make the lesson attractive to them, thereby arresting their attention and thus, motivating them to learn. He advocated the use of pictures which will help children in grounding their thoughts and feelings. He said that pictures are used as alternatives to real objects where it is impossible to show students the real objects, and they do serve effectively than imagined activities.

In Kenya, the existing system of providing for early childhood education is community based, in the sense that it is managed and run by the communities through their committees. 75% of the preschools in Kenya are community owned. Kenyan communities are diversified, and therefore, so are the preschools. There are many different types of preschools in Kenya established by different groups or organizations, such as religious organizations, employers, estates or parastatal bodies, women's groups, voluntary organizations (e.g., Rotary Club, Red Cross, etc.), private communities and individual foundations, and local authorities.

The "Guidelines for Preschool Education in Kenya" (1984), issued by the Kenya Institute of Education (KIE), defines curriculum, selects what is to be learned and taught, determines how the material should be learned and taught, provides guidance on how to implement the curriculum in varying school contexts, and in providing for types of pupils, social situations, and physical environments. However, while the guidelines serve as a curriculum in those schools with teachers trained through the national training programme, the majority of preschool teachers have not seen them, and therefore do not rely on the guidelines for assistance.

A number of the ECE centers found in urban centers are owned by private sectors who are able to provide good facilities, well paid teachers who are trained and qualified and have enough instructional materials. Such pre-schools perform better in all subjects. On the other hand the counterpart pre-schools are owned by individuals and some are found in rural areas. These pre-school have untrained teachers because the owners are not in a position to finance and pay trained teachers. The classroom conditions are not of good standards. They lack adequate teaching instructional materials and therefore the performances are also low. On the other hand, the average household expenditure of ECE is quite low. This is because the Kenya household earning capacity is low and therefore not able to provide enough funding to ECE sub-sector.

The Community around Muguga division, Kikuyu district in Central province where the study will be conducted, has a mixture of people from different ethnic backgrounds. Their income is very low because most of them perform petty jobs like barber, greengrocer casual labourers, roasting maize and subsistence farmers who totally depend on hand to mouth income. Since ECE is not part of free primary education (FPE) today, the cost of ECE is borne purely by parents and these parents in Muguga division are not able to finance ECE due to high poverty levels. Therefore the development of infrastructure in ECE has been low, lack proper classrooms, hygienic toilets, proper uniform and adequate instructional materials. This has led to poor performance in ECE sector and especially in science subject where a lot of practical activities are involved. Therefore there is need to carry out this study so that the performance of science subject may improve.

1.2 Statement of the Problem

Education is a continuous, lifelong process, which starts as soon as one is born. Since preschool education is the basis of formal learning, special attention must be given to its implementation and in determining how it can help children to develop. However, the Kenyan government has not given the pre-schools the attention and the support it requires or deserves, given its importance in forming the foundation of the child. As indicated earlier, most ECE centers are owned and run by communities and private individuals and get less than 1% of the education budgetary allocation which goes to meet the teacher's salary employed by local council and other administrative cost. Hence parents of children in ECE centres have to meet the costs of running them almost 100%. This poses a big problem given the poverty levels in the country and hence quality in the ECE centres is compromised and consequently the performance.

There has been a public outcry on science performance in the country including Muguga division in Kikuyu district. The public result shows that a lot needs to be done in science. Science is a practical subject which needs a lot of instructional materials in classroom teaching so that learning can be effective. Exposure of children to various instructional materials help them to learn and to remember what they learn and thus enjoy their learning. This is especially true because most of what we communicate in spoken world must be changed into visual impressions if children have to understood and remember factual and conceptual information. The researcher found out that instructional material affects children performance in science in pre-schools in Muguga division, Kikuyu district.

1.3 Purpose of the Study

The purpose of this study was to investigate the effects of instructional materials on children performance in science in pre-schools in Muguga division, Kikuyu district. This study sought to establish performance and use of instructional materials.

1.4 Research Objectives

The study sought to fulfill the following objectives;

1. To assess the adequacy of instructional materials used in science performance in pre-schools in Muguga.
2. To determine the types of instructional materials used in pre-school science lessons to enhance performance.
3. To investigate how instructional materials are utilized in pre-school to enhance science performance.

1.5 Research Questions

1. How adequate are science instructional materials used to enhance science performance?
2. What are some of the instructional materials used to enhance science performance in pre-schools in Muguga?
3. How are science instructional materials utilized in the pre-schools to enhance science performance?

1.6 Significance of the study

The study may inform policy makers on the practice of science activities in pre-school and use of instructional materials .The study may also help curriculum planners and curriculum implementers in selecting and developing new strategies on use of instructional materials and equipment in science so that where there are inadequate new

ones are developed and produced in pre-school centers. The study may also provide information to the Ministry of Education in making polices pertaining to production of science teaching material that embrace children centered approaches.

1.7 Limitation of the study

The target population comprised of pre-school children and pre-school teachers in Muguga division, Kikuyu district in Kenya. The study focused on instructional materials used in science. Some of the problems the researcher faced include; 1) some respondent gave false information but the researcher explained the importance of the study to respondent's in order to ensure that they respond accurately and honestly; 2) accessibility to the school was a limitation because some schools are found in the interior and the roads are impassable. The researcher will hired transport for this purpose.

1.8 Delimitations of the study

The scope of this study will include 17 pre-schools, 17 pre-schools teachers, and performance of about 150 pre-school children in Muguga division, Kikuyu District.

1.9 Assumption of the study

The study assumed that all pre-schools teachers are professionally trained, they use appropriate methodology and children are ready to learn.

1.10 Definitional terms

Learner – a learner is a school going child between age three to six years.

Pre-school – this is a learning institution of children aged between three and six years.

Performance – results obtained by administering oral and written test after learning activities.

Materials – this are teaching learning aid used to pass information when teaching.

Instructional material – these are materials that the pre-school teacher uses in the teaching/learning process.

1.11 ORGANIZATION OF THE STUDY

This study was organized into 5 chapters. The first chapter explored the background, statement of the problem, objectives, research questions justification and scope of the study, as well as definition of terms. Chapter two addressed both theoretical and empirical literature and gave an overview of the reviewed literature. Chapter three provided the methodology including research design, target population, sample size and sampling procedures, research instruments, data collection procedure and data analysis procedures. Chapter four comprised of data analysis and discussions of the findings while chapter five gave a summary of findings conclusions and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

Literature review is a process of background analysis. It can stimulate conceptual insist behind the problem and provide new ideas. Its also restricted the subject of the study. For example the purpose of this study is to investigate the impact of instructional material on pre-school children performance in science in Muguga Kikuyu district. The chapter contains the following sub topics adequacy of instructional materials and science performance, types of instructional materials used and science performance, utilization of appropriate instructional material for teaching science and important process skills in science. Finally the theoretical framework underpinning the study and the conceptual framework of the study.

2.1 Adequacy of instructional materials and science performance

Instructional materials refer to the materials that support or aid the learner in understanding of the concept of ideas presented to her in a learning environment or situation. They can also be defined as those materials that aid the teacher in the presentation of ideas or concept to the learner in a learning environment. The materials could either be commercially or locally obtained. Hillier, (2005) pointed out that learners come to school with their own learning materials and thus it's the responsibility of the teachers to use what the learner has come with to effect learning. Learning materials should be drawn from learners' experience. Homemade materials should be flexible and encourage pre-school teachers to use their initiative to fashion materials to suit their individual needs. The material should be less costly and remind both teacher

and children that they have the power to influence the environment through resourceful and inventive action

The classroom activities and instructional materials should be arranged in centers for proper learning to take place. Therefore the classroom should have the science centre where the following resources can be placed. That is plants, terrarium, animals aquarium materials that can be used for investigation like food, colouring soap flakes oil and equipment for observing and recording like magnifying glasses, battery and prisms.

Akolo (1978) states that instructional materials are facilitators of teaching/ learning process when properly used. He looked at instructional materials as all information carriers that can be used to promote and encourage effective teaching/learning activities. Instructional materials provide the opportunity for learner centered method of education. They also arouse learners' interest, stimulates imagination, raise question of discussion and a desire to find out more or solve some problems.

Audio/visual materials have been among the material for teaching and learning in educational programs for many years. Most often they have been secondary to verbal presentations by teachers to textbooks, to the chalkboard, to library materials. Often they were introduced into a class lesson at the whim of the teacher. For these reasons audiovisual as 'aids' to instruction. To improve teaching a number of educational film companies have produced qualities of films for classroom use. Many films are excellent in content and creatively designed and they do play important roles in providing visual experiences for children of all ages. According to Kemp (1968) instructional materials

were more often after thought of curriculum planning than the result of the curriculum development process. Audio visual materials usually entered the instructional process at the classroom application level, either when the teacher was casting about for materials that might 'aid' instruction or when the audiovisual director instituted a search of catalogs for appropriate materials.

According to Finn (1960), instructional technology is an area that has brought machines, materials and techniques together for educational purposes. One of the most influential media of communication is television, including both instructional (for direct classroom learning) and educational (for cultural and community enrichment). The medium has extended the influence of the 16 mm film so as to reach students with up-to-date topics and with newly organized approaches to subjects. The detailed planning incidents to television instruction put its potential for efficiently incorporating most other audiovisual materials within its format, have made many educators aware of the way to approach instruction systematically with audiovisual materials. One important result of television has been the availability of complete courses presented by one or more subject experts in a series of 100 to 160, 30 minute programs.

According to Kemp (1968) instructional materials are classified under visual materials and audio-visual resources. Visual materials refer to aids which promote learning through seeing only. They include film, slide, overhead projector, drawing, maps, magazines, calendar, charts, blackboard, flip charts and white board. Print media is considered to be one of the most flourishing industries today. It is particularly very popular to reach the target and includes texts, microfilm, encyclopedia, newspaper and teacher prepared handouts. Audio-visual materials on the other hand, refer to aids which

promote learning through both seeing and hearing. A good example is television. Kemp (1968) highlights on the importance of audio video materials and says that audio visual materials results in greater acquisition of knowledge of facts and ensures longer retention of the information gained.

According to Ayot (1987) instructional materials are categorized into three. That is the software, hardware and environment. Software in general includes science, textbooks, charts, maps, cartoons, pictures, photographs and chalkboard, flashcards, poster and real objects (realia) They acknowledge that the visual sensory skills are the most powerful of the senses. The child can visualize, perceive and put interpretation levels to different meanings. For the children who are unable to see they may find the acquisition and retention of knowledge very difficult unless other mechanical or technical means are used to record what has been subject to learning. Hardware learning materials include projected materials that are demonstrated with the aid of machines such as projectors. The projection techniques are designed to enable children to see an illustration or image of the pictures being projected. These materials include aural materials for example record players, radio, television, films, and slides internet magnetic tapes and overhead projectors

The third category according to Ayot (1987) is environment resources. These are things found in the world around us. He contends that the immediate surrounding is probably the best sources of instructional materials required in the classroom and outdoor activities since it provides real life things. The utilization of the environment in teaching and learning exposes the teachers and children to everything that affects their lives as human beings, animals, birds, climate and matter, transport and communication.

Environmental instruction materials includes musical instruments, costumes skin, wool, rocks, wires, clay, animals, plants bottles monuments sites and field trips. If all these categories of instructional materials can be used effectively in the classroom, then science performance can be felt.

Ayot (1987) states that instructional materials make learning for children more interesting. If a teacher becomes the sole active in passing information, the children become passive and therefore tend to forget easily. Good use of instructional materials will allow children to have practical experiences through which they can develop skills and concepts easily in science. The instructional materials help children to present their work in an attractive manner. When a teacher plans his teaching he should concentrate on the five senses. That is touching, seeing, hearing, doing and making. Instructional materials arouse interest, give an accurate impression, help memory retention, stimulate the imagination and provide shared experience.

Ogama (1985) says that instructional materials can create a conducive atmosphere for learning. This is brought about by the way the teacher organizes his classroom, the way he arouses and motivates his learners interest and the way he use the instructional materials. There is research evidence that the availability of instructional materials make difference in performance of children.

Munyilla (1985) felt that one way of ensuring that children learn by doing is through the constant use of instructional materials especially teaching aids. The research reveal that although teachers appreciate the importance of instructional materials they do not use them and the small number used may not be effective in instruction. He

concluded by saying that where little use of instructional material is made, the activity method is discouraged.

Instructional materials focuses on the children's interest and attract attention to what they are learning Kabiru and Njenga, (2004). The use of real objects, pictures and sketches in science assist in focusing children's attention and sustains their interest in the lesson for a much period than would the case if the teacher relied solely on oral presentations. Instructional materials when used appropriately help children to find out information and make their own interpretation. The pre-school teacher can use thematic method to teach about the colour, shape and taste of an orange in science subject. This will stimulate the learner's imagination. Instructional materials add variety to learning experiences which verbal description alone will not provide Kabiru et al., (1990). Visual perceptions are more powerful than sound perception. However a combination of the two can also be very effective in children's learning. It also help to safe time promote pre-scholars retention and memory by giving an accurate impression of the concept. Instructional materials also illustrate a relationship and help consolidate what has been learnt.

If the teacher is using science instructional materials like charts they should be big and clear enough to be seen by all children from the back of classroom. It should be bold in lettering and even printing to make the message come out clearly for proper legibility and attraction. These instructional materials should be simple with few details and only the very vital information. They should also be attractive by use of colours where possible to hold the children's attention. They should be accurate and neat with

layouts and margins that make important information stand out Ngaroga, (1996). Such material will enhance good science performance.

2.2 Types of Instructional materials used and science performance in pre-schools

One of the national goals of education in Kenya, according to National Centre for Early Childhood Education (NACECE) and Kenya Institute of Education (KIE) is individual development and self-fulfillment. Therefore every individual must be helped to grow in his physical, moral, spiritual and intellectual. One of the objectives of the early childhood education is to provide education geared towards development of child's mental capabilities and physical growth. The second objective is to enable child to develop understanding and appreciation of his culture and environment. The third objective is to foster spiritual and moral growth of the child and finally to enable the child to build good habits and acquire acceptable values and behaviour for effective living as an individual and as a member of a group.

Whitebread (1996) says that pre-scholars learn and perform better if their classrooms are well organized and equipped with instructional materials to give maximum space to the learners and provide a range of starting points for their ideas. Interactive displays in the pre-school thematic collections of carefully selected instructional materials entice the pre-scholars to explore a wide range of ideas. These displays provide a fundamental part of the young children's learning.

According to the ministry of education (2001) performance in science among learners can be affected by a variety of factors among them, the instructional materials and how they are distributed and utilized by children in terms of availability, frequency of utilization, time allowed for their use and gender sensitivity of the materials.

Gagne (1992) says that learning instructional materials refer to printed or other materials intended to convey events of instruction. Traditional instructional materials were not designed or developed by teachers. They were given instructional materials that they integrated into their lesson plans. This instructional system design underscores the selection and the development of instructional learning materials as an important part of the learning/ teaching process. This instructional system affects role of the teacher and the completeness of the materials because the teacher will have to provide whatever is needed by the pre-scholars. The teachers who deliver instructions often select and use a great variety of instruction materials to enhance understanding and good performance in science.

2.3 Utilization of appropriate instructional materials for teaching science in pre-schools

Gagne (1992) suggests that in selecting instructional materials, the pre-school teachers are expected to make decisions based in his lesson planning. He should do this basing his decision on the instructional materials he intends to use for good performance, the place where to get the materials and the time allocated for the materials. According to him, the teacher should also consider gender friendliness of the instructional materials and finally the familiarity of the instructional materials to the children so that performance can register a positive trend.

It is the role of the pre-school teacher to organize the collection of instructional materials although this could be a joint effort involving the parents, children and teachers. The learning materials should be collected from the local environment. The teacher must however warn their children and the parents against collecting dangerous

materials like poisonous plants, seeds and containers which can be harmful. The materials used should be safe and free from harmful or poisonous chemical Mwaura et al., (1990). The pre-school teacher should ensure that tins and bottles are well cleaned before children start using them in learning. Containers with sharp edges like tins should be trimmed well or made blunt at the edges. The teachers should select wooden pangas and jembes for children's safety.

According to Ngaroga, (1996) real science materials can be collected during a nature walk with children and be kept in the nature corner. These would include items such as old bird's nests, samples, bones of animals, fruits of known plants, bird's feathers, mosses and lichens. All specimens collected should be preserved, labeled and placed in all the appropriate position in the classroom setting. Science instruments like wind vane, compass, weathers charts can be made by children with guidance of the teachers or be collected from children's homes where applicable and be stored for use.

2.4 Important skills in science and performance

Observation is one of fundamental scientific skills. When using a microscope for the first time, it is difficult to understand what you are seeing, but with practice you understand better and the observation begin to have more meaning. Professor Fleming A, (1928) a scientist made a very important discovery. He was studying a particular kind of bacteria. He had grown these bacteria on a special substance on a plate. He noticed that a mould (a fungus) was also growing on this substance but no bacteria were growing near the mould. He did an experiment. He grew this mould in a kind of soup and carefully kept the original plate. He found that the fungus which grew in the soup destroyed several kinds of bacteria which cause human disease. When Fleming looked

at his bacterial plate, he made a most important observation. He did not know that he was going to see anything unusual, he therefore recognized the importance of his observation. Observation is more than just 'seeing'. We have to select out what is important and what is unimportant.

Children 'see' many things, but they don't always observe them. For example, they see bird's everyday but they don't observe that some birds are alike, others are different, and others fly by flapping their wings quickly than others. All the senses are involved in observation. That is seeing, hearing, feeling, tasting and smelling. We can develop in children these fundamental skills of observation by providing instructional material and doing a lot of practice in using them so that their science performance can be perfect Young, (1979).

According to KIE (2008), children should be taken out for nature walks in the school compound and within the neighbourhood. The nature walks should be well planned and organized such that children go out for a specific interest. However during the nature walks, children should be free to make their own observation of what interests them. The teacher should maintain close supervision as children go out to avoid unnecessary injury. Nature walks should be theme based. On the other hand field visits are made to a specific place for the purpose of learning what goes on in that particular place. Children should be taken to places such as nearby farms, markets, parks and orphanage. They should be well organized and theme based. During both field excursions and field visits children should be guided on what items to be collected and how to keep them to avoid unnecessary accidents Young, (1979).

Communication is another fundamental skill in science. A scientist has to be able to say clearly what he has observed or discovered. Sometimes he writes this down and sometimes tells another person. Sometimes he makes a table, graph or histogram and sometimes makes a drawing, diagram or model. In all these cases, the skill of communication is involved. Perhaps he is recording information for use later. Perhaps he needs to share his idea with other scientists. Communication is a two way skill. The scientist has to read what other scientists have written. He has to listen to other scientists. He has to understand their graphs and tables. Children can learn this skill of communication. They have to learn to distinguish relevant information from irrelevant. They also have to learn how to display information since most activities in science involve this process. It is as fundamental as observation

Another fundamental skill in science is counting number relationship. In science we often have to count separate object as it's done in mathematics. The teacher should have many objects which can be counted. For example seeds, stones, bottoms, pins, paperclips and sticks. It is often necessary to record the counting number observed.

Measurement is also a fundamental skill in science. We often need to compare things, size of objects, the times taken for certain events, areas, speeds, weights, temperature, and volumes. Measurement is concerned with these kinds of comparisons. Comparisons are the basis of all measurements. Thus, with young children, we should encourage this ability to make comparison Young, (1979). Unlike counting number relationships, measurements are not concerned with separate objects. It is concerned with continues materials like sand, water and clay. Children need experience with learning materials to develop their understanding of measurement later.

Experimenting is another fundamental skill. To experiment means to test, usually by practical investigation. Often we test our ideas by trial and error. That is to say, we do an experiment. If it does work, we develop our idea further Young, (1979). Children often experiment in a trial and error way. But as they grow older, they learn to think more carefully about their ideas before they do the experiment. As a teacher you can encourage the children although he might not know the child's problem, the thing is to help him to find out. With younger children the teacher should begin an experiment by asking "what would happen if.....? What is the effect of.....? For example local market mirrors are cheap and readily available the teacher could ask children to put a mirror alongside writing and ask what happens to the writing in the mirror. The children can play this as a game and in the process they learn a lot.

2.5 Other researches on instructional materials and performances

Momoh (1980) carried out a research on the effects of instructional resources on students' performances in West African School Certificate (WASC) examination in Kwara State. He correlated material resources with academic achievements of students in ten subjects. Information was collected from the subject teachers in relation to the resources employed in teaching in five schools. The achievements of students in WASC examinations for the past five years were related to the resources available for teaching each of the subjects. He concluded that material resources have a significant effect on students' achievement in each of the subjects.

Moronfola (1982) carried out a research in Ilorin local government of Kwara State. She also used questionnaires to tap information on the material resources available for the teaching of ten subjects in ten secondary schools. She collected WASC

examination results for the past five years and related these to students' achievements in each of the ten subjects and to the amount of resources available for the teaching of the subjects. She also reported a significant effect of material resources on the academic achievements of students in each of the subjects.

In the same vein, Popoola (1990) investigated the effect of instructional resources on the academic achievements of students in Ogun State. Five secondary schools in Abeokuta were used for his study. Questionnaires were designed to elicit responses on instructional materials that were available for the teaching and learning of each of the three school subjects he examined. He collected WASC examination results for five years and compared achievements of students in schools with adequate material resources and achievements of students in schools with inadequate material resources. He found a significant difference in the achievements of the two sets of students.

Akolo (1978) conducted a survey of audio-visual materials for eight Teacher Training Colleges in Kwara State and for twelve Teachers' Colleges in Plateau State of Nigeria. His study considered such elements as equipment and materials owned by each of the selected teachers colleges, utilization of equipments and materials owned, and the number of teachers that had some measure of audio-visual related training. The study revealed that there was under-utilization of instructional equipments in some areas and non-utilization in other areas where the research was conducted.

Jekayinfa (1993) carried out a study to find out the effects of instructional materials on the academic achievement of secondary school students in History. Data were collected from five hundred and five (505) form IV history students, eleven (11) History teachers and seven (7) principals in eleven (11) selected secondary schools in

Ogbomoso North and Central Local Government areas of Oyo State. Teachers and students in the sampled schools were administered a questionnaire. History Achievement Test was also administered on the students in the selected schools. Results of the study indicated that adequate supply of instructional materials have significant effects on students' performance in history. Furthermore, the results revealed that schools with adequate teacher quality and instructional materials in History showed superiority in achievements on the history test than schools without adequate teacher quality and instructional materials.

The study by Adeogun and Osifila (2008) investigated the relationship between educational resources and students' academic performance in Lagos State public secondary schools. A descriptive research design was adopted. Five schools were randomly selected from Somolu Local Government Area of Lagos State. A research instrument was developed to collect factual and perceptual information from the principals and teachers of the schools selected. The data collected were analyzed with the use of chi-square statistics. The study found that there were not enough educational resources in the selected schools. Physical, materials, financial and human resources were found to be significantly related to students' academic performance. Some suggestions and recommendations were made on how to improve academic performance through adequate provision of educational resources.

2.6 Theoretical Framework

According to Tassoni (1999) constructivist theories suggest that children learn from action and exploring their own environment. The most famous constructivist theories were probably by Jean Piaget (1980). Piaget who was a Swiss studied children

intellectual development over a period of years. He discovered those children's answers to the intelligence tests that the set followed a logical pattern based on answers schema. Therefore this theory can be anchored with my study.

Piaget believed that children were active agents of their own learning and that a major task for them was to develop an ability to organize experience and learn from them in a way which enables them to make sense of the world. According to him children construct knowledge as they act physically on the environment. Children develop mental images known as schemas. Example of schema that is common among children is to believe that every one lives with a parent figure and begin to reason logically as they play, manipulate, observe, explore and experiment with objects in the environment Tassoni, (2002).

Piaget emphasized that children, especially during their early years learn through the use of their senses of tactile, gustatory, olfactory, visual and audio. They do this as they play, manipulate, explore, experiment and observe whatever is in their environment concepts and skills. Piaget taught that language influences thought and thought influences language. This means that children clarify their concepts as they label things or talk about what they see or do in the environment. Godfrey, (1992) asserts that when children acquire many concepts and experiences from their environment their language improves.

Therefore Piaget said that for children to construct knowledge from the environment they should be actively involved in the learning activities. Children should be given opportunities to explore experiment, manipulate, observe and ask questions. In so doing, they acquire knowledge which contributes to their mental development.

According to Piaget children should be actively involved in their learning. This is called child-center learning approach. He says that for children to construct knowledge and build schemas they need to be provided with the following: plenty of concrete learning and playing materials with opportunities for them to interact actively with their environment, both human and physical and finally be provided with opportunities for visits so that they can use all their senses Mwana Mwende, (2009).

Piaget theory implies that, the teacher should be a facilitator of children's learning. The teacher can do this by doing the following; providing an environment that stimulates children to construct knowledge and find out about things on their own as they play; asking them open-ended and challenging questions which stimulate them to think and to solve problems; providing guidance for the children as they interact with their environment and providing opportunities for group work so that they can start to recognize that other people have different points of view. Finally the teacher should be listening to children as this encourages them to explore and to ask more questions. According to Romiszowski, (1981), Piaget was perhaps the most prolific researcher in development psychology. He viewed the development of intelligence as part of the more general process of biological development. He suggests that the rate of development is, to a considerable degree, a function of the child's encounters with his environment.

2.7 CONCEPTUAL FRAMEWORK

This study has identified the following independent variables that directly affect children's performance in science in pre-school in Muguga division. They include adequacy of instructional materials, utilization of instructional materials and types of instructional materials and process skills. Figure 1 shows the relationship between the two variables.

Conceptual Framework

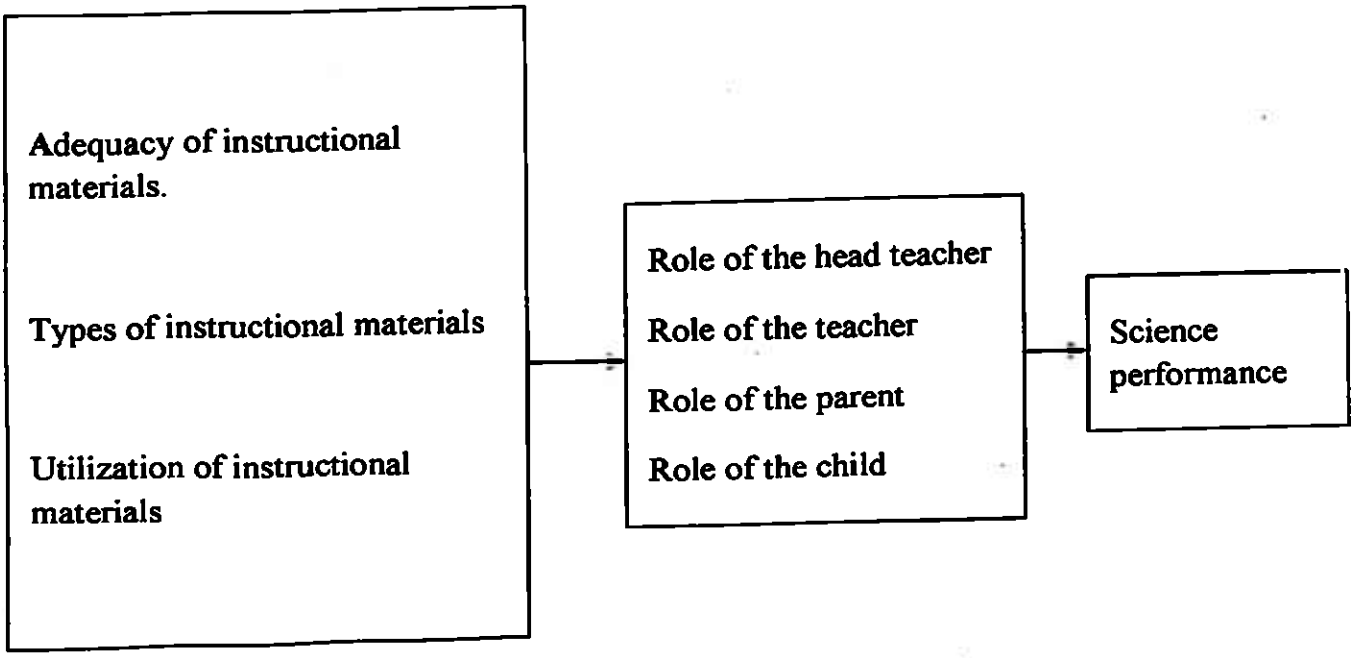


Figure 1

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter is comprised of research design, the target population, the sample and sampling procedure, research instruments, validity and reliability data collection procedure and data analysis method.

3.2 Research Design

This research took the form of survey research study design. This design uses several groups for example children as samples. The researcher selected children of the same age or class. The purpose of this research design may be to understand common factors or problems affecting children of the same age or class. Results of different ages or group are compared and conclusions are drawn about the growth and development of children of a particular age and the factor affecting their development.

3.3 Target Population

The target population of this study consisted of both pre-school children and pre-school teachers in both public and private pre-school in Muguga division in Kikuyu district. The study covered about 17 pre-schools and 17 pre-school teachers and performance of about 150 children

3.4 Sample Size and Sampling Procedure

Sampling is the process of selecting a number of individuals or unit in a research study in such a way that, estimates of the characteristics of the large group (population) from which they are choosen have no bias and have known confidence limits based on

correctly calculated sampling errors (UNESCO,2001). The researcher used stratified technique to sample the target population of children and teachers in private and public schools found in Muguga division, Kikuyu district. Stratification is the dividing up of the survey universe in to sub population called strata which are then sampled independently. It is usually divided and such a way that the strata created are more homogenous than the population as a whole, and if that the case then the overall sampling variability is reduced by stratification Mutai, (2001) The researcher gave own made test to five school with instructional materials and five with inadequate instructional material to see the difference in performance. The researcher found out that there is relationship between pre-schools children science performance in pre-schools with instructional materials and pre-schools without.

3.5 Research Instruments

These are the tools that the researcher used to collect data. The data was collected using a questionnaire which is considered the most suitable instrument for descriptive research study design Wiersman, (1986). The researcher used a achievement test, questionnaire administered to teachers who provided information on instructional materials and performance of children. The questionnaire had both open and close-ended types of questions for example whats your marital status. The questionnaire also had structured question where respondents were required to fill for example how useful are these instructional materials useful to the learner. The researcher also used observation schedule. Under the observation method the information was sought by way of investigators own direct observation without asking from the respondent. The main advantage of this method is that subjective bias is eliminated if observation is done

accurately. The information obtained under this method relate to what is currently happening. This method is also independent of respondent willingness to respond and as such is relatively less demanding of active cooperation on the part of respondents as happens to be the case in the interview or questionnaire method Kothari, (2004). Own Made science test was also given to 150 children from 10 pre-schools of which five pre-schools had adequate instructional materials and five had inadequate.

3.6 Validity of Instrument

Validity entails the research instrument measuring what it was intended to measure. It is the degree to which the test items measure the traits for which the test was designed Mugenda and Mugenda, (1999). It is also broadly classified as the degree to which results obtained from the analysis of the data actually represent the phenomenon under study Mutai, (2001).To ensure that instrument are valid and reliable the university expertise(supervises) were asked to appraise them. Their comment and rating were used to improve them. Validity helped the researcher to know if the data obtained in the research is accurate and consistent. The researcher checked if the instrument was valid by piloting about three pre-schools and three teachers using stratified sampling technique. During the pilot study, the instrument was discussed with the respondents so as to establish their suitability, clarity and relevance for the purpose of the study. In appropriate questions and items were discarded so as to improve the quality of research instruments. Schools used in the pilot study were not used in the main study.

3.7 Reliability of Instruments

According to Mugenda and Mugenda (1999), reliability is a measure of the degree to which a research instrument yields consistent results or data after repeated trials. Reliability in research is influenced by random errors. As random errors may arise from inaccurate coding, ambiguous instructions to the subject, interviews fatigue and interviews bias. The researcher used the test- retest method whereby the questionnaire was administered twice to the same groups of teachers. After a week another questionnaire with the same information was given to the same teachers. The information given by the respondent was 98% so the researcher concluded that the instrument was reliable and valid .The researcher also used observation schedule through investigating own direct observation without asking any question from the respondent. Data collected in the instances was correlated to decide on the reliability of the instrument used.

3.8 Data Collection Procedures

The researcher sought permit from the National Council of Science and Technology (NCST). The researcher then submitted self-introductory letter from the University of Nairobi (Education Communication and Technology) to the DEO for permission to collect data. Questionnaires were then administered personally to individual schools and teachers. The head teacher and teachers of the selected school were informed so as to give permission to the researcher to conduct her study. The researcher then waited for the respondent to fill in the form and collect them the same day. The observation schedule took place the same time which ensured almost 100% responses.

3.9 Data Analysis Procedure

After fieldwork, the data collected through the questionnaire was coded. Data for this study was analyzed using descriptive statistics in order to determine frequencies, mode, mean, and percentages of the responses to each question which was calculated and presented in tabular form and figures. The data was summarized and organized according to research questions, arranged into themes and presented in narrative forms.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSIONS OF THE FINDINGS.

4.1 Introduction

This chapter focuses on the return rate of the questionnaires, demographic information of the respondent, data presentations, interpretation and discussions of findings. The presentations were done based on the research questions.

4.2 Questionnaire Return Rate.

One set of questionnaire to the teachers was used to collect data. Own made science test was given to children from 10 pre-schools, observation schedule was also used during the study. Teachers questionnaires were administered to teachers and the return rate was 100%. They were well filled and therefore were usable.

4.3 Demographic Information of Respondent

The pre-school teachers were requested to provide demographic information regarding their gender, marital status, academic qualification, teaching experience and number of pre-school children in their classes. The demographic information is summarized as follows. The data collected shows that most of the pre-school teachers are female compared with male teachers.

This data revealed that pre-school in Muguga are dominated by female teachers who have a gender representation of 82.4% compared to their counterparts teachers who represent only 17.6%. This is a confirmation from other ECD researchers that most of the pre-school teachers are female. The pre-school teachers were also asked to indicate their age bracket. Table 1 present the data.

Table 1 Age bracket of pre-school teachers in Muguga Division.

Age	Frequency	Percentage
20-29	3	17.6
30 -39	7	41.2
40 – 49	5	29.4
50 and above	2	11.8
Total	17	100

Data derived on the age of the pre-school teachers showed that the largest modal group of pre-school teachers was in the age bracket of 30- 39 years with a percentage of 41.2% and very few pre-school teachers in the age bracket of over 50 years. The data shows clearly that the mean age bracket of pre-school teachers in Muguga is 38 years and two months. This shows that pre-school teachers in Muguga are young adults who are known to be active and enthusiastic in their undertakings which in this case mean teaching and so they are able to actively play their role as teachers. This data explains that the age of the teachers is not of much influence on children's science performance. What is important is for all teachers to undergo training before embarking on teaching children so that they can use appropriate process skills.

After establishing their age, they were further asked to indicate their highest academic qualifications. Their responses are presented in Table 2.

Table 2. Academic Qualification of Pre-School Teachers in Muguga Divison

Qualification	f	%
K.C.P.E	0	0
K.C.S.E	8	47.1
K.A.C.E	0	0
Diploma	9	52.9
Total	17	100

This table shows that the highest qualifications of pre-school teachers in Muguga are Diploma holders with 52.9% and 47.1% are pre-school teachers who are certificate holders. Its apparent from the data that most pre-school teachers in Muguga are trained. The more advanced the level of training the teachers have received coupled with experience, the more likely they are to be successful. The pre-school teachers were also asked to indicate their teaching experience. Their responses are presented in Table 3

Table 3. Teaching Experience of pre-school teachers in Muguga Division

Age/experience	f	%
0 -5	2	11.8
6 -10	4	23.5
11-15	5	29.4
16-20	3	17.6
Above 20	3	17.6
Total	17	100

The data shows that most pre-school teachers have teaching experience of 11 – 15 years which register 29.5% while a very small percentage of 11. 8% are less experienced. The data clearly shows that pre-school teachers have a mean of $12^{1}/_{2}$ years of teaching experience. This shows that majority of pre-school teachers have acquired considerable long experience in teaching. Thus teaching experience may not be a factor of poor science performance in pre-school.

4.3.1 Enrollment of Children per Class in Muguga Division

The pre-school teachers were also asked to indicate the number of children per-class. The findings are presented in Table 4.

Table 4 Enrollment of children per class

Type of school	f	%
Below 30	7	41.2
Between 30 -50	8	47.1
Above 50	2	11.7
Total	17	100

The data shows that pre-school teachers handle average classes of 30 – 50 children per class of a percentage of 47.1%. This is an average of 33 children in each category. This number of children is too large for a pre-school teacher to handle. The teacher may not be able to meet individual differences of each child. Materials needed may not be adequate for all children and this may lead to poor performance in science.

4.4 Adequacy of Instructional Materials and Children's Science Performance

The researcher sought to assess how adequacy of instructional materials affects science performance in pre-schools. Therefore the researcher asked the pre-school teachers from 10 schools out of 17 pre-school in Muguga to indicate the percentage of adequacy of instructional materials. The information is summarized on Table 5.

Table 5 Adequacy of Instructional Materials and Children's Science Performance

Schools	Teachers ref book/ guide	Charts	plasticine	Science corner	Crayons	Pictures
A	52.6	60.1	51.3	72.3	58.1	61.5
B	59.4	58.7	46.9	75.5	61.0	52.7
C	49.3	49.7	77.7	82.5	59.9	60.7
D	72.3	57.3	56.7	59.3	60.3	54.8
E	63.4	59.6	61.3	65.7	65.3	56.7
F	54.3	53.2	48.2	57.7	74.2	60.4
G	62.1	61.5	47.7	63.7	53.4	61.5
H	59.7	58.9	51.3	59.2	65.7	59.3
I	55.8	52.7	57.4	60.1	66.8	50.4
J	48.7	48.2	52.3	70.5	53.6	53.2
Mean	52.5	49.9	55.3	66.7	55.9	51.8

The data presented on table 5 shows that majority of pre-school teachers responded that some instructional materials are adequate while others are inadequate. The data shows that the highest modal group of instructional materials is science corner

which has a mean of 66.7% %. This means that well utilized science corner in the class will enhance performance. This is because real objects, children's own collection as well as teachers collection from the environment may be displayed at the science corner to refer while teaching thus enhance performance. The data shows that pre-school teachers in Muguga use crayons. Crayons represent 59.9%. This means that children are given practical work like colouring family members, fruits we eat and weather chart, and make attractive diagrams enhances science performance. Teachers reference books and guide represents 52.5% which means that 47.5% pre-school teachers have inadequate reference book and guide. Pictures represent 55.9 meaning well drawn, labeled and organized pictures enhances learning thus good performance. It was also found out that adequacy of instructional material have effect on science performance.

4.5 Children's Science Performance

Own made test was administered to 150 pre-school children in Muguga division. The researcher chose five private pre-schools with adequate instructional materials and five pre-schools with inadequate instructional materials. The researcher chose the five pre-schools that perform very well and five pre-schools that are known to perform poorly. The results are summarized on Table 6.

Table 6 Children's Science performance

Schools with adequate instructional materials (%)		Schools with inadequate instructional materials (%)	
	98.9		46.7
	87.2		52.8
	92.3		53.2
	89.6		60.9
	86.0		62.4
Mean	**90.8**	**Mean**	**55.2**

Pre-schools with adequate materials managed to score an average mean of 90.8% while schools with inadequate instructional materials got a mean of 55.2% in science performance. This implies that instructional materials are essential while teaching science as a subject because they quicken children, make learning interesting, help to capture children's attention and enhances memory. For this reason, children who used instructional materials registered good performance than those who did not use them. The researcher found out that there is a significant difference in the achievement of the two set of pre-schools. This agrees with Popoola (1990) who found out that schools with adequate instructional materials have significant achievement than those without. The data shows that there is a relationship between instructional material and science performance.

Pre- schools with adequate material acquired good performance in science than schools without instructional materials. Pre-schools with adequate materials managed to

score a mean of 90.8 % while schools with inadequate instructional materials got a mean of 55.2% in science performance. This implies that instructional materials are essential while teaching science as a subject because they quicken children understanding, make learning interesting, help to capture children's attention and enhances memory. For this reason, children who used instructional materials registered good performance than those who did not use them. This shows that children science performance is affected by lack of adequate instructional materials.

4.6 Types of Instructional Materials used and Children's Science Performance in Muguga Division

This question sought to seek the types of instructional materials used to enhance good science performance in pre-schools. To answer this question the respondents gave the following materials that are improvised; clay 20%, stones 15%, fruits 15%, weeds 10%, trees leaves 15%, dry bones 5%, bottle tops 20%, The information is shown on Table 7.

Table 7. Types of instructional materials used and science performance.

Materials	points	%
Stones	3	15
Fruits	3	15
Weeds	2	10
Leaves	.3	15
Clay	4	20
Dry bones	1	5
Bottle tops	4	20
Points	**20**	**100**

Some materials like weeds 10%, dry bones 5% fruits15% and stones 15% are displayed at the science corner for children to learn on their own and during the lesson if need be. Other materials like pictures and charts are hanged on the wall at strategic position where children can access easily. Other materials are displayed on the table for children to learn during the lesson. Therefore instruction materials are essential in learning. Instructional materials are aimed at assisting learners in learning. Lack of them implies that performance will be poor. That means instructional materials are integral component of the learning process. These findings are in line with Mwana Mwende (2009) who found out that availability of instructional materials has an effect on performance. Schools that do not have enough or adequate instructional materials will tend to perform poorly than schools which have adequate facilities.

The findings are also in line with the finding of a research carried out by the Ministry of Education (1994) which found out that shortage of necessary instructional teaching/learning materials was a cause of poor performance in pre-schools. Most pre-schools in Muguga seems to lack such teaching/learning materials which have led to poor performance in science

4.7 Utilization of instructional materials and Children's Science performance in Muguga Division

To answer the research questions that sought to investigate how instructional materials are utilized by pre-school teachers, they were asked to indicate how often they used them. Their response was that they only use them when they are available and according to the age and ability of the child. The information is indicated on Table 8.

Table 8 Utilization of instructional materials.

Utilization	f	%
Teachers reference book and guide	8	47.1
Manilla paper	9	52.1
Charts	11	64.7
Exercise book	13	76.3
Plasticine/ clay	7	41.2
Chalk board and chalk	15	88.2
Science corner	10	58.5
Crayons	6	35.3
Pictures	9	52.9

The data on Table 8 shows that the modal group of utilization of instructional materials is chalk board and chalk which is represented by 88.2 %. This indicates that pre-school teachers use black board and chalk when teaching. The issue of exercise book which is 76.3% means that there are adequate and may affect the science performance. The respondent also said that charts 64.7% are adequate and only a small percentage of 36.3% are inadequate. Charts are essential when teaching science. Pictures represent 52.9% on the table these are pictures of family members, fruits we eat, weather charts, and domestic animals. Pictures and charts that are well drawn coloured, labeled, attractive and well utilized help children to internalize science concepts and enhance children performance in science.

Table 9 Level of adequacy and Children's Science performance in Muguga Division

Materials	Level of adequacy	Science mean (%)
Teachers reference book	3	15
Charts	4	20
Plasticine/ clay	3	15
Science corner	4	20
Crayon	2	10
Pictures	4	20
Total	**20**	**100**

The available instructional materials are shared amongst children to enhance co-operation and problem solving skills. Some respondent said that they use this material when teaching or discussing a point or concept for example plasticine and clay which represent 15%. Others use instructional materials in order to pass information or knowledge. They are also used to improve learning because they make learning real. If these instructional materials are well utilized for example utilization of science corner which is 20% with all required materials like toys, dolls, bones, seed, fruits, bottle tops, old cloths, kitchen items, enabled children to enjoy the lesson because the lesson was interesting. This helped children to become self motivated in learning and able to tackle questions easily. Use of instruction materials also help children to manipulate thing using their own hand for example use of plasticine and clay to model domestic animals houses we live and family members, retain memory and thus help them to recall what was taught. Uses of instructional materials promote creativity and curiosity these help

children to create moral and break boredom. This data shows that there is a relationship between instructional materials and children's science performance.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter summarizes the finding of the study and presents conclusion and recommendations and suggestions for further research conducted in 17 schools in Muguga division Kikuyu district. Below follows a summary of major findings of research questions that were formulated to guide the study.

Research question (i) sought to assess the adequacy of instructional material and science performance.

Research question (ii) to determine the types of instructional materials used and science performance.

Research question (iii) to investigate how instructional materials are utilized in science performance.

5.2 Summary of the Study

The purpose of this study was to investigate the effect of instructional materials on children's performance in science in Muguga division. The study adopted the survey research study design to investigate the effects of instructional materials in children's science performance. The data was collected using questionnaires to the teachers, own made test given to 150 children and observation schedule was conducted by the researcher. The findings revealed that; Lack of instructional materials had an effect on performance in science in pre-schools. The researcher also found out that owns made test in schools with inadequate instructional materials acquired a mean of 55.2%. Pre-school with adequate materials acquired a mean of 90.8% .The pre-school teachers said

that they did not have adequate teacher's reference books and guides because it only registers 47.1%. Majority of children did not have enough plasticine and clay (41.2%) to manipulate their work. Provision of instructional material help children to learn through manipulating and experimenting for themselves, trying things out to see what happens, manipulating objects and symbols, comparing findings they obtain. By so doing they will learn easily and joyfully as they learn different concepts in science. Provision of instructional materials will enhance performance in science. Its important for schools to have good and adequate instructional materials which are attractive for good performance.

The study used survey research study design, questionnaire to the teacher, own made science test and observation to explore the effect of instructional material on science performance. The participants were 167 of which 150 were pre-school children and 17 pre-school teachers. The return rate was 100% for the pre-school teachers. The questionnaire and observation schedule were administered personally. Demographic information of the respondent was collected to show the characteristic of the respondents. The data was collected and analyzed in tables frequencies, percentage, tables and figures.

5.3 Findings of each Research Questions

5.3.1 Adequacy of Instructional Materials and Children's Science Performance

The findings shows that adequacy of instructional materials has effect on science performance. The highest modal group among instructional materials is science corner with an average mean of 66.7% as shown on Table 5. Science corner is very important in the classroom setting because the teacher displays children own collections which

they can manipulate when learning. Pictures of family members fruits we eat, domestic animals and weather chart are important when learning and enhances performance. The researcher found out that use of adequate instructional materials when teaching has positive effects on performance.

5.3.2 Types of Instructional Materials and Children's Science Performance.

The researcher found out that different types of instructional materials are essential in order to have good performance. The researcher found out that out of 20 materials, stones got 15%, fruits got 15%, weeds got 10%, clay got 20% dry bones got 5%, bottle tops got 5%. These are improvised and locally available materials which are displayed at the science corner to enhance performance. Children play around with them in class, touch them and learn the importance. The researcher has concluded that these types of instructional materials have effects on science performance.

5.3.3 Utilization of Instructional Materials and Children's Science Performance

From Table 8 on Utilization of instructional materials. the findings shows that well utilized instructional materials enhances performance. The table shows that pre-school teachers use reference books and guides 47.1%, they use chalk board and chalk which represent 88.2%. They use charts which represent 64.7% . Charts contain pictures of family members, weather charts, domestic animals and fruits we eat. With the provision of crayon which presents 35.3% children are able to colour pictures of animals, family members, fruits we eat and weather chart. The findings show that there is a strong relationship between instructional materials and science performance.

5.4 Conclusions

Based on the data, it was concluded that children poor performance in science in Muguga, Kikuyu Kenya was contributed by lack of adequate instructional materials. Inadequacy of instructional materials implies that unless the provisional of these materials are improved and used sufficiently, children would continue to perform poorly academically.

Teaching learning materials are very important if learning has to be effective. Instructional materials such as teacher's reference books and guides, children's textbooks, charts, manila, crayon, plasticine, toys, chalk and chalkboard, audio tapes and visual tapes play an important role in enhancing learning and therefore, they should be made available on a large scale. The instructional materials arouse children curiosity and motivate them in learning. However the research has established through the data that most of these instructional materials in pre-schools are lacking which may be a factor that has contributed to poor science performance. Children should be encouraged to have their own collections from environment so that they can use them when leaning science.

5.5 Recommendations

In the light of the research data the researcher wishes to make the following recommendations in order to solve the problem of instructional materials.

i. There is need to guide and counsel children on importance of science as a subject and performance, provide more instructional materials used when teaching science. Motivate children by having excursion or nature walk and science corner.

ii. Parents should be encouraged to continue giving out old tyres, toys, old cloth, utensils, pictures from old calendar and magazine to pre schools so that their children can use them when learning.

iii. From research findings children bring materials from home and should be encouraged to have their own collection from the environment and to bring them to class so that they can own their class and have a sense of belonging.

iv. Teachers in Muguga should make sure they use instructional materials that are easy, effective and relevant to help children to internalize the science concepts.

v. The pre-school teacher should be sensitized on importance of locally available materials in order to use them when using a skill like experiment, sorting and grouping to pre-schools for learning.

5.6 Suggestions for Further Research

Taking the limitations and delimitations of the study, the research makes the following suggestion for further research.

i. A similar study should be carried out in urban setting to give a balanced view on effects of instructional materials on children performance in pre-school

ii. A future study should be carried out to consider more statistical analysis of data for a deeper insight into the effects of instructional materials on science performance in pre-schools.

REFERENCES

Adeogun, A. A and G. I. Osifila.(2008). *Relationship between Educational Resources and Students'* Academic Performance in Lagos State Nigeria. Nigeria: University of Lagos.

Akolo, J.B, (1978). "*Audio-visual aids and the post primary teacher*". A paper presented at the first audio-visual workshop for selected teachers, inspections of education and audio- visual officers in Ilorin. Kwara state.

Anderson, RH, Shane HG. (2002). *Implications of Early Children Education for Life Long Learning*. Chicago: National Society for the Study of Education. Year Book II

Ayot, H.O, (1987). *Instructional methods (general methods).*Nairobi: Kenyatta University

Feeney, S, Christensen D, Moravcik E. (1987). *Who Am I in the Lives of Children'*. Columbus Ohio: Merill Publishing Company.

Finn, J.D, (1960). *Studies in the growth of instructional technology*, audio visual.

Franzer, B.J., P.A.O. Okebukola and O.J. Jegede, 1992. *Assessment of the learning environment of Nigerian science laboratory classes*. Nigeria: J. Sci. Teacher Association. Vol. 27.

Gagne, R.M, (1992). *Conditions of learning and theory interactions*. New York: Holt Rinehart and Winston.

Getao, F.N, (1996). *International education system*. Nairobi: Lectern Publications limited.

Hillier, Y, (2005). *Reflective teaching in further and adult education*. New York.

Jekayinfa, A. A, (1993). *Effects of Instructional Resources on the Academic Performance of Students in History in Nigeria*: Nigerian Journal of educational Foundation, 1, 184 – 198.

Kemp, J.E, (1968). *Planning and producing audio-visual material*. London: New York.

KIE, (2008). *Ministry of education handbook for ECD education syllabus.*

Kothari, C.R, (2004). *Research Methodology Methods and Techniques*. Revised New Age: International Publishers.

Mezieobi, Ken A, (2006). *Pre-primary Education: The Dilemma of Relevance in Contemporary Nigeria*: British Journal of Educational Studies and Society 62(10):1-8.

Ministry of Education, (2001). *Teaching and learning in classroom*.

Momoh, S. (1980). "*A study of the relationship between Instructional Resources and Academic Achievement of Students* in Ilorin Local Government Kwara State": An Unpublished M.Ed Thesis.

Moronfola, B. (1982). *"Effects of Instructional Resources on the Academic Achievements of Secondary school Students* in Ilorin Local Government of Kwara State: Unpublished M.Ed Research Thesis.

Mugenda, O, Mugenda A, (1999). *Research methods. Quantitative and qualitative approaches*. Nairobi: Kenya Aets press.

Munyilla, F.M, (1985). *A survey of instructional materials for maths in selected primary* school of Kathonzweni, Machakos district. University of Nairobi: Unpublished MED Thesis.

Mutai, B.K, (2001). *How to write quality research proposal*. A complete and simplified recipe. India: Thelley Publications.

Mwana Mwende ,(2009). *Diploma course in Early Childhood Development and education*.

Mwaura, L.P.K, Kabiru M. and Njenga, A. W, (2004). *Maths and environmental activities*. Series 3 NACECE: KLB.

Mwaura, L.P.K, Kabiru A.W, Githuru G. and Mburu H, (1990). *Management and language development*. Series 1 NACECE : KLB.

Ngaroga, J.M, (1996). *Professional studies for primary teacher education*. Nairobi: E.A educational publishers Ltd.

Ogama, A.M,(1985). *A survey of research used for teaching science in Nairobi primary*: Unpublished MED thesis.

Onasanya, S.A. and E.O. Omosewo,(2011). *Effect of improvised and standard instructional materials on secondary school students'* academic performance in physics in Ilorin, Nigeria: Singapore J. Sci. Res. 1: 68-76

Osakwe, RN, 2006. *Understanding Teaching Profession*. Benin city: Osasu Printing Press.

Owolabi, T,(2004). *A diagnosis of students difficulties in physics*. Educational Perspectives, 7: 15-20.

Popoola, T.A, (1980). "An investigation into the relationship between instructional resources and students academic performance in Secondary Schools in Abeokuta Local Government Area of Ogun State of Nigeria": *An Unpublished M.Ed Thesis.*

Romiszowski, A.S, (1981). *Designing Instructional systems*. London.

Saroury, N.J, (1958). "*Visual aids in teaching history*". West African journal of education: Volume 2. No. 1 page. 5 – 9.

Tassoni, P, Beth K. and Eldridge.(2002). *Diploma in child care and education*. Heinemann: Oxford.

Tassoni, P, Beith K, Burnham L. (1999). *Early years care and education.* Heinemann: Oxford.

UNESCO, (2001). *Fundamental of Educational Planning.* Reviewing Quantitative.

Wales, J, (1975). "*The place of teaching aids in Nigerian Education*" : West African journal of education Volume 3 No 2.

Whitebread, . D, (1996) Teaching and learning in the early years. London: Routledge

Wiersman W,(1986). *Research methods in education.* Newton :An introduction 14th edition.

Young, E.H, (1979). *Audio-visual equipment and materials.* Washington: A guide to sources of information.

APPENDICES

Appendix I

Teacher's questionnaire

Instructions

Please note that the information given here will be kept in strict confidence and you are not required to indicate your name or any form of identification. However the usefulness of the information will depend solely on your honesty.

Section A

Please respond to each question by ticking () against the appropriate information.

1. Sex : Male ( ) Female ( )
2. Marital status: Married ( ) Single ( )
3. Age in years:
   a. 20 - 29 ( ) 40 – 49 ( )
   b. 30 – 39 ( ) 50 and above ( )
4. Education or academic qualification
   a. K.C.P.E ( ) c. K.A.C.E ( )
   b. K. C.S.E ( ) d. Diploma ( )
5. Teaching experience in years.
   a. 0 - 5 ( ) d. 16 – 20 ( )
   b. 6 – 10 ( ) e. Above 20 ( )
   c. 11 – 15 ( )
6. How many children are in your class?
   a. Below 30( ) b. Between 30 – 50 ( ) c. Above 50 ( )

Section B

Instructional Material

The following are questions about the availability of instructional materials in your school. Please respond to each question by ticking () against the appropriate information appropriate materials.

1. Which textbook do you use as course book in teaching science?

_____

_____

2. How adequate are these instructional materials that you use when teaching science in class?

_____

_____

3. Where do you get these instructional materials from? _____

_____

4. How are these instructional materials distributed in the class? _____

_____

_____

5. How are these instructional materials utilized in the class? _____

_____

_____

6. What types of instructional materials do you use in teaching science? _____

_____

_____

7. What are the importances of these instructional materials in teaching science?

_____

_____

Section C

Observation schedule

Date of observation _____

Name of the school _____

How many learners are there?_____

Are there science charts?_____

How are science instructional material distributed?_____

How many children share one textbook? _____

Are material improvised or bought?_____

How is the size of instructional materials according to the age?_____

Is the science lesson provided enough for all learners to interact with instructional materials?_____

How are the instructional materials in teaching science labeled?_____

Appendix II

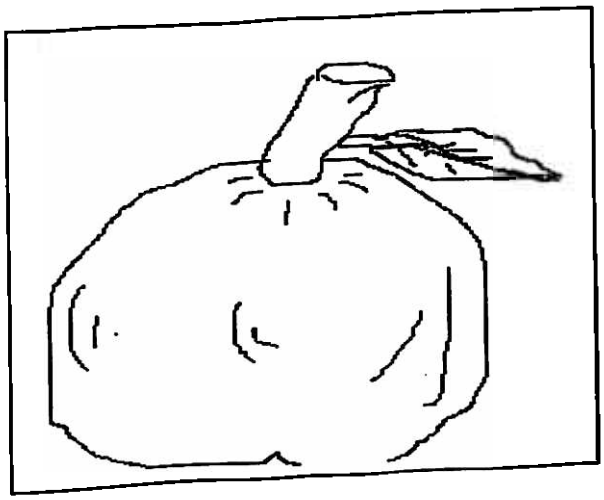
A pre-school science test.

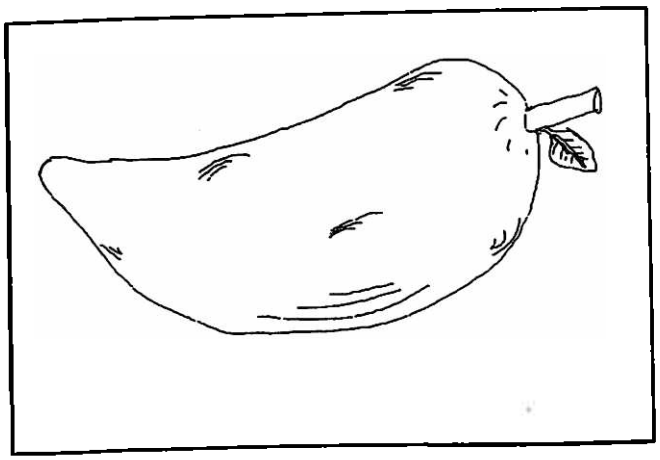
1.Draw and indicate cloudy rainy and sunny day.

2.Draw the types of vegetables

Onion **Carrot** **Sukumawiki**

3. Colour the fruits we eat





Apple **Mango**

UNIVERSITY OF NAIROBI
COLLEGE OF EDUCATION AND EXTERNAL STUDIES
SCHOOL OF EDUCATION
DEPARTMENT OF EDUCATIONAL COMMUNICATION AND TECHNOLOGY

Telegram: "CEES"
Telephone: 020-2701902

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

11 May 2011

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

RE: BORO ALICE W.M. - REG: E57/74923/2009

This is to certify that **BORO ALICE W.M.** is a bonafide student of the University of Nairobi, Department of Educational Communication and Technology. She is pausing Masters in (ECE) Education and has completed her course work. She is working on her project titled **"EFFECTS OF INSTRUCTIONAL MATETRIALS ON SCIENCE PERFORMANCE IN ECE IN MUGUGA DIVISION, KIKUYU DISTRICT".**

Any assistance accorded to her will be highly appreciated.

Yours faithfully,

PROF. P.O.O. DIGOLO
CHAIRMAN,
DEPARTMENT OF EDUCATIONAL COMMUNICATION AND TECHNOLOGY

REPUBLIC OF KENYA

NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

Telegrams:"SCIENCETECH", Nairobi
Telephone: 254-020-241349, 2213102
254-020-310571, 2213123.
Fax: 254-020-2213215, 318245, 318249
When replying please quote

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

Our Ref: NCST/RRI/12/1/SS-011/1137

Date: 4th August 2011

Alice Wanjiru Boro
University of Nairobi
P.O BOX 92- 00902
KIKUYU

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"Effects of instructional materials on science performance in pre-schools in Muguga Division,Kikuyu District,Kenya"*** I am pleased to inform you that you have been authorized to undertake research **in Kikuyu District** for a period ending ***30th March 2012***

You are advised to report to **the District Commissioner&the the District Education Officer of Kikuyu District** before embarking on the research project.

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

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

Copy to:

The District Commissioner
Kikuyu District