INFLUENCE OF INSTRUCTIONAL MATERIALS ON PRE-SCHOOL CHILDREN’S LEARNING ACHIEVEMENT IN NUMBER WORK IN MATUNGU DIVISION, KAKAMEGA COUNTY.

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DECLARATION

This research project report is my original work and has not been presented for any academic award at any other university.

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This research project report has been submitted for examination with my approval as a university supervisor.

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DEDICATION

This research project is dedicated to my late Mum Elizabeth for the inspiration and desire to see me through university education. To my husband George for standing by my side and encouraging me all the way finally to my sons, Ian and Glen and twin daughters Lyne and Liza for being patient and missing Mum’s company while undertaking this project, thank you.
ABSTRACT

The study aimed at investigating the influence of instructional materials on preschool children’s learning achievement in number work in Matungu Division Kakamega County. The use of instructional materials in teaching number work is minimal hence low achievement. The purpose of the study was to investigate whether the use of instructional materials influences their achievement of children in learning number work with special reference to the influence of Audio–Visual materials on children learning achievement in number work, the effect of printed materials in children’s learning achievement in number work and the effect of community resources on children is learning achievement in number work.

The literature reviewed on audio-Visual materials, Visual resources, printed resources and community resources in relation to academic achievement in number work. The study adopted descriptive survey. The population was 45 pre-schools 15 private pre-school, 30 public schools, 90 pre-school teachers and 850 pre-school children. The sample of the study included 14 pre-school teachers 9 public schools and 5 private pre schools, 28 pre-school teachers and 255 pre-school children. Data was collected by using various instruments such as number work test was administered to children to determine the performance, questionnaires were used to collect data from pre-school teachers, observation schedules was used to establish types of instructional/materials available and observation check list was used to a certain types of printed materials and how they were used. The data was analyzed using quantititative and qualitative method and was presented in table and graphs. The findings of this study revealed that in adequate instructional materials had an effect on children’s performance in number work in preschool. The schools that had instructional materials children were able to carry out different activities and had good mastery of the content. While the pre schools that lacked the instructional materials the performance was poor and children could not master the content easily.

In conclusion from the study carried out it clearly indicated that the use of instructional materials is minimal in Public school as compared to private. Audio-Visual materials are inadequate lack of adequate instructional materials has contributed to low performance in number work. Visual materials help in conceptualizing the concept clearly learners also use them during their free time, from the findings most pre-schools had visual materials and they help the learners to acquire the concept easily.

Printed materials help in mastering the concept taught due to a lot practice and also teachers to plan adequately learners with adequate printed materials perform better than those who are lacking from the findings lack of printed materials leads to poor achievement in number work. Community materials had an impact in the learners learning achievement learners with community materials acquired the concepts faster as compared to those who didn’t have. The community materials extracted from the community children manipulate them with a lot of easy and they are familiar with them hence the accusation of the concept become easier.

And therefore there is need to use instructional materials in teaching number work because children learn by doing hence need materials to manipulate. The study recommended that the same study to be carried out in different division and schools using different research instruments. Also the government to set aside some funds to cater for ECD Education.
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ABBREVIATIONS AND ACRONYMS

ECD – Early Childhood Development
MOE – Ministry of Education
MOEST – Ministry of Education Science and Technology
FPE – Free Primary Education
PTR – Pupil Teacher Ratio
UNESCO – United Nations Education Scientific and Cultural Organizations
NACECE – National Centre for Early Childhood Education
DEO – District Education Officer.
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CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

UNESCO (1999) posits that the development of knowledge and skills in number work (mathematics) and science holds the key to Africa’s industrialization elevation and poverty eradication in the 21st century. Mathematics and science enhance learning of all other disciplines. Therefore there is need to put more instructional resources, in teaching and learning of mathematics. In Kenya lack of information on what is happening in the ECD education sector has made it difficult to use lessons learnt from projects in planning and strategy formation.

According to the Ministry of Education, Science and technology MOEST (2006) the World is experiencing digital revolution where the economy is increasingly based on digital technology such as electronic computation. The education sector has no option other than to go digital so as to tap into the benefits of modernization. Shiundu and Omulando (1992) emphasized that such changes put tremendous pressure on the curriculum and instructional resources.

Waithaka (2005) posits that most Kenya pre-school teachers are not well trained hence types of instructional resources seem not to be seen in number work (mathematics) lessons. Due to this factor there seems to be a poor foundation for pre-scholars in number work which leads to poor performance in this discipline at all levels right from pre-school to higher levels, of learning.

Kli’banoff (2006) indicates the use of instructional materials has positive impact on children’s achievement in number work. Children handled with relevant and adequate instructional resources and qualified personnel have an advantage of acquiring number work (mathematics)
concepts and skills because teachers use relevant instructional materials which makes it easy to deliver the content and mastery of the concept without any difficult.

In the words of OLuwate (2010), instructional materials improve teachers’ creativity. As the teacher studies according to instruction he assimilates easily what knowledge to instil to learners, the best method to use to instil the skills and the best method to achieve this scope thus improving the teacher’s creativity hence leading the teacher to another level greater than where the teacher expects.

According to Fensham, P.J (1970) mathematical; teaching theory and practice, offers a range of experiences which introduce them to use mathematical concepts such as; singing number rhymes creating patterns with objects, sorting and grouping using a variety of objects. Children need to develop good mathematical understanding in order to function effectively as members of the society. To achieve the aim of functional numeric, children need to think flexibly and apply the knowledge to new situation; to solve practical problems and to experiment within mathematics itself so as to develop the ability to reason mathematically and communicate their reasoning to others. Maria Montessori (1870 – 1952) emphasized on the use of imaginative teaching materials. They lessen major weakness of verbalism, humanize and vitalize subject matter hence provide interesting approach to new topics and give initial correct impression.

Ministry of Education MOE (2006) highlighted the potential to help support implementation of free primary education (FPE) and to address emerging changes such as overcrowded classrooms. According to the area education officer annual report, (2010), schools in Matungu Division have
been slow to acquire learning materials for the learning of mathematics an issue that may affect the future placement of the children going through the schools. NACECE (2001), posits that a high pupil -teacher ratio (P.T.R), shortage of teachers of mathematics and science and relatively high cost of teaching and learning materials has led to low achievement in mathematics and science. It is on this premise that the researcher sought to investigate the impact of instructional materials in learning number work in Matungu Division.

1.2 Statement of the Problem
There are many factors that have contributed to low performance in mathematics and the use of instructional materials is one of the key factors among others. The use of instructional materials in number work is minimal that is why achievement in number work is very poor. Instructional materials are very important in teaching number work since they help learners to master the concept so easily and help teachers to deliver the content with a lot of ease. Children learn by doing hence need materials that they can manipulate.

1.3 Purpose of the Study
The purpose of the study was to establish whether the use of instructional materials influenced the achievement of children in learning of number work. In ECD schools in Matungu division, Mumias district, Kakamega County of the republic of Kenya.

1.4 Research Objectives
The study was guided by the following objectives:

(i) To explain the influence of Audio –Visual materials on children’s learning achievement in number work.
To determine the influence of Visual material on children’s learning achievement in number work

To examine the effects of printed materials on children’s learning achievement in number work

To determine the effects of community resources on children’s learning achievement in number work.

1.5 Research Questions

The study responded to the following questions:

(i) What is the influence of Audio -Visual materials on children’s achievement in learning number work?

(ii) How do the Visual materials influence children’s achievement in learning number work?

(iii) How do the printed materials influence children’s achievement in learning number work?

(iv) How do community resources influence children’s achievement in learning number work?

1.6 Significance of the Study

It was hoped that the study of the effects of instructional materials on pre-school children’s achievement in learning number work generated information to education stakeholders and curriculum developers with basic information to stimulate further debate on the best approaches to stimulate the learning of mathematics in pre-schools and source of reference when researching on instructional materials.
1.7 Limitation of the Study

The results of the study were only generalized to the population involved in this study. The area of study was limited to Matungu division.

The research instruments used did not bring out all aspects related to the topic under investigation.

1.8 Delimitations of the Study

The study was carried out among pre-school teachers and pre-school children of Matungu Division Kakamega county. The study confined itself to Matungu Division.

1.9 Basic Assumptions

The study assumed that all Early Childhood centres had adequate and relevant resources for teaching number work and that the government and parents provided instructional materials for learning number work.
1.10 Definition of Terms

**Achievement** refers to an accomplishment which is shown by scores

**Audio Visual Materials** are educational materials directed at both the sense of hearing and the sense of sight

**Classification** is the ordering of number into sets called number system such as natural numbers and the real numbers

**County** – It is an administrative region headed by a governor

**Counting** is the action of finding the number of elements of a finite set of objects. The traditional way of counting consists of continually increasing numbers.

**District** – This is one of the areas in which a county is divided for the purpose of organization, with official boundaries.

**ECDE** – Early Childhood Development Education. This is a program and curriculum for children in pre-school

**Effect** – The influence that something or somebody has or the way one behaves or how something develops

**Influence** – This refers to anything or something that has power to affect positively or negatively.

**Instructional materials**

Instructional materials are the tools and equipments used to carry body of the information to learners and they improve the teachers’ creativeness. They carry information of knowledge, understand skills, values attitude and curriculum content which is important for desired change in learner’s behaviour
Learning – It is a lifelong relative permanent change in behaviour resulting from practicing and experience accumulated knowledge skills altitudes and values.

Number Recognition can be defined as the ability to identify and name basic numerals

Number Sequence -is an enumerated collection of objects in which repetitions are allowed or list of numbers in a special order

Number work – It is a science of numbers quality and their interrelationships

Ordering is a generalization of the concept of a natural number that is used to describe a way to arrange a collection of object in – order one after the other

Performance – It is a sub-sequent production of learning process

Printing Materials -these are learning materials used to describe printed materials produced by printers or publishers such as books

Sub-county – It is a sub-administrative region within a county

Visual Materials- these are instructional devices such as charts that appeal to vision
1.11 Organization of the study

The study was arranged into five chapters and they were organized systematically. Chapter one was the introduction which had the background of the study. The statement of the problem was connected to the purpose of the study which was also connected to the objectives and question of the research.

The significance of the study was also discussed. The area of study was delimited and the limitation of the study was noted. Chapter two discussed the related literature. Chapter three discussed the design methods of the study. Chapter four was organized according to the discussion of the research findings. Chapter five gave a summary of the whole project by concluding and giving recommendations.
CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

This section reviewed literature relevant to the effects of instructional materials in children’s achievement in learning number work in Early Childhood Education (ECD) globally regionally and in Kenya. The aspects that were examined were the effects of visual materials, Audio-Visual materials, printed materials and community resources as used in learning number work. The theoretical and conceptual framework is also covered.

Research on instructional materials on pre-school children’s learning achievement in number work is still important today because the current research has established a substantial relationship between the use of manipulative materials and learners’ achievement in the mathematics classroom research are also in the process of calculating a persuasive body of evidence that supports the use of manipulative materials in the mathematical classroom. Thomas, (1981) learning theorists have suggested for some time that children’s concepts evolve through direct interaction with the environment and instructional materials acts as a vehicle through which concepts can be delivery easily. This has been discussed in a number of ways: piaget (1971) emphasizes that concepts are formed by learners through a reconstruction of reality not through an imitation of it. Dewey (1938) argued that provision of firsthand experience in a child is learning program matters a lot and this is best exercised when children are provided with relevant instructional material to manipulate Dienes (1969) suggests that learners need to construct their own concepts from within their environment and use instructional materials from their immediate environment to help them master the concepts well rather than learners having
those concepts imposed to them. All these promotes the use of manipulative materials in the learning of mathematical concepts

2.2 Audio-Visual Materials and Number Work Achievement

This literature review is to address the second objective on how audio visual materials influence children’s achievement in learning number work. These refer to those materials which provide children with the opportunity of seeing and hearing at the same time. Examples of audio Visual materials are instructional or educational televisions and educational laptops. Balo (1971) in his words indicates that Audio Visual materials bring about good mastery of the content and they give children the first hand information hence help children learn the concept and provide experience that is not easily secured when using other instructional materials.

A study carried out by Zimmerman (2007) on the use on Audio-Visual devices he postulated that watching of television contribute a lot to the brain development of a child. It helps children to remember and compare what they have seen and heard at the same time, this can help in teaching counting of numbers. On the other hand, he commented that video can also be used in teaching patterns and number sequence. Therefore, when learners use audio visual materials in class they stimulate their interest and also enhance a friendly learning environment and also make mastery of the concept easy.

Eilington (1987) postulated that this category includes various systems like the television and CD players. These instructional materials can be used to give instruction to individuals and it is very useful to slow learners because they can watch and listen without holding back the class.
Thus it is also useful in teaching number rhymes, this gives learners an opportunity to learn the concept at their own pace and it bring about good mastering of number recognition.

A study by Oketunji (2000) stressed that Audio Visual materials when effectively used they lessen major problems of verbalism and makes it possible for the teacher to discuss the content with the learners easily, provide interesting approach to new topics and, gives best approach of the topic at first sight. These help learners to develop a positive attitude and interest in learning number work. Natolic (2011) emphasizes that audio-visual materials provide rich opportunities for children to develop communication skills and acquire enough mathematical vocabulary while actively being involved in solving mathematical problems. In other words, children certainly like it more and learn better if they are allowed to participate in important and appealing activities, such as sorting and grouping, matching, counting among others.

Macnaught, (2007) stressed that audio visual materials are useful they provide learning experience that are not easily accessed in other ways hence contribute to the depth and variety of learning. He also observed that audio visual materials are very useful in teaching and as a means of instructional as well as promotional aids. He further stressed that there should be continuous use of Audio-Visual materials in presentation when teaching mathematical concepts. According to Katherine (2009), learning takes place effectively when the teachers plan to provide learning situation in which a learner will learn because of his natural reactions of the provided materials during the process of learning and the learners need to be familiar with the materials since this gives them a background for good understanding. The teacher has to provide learning situation to satisfy the natural reaction of the learner and this is through the use of instructional
aids (audio visual resources) through these aids the attention of the learners is caught and their interest is also captured thus making them ready to learn. Through this learners will be able to acquire mathematical skills without much difficult.

The study used the Audio-Visual materials in teaching number sequence and ordering where by children had to listen to a rhyme on numbers, in this case they heard and saw in a video somebody singing number rhymes and the actions that are being done and then saw how the numbers are arranged (number sequence) this helped learners to remember and comprehend what they were being taught.

2.3 Visual Resources and Number Work Achievement

This literature reviewed aids the study in discussing the second objective on how visual materials influence children’s achievement in learning number work.

According to Ellington (1993) visual resources are the teaching and learning Aids that mostly appeal to seeing and hearing on the other hand they have categorized these devices into two classes that are the prosecuted devices and electricity for projection such as films slides. The non-projectors do not need light such as picture globes posters these aids learners to remember what they have learned for a long period and it helps the slow learners to learn at their speed, it also provides learners opportunity to learn during their free time. They can learn a number of concepts such as counting, ordering using the pictures this promote their achievement in number work. Nacino (1994) emphasized that visual resource are in three dimension that include objects and specimen further he discussed objects and specimen as things that provide first-hand experience which are necessary for learners concept formation since the learning materials are from their immediate environment. In order for pre-school children to master number work
concepts they need things they can see touch and smell because it gives them a rich and more meaningful understanding of what they learn, for instance in mathematic they can count comfortably using the locally available materials like maize cobs this enhances mastery of their concept. Wolfenson (2000) argues that the use of visual aids is necessary in teaching number work. He strongly suggested that visual aids help greatly in number value by improving in ordering, classification and counting according to him when learner use these visual aids they master the concepts that they have learnt, this enhances their achievement in mathematics.

Piaget (1980) emphasized that children should be actively involved in developing their own knowledge in order to understand the world around them. Piaget came up with stages of intellectual development in the stage of concrete operational he argues that children can learn mathematical skills such as classification, grouping and ordering. Since these concepts are practical, children use concrete objects to manipulate so that the skills can be acquired and mastered.

The ECD Syllabus (2008) in order for children to learn classification skills which can help them in ordering, matching, sorting and grouping they need concrete (visual) objects that they can manipulate especially concrete materials from their immediate environment this enhances learning in number work as guided by the teacher. Rey (1999) emphasizes that children should be given a chance to learn mathematical skills and concepts since children learn by doing they should be provided with concrete materials which are visual objects to manipulate hence learn a number of concepts such as sorting, grouping, classification and ordering.
Anderson (1998) children should be provided with concrete objects to help them in mathematical skills such as ordering classifying grouping sorting counting such materials help them to learn and acquire the concept more easily while Brunner (1980) in his work on mode of representational thought he came up with three different levels. The first one is enactive whereby learning involves hand on direct experience where children need objects that they can see and manipulate in this case number work can be well taught by providing the materials for learning different skills such as grouping, ordering and classifying. The other level is iconic based on the use of visual objects in this case things like pictures can be used in teaching number work by matching the pictures with the numbers.

Dienes (1969) in his work that relates to mathematical instruction suggests that children construct their own knowledge well from within than what is imposed to them on this line children can learn effectively by use of manipulative materials provided to them. According to Canny (1984) he asserts that charts are good materials that can be used in teaching number work since they arouse interest in mathematics and at the same time they involve mathematical concepts appealing to several senses such as seeing and touching. It is also a remedy for slow learners for specific content since they can use them at their own free time and pace. The study used the visual resources in teaching number work concept like counting, ordering, sentencing and classification.

### 2.4 Community Resource and Number Work Achievement

This literature review addresses the research objective on how community resources influence children’s achievement in learning number work.
Kate (2002) says that children acquire number work skills by using a variety of learning materials that are locally available within their surroundings. The surrounding community has rich reservoirs of instructional resource that can be used to teach number work, since they are the best because children collect the materials from their homes and the school compound. Therefore, they learn using the materials that they are familiar with and this makes learning to be continuous. These learning materials can be retrieved from their familiar environment such as home, school, market places and parents can lend a hand in giving them to school for learning number work concepts. Bruce and Tina (2007) post that trained teachers have factors to consider when choosing materials for learning mathematics some include durability, versatile and cost. On this note they put into consideration the materials collected from children’s environment. This enhances the use of a verity of materials since each learner is able to collect them from his or her own environment. Due to this every child gets an opportunity to manipulate materials and by so doing it promote the learning of number and their achievement in mathematics.

According to Piaget (1896-1980) in his words it is clear that children construct their own knowledge when provided with materials and conducive environment to interact with. He says that teachers as facilitators should provide an environment that stimulate learning. They should encourage them to use the materials within their environment when learning mathematics. This enables learners to see learning as a continuous process and it becomes easy to learn number work.

In a study carried out by Apondi (2013) on the impact of instructional materials in mathematics achievement, she found out that majority of the studies indicated that mathematical achievement
increases when manipulative materials (concrete) that are found locally are put into good use. Teachers need to know when, why and how to use manipulative materials effectively in classroom as well as opportunities to observe firsthand impact of allowing learning through exploration with concrete objects. Students who use manipulative materials during mathematics instructional outperform those who do not. Therefore, learners who will be engaged in using the community materials will acquire the mathematical skills with a lot of ease. These can also help learners to handle abstract concepts and symbols that are used to represent the concepts hence promote the achievement in number work.

Burns & Hamm (2011), they emphasize that concrete manipulative materials are objects used as tools that allow students to experiment and explore mathematical concepts in this case learners can be able to acquire mathematical concepts easily for this reason learners should be encouraged to collect concrete materials that are within their reach. When they use these materials in learning number work it helps them to understand better because they learn by manipulating materials they understand and this promote the achievement in number. They further indicate that when students employ concrete manipulative in long-term use during early elementary level, they have greater mathematical achievements than learners who have not used concrete manipulative materials that resemble everyday items. These materials help learners to connect between abstract mathematical concepts and the real world. Learners who normally use concrete materials when learning mathematics they acquire the concept with a lot of his and also likely to do well in mathematics right from pre-school to high level of learning since a good foundation has been laid by using instructional materials in learning number work.
The study used community resource which are locally available in teaching a number of concept like grouping matching ordering in this case learners will use materials that they are extracted from their intermediate environment to carry but the above activities since they are familiar with the materials they can realize that learning is a continuous process that is by using the materials that used for playing at home and outside the class.

2.5 Printed Resource and Number Work Achievement

There is a wide range of printed materials for teaching and learning number work they include charts number cards, number strips mathematical puzzle cards and text books they can be used to teach number recognition, ordering sequencing among others. According to the Hand book for pre-school teachers by Gatumu (2014) these are teaching devices that promote teachers and children’s research skills and also encourage teachers and children reading habits. Through the reading habits learners will be able to do a lot of practice that promote achievement in number work. It also enables teachers to research on different techniques to use when teaching different concepts in number work in order to enable learners acquire skills and lead teachers to another higher level than what they excepted when delivering the concept.

Kenya institute of education (2006) posits that printed resources also include the ECD syllabus this is a document that shows what is to be studied in pre-school and at different ages. It has been prepared to address the changing needs of society and ensure children safety. It has incorporated vital emerging issues. In the teaching of mathematics the syllabus gives topics that are supposed to suit different ages at different times. In pre- school topic are almost the same despite the fact that the teacher keeps on building on what has been taught in the previous level. In order for
learners to acquire the skills well in the three levels of pre-school, teachers should make use of relevant instructional materials when teaching.

Kenya institute of education (2006) suggest that Handbook for ECDE syllabus is a printed document meant to orient the teacher on how to interpret the ECDE programme. It should be therefore used as a reference and a guide on how to identify activities and materials that are appropriate for specific groups. A study carried out by Wagura Josephine Nyawia from Kenyatta University on the utilizing instructional materials when teaching mathematical she found out that the community selected materials for teaching mathematics include textbooks, pictures and charts among the printed materials. She further found out that mathematical text books are books that are structure to present the basic principles or aspects of mathematics. Miheso (2004) posits that mathematics text books are used as the backbone for laying the foundation of basic concept in mathematic in entire course thus promoting the building on of concept at different level right from pre school to high level of learning in print materials. Textbooks are highly organized they contain a summary of a specific body of knowledge and usually they contain learning activities or suggestion for further study mathematics textbooks also play a vital role in teaching they are alternative sources of mathematical knowledge that teachers communicate to learners and also as a medium for presentation and ordering. These text books provide activities that are suitable for different age or class. He further emphasized on mathematics text books together with the syllabus they major determine what mathematics topics are taught but it is the duty of teacher to determine how the topics should be taught and suitable instructional materials to be used. The mathematics textbook even dedicate the scope sequence and place of the mathematics program.
According to (Farrant 1964) charts and pictures are vital visual summaries of information in the teaching learning process. Charts can bring out steps in mathematics problem solving, learners can use charts to learn a number of concepts such as number recognition, counting and ordering they can also help learners read them during their free time and this enhances mastering of the concept. Whereas pictures help to illustrate and bring a sense of reality to what is taught, charts are also used as a means of presenting the materials in a memorable form and as such often play a central role in a lesson or a concluding part. The study used printed material to find out how useful they are in learning number work and how they help learners to learn a wide range of activities in number work such as counting, number recognition, sorting and classify among others.

2.6 Theoretical Framework

The theory of constructivism by Jean Piaget (1968) guided this study. Constructivism is a theory of learning (epistemology) that argues that humans generate knowledge and meaning from an interaction between their experiences and ideas. Constructivism views learning as a process in which the learners actively construct or build new ideas or concepts based on current and past knowledge or experience.

It is also known as social constructivism. Social constructivism posits that knowledge is constructed when individuals engage socially in talk and activity about shared problems or tasks. Further, Piaget noted that children should learn using their senses to help them acquire knowledge and skills to enhance their learning. Children should therefore, be provided with various materials to manipulate using their hands, to look smell and taste.
According to Piaget, children undergo cognitive development stages. In the concrete stage they are able to carry out mathematical activities involving sorting and grouping, matching comparing and ordering of objects. All these activities should involve real concrete materials from the environment. Basing the study on effect of instructional materials on pre-school children’s performance in learning of number work, the theory emphasizes on the use of concrete object that enables the learners to acquire number work skills by manipulating the real objects enables them to generate knowledge ideas and meaning from their experiences. Learning should be from known to unknown. In learning situation teachers should give children plenty of activities and real concrete materials from the environment to manipulate since children develop logical thinking and acquire problem solving skills besides providing plenty of materials. The team should be there to motivate children and create a suitable learning environment.

The theory is concerned with children, rather than all learners. Piaget-Child Psychology

This can be considered a weakness because this theory can only apply to a certain group. This point places many limitations that this theory can account for only children. It focuses on development, rather than learning, so it does not address learning of information or specific behavior. This point can be considered a weakness because it is saying that this theory focuses on the process of learning rather than the product of learning. This can be compared to constructivist teaching because the process of learning is very important, but it is also different because the process of learning in constructivist teaching which is just as important as the product of learning.
It proposes discrete stages of development, marked by qualitative differences, rather than a gradual increase in number and complexity of behaviors, concepts and ideas. However, this does not account for at risk student and late developers. In fact this point really points out that there isn’t such a thing as a late developer, or students with special needs. Piaget carried out his studies with a hand of participants his own children.

Jerome Bruner was greatly influenced by the work of Piaget. He was interested in the general nature of cognition (conceptual development). He has given additional evidence suggesting the need of first-hand student interaction with the environment. It’s not surprising that the current research has established a substantial relationship between the use of manipulative, materials and student’s achievement in the mathematics classroom. Learning theorists have suggested for sometime that children’s concepts evolve through direct interaction with the environment and materials provide a vehicle through which this can happen. This message has been conveyed in a number of ways: Piaget (1971) suggested that concepts are formed by children through a reconstruction of reality not through an imitation of it. Dewey (1938) argued for the provision of first hand experiences in a child’s education program; Bruner (1960) indicated that knowing is a process not a product Bruner (1966) suggests three modes of representational thought. That is an individual can think about a particular idea or concept at three different levels. Enactive learning involves, hands - on or direct experience. The strength of enactive learning is its sense of immediacy and the mode of learning Bruner terms iconic is one based on the use of the visual medium: films pictures, and the like. Symbolic learning is that stage where one uses abstract symbols to represent reality. Bruner demonstrates that key to readiness for learning is interaction central development, or how a child views the world. Here he refers to the work of Piaget, stating
that what is most important for teaching basic concepts is that the child be helped to pass progressively from concrete thinking to the utilization of more conceptually adequate modes of thought. (Bruner 1960, p. 38)

Bruner suggest that readiness depends more upon an effective mix of these three learning modes than upon waiting until some imagined time when children are capable of learning certain ideas. Through his writing is the notion that the key to readiness is rich and meaningful learning environment coupled with an exciting teacher who involves children as a process that create its own excitement Bruner clings to the idea of intrinsic motivation learning as its own reward.

Bruner’s theory has some weakness in the sense that it is not concerned with the infants but only with learners. Also the way of thinking is difficult to test and so the theory can’t be demonstrated to be true. Vygotsky’s philosophy shows how children make efforts to understand the world around them working in concert with teachers’ sensitive response and interactions. Vygotsky is relevant to instructional on concept such as scaffolding and apprenticeship in which a teacher or mere advanced peers helps to structure or arrange a task so that novice can work on it successfully. Children interact with the significant objects such as books, toys; counter playing materials thus, they are active partners in the interactions constructing of knowledge skills and attitude.

According to Vygotsky the zone of proximal development contains skills and concepts that are not fully developed. The kind of assistance needed to help children develop new skills and concepts within their Zone of Proximal Development (ZPD) take different forms for children of
different ages and abilities. Vygotsky also views interaction with peers and environment as an effective way of developing skills and strategies he suggests that teachers should use co-operative learning exercise where less competent children develop with the help from more skillful peers within (ZPD).

The idea of scaffolding cannot be used in other types of learning except in language. In scaffolding it allows children to arrange a task and work on it successfully but on the other hand it may not be very effective because of some issues that can come up like class control can be difficult to a certain point hence making the task not to achieve the objective on the same note they may not achieve the objectives fully because there are some terms that they may not be able to interpret.

The main problem within vygotsky’s idea of zone of proximal development is that it does not provide the true picture of the learning ability. Also there is no scale to measure an individual or child’s zone in terms of age because children are of different abilities. Another issue is that we know little about the generality and stability of the child’s zone across all domains. Zone of Proximal Development can be an issue if the child is not given support there will be no learning development because some skills and concepts are not fully developed. In the zone of proximal development there are important concepts in learning that are not fully developed so as to achieve or complete the task. In this case if the person to guide the child is not skilled then the objective of the concept may not be achieved fully.
In the study constructivism theory by Piaget has been discussed and it has been complemented by Bruner’s work and Vygotsky. They were also influenced by the work of Piaget in this case. Piaget argues that children use their senses to help them acquire knowledge by manipulating materials while Jerome Bruner argues that children best learn concepts through direct interaction with the environment hence the environment should have rich materials for children to manipulate. On the other hand, Vygotsky posits that when children interact with their peers and environment, it is the only effective way through which they develop skills.

According to Piaget, children should be provided with concrete materials to manipulate and this helps the children to develop logical thinking and at the same time, they are able to develop problem-solving skills. Bruner in his mode of learning termed as symbolic learning, he emphasizes that in this stage, one uses symbols to represent reality and this promotes the conceptual development. On the other hand, Vygotsky argues that when children interact with significant objects, they are capable of constructing knowledge skills and positive attitude.
2.7 Conceptual Framework

Figure 2.1 below shows how instructional materials influence performance of learners in number work in ECD schools

**Figure 2.1 Conceptual framework**

**Independent variables**

- **Visual resources**
  - Charts
  - Flashcards
  - Blackboards

- **Audio –visual resources**
  - Television
  - Laptops
  - Filmslides

- **Printed resource**
  - Text books
  - Handbook
  - Syllabus
  - Supplementary Books

- **Community resource**
  - Wooden blocks
  - Maize Cobs
  - Bottle tops

**Process**

- Interaction with instructional resources
- Learners interacting with instructional resource
- Teacher guiding learners on how to use instructional resource

**Output**

- Sequencing
- Ordering
- Number recognition
- Classifying
- Counting

**Dependent variable**

Achievement in number work in ECD schools
Figure 2.1. Shows how instrumental materials influence achievement of learners in number work in ECD centers. The independent variables will help in accruing the arithmetic or number work and improve the achievement of number work skills with a lot of ease. They include: types of instructional resource. Audio visual resources these instructional resource provide learners with the opportunity of seeking and hearing at the same time they encourage the mastery of a concept learnt in number work.

Visual resources are teaching and learning devices that mostly appeal to the sense of seeing. These resources help learners acquire the concept because of seeing what is happening and they can work or manipulate what they are seeing hence encourage mastery of content.

Printed resource help in retrieving and learners can read them during their free time like charts hence help in remembering what children have learnt. Community resources: the community has rich instructional resources. It provides children with resource that they are familiar with thus they are able to manipulate and construct their own knowledge and acquire number work concept with a lot of ease.

The government policy on free primary education has made most parents to stay at home with children as they wait to join class one this brings about poor foundation of number work and this leads to poor performance. The ICT policy the world in undergoing may not be accessed in most schools due to lack of ICT equipments for example lack of knowledge on computer can lead to poor achievement because the teachers and learners cannot be able to handle some materials like computer. Finally, achievement of number work can only improve if teachers and learners are able to access number work learning materials and through the accessibility of the materials
improves the actualization of arithmetic skills and it will also enhance good mastery of the content because children can work on their own either individually in pairs or groups hence helping one another to learn.
CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents details on research design, target population, sample selection and sample size, research instruments, instruments validity and reliability, data collection procedures and data analysis techniques for this study.

3.2 Research Design

This study used descriptive survey design. A descriptive survey attempts to describe characteristics of phenomena, options, views, subjects, presence, attitudes and perceptions of people of interest to the investigation (Borg and Gall, 1983). The study being a descriptive survey had set out to describe and interpret various situations. Best and Kahn (1993) post that descriptive research is concerned with condition or relationships that exist; practices that prevail; beliefs, points of view, or attitudes that are held by people; processes that are going on, effects that are being felt and related to some preceding events that have influenced or affected a present condition or events, individuals or procedures. To a greater extent, a descriptive survey aims to obtain information from a representative section of the population from there the investigator or researcher is able to generalize the findings of a larger population as a whole (Bell 1993).

The study used both quantitative and qualitative paradigms in collecting and analyzing data. Quantitative research design as a scientific method of evolution, yields numbers, charts and tables from a given population. According to Gall, Borg and Gall 1996), quantitative research designs are by their nature structural, predetermined and specific. Quantitative research design,
on the other hand, describes and develops on understanding for a particular social situation events or interaction (Bordan&Bilweni, 1982). The qualitative design will be used because it is naturalistic and thus allows participants to express their feelings more freely to collecting and analyzing data. The human phenomena that cannot be investigated by direct observation such as attitudes, views and quantitative methods complement each other according to Mugenda &Mugenda, (1999).

3.3 The Target Population
Fraenkel and Wallen suggest that a target population is the larger group to which one hopes to generalize or apply the findings. This study will target the following; private pre-schools and public pre-schools and teachers of ECD centres. The target population of this study consists of 45 pre-schools 15 private and 30 public, 90 pre-school teachers and 850 pre-school children in both public and private pre-school in Matungu Division in Kakamega County.

3.4 Sample and Sampling Procedures
Fraenkel and Wallen(1993) sampling is the procedure of selecting individuals for a study while a sample refers to a group on which information is obtained. The population of this study will be 45 pre-schools 90 pre-school teachers and 850 pre-school children. Mugenda and Mugenda (1999) recommend that the sample size of 30% of the population should be a representative enough for determining parameters or characteristics of the whole population. The sample population for this study will be 14 pre-schools 9 public pre-school and 5 private pre-school 27 pre-school teachers and 255 pre-school children.
Matungu Division was purposively selected because of well-established ECD schools in the area. According to Patton (1990) purposive sampling is used when there exists reasons to limit the sample to the cases that are likely to be “information rich” with respect to the purpose of the study. Simple random sampling was used to select pupils and teachers who would participate in the study. This technique allows each and every member to have equal and independent chance of being selected. The researcher gave numbers to the population so that any number selected randomly will end up qualifying to take part in the research.

3.5 Research Instruments

The researcher used the following research instruments questionnaires, number work test, observation checklist and observation scheduled to collect data. The instruments were developed by examining the research objectives, research questions and reviewed literature. These instruments were used because of their accuracy in accessing information during data collection as the respondents are literate and can give responses at their own pace.

3.5.1 Number Work Test

The researcher administered a test to learners which addressed the following aspects in number work. Matching items, classifying materials given according to colour and shape, counting numbers using counters and writing numbers 1-9

3.5.2 Questionnaire

The researcher administered a questionnaire to teachers which addressed the following aspects; the teacher’s gender age academic qualifications, the type of school they are teaching in, the
period they have worked there, instructional materials they use, how often they use them the availability of these materials and the problems they encounter in teaching number work.

### 3.5.3 Observation Schedules

The researcher used an observation schedule as one of the instruments for research, the following aspects were addressed and information collected using observation schedule, the name of the school, number of pupils, availability of instructional materials, relevance of instructional materials, how often the instructional materials are used by teachers while teaching and which instructional materials are used more often and how.

### 3.5.4 Observation Checklist

The checklist was also used to identify the availability of various teaching documents like schemes of work, the lesson plans and the syllabus to ascertain whether they are well structured and used according to the ECD curriculum. The progress records were closely examined to find how pupils are performing in number work and types of instructional materials available.

### 3.6 Validity and Reliability of the Instruments

According to Bell (1993), Validity is the extent to which values provided by the instruments actually measure the attributes they are intended to measure. To ascertain validity of the research instruments, a pre-test of the questionnaires was done to eliminate weakness and ambiguities but for the other instruments they may not require any pre-test the researcher went through them during the time of visiting the school for research due to the fact that they exist in the ECD centres. Therefore the researcher ascertained whether they were used properly and if they were
available. Expertise advice from supervisors of University of Nairobi were also sought to ensure validity.

3.7 Reliability

Bell, (1993) suggests that reliability is the degree of consistency between two measures. To ascertain reliability of the research instrument, test-retest method was applied on all instruments to ensure reliability and consistence of results. This involved administering the research instruments (questionnaire observation schedule observation check lists) to the same group of respondents at two separate intervals and then calculate the correlation coefficient. These instruments were given to a sample of 30 respondents chosen at random from each group. The responses were scored to give a set of scores. After two weeks the same instruments were used to the same sample and their responses scored to obtain another set of scores were correlated to ascertain their reliability.

3.8 Data Collection Procedure

The researcher obtained a letter of introduction from Nairobi University and took it to Mumias Education office to allow her conduct the research. The sampled schools were visited by the researcher to familiarize herself with the respondents. A second visit made as indicated in the observation schedule and observation check list on the different types of instructional resources available. The questionnaires were administered to the ECDE teachers to give the required information on instructional materials in relation to the performance of learners in number work and also the qualification. A test was given to the schools to get the differences in performance.
3.9 Data Analysis

Data was analysed both qualitatively and quantitatively. This is because the researcher used both numbers and words to analyse the data that was collected from the natural setting. The researcher organized the data along with the research questions and then analysed with some statistics like tables and percentages.

3.10 Ethical Concern

The research ethics that were observed in this study include: The researcher sought the consent of carrying out the research from the University of Nairobi Department of Education Communication and Technology, The District Education Officer (D.E.O) Mumias District and the head teacher or stakeholders of the schools where data was collected. The data that was obtained was used for educational purposes only. The researcher ensured that the identity of all respondents was protected by using codes. Lastly, the respondents’ opinions were respected.
CHAPTER FOUR

FINDINGS AND DISCUSSION

4.0 Introduction

This chapter discusses the findings of this research which were gathered through the research instruments; these findings have been tabulated in tables and charts in line with the different objectives that were set by this study.

Table 4.1 Audio visual materials

<table>
<thead>
<tr>
<th>Computer</th>
<th>Laptop</th>
<th>Film slides</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>00</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>00</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>00</td>
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<tr>
<td>00</td>
<td>2</td>
<td>00</td>
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<tr>
<td>1</td>
<td>2</td>
<td>1</td>
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<tr>
<td>0</td>
<td>1</td>
<td>00</td>
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<td>1</td>
<td>0</td>
<td>00</td>
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<td>0</td>
<td>1</td>
<td>00</td>
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<tr>
<td>0</td>
<td>0</td>
<td>00</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>00</td>
</tr>
<tr>
<td>0</td>
<td>20</td>
<td>00</td>
</tr>
<tr>
<td>Total 16</td>
<td>19</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 4.1 shows different groups of audio visual materials they include computers, laptop and films slides. From the observation that was made in the 14 schools there were 16 computers. The schools that had few computers learners were able to recite number rhymes and also recognize number with a lot of ease as compared to schools that had none. The schools that did not have most learners had a problem in number recognition. This is because they are lacking material to
manipulate since children learn best by doing. So they need to be engaged in learning by manipulating materials to help them master the concept well.

On laptops in the 14 schools they had a total of 19 laptops. The preschools that had laptops, learners were able to count numbers 1-9, recognize them with a lot of ease as compared to the schools that didn’t have. On film slides in the 14 schools they had a total of 4 film slides and the learners who had them were able to count, write and recognize numbers 1-9 thus use of film slides was minimal. This is in line with the first objective that was to establish the influence of audio-visual materials on children is learning achievements in number work. The findings revealed that the use of audio-visual materials is very minimal and a big number of learners lack an opportunity to interact and manipulate materials individually and this is because they are inadequate and in some case they are not available. From the questionnaires that were administered to teachers, the teachers responded by explaining that the audio visual materials assist learners in acquiring various concepts in number work thus improving their achievements. On the other hand lack of these materials brings about poor performance in mathematics right from preschool to high levels of learning so from the study the researcher was satisfied to note that audio visual materials have a strong impact in the achievement of learners in number work since these materials give them an opportunity to see and hear so they help them to acquire mathematical skills easily since they are able to manipulate the material comprehend and retain what they have learned and for that reason they need to be available for learners to manipulate hence improve the achievement in number work. These findings are supported by the ministry of Education (2011) that performance in mathematics among learners can be affected by many factors such as in-adequate learning resources.
Table 4.2 Visual materials

<table>
<thead>
<tr>
<th>CHARTS</th>
<th>FLASH CARDS</th>
<th>BLACKBOARDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>40</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>60</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>40</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>20</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>40</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>20</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>00</td>
<td>2</td>
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<tr>
<td>5</td>
<td>50</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>20</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>20</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>00</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>Total 58</td>
<td>345</td>
<td>21</td>
</tr>
</tbody>
</table>

Table 4.2 indicates the visual materials that were available in schools which include; charts, flashcards and blackboards. In the 14 schools there were 58 charts in total the schools that had enough charts, their learners were able to acquire the number concepts that they learnt such as counting recognition of numbers and matching numbers with the objects (number value) with a lot of ease as compared to the learners who didn’t have the instructional materials. These learners had a problem in counting and recognition of numbers. Those learners who had learning materials could understand and master the concepts faster such as counting, they used concrete objects to count and this made it easy for them to comprehend. Therefore the visual instructional materials place learners at better levels when learning number work. There were 345 flashcards in the 14 Pre-schools. In these schools most of them had the flashcards and learners were able to recognize number with a lot of ease. Lastly, there were 21 blackboards in the 14 schools and they were used for presentation. The schools that had two blackboards gave their learners an opportunity of reading the numbers and other number work charts hanged there during their free time which
enhanced the acquisition of number work concepts easily. This is in line with the second objective that was to determine the influence of visual materials on children’s learning achievement in number work from the findings most Pre-schools had visual materials like charts that were well displayed on the number work corner where learners were able to reach them and read during their free time. The flashcards were in-adequate and learners were forced to use them in groups. From the study it clearly portrays that visual materials have a positive impact on children’s learning achievements in number work if made available and adequate. Therefore visual materials should be put in place for learners to use them. Most teachers responded by clarifying that learners enjoy when using these materials hence make the lessons interesting and they assist in conceptualizing the concepts clearly. This is supported by Piaget(1896-1980) who emphasized on the use of concrete materials in the 3rd stage of development children should be given concrete materials to manipulate hence learn mathematical concepts with a lot of ease.

Table: 4.3 Printed materials

<table>
<thead>
<tr>
<th>TEXT BOOKS</th>
<th>REFERENCE BOOKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity /Books</td>
<td>Syllabus</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
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<td>5</td>
<td>4</td>
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<td>3</td>
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<td>4</td>
<td>2</td>
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<td>4</td>
<td>3</td>
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<tr>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Total 61</td>
<td>43</td>
</tr>
</tbody>
</table>
Table 4.3 indicates the printed materials that were available in the pre-schools. There were 61 textbooks in the 14 pre-schools and a total of 43 reference books. From the observation, both private and public pre-schools had activity books which enabled them carry out relevant activities that enabled them acquire some mathematical concepts such as classifying, counting, ordering and writing with a lot of ease while the few pre-schools that had about 3 activity books. Learners managed to do counting and writing of numbers but they lacked enough and relevant activities due. On the other hand, the reference books were 43 in total. The pre-schools that had a good number of reference and supplementary books, their learners were able to do some mathematical activities with a lot of ease such as writing of numbers, number recognition, classification and ordering among others, this was because they had supplementary books for carrying out more practice the pre-schools that did not have, their learners managed a few and this was because they lacked enough practice from the teachers’ questionnaire, those with reference books responded by noting that the textbooks, syllabus, and handbooks are very vital because they guide them with age-appropriate activities and with the extra exercise. Supplementary books assisted learners in mastering the concepts taught thus improving the achievement in number work. Therefore the study showed that lack of printed materials contributes to poor achievement in learning number work. This is because printed materials like the syllabus and reference books, guide teachers to know how to plan for teaching that is from known to unknown and also help them to organize topics to be taught systematically. Supplementary books helped them in giving activities for further practice that is why preschools that had enough printed materials, their learners had good mastery of the content that they were taught as compared to those preschools that had little printed materials, therefore lack of printed materials can definitely lead to poor achievement in number work. This is supported by the
Kenya Institute of Education (2016) that printed materials such as handbooks and syllabus help teachers to identify relevant activities for a particular age.

Table 4.4 Community Materials

<table>
<thead>
<tr>
<th>Wooden blocks</th>
<th>Maize cobs</th>
<th>Bottle tops</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>290</td>
<td>300</td>
</tr>
<tr>
<td>150</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>200</td>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td>60</td>
<td>500</td>
<td>350</td>
</tr>
<tr>
<td>180</td>
<td>150</td>
<td>200</td>
</tr>
<tr>
<td>60</td>
<td>250</td>
<td>280</td>
</tr>
<tr>
<td>150</td>
<td>240</td>
<td>150</td>
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<td>200</td>
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<td>00</td>
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<td>45</td>
<td>250</td>
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<td>40</td>
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<td>40</td>
<td>240</td>
<td>150</td>
</tr>
<tr>
<td>150</td>
<td>230</td>
<td>300</td>
</tr>
<tr>
<td>Total 1385</td>
<td>3650</td>
<td>3460</td>
</tr>
</tbody>
</table>

Table 4.4 above shows the finding as observed by the researcher the table shows that the community materials that were available included wooden blocks, maize cobs and bottle tops. In the 14 pre schools they had a total of 1385 wooden blocks, 3650 Maize Cobs and 3460 Bottle tops. The findings from the respondents show that community materials were used both in private and public pre schools. It was clear from the observation that pre-schools that had community resources learners were able to do classification, ordering, counting and writing with a lot of ease as compared to the schools that didn’t have or had very little that was shared by learners in groups or were used by teachers for demonstration. The findings indicated that some parents did not support their children fully through the provision of community resources since they are locally available or within their environment.
From the teachers’ responses the pre school that had the materials, there was an indication that however little the materials were they had an impact in the learners’ learning achievement in number work. This is because pre schools that didn’t have adequate materials to manipulate their learners could not acquire number skills and concept faster as compared to other preschool that had enough material for manipulation. Community materials that are extracted from the learners’ immediate environment help them to understand better because they are familiar with and may have interacted with them even before they came to school. This helps them to see learning as continuous and help them learn from simple to complex. Teachers further explained that when they used the community materials that children are familiar with, they understood the concept very well and could do some activities given on their own using the materials and they performed better as compared to those learners who had little or none at their exposure to manipulate. This study clearly indicates that if the community materials are made available and enough the learned could register or improve highly in their achievement in number work through the manipulating of different mathematical concepts. This is supported by Kate (2002) who emphasizes that children acquire number work skills by using a variety of learning materials that are locally available within their environment. The community has rich reservoirs instructional resources that can be used to teach number work, these materials seem to be the best since student are familiar with the materials. They can be retrieved from their familiar environment such as home, school and market places. Parents can lend a hand in giving them to school for learning number work concepts such as counting, ordering among others.
4.1 Children’s performance in number work

Figure 4.1. Shows children’s performance in number work

The researcher had to find out the performance of learners in number work by use of a test. The test was administered to all pre-schools that is preschools with the resources and pre-schools with inadequate resources. The figure 4.1 below shows the outcome.

The researcher made the following conclusions from the test given whereby preschools with printed resources scored 80% while pre schools with adequate community resources scored 60%. On the other hand, Pre-schools with inadequate visual resources scored below average that is 40% and preschools with inadequate audio visual scored very low as 20%. The findings clearly show that there is a great difference between pre schools with adequate instructional resources and pre schools with inadequate resource .This implies that instructional resources are essential when teaching number work because they enable learners acquire the number concepts and skills learnt by manipulating the materials. In the pre schools with inadequate resources, the
achievement was very low and this is due to limited or lack of adequate resources. Therefore the findings of this study reveal that the use of instructional resources has a positive influence in learning of number work in children’s achievement. According to the teachers, instructional resources are vital in learning number work in that, when they use them, they aid in the mastery of the content. These resources also assist learners in working out mathematical problems on their own once the teacher has explained how to use the instructional resources thus the whole learning experience becomes enjoyable to learners. On the other hand, the schools that do not have adequate instructional resources, teachers experience a lot of difficulties in teaching number work because learners are not able to internalize the concept taught adequately.
CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This chapter makes a summary of this study, draws conclusions based on the findings, makes recommendations and suggestions for further research. The following are the objectives that were set to address this study:

i. To establish the influence of Audio-Visual materials on children’s achievement in number work.

ii. To determine the influence of Visual materials on children in learning achievement in number work.

iii. To establish the influence of printed materials on children in learning achievement in number work.

iv. To determine the influence of community materials on children’s learning achievement in number work.

5.1 Summary of the Study

The purpose of this study was to investigate the influence of instructional materials on Pre-School children’s learning achievement in number work. This study was set to address four objectives on number work that is influence of Audio Visual materials in children’s learning achievement in number work influence of Visual Materials in children’s learning achievement in number work influence of printed materials in children’s learning achievement in number work and influence on community resource in children’s learning achievements in number work. The instruments for data collection were as follows: number work test that was
administered to learners to assess matching, counting numbers and writing numbers 1-9. Questionnaires for pre-school teachers to assess the types of instructional materials, how often they are used, availability of the materials and problems encountered when using the materials when teaching. The observation schedule was used by the researcher to observe the availability of instructional materials, how often the instructional materials are used by teachers when teaching. The observation check list was also used to find out the type of instructional materials available, the types of printed materials available and the progress record to find out learners’ performance.

The findings of this study revealed that in-adequate instructional materials had an effect on children’s performance in number work in pre-school. The researcher found out that almost all pre–schools had community materials and printed materials this is because most of community materials are retrieved from the community and most of the printed materials are given by the government. Most pre-schools did not have the audio–visual materials and their learners had a problem in counting numbers 1-9 and also number recognition. Adequate materials and a variety are vital in pre-school since they give children an opportunity to manipulate the materials individually and this enhances good performance.

The study used descriptive survey design. Literature was reviewed based on instructional materials, the influence these materials have on children in learning achievements. The conceptual framework was used to address some of the variables involved in teaching number work.
The sample for this study was 14 pre-schools, 9 public pre-schools, 5 private pre-schools and 28 pre-school teachers. The response was 100% for the pre-school teachers. The data was analyzed in tables, figures and graphs.

5.2 Conclusion

5.2.1 Audio Visual Materials on children’s learning achievement in number work.
The researcher found out that the use of Audio Visual materials in teaching number work was very minimal in almost all schools except 9 pre-schools that had a few and their learners were able to manipulate them hence learn number concept with a lot of ease. In considering the performance learners with Audio Visual materials registered a good performance.

5.2.2 Visual materials on children’s learning achievement in number work.
The researcher found out that the use of visual materials was above average. Most of the visual materials that are locally available were sufficient for learners to manipulate. On the other hand, there were charts in most schools but they need to be updated. The use of flashcard was minimal. The 9 preschool that had adequate visual materials children scored 50% and above in counting, writing of numbers and classifying while those pre-schools that had inadequate obtained low score.

5.2.3 Printed materials on children’s learning achievement in number work.
The researcher found out that most pre-schools had the activity books and their learners were able to carry out some mathematical concepts such as classifying, counting and writing with a lot of easy because teachers were able to give relevant activities. On the other hand, on reference
books, the hand books and syllabus were available and some pre-schools had supplementary books for more practice; 5 pre schools lacked supplementary books and their learners seemed to have a problem in carrying out some number work activities like sequencing and writing and this brought about poor performance in number work.

### 5.2.4 Community Materials

Table 4.4 showed that community materials were available but in public schools they were not adequate compared to the population of their learners. In private schools they were adequate hence each learner had an opportunity of manipulating the materials individuals and this brings about acquisition of the mathematical concept with a lot of ease hence good performance. While on the public schools they manipulated some materials in groups and this denied some learners an opportunity of interacting with the materials hence poor performance in number work.

### 5.3 Conclusions

Teaching and learning resources are necessary in the teaching of number work. This is because the materials help the learners to acquire and master the concept with a lot of ease. On the other hand, they help teachers to explain a concept with a lot of ease. Adequate visual, audio visual, community and printed materials are necessary in teaching and learning of number work. From this study the researcher found out from the data that instructional materials are inadequate in the pre schools and this may be one reason that brings about poor performance in number work. The pre-school children, teachers and parents should be fully committed in the provision of the instructional materials more especially the community materials that are available in their immediate environment.
On the other hand, the government has not addressed the issue of overcrowded classes through enough supply of teachers and adequate teaching and learning materials in public schools. Therefore, from the findings, children’s poor performance in number work has been attributed to the lack of inadequate teaching and learning materials. These issues of teaching and learning materials should be addressed so as to cap the issue of poor performance in number work from low to high levels of learning.

5.4 Recommendations

Therefore from the foregoing, the researcher wishes to make the following recommendations:

i. The government should set aside some funds to cater for pre-school and also provide adequate and relevant materials for pre schools.

ii. The teachers should attend refresher courses and seminars to gain more insight in teaching number work and the teaching materials in teaching number work.

iii. Parents should be sensitized on provision of then locally available materials hence support the learning process of their children.

iv. Teachers should vary their teaching methodology to suite the learners’ needs and experience through their own creation of learning materials.

5.5 Suggestion for further research

i. The same study can be carried out in different districts and schools using different research instruments to verify the results of the current study.

ii. A further research on effect of audio visual materials on children in learning achievement in number work should be carried out.
iii. Research can be carried out on effect of government fund allocation for early childhood education.
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Appendix 1: Questionnaire for Teachers

Kindly read the questionnaire and complete it. Indicate your response(s) by marking a tick in the spaces provided. In section B write down your responses or comments. Write them in the spaces immediately after the questions.

1. Indicate the category of your school
   - [ ] Private
   - [ ] public

2. What is your gender? Below 24 [ ]
   - 26 – 30 [ ]
   - 31 – 35 [ ]
   - over 35 years [ ]

3. What is your highest academic qualification
   - KCPE [ ]
   - O-level [ ]
   - A level [ ]

4. What is your professional qualification?
   - Masters [ ]
   - Degree [ ]
   - Diploma [ ]
   - Certificate [ ]

5. Indicate whether trained
   - [ ] Untrained
   - in service [ ]
   - none of the above [ ]
SECTION B

1. For how long have you worked as an ECDE teacher?

2. List down instructional materials available in your school
   (i)
   (ii)
   (iii)
   (iv)
   (v)
   (vi)
   (vii)
   (viii)
   (ix)

3. Are there some instructional materials you fees are necessary in your school but are not available
   □ Yes □ No
If Yes in question 3 list them down

(i)

(ii)

(iii)

(iv)

(v)

(vi)

(vii)

(viii)

(ix)

4. List different types of instructional materials found in your school

(i)

(ii)

(iii)

(iv)

(v)

(vi)

(vii)

(viii)

(ix)

5. List three problems you encounter in the process of using the instructional materials.
Appendix 2: Observation Check List

DATE OF OBSERVATION …………………………………………………………………………

<table>
<thead>
<tr>
<th>SCHOOL CATEGORIES</th>
<th>TYPES OF INSTRUCTIONAL RESOURCES</th>
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<tbody>
<tr>
<td></td>
<td>Visual materials</td>
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<tr>
<td></td>
<td>Audio visual materials</td>
</tr>
<tr>
<td></td>
<td>Community resources</td>
</tr>
<tr>
<td></td>
<td>Printed materials</td>
</tr>
</tbody>
</table>
Appendix 3: Observation Schedule for Children

DATE OF OBSERVATION ........................................

<table>
<thead>
<tr>
<th>SCHOOL CATEGORY</th>
<th>MATCHING</th>
<th>CLASSIFYING</th>
<th>COUNTING</th>
<th>NUMBER WRITING</th>
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<tbody>
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</table>
Appendix 4: Pre-School Number Work Test
1. Counting numbers 1 – 9
2. Colouring numbers 1 - 9
3. Match items with the number

1

2

4

3
Appendix 5: Research Permit

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Ref No: NACOSTI/P/17/68031/19254

Date 18th September, 2017

Hannah Moraa Abaya
University of Nairobi
P.O. Box 30197-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on “Influence of instructional materials on pre-school children’s learning achievement in number work in Matungu Division, Kakamega County,” I am pleased to inform you that you have been authorized to undertake research in Kakamega County for the period ending 18th September, 2018.

You are advised to report to the County Commissioner and the County Director of Education, Kakamega County before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit a copy of the final research report to the Commission within one year of completion. The soft copy of the same should be submitted through the Online Research Information System.

GODFREY P. KALERWA MSc., MBA, MKIM
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Kakamega County.

The County Director of Education
THIS IS TO CERTIFY THAT:  
MS. HANNAH MORAA ABAYA  
of UNIVERSITY OF NAIROBI, 35822-200  
nairobi, has been permitted to conduct  
research in Kakamega County  
on the topic: INFLUENCE OF  
INSTRUCTIONAL MATERIALS ON  
PRE-SCHOOL CHILDREN’S LEARNING  
ACHIEVEMENT IN NUMBER WORK IN  
MATUNGU DIVISION, KAKAMEGA  
COUNTY.

for the period ending:  
18th September, 2018

Applicant’s Signature

Director General  
National Commission for Science,  
Technology & Innovation

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research site specified period.
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