IMPACT OF LEARNING RESOURCES ON CHILDREN'S PERFORMANCE ON PRE-SCHOOL SCIENCE AT ITHIRU ZONE, KANDARA SUB COUNTY, MURANG'A COUNTY

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A Research Report Submitted in Partial Fulfillment of the Requirements for the Award of the Degree of Master of Education in Early Childhood Education to the Department of Educational Communication and Technology, University of Nairobi.

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DECLARATION

This research report is my original work and has not been submitted for any academic award at any other University.

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This research report has been submitted for examination with my approval as the University Supervisor.

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DEDICATION

This research report is dedicated to my husband Ngugi, our children: Wangui, Mwangi and Murimi.

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ACRONYMS AND ABBREVIATIONS

ECD	:	Early Childhood Development
KCPE	**:**	Kenya Certificate of Primary Education
LRC	:	Learning Resources Centre
TACs	:	Teacher Advisory Centers
ECE	:	Early Childhood Education
NACECE	:	National Centre for Early Childhood Education
KNEC	:	Kenya National Examination Council

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ABSTRACT

The purpose of this study was to find out the impact of learning resources on performance in pre-school science. The following were the objectives: To examine the effects of real objects on children's performance in preschool, to determine whether the frequency of using learning resources has any impact on children's performance in pre-school science, to establish the effect of the ratio of the learning resources to the number of children on children's performance in preschool science and to determine whether diagram or pictures have any effect on children's performance in preschool science. The literature reviewed on impact of learning resources on children's performance in preschool science covered real object, use of pictures and diagrams. The study used quasi-experimental research design. There were two groups used-control and experimental. The target population comprises of pre-school children, primary children, primary science teachers, preschool teachers and headteachers. The five best and worst performed school were chosen purposively. The study used questionnaires, observation interview and document analysis. From the study it was concluded that the children who used learning resources performed better than those who did not use them. Based on findings it was recommended that the lessons should be made more practical than theoretical. Community, parents, teachers and government should be involved in providing learning resources. The study showed that learning resources have positive impact in children's performance in preschool science the results obtained indicated, that teaching and learning resources create motivation in learning by supporting the learning process. The study found that children learning using resource perform better than those who do not.

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Early childhood development concept is extremely important to parents, community and country as well. The vision for education sector by 2030 is to have globally competitive quality education, training and research for sustainable development. Kenya intends to have international ranking for children's achievement in mathematics, science and technology. For this reason, science has to be performed well in order to achieve this goal of the Vision 2030.

Education is a fundamental human right. According to Wolfenson, (2000), the key to sustainable development, peace and stability in and among countries is the provision of education. To the populace of such countries, availability of learning resources enhances the effectiveness of schools and this result to children's good academic performance.

Among the most important instructional materials that have a significant influence in learning process are textbooks and other learning materials. Studies have pointed to evidence, particularly in developing countries, that the availability of such materials have positive effects on school effectiveness (Farnel and Lockheed and Vespoor, (1991) Psacharopoulos and Woodlau, (1985). Availability of textbook has been proved to have direct and positive correlation with pupil achievement in developing countries.

Holliday (1994) cited that science in primary school is taught in overcrowded classroom without adequate resources thus limiting the learning experiences. The researcher also noted the same scenario in some of the public pre-school visited during the pre-test of the instruments. The method of teaching of talk and chalk method, memorization and note taking is proofed not to be effective. The method increases children passive recipient of knowledge thus making science uninteresting, demotivating and uninspiring. Therefore use of learning resources is very important in pre-school science.

A pre-experimental study done in five public primary schools at Kandara Muranga County was done to investigate the impact of learning resources on children performance on preschool science. In two of the preschools visited, the pre-school teachers were using learning resources when teaching science. The two preschools had planted maize in tins. The children observed the stages in germination of the seed and recorded what they observed. The other three preschools were taught using lecture method without learning resources. After teaching; children were given a test. The pre-school children from the two preschools that used resources performed better while the other three preschools children did not perform well. This showed that if all pre-school teachers use resources as they teach and exposes children to do more and more experiment the performance in science at Ithiru can improve.

There has been poor performance at Ithiru zone in Murang'a County over the years. For the last four years Ithiru zone has never attained an average score of 50% in science in KCPE. According to the Kenya National Examination Council result of KCPE, Ithiru Zone in 2010 had an average score of 46.66 in science subject, in 2011 it had 46.89, in 2012 the zone had 45.95 and 2013 it had scored 46.33. The researcher gave children in some pre-schools a science test and they scored between 36-46%. The performance indicated that poor performance in science start from pre-school. Due to this poor performance in science, the District Education Officer in Kandara District, parents and other stakeholders in the County are interested to know the cause. This necessitated the need to find out the impact of learning resources on performance in pre-school science. It also necessitated to finding out the root cause of poor performance in pre-school science.

Learning resources are very important in acquisition of concepts and skills in preschool. Children learn by doing. They learn better by manipulating materials and make sense out it for a long time. There has been a debate on the best time to introduce instructional resource in science in the life of a learner- in preschool, primary or secondary level. Learning resources are very important in improving performance in pre-school science. If pre-school children uses real objects, they understand better than when a teacher uses pictures or diagrams. If children use learning resources always they are likely to perform better than those who do not use learning resources at all. When children have enough resources they may perform better in science than those who have few learning resources. The use of diagrams or pictures help the children to understand science better than those

children whose teacher uses lecture method when teaching. Montessori (1949) stated that learning and teaching resources are very important on performance in pre-school science.

1.2 Statement of the problem

There is underutilization of learning resources in Ithiru Zone. Teachers were teaching children without resources. This led to poor performance at Ithiru Zone in Muranga County. For four years, Ithiru zone has never attained an average score of 50% in science in KCPE. According to the Kenya National Examination Council of KCPE, Ithiru Zone in 2010 had an average score of 46.66 in science subject, 2011 it had 46.89, in 2012 the zone had 45.95 and 2013 it had scored 46.33. The researcher gave children some preschool science tests and they scored between 34-40%. The performance in science starts from preschool. Due to this poor performance in science, the District Education Officer in Kandara District, parents and other stakeholders in the county are interested to know the cause of this poor performance. This necessitated the need to find out the impact of learning resource on performance in preschool science.

1.3 Purpose of the study

The purpose of the study is to find out the impact of learning resources on performance in pre-school science

1.4 Research objectives

i) To examine the effects of real objects on children's performance in pre-school science.

ii) To determine whether the frequency of using learning resources has any impact on children's performance on preschool science

iii) To establish the effect of the ratio of the learning resources to the number of children on children's performance in pre-school science

iv) To determine whether use of diagrams or pictures have any effect on children's performance in pre-school science.

1.5 Research questions

i) What are the effects of real objects on children's performance in pre-school science?

ii) What are the effects of ratio of learning resources to the number of children in a class on children's performance in pre-school science?

iii) What are the impacts of the frequency of using learning resources on children's performance in pre-school science?

iv) What are the effects of using diagrams or pictures on children's performance in pre-school science?

1.6 Significance of the study

The findings will provide useful information for planning purpose, training and preparing for seminars for preschool teachers. The findings will also be used to provide information for improvement of science performance in KCPE. The information will be useful in formulating policy on teaching science in preschool and primary classes. Lastly it can be used by preschool curriculum developer.

1.7 Limitation of the study

The study did not cover all preschools and primary schools in Ithiru zone because of the distance between one pre-school to another and time constraints. The researcher did not get enough information as it was intended because some of the information was not available from Ithiru education zone office.

1.8 Delimitation of the study

The participants of the study were pre-school teachers, pre-school children, primary science teachers and headteachers primary schools in Ithiru zone in Muranga County.

1.9 Basic assumptions

It was assumed that all preschools in the zone are registered. It was also assumed that it is the uses of learning resources that improve science performance in pre-school children.

1.10 Definition of key terms used in the study

Diagram – is a two dimensional geometric symbolic representation of information according to some visualization technique.

Frequency of using learning resources is about the number of times a teacher uses various learning resources/materials in teaching children.

Impact of learning resources is the effects or consequences whether tangible or intangible in relation to the performance of pre-school science.

Learning resources – are texts books, video pictures, charts, or other materials that a teacher uses to assist students to meet the expectation for learning as prescribed in the learning curriculum.

Performance- the act of meeting the required expectations, how well or badly you does something.

Picture- is a design or representation made by various means as painting, drawing, or photography. It is also a description of vivid or graphic as to suggest a mental image or give an accurate idea of something.

Pre-school science – is where the learner is involved in performing activities in science.

Pre-school is an institution where young children 3-6 years are mold to join primary school.

Ratio is a relationship between numbers of the same kind for example objects, persons or students.

Real objects- are concrete objects that a child can see and feel such as maize seed or a plant.

1.11 Organization of the study

Chapter One contains background to the study, statement of the problem, purpose of the study, research objectives, research questions, significant of the study, limitation, delimitation and the basic assumptions. Chapter one also contains definition of real objects, duration of time, ratio of learning resources and diagrams and pictures. Chapter Two contains review of the related literature.

Chapter Three contains research design, population, sampling procedures and sample size, instructions for data collection, pre- test and post- test, validity and reliability, procedures for data collection and data analysis and ethical concern. Chapter Four contains findings of the study and discussions and Chapter Five has the summary conclusion and recommendations.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.0 Introduction

The review of the related literature covers, real object, duration for using learning resources, the ratio of learning resources to the number of children, diagrams and pictures.

2.1 Literature on resources

Pre-schools should have adequate learning resources which should be either bought or improvised. A teacher should be creative so that he can improvise learning materials rather than relying on buying from the shops. Learning resources are very expensive and at times may not be enough for all the children in a school. Maria Montessori (1949) stated that learning and teaching resources are very important in science development. Pre-school children learn best through physical manipulation on concrete materials and therefore teachers should organize for a learning environment that is conducive and rich in materials that allow for child centred activities (KIE, 2003).

According to Macharia (2009), learning resources is something which is used to achieve an objective such as a book, equipment so as to provide information to teachers and children. A learning resource is a teaching aid which is used to make learning interesting and effecting. The learning resources are appropriate for the purpose for which they are intended. They are evaluated to make sure that they work effectively.

According to Wales (1975), instructional resources which are educational inputs are of importance to the teaching of any subject in schools curriculum. He stated that the use of instructional resources would make discovered facts to be understood. Well-planned and imaginative use of visual aids lesson would do much to banish apathy, supplement inadequacy of books as well as arouse children interest by giving practical to see and do act at the same time helping them to think out themselves. He said that selection of materials which are related to the basic content of a lesson helps in understanding of such a lesson make it attractive to them thereby arresting their attention and thus, motivating them to learn.

2.1.1Real objects

Hobart (1999) pointed out that natural materials are readily available and very familiar to children. The real objects may be water, sand, clay, mud, wood, plants and insects among others. These materials are readily available at minimal costs or not cost at all. Using these materials, children can easily plan their own experiments to get knowledge. Malleable materials include clay and mud. These materials are used to mold pots, model animals or any other objects. They can also provide tactile sensory experiences. During modeling the children are able to interact with each other thus improving performance in pre-school science.

Hobart (1999) stated that water is the most familiar of all the real objects; all children enjoy carrying out experiments with water such as filling and empting containers,

floating and sinking. During the experiments, children can discover objects which float or sink. Using of water helps the children to learn the concept of volume and density. He also stated that children can use clay to explore and experiment many things. When children repeat the experiments and practice handling the material many times, they learn its properties and this can improve performance in pre-school science.

According to KIE (2003) report, common outdoor learning centres include sand and sawdust where children learn about volume and capacity through activity like emptying and filling of sand or saw dust in a container. Teaching, learning activities and resources influence learning and general performance of science in early childhood education. The real resources available determine activities the learner is exposed to. The effect to this is seen in children's performance in primary and higher levels of learning. The school and the community should ensure that locally available resources are utilized for teaching and learning of science in pre-school. KIE has developed manual for environmental science activities for effective learning of science in early childhood education.

The foundation of all science learning is first hand experiences with real things. Science experiences need not to involve unusual elaborate or expensive apparatus and materials. MOEST and UNICEF in (2002) launched the child centered interactive approach to teach and learn science in and out of classroom environment by motivating and empowering learners and teachers. Creating a stimulating environment for science in and out of classroom helps children to learn the subject better. The child is able to relate prior

knowledge and concept to be acquired. Science is a practical subject and should be applied to everyday life. The use of real objects helps the children to perform well in pre-school science. Real object are real and cannot be substituted, they are three-dimensional and allow use of all senses.

2.1.2 Frequency of using learning resources

Children in pre-schools need to use learning resources all the time. There are some pre-school teachers who use learning resources more times than others and others do not use them at all. This may make the children not to perform well in science. Hobert (1999) pointed that children proceed through different stages in their use of learning resources. At first they explore and experiment then repeat the experiments and practice handling the materials and this leads to controlled use and creativity. The children familiarize with learning material thus improving performance unlike the children who do not use learning resources at all.

According to Piaget (1969), child can conserve. For this concept to form in child's mind, the child has to interact with learning resource many times so that he/she can discover the concept. And this can be done in volume, mass, length and numbers. For this reason, the child has to explore so as to discover the concept. Pre-school children do not have long period of concentration and therefore they need to be involved in doing experiments all the time the teacher want to teach a new concept. They observe, manipulate things and ask questions.

Hobart (1999) pointed that when children use the learning resource many times they develop physically, socially and morally, emotionally and intellectually. When children are using learning resources they develop skill like observing, exploring, discovering recording and experimenting. Children may use straw in water to learn that water contain air, Handbook (2008) suggested that all these process skills help the child to improve science performance.

2.1.3 The ratio of learning resources to the number of children

The learning resources should be enough and of many varieties so that each child can have a chance to use the resources. Holliday (1994) stated that a crowded class without enough learning resources does not provide a good atmosphere for use of learning resources during science lesson. The active learning by a child should be from child's knowledge, personal interaction with the world. Children are expected to learn using observation and scientific method. The essence of scientific method is learning from experience and even the youngest child can learn. The teacher may present information then asks questions to the child to promote the learning of the child. If a child understanding the concept the teacher should praise the child and continues to the next one. If the child does not understand the concept, the teacher should repeat the process from the beginning.

2.1.4 Diagrams and pictures

Pictures are photographic representation of objects, people, events or concept. Pictures in this context are still or motionless objects. They may be illustrations in textbooks,

periodical catalogue magazines and study prints. Pictures are used to communicate abstract ideas in a more realistic way. A good picture should have good composition, a clear message, good contrast and sharpness with effective colour. Etim (1998) Okechukwu (1997) pointed that children taught with instructional pictures performed better that their counter parts taught without pictures.

A report by K.I.E (2008) stated that children should be provided with pictures to observe and materials for drawing. Children should draw freely and colour the pictures. Before a child reaches this stage they should be provided with frequent opportunities to paint and draw pictures. This helps the teacher to know the development stage of the child. Children should be provided with resources like paint, papers, pencils, colour, crayons, brushes and water. When children draw pictures of animals and plants and identify their parts, it helps them to understand better the parts of animals and plants.

Hobart (1999) pointed that drawing and painting helps the children to develop muscles in arms, gain more control, finer manipulative skills and eye-hand coordination. This helps the child to draw a diagram and pictures on the charts and chalkboard. The use of this visual learning resource has advantage because many children can use it in science. Using of pictures and diagram help the child to develop physically, socially, morally, emotionally and intellectually. The child develop in language, stimulate aesthetic and spiritual and lastly the learning materials encouraged a child in tactile and colours stimulate their vision.

2.2 Literature on performance in pre-school science

Hobart (1999) found that children can use clay to explore and experiment. When they repeat experiments and practice handling the material, they learn properties of those materials and this could improve performance in pre-school science. (K.I.E, 2003) suggests that performance may be assessed through questioning, observing plants, animals and carrying out experiments. Direct observation is done as individual children carry out activities. Oral test is where a teacher prepares questions which he/she asks the children and each child answers a question. Practical work is where children carry out an experiment like sinking and floating. Written work is where children are given questions and answer them through writing. Performance in preschool science can also be explained as measures used to assess effects of the preschool pathways to science program. This included task similar to those used in developmental work such as test of children understanding of the sources of their knowledge and about setting upon informative experimental test.

2.3 Summary of reviewed literature

The study aimed at filling the gap left by previous researchers. This study is on the impact of learning resource on children performance in preschool science. Nyaundi (2011) did a study on utilization of learning materials in pre-school. While Kavoi (2012) study was on the impact of inquiry method on pre-school children's achievement in science activity. Rutere (2011) study was on the impact of children own investigation on performance in pre-school science activities.

Learning resources is a very important part of learning and they should be attractive, age appropriate, cost effective, safe, available and relevant to the concept. They should be improvised in case the school is not able to buy them from the shops and should be stored in a safe place for future use. The learning resources help to sustain interest of the children when learning, make the learning real and enjoyable thus improving performance in pre-school science.

2.4 Theoretical framework

The theoretical framework of this study was based on constructivism theory by Piaget. Piaget posited that knowledge is not taught but is constructed through an active mental process. In the study, the children would learn process skills like observing, drawing, experimenting, recording and interacting with materials. All these would help the children to construct knowledge, through these activities. Piaget found that, learning does not depend on maturation, which is a biological process. It comes from within if it is through understanding. In constructing knowledge, children move through different stages. The child constructs physical knowledge out of experience with objects. The child constructs knowledge or learns about object and their properties. The more experienced the child has with the objects, the more he/she learns. The child learning is an active mental process. It is not taught but has to be constructed by the child. In the study, the children use learning resource in learning science. They have to know, the objects and their properties, use them always so that they can learn more. For example, children learn

about blocks and construct houses, toys and how to use them. This makes them to learn more as they interact in construction.

According to Dewey (1938), education and learning are social institution through which social reforms can and should take place. In addition, he believed that learner thrives in an environment where they are allowed to experience and interact with curriculum and all learners should have an opportunity to take part in their own learning. Dewey makes a strong case for the importance of school not only as a place to gain knowledge, but also as a place to live. He notes that to prepare the learner for future life means to give children command to them. He stated that education is a regulation of the process of coming to share in the social consciousness and that judgment of individual activity on the basis of this social consciousness is the only sure method of social construction. This theory from Dewey supports the study where children should be exposed to more and more activities and a lot of experiments.

According to Bruner (1966), discovery learning is an inquiry based on the constructivist theory that takes place in problem solving situations where the learner draws on his own experience and existing knowledge to discover facts and relationship and new truth to be learned. Students interact with the world by exploring and manipulating objects, wrestling with questions and controversies, or performing experiment. As a result, children may be more likely to remember concept and knowledge. Discovery learning model include guided discovery, problem based learning, simulation based learning, incidental learning among others. It encourages active engagement, promote motivation,

and promote autonomy, responsibilities, independence and development of creativity in problem solving skills.

Dewey's philosophy is ideal in this study. The study is also supported by Vygosky (1896-1934) who is known for his theory of social constructivism, who believes that learning and development is collaborative activity and that children are cognitively developed in the context of socialization and education. Perceptual attention and memory capacity of children are transformed by vital cognitive tools provided by culture such as history social content, traditions, language and religion. For learning to occur the child first makes contact with the social environment on an interpersonal level and then internalizes the experience. The earlier notion and new experience influences child who then construct new ideas. Vygotsky (1978) suggest that cognitive development is limited to a certain range at a particular age. However such assistance from mentor help a child to comprehend concept and schemes that they cannot move on their own. Curriculum specialists and lesson plan of proximal development is a guiding method.

Both Piaget and Vygotsky appreciated the essence of building construct's and internalizing the knowledge given rather than accepting the information as presented through rote memory, Constructivist learning environment promotes the learner, gather, filter analyze and neglect on information provided and comment on this knowledge so that it will result into individual comprehension and promote learning. All these theorists support the study.

In the study, the children could be helped in cognitive or constructive process, by providing activities that stimulate thought like the discovery of the properties of object and putting of object into relationship. Among the activities to be undertaken by children include painting, playing with sand, water, clay and role plays. During the study the children carried the activity of sorting and grouping. This helps the children to get a lot of knowledge as they engage themselves with these activities.

In conclusion, this theory of constructivism fits in this study. Our goal in future should be to prepare people who have the knowledge and originality to build a far better world we ever imagined. The teaching profession itself should be engaged in a construction of teacher education, this is because children deserve effort from teaching profession.

2.5 Conceptual framework

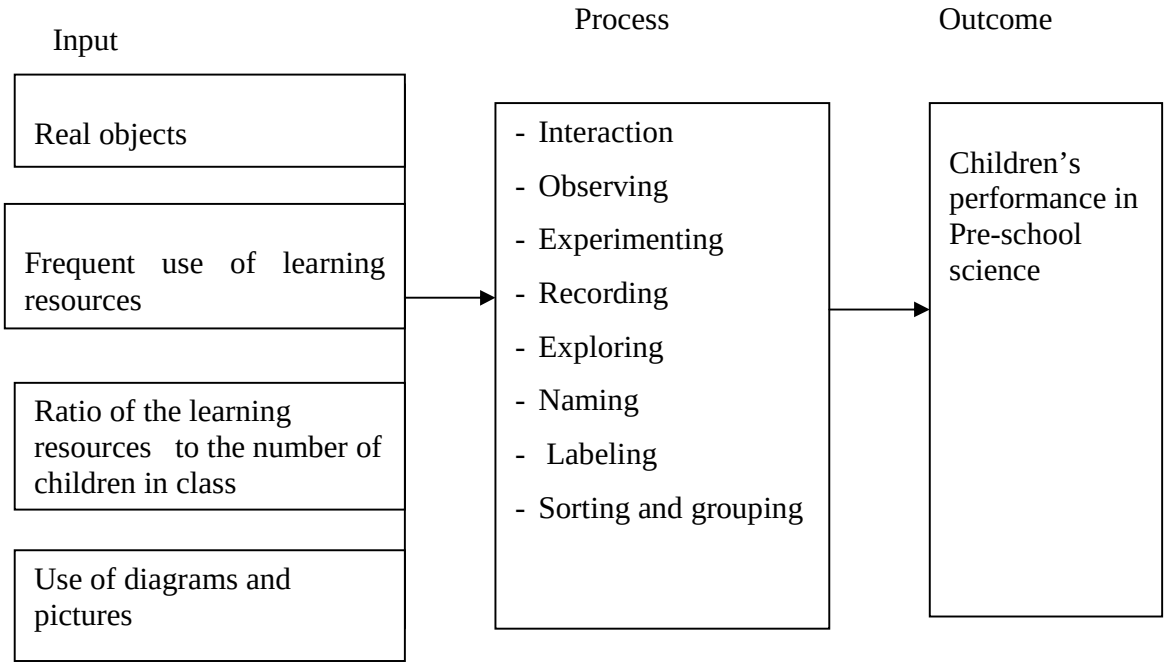


Figure 2.1: Impact of learning resources on children's performance

The above figure shows the relationship between real object, frequency of using resources, ratio of using learning resources to the number of children and diagrams and pictures with the process such as interact, observe, explore in influencing performance in pre-school science.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter described the research design, target population, sample and sampling procedures used in the study. Other areas include the study of instrument, validity and reliability, procedure of data collection, data analysis and ethical concern.

3.2 Research design

The study was conducted using quasi experimental research design. The design was considered appropriate since the study involved impact of learning resource on children performance in pre-school science. In the study pretests and posttests were carried out and each group had thirty children. One acted as control group and the other one as experimental group where children were using learning resources they performed better than in control group who did not have learning resources. The study had four control groups and four experimental groups. In control groups children were not provided by the learning resources but in experimental children were provided with material. The study showed that those used learning resources performed better than those who did not.

3.3 Target population

The study was conducted at Ithiru education zone in Kandara sub-county. The sub county is divided into 5 education zones namely Kagundu, Githimu, Ithiru, Gaichanjiru and Muruka. In Ithiru zone has 16 primary schools. 14 are public and 2 are private primary

schools. The Zone has 20 preschools out of which 16 are part of the primary schools and 4 are private pre- schools. The 20 preschools have 800 children. The 16 primary schools have 8,800 children. There are 48 primary science teachers and 20 preschools teachers and 16 head teachers in the Zone.

3.4 Sample and sampling procedures

The researcher purposely sampled 10 primary schools from 16 primary schools. These schools were selected according to their performance the five best schools in science and the five poor schools in science. The performance results were collected from the Ithiru education zone. Pre-school teachers and the head teachers from the selected primary schools were interviewed. There were twenty primary school science teachers from the selected ten primary schools who were interviewed, 60 pre-school children and 30 primary school children from the same primary schools were sampled for interview. The researcher was able to get 130 respondents in total.

3.5 Instruments for data collection

The research applied various instrument to collect data. These included questionnaire, observation, interviews and review of documents from the zone. The researcher gave questionnaires to teachers both from the preschools and primary schools where the response was through completing the questionnaires. Collecting data through giving out questionnaires was less expensive compared with an interview especially when it is self-administered. The researcher used closed ended questionnaire and guided the

respondents. The researcher used interview method to collect information from individuals or groups.

The researcher reviewed some of the documents which included children work, syllabus, report form, progress records, the teacher guide books and lesson plan books. The children exercise books were also reviewed. The review of the documents has the advantage because they were easily accessible. It was simple and inexpensive compared with questionnaire and interview. Lastly the researcher used observation schedule to guide the observation. The observation schedule is also called check list. The advantage of observation is that data is from a natural setting.

3.6 Validity of the instruments

Validity is the degree to which research instruments would appropriately and accurately measure to what they are supposed to measure Orodho, (2005). The instruments were developed based on the research objectives. Piloting of the instruments was done in two sampled preschools that were not selected for the study to validate them and determine their accuracy, clarity and suitability. Piloting instruments, help to check whether they would enable the researcher collect the necessary data for the study.

3.7 Reliability of the instrument

Reliability is essentially a measure of degree to which research instrument yields constant results or data in repeated trials. The more consistent the result is repeated measurements, the higher the reliability of the measuring procedure, Mugenda (1999). A test method was

used to test reliability of instruments before they were administered to the respondents and collecting the responses. Then after a lapse of one week, the same instrument were administered to some respondents to compare the results of initial responses with latter. This freed them from misinterpretation. The unsuitable questions were discarded while others were used. The revised instruments were administered to a sampled population.

3.8 Data collection procedure

The researcher was granted permission to collect data by primary school head teachers. The data was collected from primary school science teacher's pre-school teachers, pupils from primary school and preschool children. The researcher had two groups experimental and control. Experimental group children were taught using learning resources while control groups were taught without. The results were recorded and analysed.

3.9 Data analysis

The results of data analysis were presented in frequency tables histogram and line graphs. The statistics used included frequency, means and percentages.

3.10 Ethical concerns

The study ensured that the researcher observed confidentiality of the information. This was done by hiding the identity of the respondents. Mugenda and Mugenda (2003) the researcher was very careful to avoid causing physical and psychological harm to respondents by asking embarrassing and irrelevant questions, threatening language or making respondents nervous. The researcher ensured their confidentiality of their responses and identities.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION OF THE FINDINGS

4.1 Introduction

This chapter presents the data analysis, interpretation and discussion of the findings. The Chapter also contains the analysis of the impact of learning resources on children's performance in preschool science, the real objects, and frequency of using learning resources, the ratio of learning resources and the use of diagrams and pictures. Figures, tables, percentages, line graphs and histograms have been used to summarize the information obtained from the field. The pretest and posttest were done for both control groups and experimental groups.

4.2 Resources in preschool science

Learning resources

The materials used in the study were plants and their parts. The children were naming the parts of plant and were also carrying out the activity of sorting and grouping. There were great differences between children learning using resource and those who did not. Those who used resources performed very well as indicated in Table 4.1

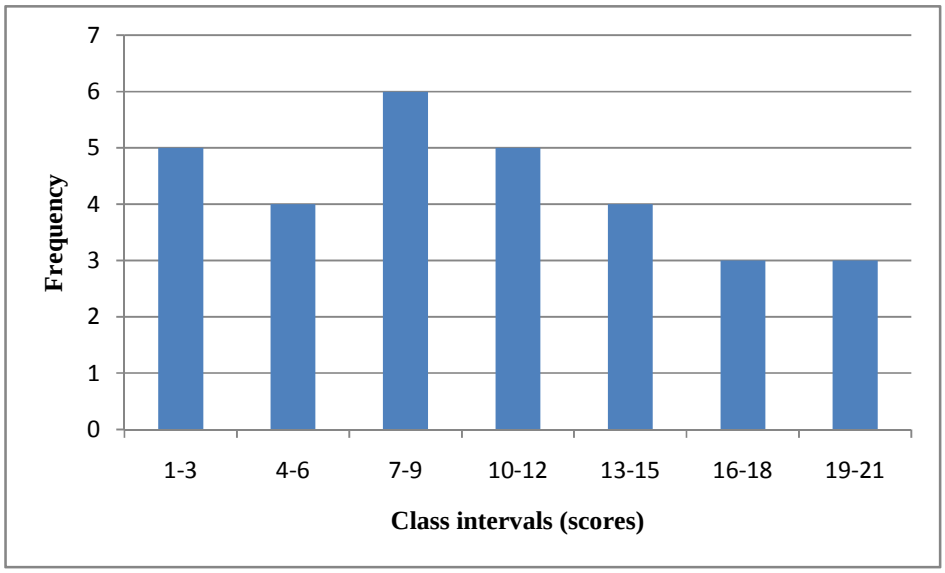
Table 4.1: Pre Test Performance in Experimental Group

Class intervals (scores)	Frequency (f)
1-3	5
4-6	4
7-9	6
10-12	5
13-15	4
16-18	3
19-21	3
	Σf=30

Mean $\frac{300}{30} = 10$

$\frac{10}{20} x100 = 50\%$

Figure 4.1 Pre Test Performance in Experimental Group



In experimental group the children had slightly higher score than in control group. This is because the children were taught with learning resources. This group scored a mean of 50%. This is shown on the Table 4.1 and Figure 4.1. The children could remember most of the parts of the plant because they used their senses like sight and touching; when the teacher was teaching them. During the test they performed better than control group which had a mean of 35%. Their teacher did not use learning resources, this contributed to poor performance.

Those who did not use resources performed poorly in science activities as shown in Table 4.2

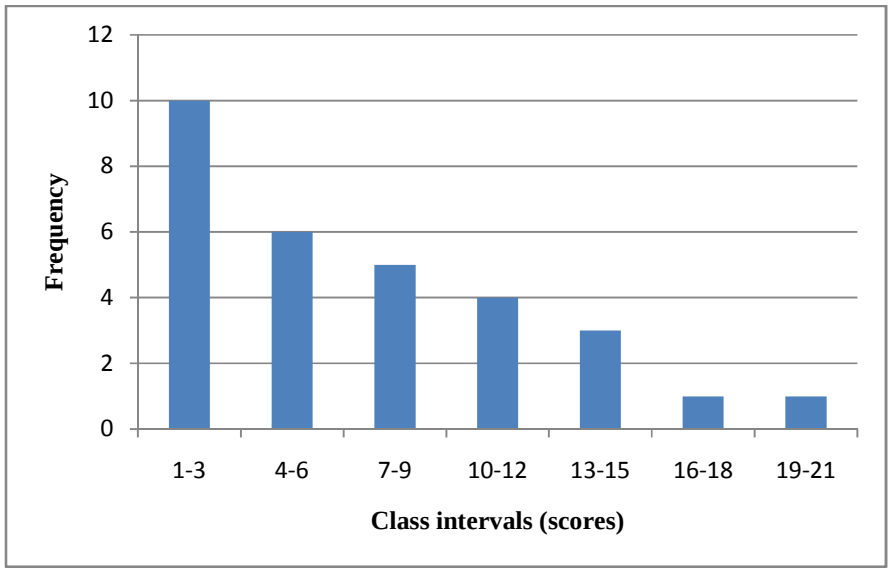
Table 4. 2: Pre test performance in control group (real objects)

Class intervals (scores)	Frequency (f)
1-3	10
4-6	6
7-9	5
10-12	4
13-15	3
16-18	1
19-21	1

Σf =30

Mean $\frac{213}{30} = 7.1 = 35\%$

Figure 4. 2: Pretest performance in control group



From Table 4.2 and figure 4.2 indicated that the children who did not use resources performed poorly. They scored a mean of 35%. These children did not get the content the teacher was teaching. The teacher did not involve their senses like sight and touching. The children were not active. The class was teacher centered. This made them to score low marks in their test.

Instructional resources are the devices developed or acquired to assist or facilitate teachers in transmitting, organized knowledge skills and attitudes to the learners within an instruction situation as its stated by Nwachukwa (2006). Teachers use different instructional resource to motivate learning. Teachers often make use of textbooks, charts, model and real objects as well as improvised materials. Awotuatfebo (2006) suggested that success in the skill and knowledge acquisition in learning situation of the instruction material adequacy and effective utilization of available of learning resources Olaitan and Agusibo (1994). They also pointed the relevance of learning resources to the objective of the lesson and the use of them on serious considerations in learning resources utilization to better the learner's performance Ikot (2008) suggested that many teachers go to classes teach science without learning resources. Learning is facilitated when the children make use of all senses like seeing, hearing and touching.

Learning resources are also text books, video pictures, and other materials that teachers use to assist children meet the expectation for learning as prescribed in the learning curriculum. Learning resource is something that can be used to achieve an aim especially a book, equipment that provides information for teachers and children. A learning resource is the same as teaching aid which is used to make learning interesting and

effective. The learning resources are appropriate for the purpose and group for which they are intended. They are evaluated to make sure that they work effective. According to Wales (1975) instruction resources are educational inputs which are important to teaching any subject on school's curriculum. He stated that the use of instructional resources would make discovered facts to be understood. The learning resources help children to think out themselves. He said that selection of materials which are related to the basic content of the course or a lesson helps in depth, understanding of such a lesson by making it interesting and enjoyable. Jomo Kenyatta Foundation (2002) stated that there is an opportunity for each child to excel and reach a higher standard. The children can work at their own levels within physical and mental abilities. Each child gains confidence in use of a large selection of materials or equipment by being allowed to get used to them. This helps the children to know the materials as they work.

4.3 Performance in preschool science

Performance in science can be accessed through questioning, observing plants, animals and carrying out experiment. A direct observation is done as individual child carry out activities. Oral test is where a teacher prepare question which she asks children and each child answers the question. Practical work is where children carry out experiment like sinking and floating. The children can also carry out an activity of sorting and grouping. Written work is where the children are given questions and answer them through writing.

4.3.1 Real objects

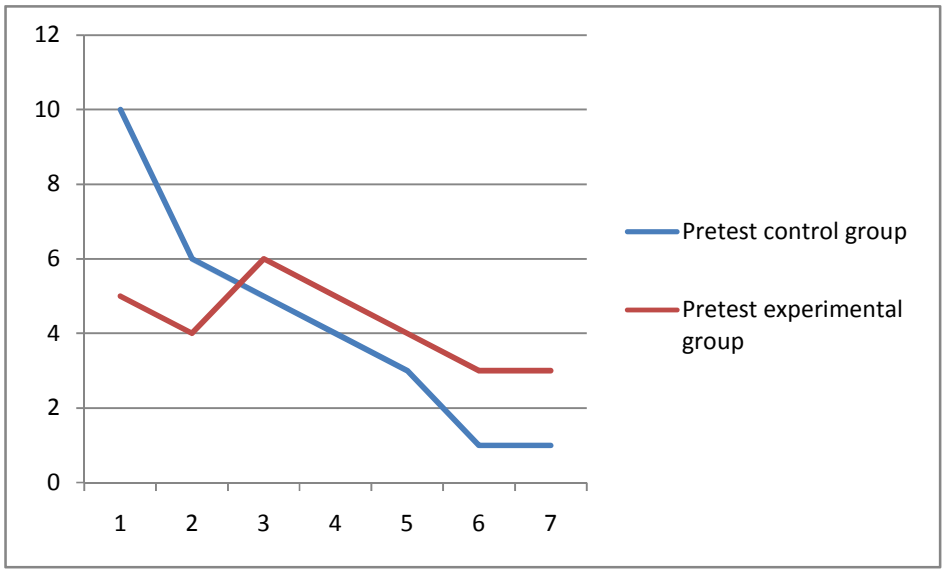
Real objects can be seen, touched, smelt, tasted and felt, through use of senses. The study used plants as one of the learning resources. Children carried the activities of naming,

sorting and grouping of flowers, leaves and seeds. Hobart (1999) pointed out that natural materials are readily available and very familiar with preschool children. These real objects can be plants sand, mud, wood, animal and insects. These materials costs nothing or very little. Children can easily use them in their experiment to gain knowledge. In Ithiru zone, out of the preschool teachers interviewed, 6 (15%) teachers used real object while 34 (85%) preschools were not using real objects while teaching. The ones who used them the children performed better than those who did not.

4.3.1.1 Pretest performance for control and experimental group (real object)

In the study pretests and post-tests were carried out and each group had 30 children. One acted as control group and the other one as experimental group. The study showed that many preschool children during the pretest had a lot of difficulties in sorting and grouping parts of plants since the teacher was not using learning resources. The frequency table on the appendix 8 showed that most of children scored very poor marks. The control group continued with sorting and grouping activity. The teacher taught them without using any real object resources. The teacher drew objects to be sorted and grouped on the chalkboard. The experimental group was provided with leaves, flower and seeds. The children were able to sort and group leaves, seeds and flowers together. The children were also provided with plants to name their parts. Each group work was always displayed for others to see. The work was assessed by both the researchers and pre-school teachers and marks awarded. The results are shown in the Figure 4.3.

Figure 4. 3: Pretest performance for control and experimental group (real object)



The children in experimental group performed well because their teacher used learning resources when teaching. This made the children to use their senses like sight and touch. There was multiple presentation of the content being learnt. This is shown in Figure 4.3

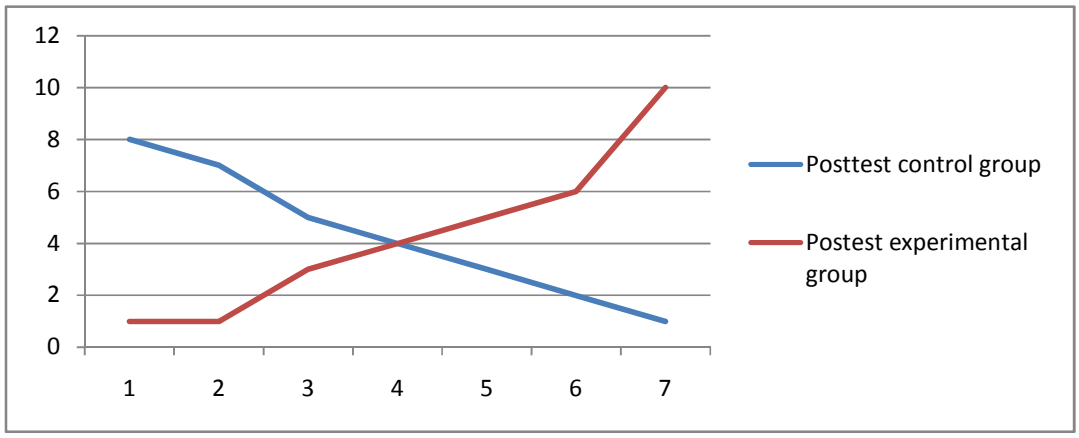
4.3.1.2 Posttest for control and experimental group

The study showed that there was slight improvement in sorting and grouping and naming parts of plants. The results are tabulated in appendix 9 teaching and learning was teacher centered and children were passive. The children did not enjoy learning due to lack of involvement. They had low attention span, maintaining class control was very difficult. Children interest was not catered for as well as individual differences. The children did not have a chance to see and touch the materials. The children became stuck and withdrew from the activity. This made them to get very low marks. Results are at the Appendix 10.

The study analysed the result when the group used learning resources. The children collected different flowers, leaves and seeds from different crops. As the teacher was teaching children it was observed that they enjoyed the lesson. The researcher was able to note children abilities and interests. As the children carried the activity, different multiple intelligence were observed. The teacher got a chance to build on different children potential. Afolabi (2006) stated that instruction materials had positive influence on achievement in science. That activity of sorting and grouping helped children to think and reason logically. The result shows that children were able to get a mean score of 69% from the previous mean score of 50%. This shows that if Ithiru zone use real objects when teaching children they can improve the performance in science.

The post test distribution table at Appendix 11 showed that post test scores represented by line graph which skewed on the right. This showed a positive performance that was registered after using learning resources when teachings. The children were fully engaged in the activity.

Figure 4.4: Posttest performance for control and experimental group (real object)

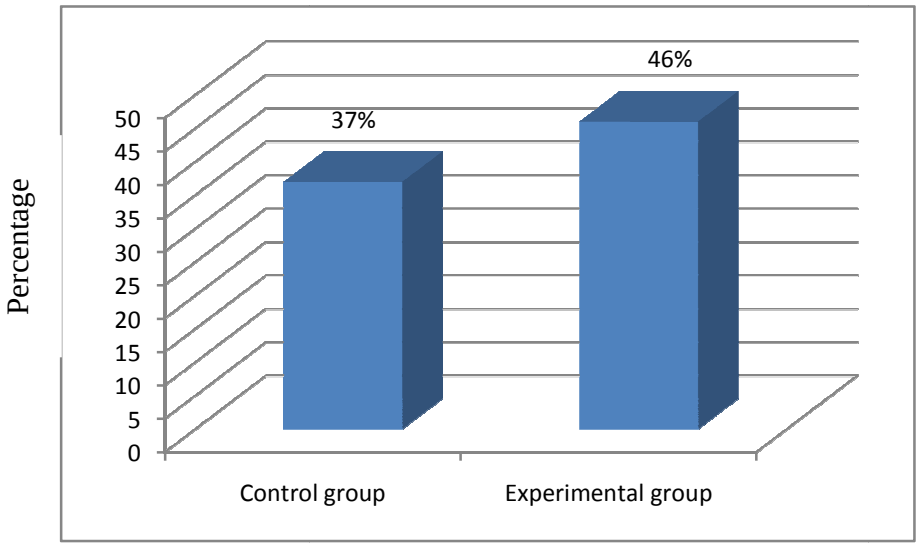


MOEST and UNICEF in (2002) launched the child centered interactive approach to teach and learn science in and out of classroom environment by motivating and empowering learners and teachers. Creating a stimulating environment for science in and out of classroom helps the children to learn the subject better. The children are able to relate prior knowledge and concept to be acquired. Science is a practical subject and should be applied to everyday life. The use of real objects helps the children to perform well in preschool science.

4.4 Frequency of using learning resources

During pretest both control group and experimental group was tested and children scored the following. The results are tabulated on appendix 12 and 13.

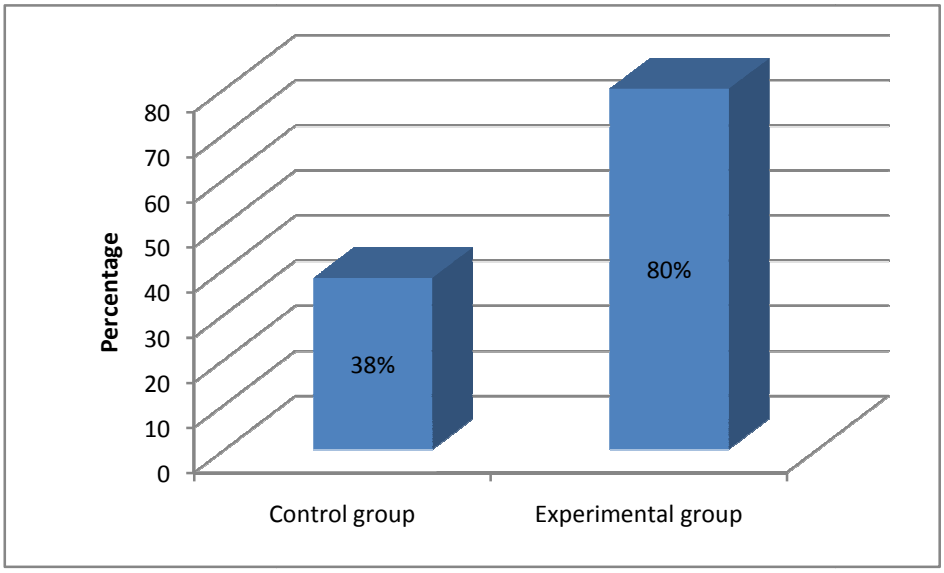
Figure 4.5: Pre-test performances in control and experimental group (frequency of using learning resources)



The graph above gives the information about pretest performance that was done by control and the experimental groups before the treatment of any group. The result is shown in table on appendix 12 and 13.

In Figure 4.5 during pretest the children in experimental group had superior performance than in control group. This was brought by the teacher who used learning resources always when teaching. Her children could remember most of the things they learnt. These children scored 46% while others from control group scored 37% for control group they never used learning resources and so they could not remember most of the things. The children did not use their senses this made them inactive in the class.

Figure 4.6: Post-test performances in control group and experimental group (frequency of using learning resources)



In control group there was very slight improvement from 37% to 38%. This was because the teacher used the resources rarely. This made children to forget some of activities in sorting and grouping the children also had difficulties in remembering parts of plant. In experimental group the children were provided with varieties of resources always. This made them to score a mean score of 80% from 46%. This made a difference of 34.3%. The results are shown in appendix 15.

There are some preschool teachers who use resources more than others. Hobart (1999) pointed that children proceed through different stages in their use of learning resources. They explore and perform the experiments and this helps to practice handling the materials which leads to creativity. The children familiarize with learning resources thus improving performance unlike the children who use learning resource rarely.

4.4.1 The ratio of learning resources to the number of children

Learning resources should be adequate in all preschools. A teacher should be creative so that he/she can improvise learning resources rather than relying on imported ones which may be very costly and unavailable.

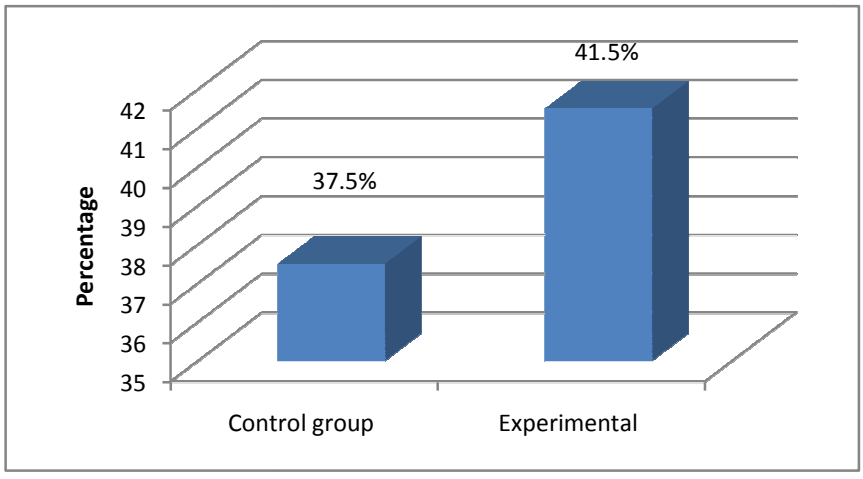
Table 4.3: Adequacy of learning resources

Adequacy	**No. of pre-school teachers**
No	30
Yes	10
Total	**40**

Source: Field data

From the table above it is shown that teachers who had enough learning resources were only 10 while those who didn't were 30. This shows that most schools do not have adequate learning resources. In the study adequate resources mean each child had his or her own resources to use in the activity. For example there were enough charts or objects for each child. When a class has many children the resources might not be enough. These results were collected from the field by the researcher. Holiday (1994) stated that a crowded class doesn't provide a good atmosphere for use of learning resources during science lesson.

Figure 4.7: Pretest performances in control and experimental group (ratio of using learning resources to the numbers of children)



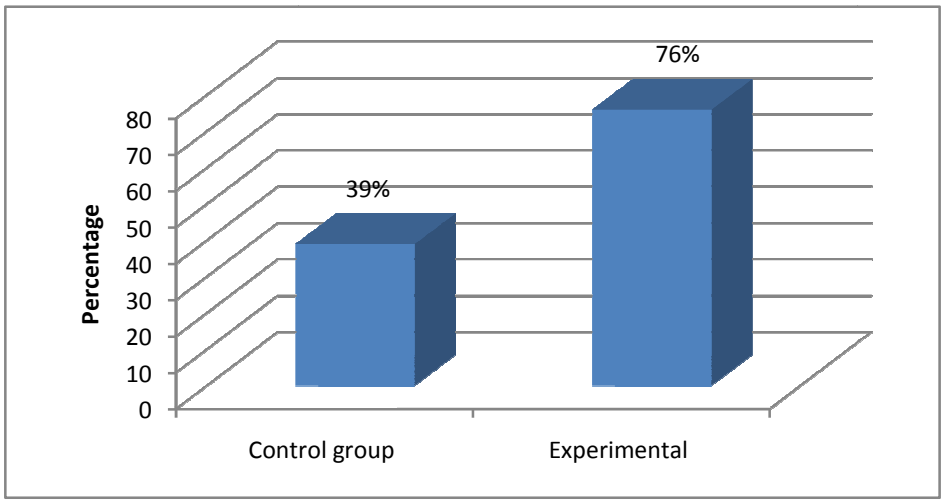
From the Figure 4.7 the experimental group had enough learning resources. The teacher used learning resources when teaching. The children had each a learning resource. This made them to remember some concept during the test even without learning resources. This group scored 41.5% while in control group the children scored 37.5%. The children

were taught with only one resource like a plant. The children had difficulties as they tried to use their senses like touching and smelling. The class was teacher centred. This contributed to poor performance because the children could not remember some parts of the plant.

4.4.1.1 Posttest performance in control group

The teacher had very few plants, seeds, and flowers. The children were sharing the resources. The lesson was teacher centered because the children who did not get plants, teacher used the few plants to show them how to sort and group the flowers, leaves and seeds. When the teacher used resources which were not enough, some children were passive, others were fighting for the learning resources and there was no class control. The teacher ended up without teaching. When the children were tested, most of them scored low marks. The results are at appendix 18, 19 and Figure 4.8.

Figure 4.8 Posttest performances in experimental and control group (ratio of using learning resources



In preschool where a teacher had only one plant, all the 30 children wanted to touch, smell or see. The teacher ended the lesson without achieving the objectives. The children did not get opportunity to explore, invented and initiate new things. The slow learners were not catered for. In another pre-school visited there was only one swing. One climbing ladder, three tyres and one ball for playing. The children fought over the few resources which made them not to enjoy learning and playing. After the test control group scored 39.5% while experimental scored 76%.

4.4.1.2 Post-performance on experimental group

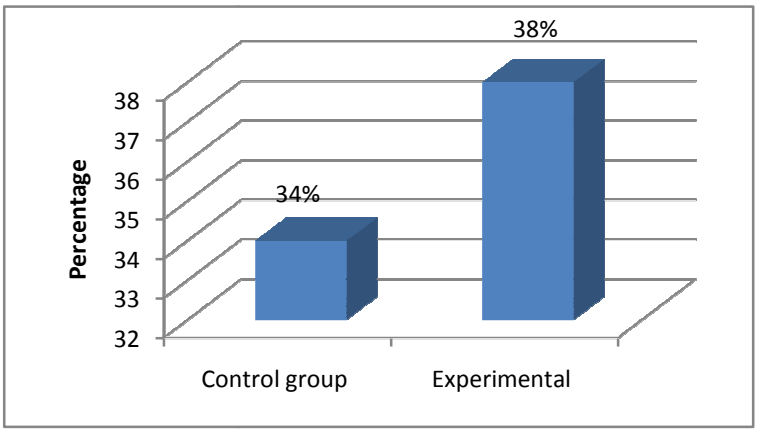
Preschool should have enough learning and teaching resources which can be either bought or improvised. The teacher should be creative so that he/she can improvise learning resources rather than buying. Learning resources and especially those that are imported are expensive. There was a great difference between pretest performance and posttest performance. During pretest, the children obtained a mean score of 8.3 and in post-test the children obtained 15.2 which is 39% and 76% as indicated in Figure 4.6.

4.4.2 Diagrams and pictures

Hobart 1999 suggested that drawing and painting help the children to develop muscles, finer manipulative skills and eye hand co-ordination. This helps the children to draw diagrams and pictures on the charts and chalkboard. The use of this visual learning resource has advantage because children can use it in science. Preschool children should be encouraged to draw objects like plants and animals and should name their parts.

The children were provided with all resources needed during naming of the parts of the plant. The children enjoyed as they were naming different parts of plants form different crops.

Figure 4.9 The pretest performance both control and experimental group (diagrams and pictures)



In Figure 4.9 the children in experimental group scored 38%. This was because when the teacher was teaching children about plants. She/he drew on the chalkboard and charts. The children had seen how a plant is drawn and named. During the exam the children were able to remember now the plant was drawn and they named some parts. While in control group the teacher did not use any diagrams and pictures. This contributed to low marks. These children would not remember how a plant looks like because their teacher never used the resources.

4.4.2.1 Pre test performance in control group

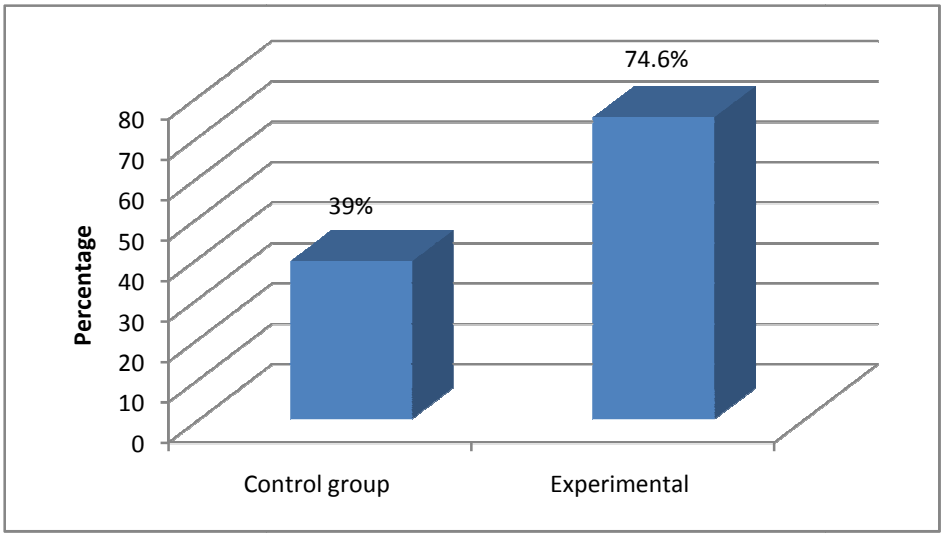
The preschool children in the control group were tested in drawing a plant and filling parts. The children had a lot of difficulties in naming the parts. The children obtained

mean score of 6.8. This shows many children scored below ten marks. The results are shown in appendix 13. Most preschools in Ithiru Zone did not have science charts and pictures. The classes had a lot of charts in languages and mathematics. This shows that science is not considered very important in preschool. Most of children from these schools could not answer most questions relating to the parts of plants.

4.4.2.2 Pretest performance on experimental group

During pretest experimental group is not given any learning resources. The results are tabulated in appendix 14. The children did not use diagram and pictures. The children scored very low marks compared with those that used resources. Pretest performance of the control and experimental group is shown in the figure 4.9 above shows that both groups scored very low marks.

Figure 4.10 Posttest performances in control and experimental group (Diagrams and pictures)



The children were taught without learning resources. This made children to be passive. The lesson was teacher centered. After the teaching children did a test and scored a mean score of 7.8 making 39%. There was a slight improvement from 6.8 (34%) to 7.8 (39%). As shown in appendix 13 and 15.

4.4.2.3 Post-test experimental group

In experimental group the children performed very well. The class was full of diagrams and pictures on plants. The children could move to the science corner and draw different plants. The teacher taught using charts, chalkboard and pictures which were very colorful. The children were happy and enjoyed the lesson. When they were tested they scored a mean score of 14.9 (74.6% from 7.7 (38%).

The uses of diagrams and pictures have advantages over other learning resources like real objects. They can be used where a class is large. Only one picture or diagram can be used by many children. The children recognized the parts faster and also developed reasoning and logical thinking. According to the data collected the use of pictures made the lesson interesting and enhanced eye hand coordination. Look and say become more effective. The researcher visited 10 schools and came up with the number of diagrams and pictures in preschool Table 4.4 on frequencies by thematic area.

Table 4. 4: Frequency by thematic area

Activities	**Frequency**
Language	20
Mathematic	20
Outdoor	10
Social	8
Music and movement	7
Science	5

Source: Field data

It was observed that most of the pre-schools visited had more picture and diagrams on language and mathematic. This implies that, preschool in Ithiru zone concentrate more on language and mathematic. Most of the time is spent making learning resources for the two activities and ignore the other activities. It was also noted that even on the time table, science is allocated only two lessons while mathematics and English has been allocated five lessons each.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter contains the summary of the study, conclusion from the findings and recommendations for further research.

5.2 Summary

The study was to investigate the impact of learning resources on children's performance in pre-school science. The study found that children taught using learning resource perform better than children taught without the use of learning resources. Most of the teachers in Ithiru zone do not use learning resource. The teachers who used learning resource always, the children perform better than those who rarely use them. The children who learn using resources scored 80.3% in the test administered by the researcher while those who never use the resources got 38%.

The analysis of the effect of the ratio of learning resources to the number of children, the study shows that children who use the learning resource in the ration of 1:1 perform better. The children are disciplined and easy to manage. They gain sense of order and control their behavior. Enough learning resources enhance mental, moral, emotional and sociological aspect of the children. Learning resources help children to sustain interest, make learning real and more enjoyable.

While those who share resource 1:30 do not perform well and it is hard to control the class as children fight for the few resources. This is as a result of every child want to see, touch and smell the object thus creating confusion in class. In the analysis of the use of the diagrams and pictures in learning, children have eye hand coordination as they drew the pictures. In the study there were more pictures and diagrams on language and mathematic than in science. This shows that the teachers concentrate more in language and mathematic compared to science.

The literature reviewed was on impact of real object, frequencies of using learning resources, ratio and impact of pictures and diagrams. The study used quasi-experimental where there were two groups control and experimental. The target population comprises of pre- school children, pre-school teachers, primary science teachers, primary children and primary head teachers. The study used questionnaire observation, interviews and documentary analysis.

The schools were purposively sampled where five well performed primary school and the worst performed schools were chosen. The data was analyzed using descriptive statistics, frequencies, percentages and mean score. The children who were taught science by a teacher using learning resources performed better than the teachers who did not use resources.

5.3 Conclusion

From the study it can be concluded that the children who were using real objects performed better than those who did not use them. The children were able to score a mean of 69% while in control group they scored a mean of 38.5%. When children used learning resources always they were able to score a mean of 80% while the children who never used resources scored a mean of 38%. From the study it can also be concluded that the children who were taught with enough learning resources performed very well. They scored 76% while where children were taught by a teacher using only one learning material scored a mean of 39.5% which was low compared with a mean of 76%. Lastly when children were taught by the teacher using pictures and diagrams they performed better than those children who were taught without, they scored a mean of 74.6% while those were taught without score a mean of 39% this was very low compared with a mean of 74.6% for children who were taught with diagrams and picture.

5.4 Recommendations for policy

The study made the following recommendations.

1. Learning need to be made more practical than theoretical.
2. The community, parents and teachers should be involved in providing the children with learning resources.
3. The government should provide all public preschools with learning resources.
4. Time for learning science should be increased from two lessons per week to five lessons per week.

5. The preschool teachers should be trained how to improvise learning resources in case they have not been provided with resources by the government.
6. The schools should keep learning resources in a safe place to avoid being destroyed or stolen by children.
7. The government should train and employ pre-school teachers.
8. The government should make the pre-school free and compulsory.

5.5 Suggestions for further research

1. Similar study may be carried out in other counties.
2. A study may be carried out on the impact of learning resources on performance on language in pre-school.

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APPENDICES

APPENDIX 1: QUESTIONNAIRE FOR PRE-SCHOOL TEACHERS

This questionnaire is for the purpose of research only. Please put a tick in the appropriate bracket (✓) or fill in the information as your response to all the questions. Do not write your name anywhere.

PART A: Background

1. You are: a) Male b) Female
2. Your age is:
   a) Less than 25 years ( )
   b) 25-35 years ( )
   c) 36-45 years ( )
   d) Over 45 years ( )
3. Your present highest academic qualifications
   a) Graduate (degree) ( )
   b) 'A' Level ( )
   c) 'O' Level ( )
   d) KCPE ( )
   e) Other (specify) _____
4. Indicate your highest professional qualification.
   a) M.Ed. ( )
   b) B.Ed ( )
   c) Diploma ( )

d) Others (please specify) _____

Part B:

5. When teaching science, what problem do you encounter?

   _____

6. In your own opinion, how is science?

   a) Easy ( ) b) Hard ( ) c) Enjoyable ( )

7. How often do you use teaching and learning resources in science?

   a) Sometimes ( )

   b) Rarely ( )

   c) Always ( )

8. Who provides the learning resources?

   a) Teacher ( )

   b) School ( )

   c) Children ( )

   d) Parent ( )

   e) Government ( )

9. How often do you use experiments when teaching science?

   a) Always ( )

   b) Sometimes ( )

   c) Rarely ( )

10. Are the learning resources for pre-school science adequate?

    a) Yes ( ) No ( )

11. Do you use charts and pictures?

    a. Yes ( )

    b. No ( )

12. How often do you teach science?

    a) Daily ( )

    b) Twice ( )

    c) Weekly ( )

13. Do you use a variety of learning resources?

    a. Yes ( )

    b. No ( )

14. Do you have a lockable place to keep the learning resources?

    a. Yes ( )

    b. No ( )

15. Is there any importance in using learning resources? _____

16. Do you attend seminars related to science learning resources?

    a) Yes ( )

    b) No ( )

16. What problems do you face when teaching science?

    _____

17. How do you think science performance can be improved?

    _____

    _____

APPENDIX 2

QUESTIONNAIRE FOR PRIMARY SCIENCE TEACHERS

This questionnaire is for the purpose of research only. Please put a tick in the appropriate bracket (✓) or fill in the information as your response to all the questions. Do not write your name anywhere.

PART A: Background

1. You are: a) Male ( ) b) Female ( )
2. Your age is:
   a) Less than 25 years ( )
   b) 25-35 years ( )
   c) 36-45 years ( )
   d) Over 45 years ( )
3. Your present highest academic qualifications
   a) Graduate (degree) ( )
   b) 'A' Level ( )
   c) 'O' Level ( )
   d) KCPE ( )
   e) Other (specify) _____
4. Indicate your highest professional qualification.
   a) M.Ed. ( )
   b) B.Ed ( )
   c) Diploma ( )

d) Others (please specify) _____

e) Which is your best teaching subject?

Just tick.

a) Mathematics ( )

b) English ( )

c) Science ( )

d) CRE ( )

e) Social Studies ( )

5. Indicate your teaching experience in years for the subject listed above:

Subject teaching	**Experience**
Mathematics English Science CRE Social Studies	

6. For which particular subject have you attended on (INSET) programme in the last one year? Tick:

a) Mathematics ( )

b) Social ( )

c) Social Studies ( )

d) Science ( )

Part B:

7. When teaching science, what problem do you encounter?

   _____

8. Do you use learning resources when teaching science?

   a) Yes ( )

   b) No ( )

9. In your own opinion, how is science?

   a) Easy ( ) b) Hard ( ) c) Enjoyable ( )

10. How often do you use teaching and learning resources in science?

    a) Sometimes ( )

    b) Rarely ( )

    c) Always ( )

11. Who provides the learning resources?

    a) Teacher ( )

    b) School ( )

    c) Children ( )

    d) Parent ( )

    e) Government ( )

12. How often do you use experiments when teaching science?

    a) Always ( )

    b) Sometimes ( )

    c) Rarely ( )

13. Do you use a variety of learning resources?

    a) Yes ( )

    b) No ( )

14. Are the learning resources enough for the children?

    a) Yes ( )

    b) No ( )

15. Do you have a lockable place to keep the learning resources?

    If yes, which ones? _____

16. How often do you teach science?

    a) Daily ( )

    b) Weekly ( )

17. Is there any significance in learning using learning resources? _____

18. Do your pupils perform better when using learning resources?

    a) Yes ( )

    b) No ( )

19. How else do you think science performance in your school can be improved?

    _____

    _____

20. Do you attend seminars/workshops/conferences related to science learning resources?

    a) Yes ( )

    b) No ( )

APPENDIX 3

QUESTIONNAIRE FOR HEAD TEACHERS

This questionnaire is for the purpose of research only. Please put a tick in the appropriate bracket (✓) or fill in the information as your response to all the questions. Do not write your name anywhere.

PART A: Background

1. You are: a) Male b) Female
2. Your age is:
   a) Less than 25 years ( )
   b) 25-35 years ( )
   c) 36-45 years ( )
   d) Over 45 years ( )
3. Your present highest academic qualifications
   a) Graduate (degree) ( )
   b) 'A' Level ( )
   c) 'O' Level ( )
   d) K.C.P.E ( )
   e) Other (specify) _____
4. Indicate your highest professional qualification.
   a) M.Ed. ( )
   b) B.Ed ( )
   c) Diploma ( )

d) Others (please specify) _____

5. Which is your best teaching subject?

   Just tick.

   a) Mathematics ( )

   b) English ( )

   c) Science ( )

   d) CRE ( )

   e) Social Studies ( )

6. Indicate your teaching experience in years for the subject listed below.

Subject teaching	**Experience**
Mathematics English Science CRE Social Studies	

7. For which particular subject have you attended on (INSET) programme in the last one year? Tick:

   a) Mathematics ( )

   b) Social ( )

   c) Social Studies ( )

   d) Science ( )

PART B:

8. When teaching science, what problem do you encounter?

   _____

9. In your own opinion, how is science?

   a) Easy ( ) b) Hard ( ) c) Enjoyable ( )

10. How often do teachers use teaching and learning resources in science?

    a) Sometimes ( )

    b) Rarely ( )

    c) Always ( )

11. Who provides the learning resources?

    a) Teacher ( )

    b) School ( )

    c) Children ( )

    d) Parent ( )

    e) Government ( )

12. How often do teachers use experiments in pre-school during science activities?

    a) Always ( )

    b) Sometimes ( )

    c) Rarely ( )

13. Are the learning resources for pre-school science adequate?

    Yes ( )

    No ( )

14. Do you attend seminars/workshops/conferences related to science learning resources?

a) Regularly ( )

b) Resources ( )

c) Never ( )

15. How often do you use the learning resources?

_____

16. Do you use a variety of learning resources?

Yes ( )

No ( )

17. Are the resources enough for the children?

Yes ( )

No ( )

18. Do you have a lockable place to keep the learning resources?

If yes, which ones? _____

If no explain: _____

19. Do you use the learning resources when you are teaching?

Yes ( )

No ( )

20. How often do you teach science?

Daily ( )

Weekly ( )

21. Is there any significance in learning using learning resources?

_____

22. Do your children perform better when using learning resources?

_____

23. How else do you think science performance in your school can be improved?

_____

APPENDIX 4

QUESTIONNAIRE FOR CHILDREN/PUPILS

SECTION A

Please put a tick (✓) or provide brief explanation in the spaces. Do not write your name.

1. Indicate you gender: Male ( ) Female ( )
2. What was your science score last term?

   0-20 ( ) 21-40 ( ) 41-60 ( )

   61-80 ( ) 81-100 ( )

SECTION B

1. Do you like the science subject?

   a) Yes ( ) b) No ( ) c) Can't tell ( )

2. How often do you use learning resources?

   a) Once ( ) b) Many times ( ) c) Not at all ( )

3. What type of learning resources does your teacher use?_____
4. Are the resources enough for each pupil?

   a) Yes ( ) b) No ( )

5. How do you share the learning resources?

   a) One each ( ) b) Many ( )

6. Do you use charts and pictures?

   a) Yes ( ) b) No ( )

7. What problems do you encounter when learning science?

   _____

APPENDIX 5

OBSERVATION SCHEDULE

	Activities		**Conditions**	
		Pictures Charts No.	**Fair**	**Poor**
1	Language			
2.	Mathematics			
3.	Outdoor			
4.	Social			
5.	Music and movement			
6.	Science			

APPENDIX 6

SCIENCE QUESTIONS FOR PRE-SCHOOL CHILDREN

1. Name any three parts of a plant.

    a)

    b)

    c)

2. Name any three external human body parts.

    a)

    b)

    c)

3. State 3 uses of different external human body parts.

    a)

    b)

    c)

4. Identify 3 items that float and those that sink.

    a)

    b)

    c)

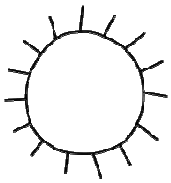
5. Identify 3 substances that dissolve in water

    a)

    b)

    c)

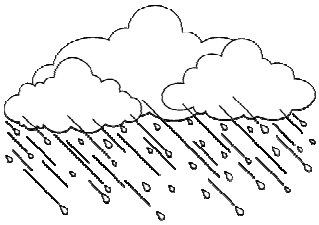
6. Name and read the weather charts:

a) 

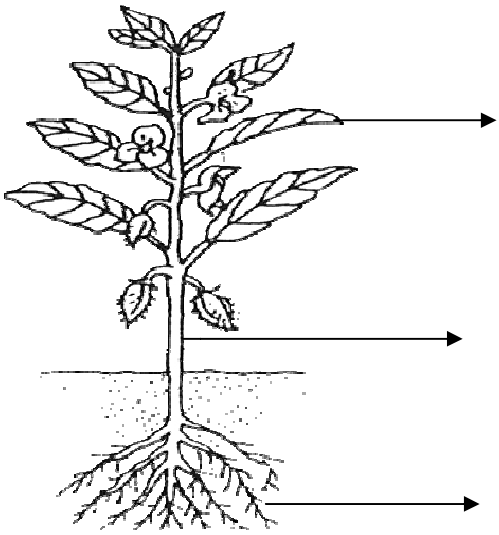
b) 

c) 

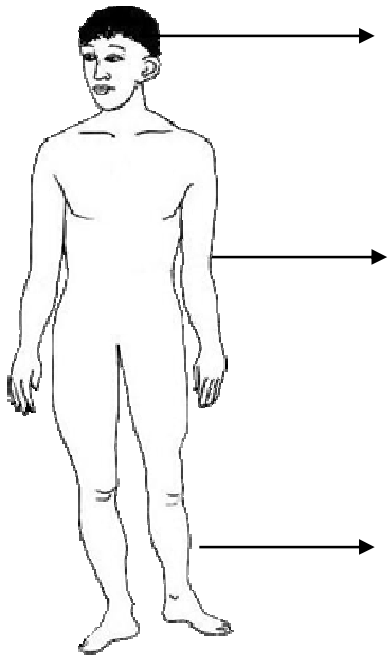
d) 

e) 

7. Name the parts of the plant



8. Name the parts of a human being



APPENDIX 7

CHILDREN'S WORK

Children could not answers questions without pictures and diagrams

SCIENCE QUESTIONS FOR PRE-SCHOOL CHILDREN

Name any three parts of a plant.

a)

b)

c)

Name any three external human body parts.

a)

b)

c)

State 3 uses of different external human body parts.

a)

b)

c)

Identify 3 items that float and those that sink.

a)

b)

c)

Identify 3 substances that dissolve in water

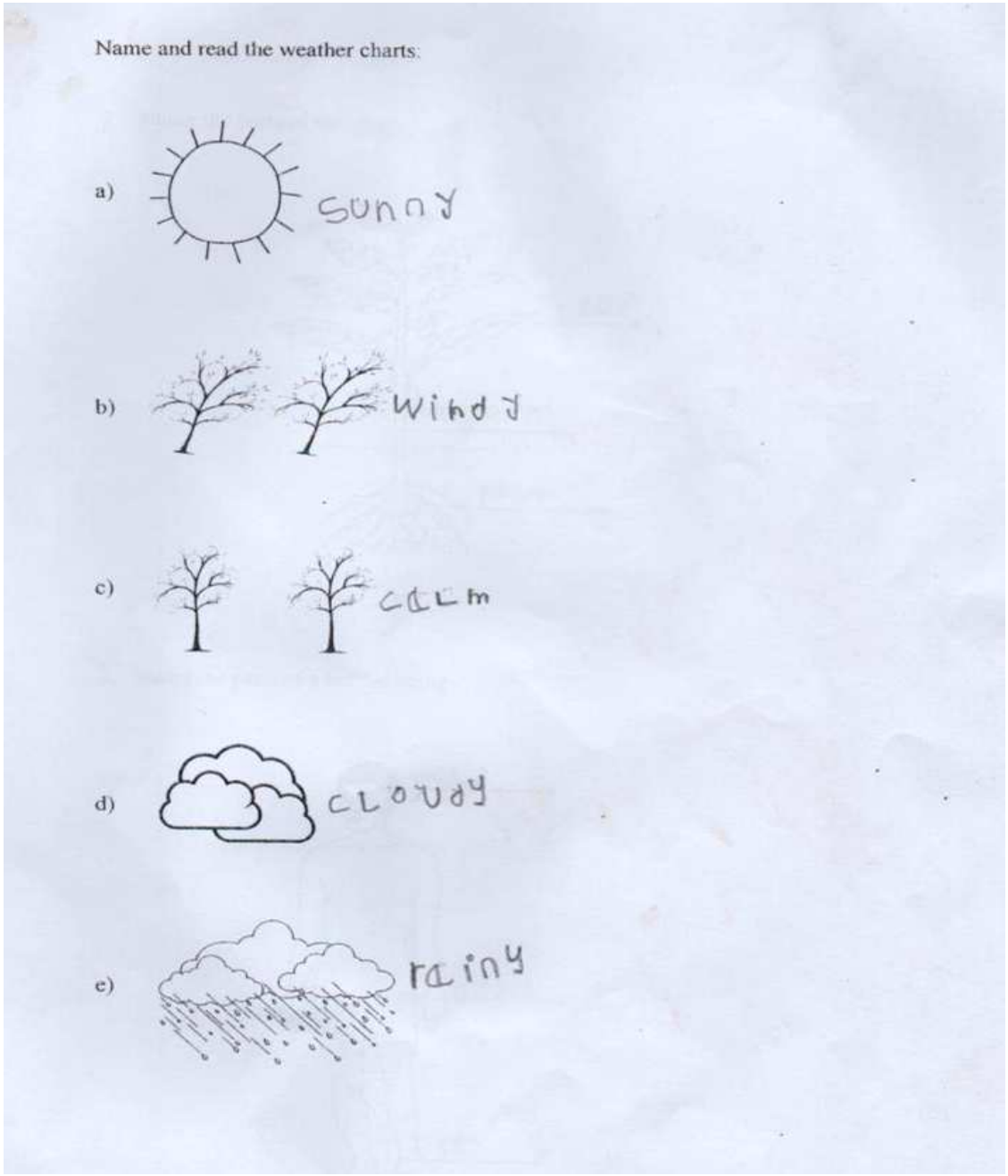
a)

b)

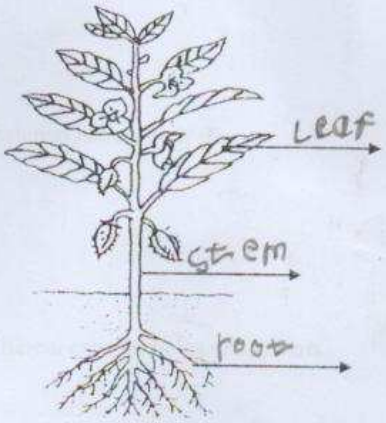
c)

Read the weather chart

Children answered questions when pictures and diagrams were drawn



1. Name the parts of the plant



2. Name the parts of a human being

APPENDIX 8

PRE TEST PERFORMANCE IN CONTROL GROUP (REAL OBJECTS)

True class boundaries	Class intervals	Midpoint x	Frequency (f)	Fx	X^2	Fx^2
0.5-3.5	1-3	2	10	20	4	40
3.5-6.5	4-6	5	6	30	25	150
6.5-9.5	7-9	8	5	40	64	256
9.5-12.5	10-12	11	4	44	121	363
12.5-15.5	13-15	14	3	42	196	393
5.5-18.5	16-18	17	1	17	289	289
18.5-21.5	19-21	20	1	20	400	400
			$\Sigma f = 30$	$\Sigma fx = 213$		$\Sigma fx^2 = 1890$

Mean $\frac{213}{30} = 7.1$

$= 35\%$

APPENDIX 9

PRE TEST PERFORMANCE IN EXPERIMENTAL GROUP

True class boundaries	Class intervals	Midpoint x	Frequency (f)	Fx	X^2	Fx^2
0.5-3.5	1-3	2	5	10	4	20
3.5-6.5	4-6	5	4	20	25	100
6.5-9.5	7-9	8	6	48	64	384
9.5-12.5	10-12	11	5	55	121	605
12.5-15.5	13-15	14	4	56	196	784
5.5-18.5	16-18	17	3	51	289	852
18.5-21.5	19-21	20	3	20	60	1200
			$\Sigma f=30$	$\Sigma fx=300$		$\Sigma fx^2=3945$

Mean $\frac{300}{30} = 10$

$= 50\%$

APPENDIX 10

POST TEST PERFORMANCE IN CONTROL GROUP (REAL OBJECTS)

True class boundaries	Class intervals	Midpoint x	Frequency (f)	Fx	X^2	Fx^2
0.5-3.5	1-3	2	8	16	4	40
3.5-6.5	4-6	5	7	35	25	175
6.5-9.5	7-9	8	5	40	64	320
9.5-12.5	10-12	11	4	44	121	484
12.5-15.5	13-15	14	3	42	196	588
5.5-18.5	16-18	17	2	34	289	578
18.5-21.5	19-21	20	1	20	400	400
			$\Sigma f=30$	$\Sigma fx=231$		$\Sigma Fx^2=2585$

Mean $\frac{231}{30}$ = 7.7

= 38.5%

APPENDIX 11

POST TEST PERFORMANCE IN EXPERIMENTAL GROUP (REAL OBJECTS)

True class boundaries	Class intervals	Midpoint x	Frequency (f)	Fx	X^2	Fx^2
0.5-3.5	1-3	2	1	2	4	4
3.5-6.5	4-6	5	1	5	25	25
6.5-9.5	7-9	8	3	16	64	192
9.5-12.5	10-12	11	4	33	121	484
12.5-15.5	13-15	14	5	56	196	980
5.5-18.5	16-18	17	6	102	289	1734
18.5-21.5	19-21	20	10	200	400	4000
			$\Sigma f=30$	$\Sigma fx=414$		$\Sigma Fx^2=7419$

Mean $\frac{414}{30}$ = 13.8

= 69%

APPENDIX 12

PRE TEST PERFORMANCE IN CONTROL GROUP (FREQUENCY OF USING LEARNING RESOURCES)

True class boundaries	Class intervals	Midpoint x	Frequency (f)	Fx	X^2	Fx^2
0.5-3.5	1-3	2	10	20	4	40
3.5-6.5	4-6	5	6	30	25	150
6.5-9.5	7-9	8	4	32	64	256
9.5-12.5	10-12	11	4	44	121	484
12.5-15.5	13-15	14	3	42	196	588
5.5-18.5	16-18	17	2	34	289	578
18.5-21.5	19-21	20	1	20	400	400
			$\Sigma f = 30$	$\Sigma Fx = 222$		$\Sigma Fx^2 = 2496$

Mean $\frac{222}{30}$ = 7.4

= 37%

APPENDIX 13

PRE TEST PERFORMANCE IN EXPERIMENTAL GROUP (FREQUENCY OF USING LEARNING RESOURCES)

True class boundaries	Class intervals	Midpoint x	Frequency (f)	Fx	X^2	Fx^2
0.5-3.5	1-3	2	7	14	4	28
3.5-6.5	4-6	5	5	25	25	125
6.5-9.5	7-9	8	5	40	64	320
9.5-12.5	10-12	11	4	44	121	484
12.5-15.5	13-15	14	3	42	196	588
5.5-18.5	16-18	17	3	51	289	867
18.5-21.5	19-21	20	3	60	400	1200
			$\Sigma f=30$	$\Sigma fx=276$		$\Sigma Fx^2=3612$

Mean $\frac{276}{30}$ = 9.2

= 46%

APPENDIX 14

POST TEST PERFORMANCE IN CONTROL GROUP (FREQUENCY OF USING LEARNING RESOURCES)

True class boundaries	Class intervals	Midpoint x	Frequency (f)	Fx	X^2	Fx^2
0.5-3.5	1-3	2	9	8	4	36
3.5-6.5	4-6	5	5	25	25	125
6.5-9.5	7-9	8	6	48	64	384
9.5-12.5	10-12	11	5	55	121	605
12.5-15.5	13-15	14	2	28	196	392
5.5-18.5	16-18	17	2	34	289	578
18.5-21.5	19-21	20	1	20	400	400
			$\Sigma f=30$	$\Sigma fx=228$		$\Sigma Fx^2=2520$

Mean $\frac{228}{30}$ = 7.8

= 38%

APPENDIX 15

POST TEST PERFORMANCE IN EXPERIMENTAL GROUP (FREQUENCY OF USING LEARNING RESOURCES)

True class boundaries	Class intervals	Midpoint x	Frequency (f)	Fx	X^2	Fx^2
0.5-3.5	1-3	2	1	2	4	4
3.5-6.5	4-6	5	1	5	25	25
6.5-9.5	7-9	8	2	16	64	128
9.5-12.5	10-12	11	3	33	121	363
12.5-15.5	13-15	14	5	70	196	980
5.5-18.5	16-18	17	8	136	289	2312
18.5-21.5	19-21	20	10	200	400	4000
			$\Sigma f=30$	$\Sigma fx=482$		$\Sigma Fx^2=8212$

Mean $\frac{482}{30}$ = 16.06

= 80.0%

APPENDIX 16

PRE TEST PERFORMANCE IN CONTROL GROUP (THE RATIO OF LEARNING RESOURCES)

True class boundaries	Class intervals	Midpoint x	Frequency (f)	Fx	X^2	Fx^2
0.5-3.5	1-3	2	8	16	4	36
3.5-6.5	4-6	5	7	35	25	150
6.5-9.5	7-9	8	6	48	64	320
9.5-12.5	10-12	11	4	44	121	605
12.5-15.5	13-15	14	2	28	196	588
5.5-18.5	16-18	17	2	34	289	2378
18.5-21.5	19-21	20	1	20	400	400
			$\Sigma f=30$	$\Sigma fx=225$		$\Sigma Fx^2=2577$

Mean $\frac{225}{30}$ = 7.5

= 37.5%

APPENDIX 17

PRE TEST PERFORMANCE IN EXPERIMENTAL GROUP (THE RATIO OF LEARNING RESOURCES)

True class boundaries	Class intervals	Midpoint x	Frequency (f)	Fx	X^2	Fx^2
0.5-3.5	1-3	2	8	16	4	32
3.5-6.5	4-6	5	5	25	25	125
6.5-9.5	7-9	8	6	48	64	384
9.5-12.5	10-12	11	4	44	121	484
12.5-15.5	13-15	14	3	42	196	588
5.5-18.5	16-18	17	2	34	289	578
18.5-21.5	19-21	20	2	40	400	800
			$\Sigma f=30$	$\Sigma Fx =249$		$\Sigma Fx^2=2991$

Mean $\frac{249}{30}$ = 8.3

= 41.5%

APPENDIX 18

POST TEST PERFORMANCE IN CONTROL GROUP (THE RATIO OF LEARNING RESOURCES)

True class boundaries	Class intervals	Midpoint x	Frequency (f)	Fx	X^2	Fx^2
0.5-3.5	1-3	2	8	16	4	32
3.5-6.5	4-6	5	6	30	25	150
6.5-9.5	7-9	8	5	40	64	320
9.5-12.5	10-12	11	5	55	121	605
12.5-15.5	13-15	14	3	42	196	588
5.5-18.5	16-18	17	2	34	289	578
18.5-21.5	19-21	20	1	20	400	400
			$\Sigma f=30$	$\Sigma Fx =237$		$\Sigma Fx^2=2673$

Mean $\frac{237}{30} = 7.9$

$= 39.5\%$

APPENDIX 19

POST TEST PERFORMANCE IN EXPERIMENTAL GROUP (THE RATIO OF LEARNING RESOURCES)

True class boundaries	Class intervals	Midpoint x	Frequency (f)	Fx	X^2	Fx^2
0.5-3.5	1-3	2	1	2	4	4
3.5-6.5	4-6	5	2	10	25	50
6.5-9.5	7-9	8	2	16	64	128
9.5-12.5	10-12	11	2	22	121	242
12.5-15.5	13-15	14	5	70	196	980
5.5-18.5	16-18	17	8	136	289	21312
18.5-21.5	19-21	20	10	200	400	4000
			$\Sigma F=30$	$\Sigma Fx =456$		$\Sigma Fx^2=7716$

Mean $\frac{456}{30} = 15.2$

$= 76\%$

APPENDIX 20

PRE TEST PERFORMANCE IN CONTROL GROUP (DIAGRAMS AND PICTURES)

True class boundaries	Class intervals	Midpoint x	Frequency (f)	Fx	X^2	Fx^2
0.5-3.5	1-3	2	9	18	4	36
3.5-6.5	4-6	5	8	40	25	200
6.5-9.5	7-9	8	6	48	64	384
9.5-12.5	10-12	11	3	33	121	363
12.5-15.5	13-15	14	2	28	196	392
5.5-18.5	16-18	17	1	17	289	289
18.5-21.5	19-21	20	1	20	400	400
			$\Sigma f=30$	$\Sigma Fx =204$		$\Sigma Fx^2=2064$

Mean $\frac{204}{30}$ = 6.8

= 34%

APPENDIX 21

PRE TEST PERFORMANCE IN EXPERIMENTAL GROUP (DIAGRAMS AND PICTURES)

True class boundaries	Class intervals	Midpoint x	Frequency (f)	Fx	X^2	Fx^2
0.5-3.5	1-3	2	8	16	4	4
3.5-6.5	4-6	5	7	35	25	175
6.5-9.5	7-9	8	5	40	64	320
9.5-12.5	10-12	11	4	44	121	484
12.5-15.5	13-15	14	3	42	196	588
5.5-18.5	16-18	17	2	39	289	578
18.5-21.5	19-21	20	1	20	400	400
			ΣF=30	ΣFx =231		ΣFx^2=2573

Mean $\frac{231}{30} = 7.7$

$= 38\%$

APPENDIX 22

POST TEST PERFORMANCE IN CONTROL GROUP (DIAGRAMS AND PICTURES)

True class boundaries	Class intervals	Midpoint x	Frequency (f)	Fx	X^2	Fx^2
0.5-3.5	1-3	2	8	16	4	32
3.5-6.5	4-6	5	7	35	25	175
6.5-9.5	7-9	8	6	48	64	384
9.5-12.5	10-12	11	3	33	121	363
12.5-15.5	13-15	14	2	28	196	393
5.5-18.5	16-18	17	2	34	289	578
18.5-21.5	19-21	20	2	40	400	800
			$\Sigma f=30$	$\Sigma fx=234$		$\Sigma fx^2 = 2724$

Mean $\frac{234}{30}$ = 7.8

= 39%

APPENDIX 23

POST TEST PERFORMANCE IN EXPERIMENTAL GROUP (DIAGRAMS AND PICTURES)

True class boundaries	Class intervals	Midpoint x	Frequency (f)	Fx	X^2	Fx^2
0.5-3.5	1-3	2	1	2	4	4
3.5-6.5	4-6	5	1	5	25	25
6.5-9.5	7-9	8	3	16	64	192
9.5-12.5	10-12	11	2	22	121	242
12.5-15.5	13-15	14	6	84	196	1176
5.5-18.5	16-18	17	7	119	289	2033
18.5-21.5	19-21	20	10	200	400	4000
			$\Sigma f=30$	$\Sigma Fx =448$		$\Sigma Fx^2 =7572$

Mean $\frac{448}{30}$ = 14.9

= 74.6%

APPENDIX 24

INTRODUCTION LETTER

UNIVERSITY OF NAIROBI

COLLEGE OF EDUCATION & EXTERNAL STUDIES

SCHOOL OF EDUCATION

DEPARTMENT OF EDUCATIONAL COMMUNICATION & TECHNOLOGY

Telephone: 020-2500759, 020-2500760 P.O. BOX 30197, 00100 NAIROBI

020-2500762, 020-2460056 P.O. BOX 92, 00902 KIKUYU

18th September 2014

TO WHOM ITMAY CONCERN

RE: NGUGI JESINTA WAIGARI **REG No:** -ES 71820601/2012

This is to certify that NGUGI JESINTA.W. is a bonafide student of the University of Nairobi, Department of Educational Communication and Technology. Currently she is doing M.Ed in Early Childhood Education. Her project Title is "IMPACT OF LEARNING RESOURCES ON PERFORMANCE IN PRESCHOOL SCIENCE ACTIVITIES."

Any assistance accorded to her will be highly appreciated.

Yours faithfully,

C.E.E.S. 18 SEP 2014

for— **Dr. John Mwangi**

M.ED ECE COURSE COORDINATOR