DETERMINANTS OF PRE-PRIMARY SCHOOL TEACHERS’ USE OF IMPROVISED MATERIALS IN SCIENCE INSTRUCTION IN BUNGOMA EAST SUB COUNTY, BUNGOMA COUNTY, KENYA

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A RESEARCH THESIS SUBMITTED IN PARTIAL FULFILMENT FOR THE AWARD OF DEGREE OF MASTERS OF EDUCATION (EARLY CHILDHOOD EDUCATION), IN THE SCHOOL OF EDUCATION, KENYATTA UNIVERSITY

APRIL, 2017
DECLARATION

I declare that this thesis is my original work and has not been presented in any other university/institution for certification. This research thesis has been complemented by referenced sources duly acknowledged. Where text, data, graphics, pictures or tables have been borrowed from other sources, including the internet, these are specifically accredited and references cited in accordance with anti-plagiarism regulations.

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DEDICATION

I dedicate this piece of work to Almighty God for his strength, grace and inspiration in my endeavor to carry out this research. Secondly, I wish to express my sincere gratitude and appreciation to my loving parents Ben Makokha and Clare Naliaka Lusaka who nurtured my education and firmly encouraged me through their unwavering prayers and support that has brought me this far. Finally this work is dedicated to my beloved siblings John, Audrey, Angeline, Roy, Stella, Doreen and Eugene for their encouragement and support during the period of my studies at Kenyatta University.
ACKNOWLEDGMENT

First and foremost I highly express my heartfelt gratitude to my Heavenly Father for all the provisions, strength, support and giving me an opportunity to pursue and complete this research thesis. I would also wish to thank my dear parents Mr. and Mrs. Makokha for their unfailing love, support, care and financial provisions throughout my studies. Many are times I felt discouraged but you were always there to lift me up.

Many thanks goes to my supervisors Dr Gladwell Wambiri and Dr John Ng’asike for their guidance, enthusiastic encouragement, mentorship, inspiration and useful critiques of this research work. I would also like to express my gratitude to all lectures in the department of early childhood studies in Kenyatta University for their professional support and encouragement.

My grateful thanks are also extended to Flavian Waiswa and Juddy Ngusa. You were not just my colleagues but also my sincere friends. Many are the times you supported, encouraged, guided and gave me a shoulder to lean on. The journey has not been smooth, but I derived hope and strength from you. Thank you very much for your sacrifice.
# TABLE OF CONTENTS

DECLARATION ........................................................................................................... ii  
DEDICATION .............................................................................................................. iv  
ACKNOWLEDGMENT ................................................................................................ iv  

TABLE OF CONTENTS ............................................................................................. v  

LIST OF TABLES .......................................................................................................... x  
LIST OF FIGURES ....................................................................................................... xi  
ABBREVIATIONS AND ACRONYMS ....................................................................... xii  
ABSTRACT .................................................................................................................... xiii  

CHAPTER ONE: INTRODUCTION AND BACKGROUND OF THE STUDY .......................................................................................... 1  
1.0 Introduction .......................................................................................................... 1  
1.1 Background to the Study ..................................................................................... 1  
1.2 Statement of the Problem ................................................................................... 8  
1.2.1 Purpose of the Study ..................................................................................... 9  
1.2.2 Objectives of the Study ................................................................................ 10  
1.2.3 Research Hypotheses ................................................................................... 10  
1.3 Significance of the Study ................................................................................... 11  
1.4 Limitation/Delimitation of the Study ................................................................. 12_Toc377295150  
1.4.1 Limitations of the Study .............................................................................. 12  
1.4.2 Delimitations of the Study .......................................................................... 12  
1.5 Assumptions of the Study .................................................................................. 13  
1.6 Theoretical and Conceptual Framework ........................................................... 13  
1.6.1 Theoretical Framework .............................................................................. 13  
1.6.2 Conceptual Framework .............................................................................. 15  
1.7 Operational definition of terms ........................................................................ 18
CHAPTER TWO: REVIEW OF RELATED LITERATURE

2.0 Introduction

2.1 Availability of Science Improvised Instructional Materials in Pre-primary Schools

2.2 The Frequency of Use of Science Improvised Instructional Materials in Pre-primary Schools

2.3 Pre-primary School Teachers’ Training Level and Use of Improvised Instructional Materials

2.4 Pre-primary School Teachers’ Teaching Experience and Use of Improvised Instructional Materials

2.5 Pre-primary School Head Teachers’ Support and Teachers Use of Improvised Instructional Materials

2.5 Summary of Literature Reviewed

CHAPTER THREE: METHODOLOGY

3.0 Introduction

3.1 Research Design

3.1.1 Research Variables

3.2 Location of the Study

3.3 Target Population

3.4 Sampling Technique and Sample Size

3.4.1 Sampling Technique

3.4.2 Sample Size

3.5 Research Instruments

3.5.1 Questionnaires for the Teachers

3.5.2 Observation Checklist

3.6 Piloting of the Research Instruments

3.6.1 Validity of the Instruments

3.6.2 Reliability of the Instruments

3.7 Data Collection Procedures

3.8 Data Analysis
3.9 Logistical and Ethical Consideration

3.9.1 Care and Protection of Research Participants

3.9.2 Protection of Research Participants Confidentiality

3.9.3 Informed Consent Process

3.9.4 Community Considerations

CHAPTER FOUR: PRESENTATION OF FINDINGS, INTERPRETATION AND DISCUSSIONS

4.0 Introduction

4.1 General and Demographic Information

4.1.1 Instrument Return Rate

4.1.2 Demographic Data

4.1.3 Distribution of teachers’ by level of training

4.1.4 Distribution of teachers by teaching experience

4.2 Availability of improvised instructional materials used during science activity

4.3 Frequency of use of IIM during science instruction in pre-primary schools

4.4 Relationship between teachers level of training and the frequency of use of improvised materials

4.5 Relationship between teachers’ level of teaching experience and frequency of use of improvised instructional materials

4.6 Relationship between head teacher’s level of support and the teachers’ use of improvised instructional materials

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

5.1 Summary of the Findings

5.2 Conclusions

5.3 Recommendations

5.3.1 Recommendations for pre-primary school teachers

5.3.2 Recommendations for the head teachers
5.3.3 Recommendations for District Centre for Early Childhood Education ......78
5.4 Suggestions for Further Research ..........................................................79
REFERENCES ................................................................................................80
APPENDICES ................................................................................................86
APPENDIX I INFORMED CONSENT FOR TEACHERS .........................86
APPENDIX II: QUESTIONNAIRES FOR THE TEACHER ......................88
APPENDIX III: OBSERVATIONAL CHECKLIST .....................................92
APPENDIX IV: RESEARCH AUTHORIZATION ..................................94
APPENDIX V: RESEARCH PERMIT .........................................................95
LIST OF TABLES
Table 3.1 study variables.................................................................37
Table 3.2 Sample Size of the Study....................................................41
Table 4.1. Availability of improvised instructional materials used for science activities in schools.........................................................55
Table 4.2 Teacher's Level of Training and Frequency of use of IIM.........60
Table 4.3: Chi-square test results for relationship between teachers training level and frequency of use of IIM at .005 level of significant.........................62
Table 4.4 Teachers teaching experience and the frequency of use of IIM....65
Table 4.5. Chi-square tests results for the relationship between teachers teaching experience and the frequency of use of IIM......................................................66
Table 4.6 Level of head teachers support and pre-primary teachers’ frequency of use of IIM..............................................................71
Table 4.7. Chi-square test results for the relationship between the level of head teachers’ support and the teachers’ frequency of use of IIM during science instruction.................................................................72
LIST OF FIGURES

Fig 1.1 Conceptual framework on the relationship between frequency of use of IIM by pre- primary teachers and the factors that influence their use ......................16
Fig 4.1 Distribution of teachers by level of training ................................51
Fig 4.2. Distribution of teachers teaching experience ................................53
Fig 4.3 Frequency of use of IIM .................................................................58
Fig 4.4 Headteachers level of support to pre-primary teacherstowards the use of IIM ........................................................................................................69
## ABBREVIATIONS AND ACRONYMS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DICECE</td>
<td>District Centre for Early Childhood Education</td>
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<td>ECDE</td>
<td>Early Childhood Development Education</td>
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<tr>
<td>ECD</td>
<td>Early Childhood Development</td>
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<tr>
<td>IIM</td>
<td>Improvised Instructional Materials</td>
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<tr>
<td>IM</td>
<td>Instructional materials</td>
</tr>
<tr>
<td>KIE</td>
<td>Kenya Institute of Education</td>
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<td>MOE</td>
<td>Ministry Of Education</td>
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<td>MOES&amp;T</td>
<td>Ministry Of Education Science and Technology</td>
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<td>NACECE</td>
<td>National Centre for Early Childhood Education</td>
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<td>SDGs</td>
<td>Sustainable Development Goals</td>
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<td>SMASSE</td>
<td>Strengthening Mathematics and Science Education</td>
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<td>SPSS</td>
<td>Statistical Packages for Social Sciences</td>
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Science is essential to all people and it should be taught in all learning institutions since it helps in the growth of economy, industrialization and advancement in technology. Early years are important to build a solid foundation for learners in science subjects. In this regard science education and instruction should be made affordable and accessible to all learners by using locally improvised materials. Research done in Western countries like USA revealed that teachers used materials from the local environment to teach science in preschools. In Africa especially in Nigeria and Kenya, there is inadequate use of materials for science instruction and majority of teachers adopt the lecture method to teach science in pre-primary schools, blackboard appears to be the common material used. This really hinders proper science instruction to learners given that science is a practical subject and children learn best by doing. The purpose of the study therefore was to examine the pre-primary school teachers’ use of improvised materials in science instruction in Bungoma East Sub County, Bungoma County. The study specifically sought to determine the relationship between the frequency of use of improvised instructional materials in science instruction by pre-primary teachers and the factors which were believed to influence their use. Jean Piaget’s theory of learning guided the study. Co relational study design was employed. The dependent variable was the frequency of use of improvised materials in science instruction while independent variables were the availability of improvised materials, teachers training level and teaching experience and the level of head teachers support towards improvisation. Purposive and random samplings were used to select the study location. Stratified sampling was used to select the pre-primary schools from the 58 targeted schools (34 public and 24 private). Questionnaires and observation checklist were used to generate data where content validity and test retest techniques were used to determine validity as well as reliability of the instruments respectively. Results from data analysis were presented using tables and were organized according to objectives. The data collected was coded and analyzed using the Statistical Package for Social Science (SPSS). Quantitative techniques were used to analyze data which involved frequencies, standard deviation, means and percentages. Inferential statistics used to test null hypotheses was Chi-square at alpha value 0.05 (p<0.05). Results from the data analysis revealed that there were a variety of improvised science instructional materials in pre-primary schools although they were not adequately used. There was no significant relationship between teachers training level and the use of improvised materials in science instruction at (p=0.957). It was also evident that there was significant relationship between teachers teaching experience and frequency of use of improvised instructional materials at (p=0.001). It was also observed that there was significant relationship between head teachers level of support and teachers frequency of use of IIM at (p=0.012). The findings suggest that when teachers are well experienced and get adequate support from their head teachers, they are able to use IIM frequently and effectively. To improve the use of improvised instructional materials in the schools, the teachers, head teachers and other stakeholders need to work together and organize seminars, workshops and capacity building forums to get empowered at the district and county levels.
CHAPTER ONE

INTRODUCTION AND BACKGROUND OF THE STUDY

1.0 Introduction
This chapter presents the background of the study, followed by the statement of the problem, purpose of the study, objectives and hypotheses, significance of the study, limitation and delimitation, assumptions, theoretical framework, conceptual framework and concludes with definition of operational terms.

1.1 Background to the Study
Science is the foundation upon which today’s technological advancements are laid. Nations worldwide including Kenya, are striving hard to develop technologically and scientifically. Science is essential for citizens of a given country to learn and it should be taught in all learning institutions starting from pre-primary to higher institutions of learning. Science is vital in providing learners with the skills required for accelerating economic growth, industrialization and advancement in technology (MOEST, 2005). It is a core subject in helping Kenya to attain vision 2030 which is geared towards developing Kenyan economy and technology. Science has become an integral part of human society Owolabi (2004), and through it man has been able to better understand his environment.

Children are scientific in nature and so they are curious to learn everything that happens around them. Science enables them to understand the world in which they
live. They use all their senses in learning scientific processes that involve exploration, discovery, experimentation, organization of information and reporting. It is essential to provide a conducive and stimulating environment where children learn science by doing and carrying out activities (Tina, 2005). The children should thus be provided with many activities accompanied with relevant adequate materials from the surrounding environment. Pre-primary school teachers play crucial role in bringing positive learning of science in children. Therefore, they should improvise, organize collection and make materials from the natural environment to be used in teaching and learning.

Improvised instructional materials (IIM) are acquired from the local environment, either within or outside the school environment. They are sourced by teachers, parents, learners, community members and other charity organizations. Improvisation involves the process of selection and creation of relevant instructional elements for teaching and learning process to achieve the educational goals and objectives (Eshiet, 1996). Science IIM is effective in teaching and learning process because the learners are familiar with them hence they enjoy learning. They also motivate learners, encourage classroom participation, enlarge the limited knowledge of learners as well as improving the quality of teaching and learning (Ibe Bassey, 2012). According to KIE (2008) IIM enhance smooth transition of children from home to school as it makes it easier for them to connect new knowledge to their own daily life experiences.
Globally, like in USA science instruction in pre-primary schools follows the National Association for Education of Young Children (NAEYC) guidelines on developmentally appropriate practices (DAP). A study conducted by Ngasike (2012), indicated that the guideline advocates for cohesive science teaching and learning through play, exploration of the natural environment, experiments, creativity and problem solving. The teacher has to arrange the classroom well to ensure learners learn science well and their misconceptions are cleared. The programme ensures that children have adequate materials from the natural environment to use in learning science. This shows that science learning reflects what goes on in the child’s environment thus ensuring that teaching and learning of science is meaningful and relevant to the life of the learners. IIM are acknowledged globally and used in pre-primary science instruction and Africa let alone Kenya, should similarly follow suit.

In Nigeria, the government has tried to put several mechanisms to boost science performance in the country. In spite of all efforts to make science education effective, there has been consistent poor performance in the subject and Poopola, (2002) indicates that the problem can be traced back to the poor teaching methods in the early years. Therefore, in the new approach to teaching science in the primary schools, the aim is not to pour in facts and to rely on textbooks, rather to construct an environment full of materials in which a child can explore for himself/herself by feeling, comparing and discovering relationship through his own observation. The
effective teaching of science concept therefore, requires effective communication techniques by teachers and learners since science consist not ordinarily imparting the facts but encouraging the students to observe and reason. For this effective communication to take place in science classes, researchers suggested the use of interactive approach to science teaching with audio, visual audio-visual and tactile materials to stimulate learners interest in learning and improve their academic achievements. Esu, Enukohua and Umorm (2004) assert that these instructional materials are the pivot on which the wheel of the teaching-learning process rotates. They help to promote greater acquisition and higher retention of factual knowledge as well as contribute to the development of attitude and behavior change. They challenge pupils’ creativity and help to overcome physical disabilities and hindrances to learning in the subject matter (Igwe, 2005).

Instructional materials are not widely used in schools by teachers and learners. Ezeasor (2012) study on assessing teachers’ use of improvised materials in science education revealed that most science teachers did not improvise science materials nor use IIM in teaching sciences in schools. This was attributed to poor funding, lack of time on the part of the teacher, lack of creativity and poor improvisation skills. Similarly Ofoegbu (2012) study on resources for teaching basic science and technology in Nigerian primary schools found that the teachers used only textbooks and chalkboard during instruction. This inhibits the pre-primary learners in developing their inherent potential and also the use of senses in learning science. Therefore, there is need to embrace improvisation of instructional materials from
the local environment. The above studies were done in Nigeria and yet they cannot be generalized in Kenyan pre-primary schools hence the need for the current study to ascertain the availability and frequency of use of IIM in pre-primary schools.

Since science is vital in both developed and developing countries, the basic scientific education foundation should be laid in early childhood using culturally relevant improvised materials where children can learn science in culturally responsive ways (Ngasike, 2010). Science instruction for young children should be activity oriented with variety of materials from the local environment to manipulate and construct their own scientific knowledge given that, science is compulsory from pre-primary to secondary schools (Republic of Kenya, 1999). Children ought to access education that is based on their culture to ensure easy transmission of knowledge, attitudes and values about the society (ECDE National policy framework, 2006). Children should be taught using improvised and culturally relevant instructional materials since it has the local content like pictures, plants, foods, hides, models, story books, charts, fruits, soil, animals and real objects. Therefore this study had the main objective of assessing teachers’ frequency of use of IIM in pre-primary school science instruction.

To be able to provide Education For All (EFA) and to attain Sustainable Developmental Goals (SDGs), the main objective is to provide quality education and training to every child despite the background they come from. Children can access cheaper and quality education through use of locally improvised materials
from the local environment. This can also motivate children to come to school and to reduce the absenteeism rate as indicated by Uwezo report (2011). Use of IIM makes learners enjoy learning and retain learnt content for long. The role of the teachers is evidently significant, they need to provide locally improvised materials in the classrooms as well as use them in the teaching and learning process.

Pre-primary school teachers’ use of instructional materials in the teaching learning process is influenced by several factors. MOEST (2003) notes that among factors that shape the teachers’ quality are: formal education attainment, teacher training attainment, the experience gathered by teachers during teaching, management support and availability of the teacher. A study by Kangori (2014) on teacher related factors in the implementation of science curriculum in preschools. The study established that teacher related factors such as academic qualification, professional qualification, teaching strategies and teachers’ attitudes influence implementation of science curriculum. The above study did not shed light on how the teachers related factors affect the use of IIM during science instruction in pre-primary schools. Therefore, there was need to research on the relationship between teacher related factors like training level, teaching experience and head teachers level of support and use of IIM during science instruction in Bungoma East Sub County pre-primary schools.

Due to poor performance of science subjects in primary and secondary schools. MOE (2003) came up with a programme for primary and secondary science teachers...
called Strengthening Mathematics and Science Education (SMASE) with the main objective of making mathematics and science instruction learner centered as well as improving the performance of science in both primary and secondary schools. The programme appears to concentrate on improving science in primary and secondary school levels. In the process, it has neglected the pre-primary level which might be the root cause of poor performance in higher levels in science subjects. The current study is concerned with pre-primary level by specifically looking at the frequency of use of IIM because without a solid foundation in science skills at the early years, the effort at higher level can easily be counterproductive.

Research conducted in Kenya on use of instructional materials and science instruction in pre-primary schools, appeared not to focus on the use of IIM and teacher related factors that affect its use. The studies focused on some other aspects such as use of culturally relevant materials (Waigera, 2013), Effects of learner participation in science activities (Wambui, 2013), teachers’ related factors in implementation of science activities in preschools (Kangori, 2014). Conditions for science curriculum implementation in ECDE centers (Indoshi et al, 2008), preschool teacher knowledge and use of visual media (Mwololo, 2012). Ngasike (2010) science instruction in pre-primary schools in Turkana and Kathure(2011) study on children’s own investigation on preschool science activities. The above studies did not shed light on availability and use of IIM during science instruction in pre-primary schools. Therefore, this study addressed the existing gap by investigating the availability and frequency of use of IIM during science instruction and the
possible teacher related factors that influence its use like teachers’ training level, teachers’ teaching experience and level of head teachers’ support in Bungoma East Sub County, Bungoma County.

1.2 Statement of the Problem

Science is largely practical. Teachers need to provide adequate materials from the local environment for pre-primary learners, as they learn best by doing activities and manipulating materials. By doing so, they understand the world around them by observing, hearing, exploring, discovering, experimenting and manipulating. It is unfortunate that research has shown that science instructional materials are inadequate and minimally used in Kenyan pre-primary schools. It is also observed that there is consistent poor performance in national examinations in science subjects at both primary and secondary schools levels. This calls for pre-primary school teachers to embrace improvisation of materials from the local environment to curb for the shortage, improve science instruction and performance in schools.

Pre-primary schools in Kenya do not receive funding from the government for purchasing IM, there is need to establish how pre-primary schools obtain materials and how frequently they are used. If this is not established, some pre-primary schools may continue operating with scarce or no materials thus impacting negatively on children’s foundation for science development. Lack of knowledge from research to inform the use of IIM in early childhood education has hampered efforts by teachers and curriculum developers on the use of these locally available
resources in science instruction in ECDE classrooms. This study intended to address this gap in knowledge and it investigated the availability of IIM and relationship between frequency of use of IIM during science instruction and teacher related factors affecting its use in Bungoma East Sub County ECDE centers.

1.2.1 Purpose of the Study
The purpose of the study was to establish the determinants of pre-primary school teachers’ use of improvised instructional materials in science instruction. The study established the availability and frequency of use of IIM during science instruction and further investigated the relationship between teachers’ frequency of use of IIM and teachers’ training level, teaching experience and the level of head teachers’ support in Bungoma East Sub County pre-primary schools, Bungoma County.
1.2.2 Objectives of the Study
The study was done in Bungoma East Sub County, Bungoma County basing on the following objectives:

i. To establish the availability of improvised instructional materials used during science activity in pre-primary classrooms.

ii. To determine the frequency of use of IIM during science instruction in pre-primary schools.

iii. To establish the relationship between pre-primary school teachers’ level of training and frequency of use of improvised science instructional materials in the classrooms.

iv. To determine the relationship between pre-primary school teachers’ teaching experience and frequency of use of improvised materials in teaching science in pre-primary schools.

v. To determine the relationship between level of head teacher’s support in the use of improvised science instructional materials and the teachers frequency of use of IIM in the classrooms.

1.2.3 Research Hypotheses

Ho1: There is no significant relationship between pre-primary school teachers’ level of training and the frequency of use of IIM in science instruction.
Ho2: There is no significant relationship between pre-primary school teachers’ teaching experience and the frequency of use of IIM in science instruction.

Ho3: There is no significant relationship between head teachers’ level of support towards improvisation and pre-primary school teachers’ frequency of use of IIM in science instruction.

1.3 Significance of the Study
The findings of the study may provide vital information on the use of IIM to different individuals in various ways. Pre-primary school teachers will benefit from the findings of the study where they will see the need for improvisation and how to use the improvised materials in teaching and learning process. The study could help the school head teachers and the school management to actively support the improvisation of instructional materials for effective learning to take place. The information could be of benefit to county and district education directors on the need to organize seminars and training meetings with pre-primary teachers to train them on improvising instructional materials from the local environment and to encourage them to use them frequently in teaching. Finally, the study may help parents and other stakeholders like Non-Governmental Organizations (NGOs), Faith Based Organizations (FBOs) and Community Based Organizations (CBOs) in channeling their resources and efforts towards improvising materials and enlightening teachers on using IIM during instruction.
1.4 Limitation/Delimitation of the Study

The study encountered several limitations that the researcher was able to handle. Delimitations of the study are also discussed below.

1.4.1 Limitations of the Study
The study was conducted in only one Sub County in Bungoma County. The findings of the study may not be generalized to other parts of the country. However, it can be generalized to those areas with similar characteristics. Some teachers were reluctant to responding to some items on the questionnaires especially the questions concerning their head teachers because they feared being victimized. However the researcher assured them that confidentiality was to be ensured.

1.4.2 Delimitations of the Study
The study focused on determinants of pre-primary school teachers’ frequency of use of IIM in science instruction in the sampled pre-primary schools both public and private in Bungoma East Sub County, Bungoma County. There were several factors which may influence pre-primary teachers’ use of IIM. This study was delimited to only four determinants that include availability of IIM, teachers’ training level, teachers teaching experience and head teachers level of support towards improvisation and use of IIM.
1.5 Assumptions of the Study
The researcher made several assumptions which guided the study. The researcher assumed that pre-primary teachers used improvised instructional materials during science lessons since they are equipped with knowledge and skills on how to improvise and use materials effectively during science instruction. The researcher also assumed that several factors affect the pre-primary school teachers’ frequency of use of improvised instructional materials. These factors include pre-primary teacher’s level of training, pre-primary teachers teaching experience and the level of head teachers support towards the use of IIM.

1.6 Theoretical and Conceptual Framework
In this sub section, the researcher describes the theoretical framework which guided this study. The conceptual framework is also illustrated.

1.6.1 Theoretical Framework
The study was guided by Jean Piaget Cognitive development theory of learning developed in 1964. According to the theory cognition increases with age and maturity. Two complementary cognitive processes play a major role in promoting change and increasing children’s cognitive understanding of their world. Children use their current knowledge of how the world works as a framework for the assimilation of new experiences through the use of IIM from the local environment. Children learn best through doing and actively exploring their environment (Onwioduok, 2012). Therefore, they should be given variety of IIM to enable them understand and learn science well.
The theory comprises of four stages of cognitive development which are sensory motor stage (birth-2 years), pre operational stage (2-7 years) concrete operational stage (7-11 years) and formal operational stage (12 and above). Therefore, when a teacher decides to use learning resources in teaching, he/she has to take into account the learner’s stage of cognitive development, if the learners are to benefit from them. This implies that, some learning resources are better adapted according to individuals varying stages of cognitive development.

According to the theory, pre-primary school learners are in pre-operational stage. Children at this stage cannot mentally manipulate information or think abstractly. They need to be occupied with useful activities using IIM that will enable them develop concrete ideas of many abstract scientific concepts. In addition, Piaget (1964) argues that children at pre-operational stage are ego-centric, meaning that they are not able to easily share materials during learning. Therefore pre-primary teachers need to avail adequate IIM during instruction to avoid children fighting over few ones. When instructional materials are plenty, the learning process becomes enjoyable and effective. The theory also asserts that, children’s mental structures develop from experiences availed to them. Thus pre-primary teachers should expose learners to scientific activities with IIM as they advance their knowledge and skills in science (Rotumoi, 2012).

The theory further proposes that learners construct and create their own knowledge. Therefore, Methods of teaching science should be diverse, enjoyable, meaningful
and consistent with the children’s level of conceptual development. Hence in teaching science the teachers need to use adequate of IIM since science is an activity oriented subject and the learners have to acquire their own knowledge through hands on activities and active manipulation of IIM. Udosen (2012) also asserts that science should be taught in a way that children are provided with plenty of IIM. This makes learners well equipped to pursue science related courses in future as they help the Kenyan country in attainment of Vision 2030.

1.6.2 Conceptual Framework
Fig 1.1 shows the relationship between teacher’s attributes/characteristics, availability of IIM and the frequency of use of IIM. The frequency of use of IIM in pre-primary schools during science instruction may depend on various factors such as the pre-primary school teachers’ level of training, teaching experience, availability of improvised instructional materials and the level of head teacher support towards improvisation of the materials and its use as indicated in the fig below.
Learning outcomes
- Improved science instruction/learning
- Active participation in science activities
  - Improved science performance
  - Improved creativity in learners

Teachers’ frequency of use of improvised instructional materials in pre-primary science
- Low use
- Average use
- High use

Head teachers’ support
- Provision of finances
- Commendation for use of IIM
- Provision of IIM

Availability of IIM
Water, sand, charts, plants, realia, models, pictures etc

Teachers characteristics/attributes
- Teachers’ level of training
- Teachers’ teaching experience

Key
☐ Study variables
☐ Non study variables

Fig 1.1 Conceptual framework on the relationship between frequency of use of IIM by pre-primary teachers and the factors that influence their use.
It is assumed that when these factors work positively, that is IIM are available, teachers are well trained and experienced in using IIM and they receive adequate support from their head teachers in matters of improvising materials. The teachers will be able to use IIM more frequently during science instruction resulting in meaningful and enjoyable learning process. Learners will be able to perform better, actively participate in the learning process and develop positive attitude towards science and learning.
1.7 Operational definition of terms

**Frequency of use of IIM** - The number of times IIM were used during science lessons.

**Head teachers support** - Different levels of support the head teacher’s offers towards use of IIM like low, average and high level of support.

**Improvised materials** - Teaching and learning resources made or collected from the local resources for the teaching of science in Pre-primary school.

**Pre-primary children** - Learners aged 3-6 in a pre-primary school.

**Pre-primary** - Learning institutions that provide basic educational foundation to children between ages three to six.

**Science activity** - The act of doing, seeing things happen, measuring and reporting the findings by preschool children.

**Teachers’ teaching experience** - Different levels of teaching experience such as the low experience, average experience and high experience.

**Teachers’ training level** - Refers to different training levels a teacher undergoes such as certificate, diploma, degree, masters.
CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.0 Introduction.

This chapter presents literature review on important topics and studies related to the study. It covers the availability and frequency of use of IIM, pre-primary teacher training level and the use of IIM, pre-primary teacher teaching experience in relation to the use of IIM in pre-primary and the headteachers’ level of support in improvisation and use of IIM in pre-primary. The chapter ends with a summary of the literature reviewed.

2.1 Availability of Science Improvised Instructional Materials in Pre-primary Schools

Provision of IIM to pre-primary classroom by teachers is an important activity that should be done continually. Improvisation could be seen as the act of providing teaching and learning materials from our locality when there is shortage or lack of standard ones. It is also seen as a means to source, select, create, make, substitute and provide local materials obtained within and outside the school environment in the absence of the original ones. In the same way Eshiet (1996) defined improvisation as the process which involves sourcing, selection and creation of relevant instructional elements of teaching and learning in order to achieve the educational goals and objectives. Abdullah (1982) adds that for an improvised material to be valid and effective, the material should provide the desired results,
improve the lesson effectiveness and reduce to the minimum the risks associated with the usage.

Improvised instructional materials are often more effective as teaching tools since they bring about fruitful learning, stimulate student senses as well as motivating them (Olagunju & Abiola, 2008). Arhin and Asimah (2006), added that improvised materials are effective and appropriate for use since they are cheaper to produce or to buy given that the raw materials are easily accessed from within the environment, can be used to teach a big number of learners, encourage classroom participation since the raw resources used are familiar to the learners. They motivate learners during participatory activities like during production of the materials, arouse the interest of the learners as well making the teaching and learning process effective. Pre-primary school teachers should then make it a priority to improvise teaching and learning materials.

Improvised instructional materials in pre-primary enables learners to develop imagination, discovery, creative and manipulative skills in their learning process. Otubula (2010) study on effects of IM on implementation of pre-primary curriculum in Butere County revealed that, there are several IM in schools, these materials contributed to the high enrollment of learners in the school and even the parents acknowledged the important role played by IM. The parents participated in provision of materials to the schools assisted by teachers. The study generally
looked at IM on curriculum implementation. This study was concerned with the availability of IIM in science instruction in pre-primary schools.

Science improvised materials can enlarge the limited knowledge, improve the quality of teaching and learning, promote the strategies that ensure the integration of technology in teaching and learning process of science education (Ibe Bassey, 2012). IIM also makes learners to understand better, perform well, enhances teaching and learning of science as they make the learning process interesting and enjoyable to learners (Mboto, 2012). Science IIM in the local community include animals, plants, stones, sticks, bones, bottletops, charcoal, water, clay, grass, blocks, strings, ropes, sacks, banana fibers, maize cobs, seeds, locally made flash cards, charts, pictures, real objects and locally taken photographs (Dale, 1996). Students that are exposed to improvised resources during science instruction develop positive attitudes towards learning and acquire new knowledge in the content (Udosen, 2014).

Schools have inadequate materials that hinder teaching and learning process. Ogunleye (2002) and Obioha (2006) studies confirm that there are inadequate resources for teaching science and even the few available ones are not in good condition. Therefore, there is need on the part of the teacher to improvise science instructional materials to be used by pre-primary school children. In addition, a study done by Ibe Bassey (2012) confirms that science teachers lacked the desire for improvisation of materials and they highly depended on textbooks, illustrations
and direct lecture method. Likewise, Fgatabu (2012) study on the influence of teaching and learning materials on children performance in pre-primary also revealed that they are few materials in the classrooms. This poses a great urgency for improvisation of materials in pre-primary classrooms that will ensure effective science instruction and even boast the learners’ performance in the subject. The above studies were done in Nigeria and hence there is need to carry similar studies in Kenyan preprimary schools to ascertain the availability of IIM for science instruction.

In Kenya, a study done by Magiri (1988) on factors that affect science teachers in primary schools revealed that acute shortage of apparatus and teaching materials was the major problem. As a result the teachers used theoretical approaches in teaching science. Teachers hardly improvised IM and the few they had were not kept well for future use. Additionally, a study by Ng’asike (2012) on training of science teachers for ECDE and primary grades in Kenya, the study found out that there were inadequate materials and apparatus for science in the colleges and therefore there was need for improvisation. The above studies were done in primary and ECDE colleges. The current study was done in pre-primary schools to evaluate the availability of IIM.

Inadequacy of instructional materials is very evident in many schools in Kenya. Study conducted by KIE (1989), revealed that manufactured instructional materials are not available in many schools because they are expensive, and that pre-schools
were poorly equipped and they lacked valuable resources such as teaching and learning materials. This study concurs with the one done by Ngasike (2010), which established that pre-primary schools in Turkana were always empty and the only learning resource found in the classroom for teaching science was the blackboard; hence there is need to advocate for improvisation of materials in pre-schools and also carry out the study to ascertain if IIM are available in other areas of the country such as Bungoma East sub county, Bungoma county.

Teaching and learning of science in pre-primary schools can only be effective when adequate facilities, materials, equipments and activities are put in place. A study done by Milimu and Indoshi (2008) on conditions for implementation of science curriculum in ECDE centers where questionnaires were used to analyze the availability of science materials used by learners in the classrooms. It was found that many ECDE centers had inadequate science materials, the activities that children were involved in were mostly not in accordance with science activities in pre-primary schools. It is evident that all the reviewed studies came up with similar findings. There are inadequate materials for teaching science in schools. It is therefore necessary to find out whether a similar situation is experienced in pre-primary schools in Bungoma East Sub County in Bungoma County. The study was mandated to investigate the availability of IIM during science instruction.
2.2 The Frequency of Use of Science Improvised Instructional Materials in Pre-primary Schools

The use of local resources is usually associated with improvisation where teachers devise a substitute when the original material is not available. Kadzera (2006) gave an example of a globe made from clay and articulated by a bamboo, which can be used to illustrate rotation of the earth. Improvisation here emphasizes the ability to make the item look like and function in the same way as the original material. This helps students to have a true picture of the situation and the content taught. Pre-primary school teachers need creativity and skills to enable them use available materials to produce instructional media.

Improvised materials are equally significant as the standardized materials in science instruction, so any teacher who wants his or her learners to perform better and retain whatever they have been taught for longer, need to embrace improvisation of materials in the classroom. Udosen (2014) did a study on improvisation of instructional media and students’ performance in primary schools in Nigeria schools. The study concluded that there was no significant difference in the performance of pupils exposed to improvised science equipment and those standard equipments. The equipments played similar roles resulting in similar performance. The study further recommended the government to organize workshops to equip teachers with knowledge and skills on use of improvised materials.

Materials have great impact on learners’ participation in the learning process and acquisition of knowledge. Wambui (2013) study on effects of use of instructional
materials on learner participation in science classrooms in Kiine Zone, Kirinyaga County. The study showed that IM are not well utilized in pre-primary school classrooms. This was caused by several factors such as lack of enough compound, language barrier, high child teacher ratio. The study recommended that learners should be encouraged to interact with science materials in the classrooms and even at home where parents improvise the materials for their children. The study looked at use of IM on learner participation in science activity while the current study narrowed down and looked at the frequency of use of IIM in science instruction in Bungoma Sub County pre-primary schools.

Pre-primary teachers need to fully embrace the use of IIM in teaching and learning for effective educational outcome. Waigera (2013) study on teachers’ use of culturally relevant instructional materials in pre-primary schools, revealed that realia, pictures and charts were the only materials used in teaching science. Both private and public pre-primary schools used similar materials in teaching science. The real objects were the most frequently used during science instruction comprising of water, soil, leaves among others, followed by pictures and the least used were the charts. The study further revealed that science instruction recorded the least number of materials used as compared to other activity areas and that majority of the pre-primary schools did not have instructional resources for teaching science. The study focused on culturally relevant materials used while the current study focused on the frequency of use of IIM.
2.3 Pre-primary School Teachers’ Training Level and Use of Improvised Instructional Materials

Teachers training level plays an important role in teaching and influences the use of instructional resources in teaching. According to MOEST (2003), the training that teachers receive affects the way they teach pre-primary school children. Trained teachers have a positive relationship with the learners and they also socialize well with learners as they use the IM (Homes, 1997). There is need for pre-school teachers to undergo intensive training so that they can get equipped with knowledge and skills to cope well with the demanding nature of young children (Munyeki, 1987). The study further advocated that when pre-primary school teachers are trained they are in a better position to provide learners with appropriate materials during instruction.

The requirements for pre-primary school teachers vary worldwide, in USA, a minimum of a higher diploma is required for one to be licensed teacher for child care centers. In France, a minimum of a degree is required for one to enter into the profession. In New York, one should attain a masters degree in 5 years after employment (Whitebook, 2003). In Japan at least a degree is required for one be a preschool licensed teacher while in Kenya, the minimum is a certificate for one to teach in a preschool with a minimum entry of a D+ at O level (Republic of Kenya, 2006). This low level of qualification and entry in the profession is raising eyebrows and that’s why the researcher investigated if this level of training has impact on use of IIM in science instruction.
A study done by Mwololo, Koech, Begi and Mutweleli (2011) on preschool teachers knowledge and attitudes towards use of visual media, confirmed that trained preschool teachers frequently used visual media than the untrained teachers. The study concurs with Aila (2005) which found out that trained teachers used instructional visual aids more often than the untrained teachers. The above studies generally focused on how the level of teachers training influences the use of instructional materials in the entire teaching and learning process while this study focused only on science instruction.

Teachers’ level of training and qualifications is essential in determining the teaching process. This is because teachers influence the IM used as well as detecting any problem associated with teaching and learning in the classrooms. A study done by Rotumoi (2012) on factors influencing the choice of approaches used by preschool teachers in Baringo county revealed that majority of teachers were O level/KCSE holders, followed by A level then diploma holders, CPE/KCPE and degree holders were the least in number. The study appeared to look at how teachers’ level of training affect the choice of approaches used in pre-primary schools while the current study explored how the teachers level of training influences the frequency of use of IIM during science instruction.

Pre-primary school teachers undergo different level of training that influence the way they use materials during instruction. A study done by Kinuthia, Kombo and Mweru (2013) found out that 71% of the teachers were trained while 23% were
undergoing training and 4% were not trained. Out of the total number of trained teachers, 66% had certificate, 15% diploma and 4% had a degree. The administrators preferred to hire teachers with low levels of qualification so that they can pay them low wages as compared to those who have done a degree. A similar study was carried in Bungoma by Muyoka, Kafu and Nyandusi (2012) which revealed that 25 (65.8%) of the teachers had undergone certificate training, 12 (31.6%) had diploma and 1 (2.6%) had degree in ECDE. From this, it appears that all the teachers are professionally qualified hence competent in teaching ECDE children. However the studies did not focus on how the teachers’ level of training affects the use of IIM during science instruction. Therefore, this lays the foundation of this study.

Lack of knowledge and skills inhibits pre-primary school teachers’ chances of showing and teaching learners on how to handle IM during science instruction. A study done by Wambui (2013) on effect of use of IM on leaner participation in science activities in pre-primary classrooms in Kiine discovered that out of the 30 participants, 10 (33%) were diploma holders, 15 (50%) were certificate holders while 5 (17%) were untrained teachers. The study found out that IM are underused in the area of study. One of the reasons attributed to this was lack of professional skills. The teachers in this study location were not highly qualified since the highest level of education was diploma while other teachers were not trained. It is not clear if this level of training could be the main reason as to why materials were not effectively used. The mandate of this study was to establish if the teachers’ level of
training had an impact on use of IIM during science instruction in pre-primary schools.

2.4 Pre-primary School Teachers’ Teaching Experience and Use of Improvised Instructional Materials.

Education of young children should take into account the increasing experience of the teacher (Dewey, 1982). This implies that the pre-school teacher needs to be well trained and experienced to meet all the developmental and educational needs of young children. The pre-primary teachers are supposed to support, inform, inspire, listen to and respect children during the teaching and learning process. This can be made possible through provision of adequate materials from the local environment.

The number of years a teacher has in the teaching profession influences the use of instructional materials during instruction. Ngure (2014) did a study on utilization of instructional media in pre-primary school training teachers college. The study revealed that majority of the tutors had teaching experience of over 3 years. The study further confirmed that most tutors had been teaching for long period of time and that’s why they are well equipped to prepare and utilize instructional materials during instruction. Adegbija and Fakomogbon (2012) study on the use of instructional media in teaching and learning in selected schools in Nigeria, also confirmed that the experience a teacher had with IM through in-service training, workshops and conferences promoted utilization of instructional media. Similarly Onasanya (2006) study on preparing primary school teachers on selection,
production and use of instructional media for effective classroom teaching in Nigeria, confirmed that, the skills accumulated by teachers with years of exposure to IM equipped them to produce and utilize instructional media. This study was mandated to investigate if there is a relationship between teachers teaching experience and the frequency of use of IIM during science instruction in pre-primary schools.

It is also observed that teachers who are more experienced in ECDE have a positive relationship with pre-primary children as compared to those who are less experienced (Homes, 1997). Preschool teachers who are well experienced are seen to be more confident in dealing with young children and are also more effective in their teaching. This is because they have acquired a lot of skills in teaching young children and therefore they are in a position to tackle the teaching process better. Sidhu (1982) also reported that successful teaching experience is very important, it enables the teacher to acquire professional characteristics such as promptness, adaptability, efficiency, arousing and maintaining children’s interest, provision of adequate IM and the ability to face the class with confidence. Thus, teachers with enough working experience are capable of choosing teaching and learning materials appropriately. The studies above generally looked at how teaching experience influences the use of materials while the current study specifically focused on the relationship between the level of teaching experience and the frequency of use of IIM during science instruction in pre-primary schools.
The above studies deviate from a study done by Waigera (2013) on relationship between use of culturally relevant IM and teaching experience. The study revealed that 5% of teachers had less than a year of teaching experience, 20.4% had 1-5 years of teaching experience while the remaining percentage had over 6 years of teaching experience. The study clearly shows that majority of teachers were well experienced with over 6 years of teaching experience. The study further found that teachers teaching experience and their use of culturally relevant IM have no significant relationship. Similarly a study done by Rotumoi (2013) revealed that 17% of teachers have 0-5 years of teaching experience while 66% have 6-10 years of teaching experience, the rest 17% have between 11-15 years of teaching experience. Many of the teachers in the study location had over 5 years of teaching experience. Despite the fact that majority of the teachers were well experienced in teaching, they did not effectively use IM. This raises a lot of concern and that’s why this study investigated if the similar case is happening in pre-primary schools in Bungoma East Sub County, Bungoma County by focusing on how teaching experience influences the use of IIM by teachers during science instruction.

2.5 Pre-primary School Head teachers’ Support and Teachers Use of Improvised Instructional Materials
Pre-primary school head teachers have the responsibility to support teachers by supervising them as well as children and parents to ensure that the curriculum is well implemented in schools (Olembo & Karagu, 1992). They have the responsibility to ensure that all systems in school are well planned and that there are
enough teaching and learning resources to make the learning process effective. The study further revealed that majority of the head teachers were not concerned with what takes place in pre-primary classrooms. When the head teachers are not involved in the school activities and in the preschool classroom, there is always a high rate of school dropout and poor performance (Njenga & Kabiru, 2001). Therefore, the head teachers are supposed to be involved in all activities in the pre-primary school.

Pre-primary schools make part of the primary schools in Kenya, which are headed by head teachers (Republic of Kenya, 2005). Head teachers need to oversee effective implementation of the curriculum in the pre-primary schools through provision of instructional materials, physical facilities and to ensure smooth teaching and learning process. In many schools this might not be the case since the training acquired by head teachers in the colleges does not prepare them well to handle pre-primary schools responsibilities. It is therefore necessary to find out whether head teachers offer any support towards improvisation and use of IIM required for effective instruction process in pre-primary schools.

A study done by Gatumu (2010) reported that head teacher had the responsibility of providing teaching and learning materials, guidance and counseling and also paying teachers. For instance the role of providing resources is widely mentioned 44% (n=30). Indeed the provision of resources is the main task that head teachers need to do to teachers and learners (Okumbe, 1998). The study failed to ascertain to what
extend did pre-school head teachers offer support and if there is any relationship between their level of support and the teachers frequency of use of IIM during science activity and this is what the current study investigated.

In addition, a study conducted by Kiragu (2014) on primary school head teachers role in implementation of the early childhood education curriculum in Makuyu Division, Muranga county. The study confirmed that majority of head teachers provided teaching and learning materials to pre-primary schools. The materials provided include textbooks, exercise books, chalk, dusters, pens, pencils, crayons, water colors among others. Facilities for storage like shelves and cupboards were provided. Head teachers also provided outdoor play equipment such as swings, merry go round, slides and seesaws. It’s evident that the head teachers provided the necessary materials to pre-primary schools to facilitate effective implementation of the ECDE curriculum. This study narrowed down and looked at the relationship between the level of head teachers support and the teachers’ frequency of use of IIM.

Consequently a study done by Kathure (2011) on children’s own investigation on performance in preschool science activities in Isiolo revealed that children who were taught science activity using traditional methods involving children’s own investigation performed well than the counterparts who were taught using the traditional methods alone. The study further revealed that all the headteachers in the study location recognized the importance of IM in pre-primary school science activities. They also supported the fact that pre-primary schools should improvise
materials by involving teachers, parents and children in collecting materials from the local environment. The study missed out on the level of headteachers support towards improvisation and use of IM during science instruction. This study therefore looked at the level of head teachers support and the teachers frequency of use of IIM in pre-primary school science instruction.

2.5 Summary of Literature Reviewed

The reviewed literature on science instructional materials revealed that there are inadequate instructional materials in schools and majority of teachers tend to use textbook illustrations and theoretical teaching. Hence there was need for improvisation and use of improvised materials in science instruction in pre-schools. The current study investigated the availability and frequency of use of IIM. The literature review further revealed that pre-primary school teachers attained different levels of training such as certificate, diploma, degree and P1 certificate while a significant number are untrained. It was concluded in all studies that there is a significant relationship between teachers’ level of training and the choice of instructional approaches and use of IM. This study specifically explored the relationship between teachers’ level of training and the frequency of use of IIM during science instruction in pre-primary schools to find out whether the situation was similar or not.
Literature reviewed on teachers’ teaching experience revealed contradictory findings on teachers teaching experience. Some studies confirmed that teaching experience influences the use of materials in teaching while others confirmed otherwise. The current study therefore, tried to clear the misunderstanding by determining the relationship between pre-primary teachers’ teaching experience and the frequency of use of IIM in science instruction.

Studies showed that some head teachers offered their support through provision of materials to pre-primary teachers like charts, books, chalk, equipment, playground etc. Few others were not concerned with what went on in pre-primary classrooms. The findings did not shed clear light on how the head teachers support affects the teachers’ use of materials during instruction. This study filed the gap by investigating the relationship between the level of head teachers’ support and the teachers’ frequency of use of IIM during science instruction in pre-primary schools in Bungoma East Sub County, Bungoma County.
CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.0 Introduction
This chapter describes the methodology used in the study. It focuses on research design, research variables, research methodology, location of the study, target population, sampling technique and sample size, research instruments, pilot study, data collection and analysis and finally logistics and ethical considerations.

3.1 Research Design
The study adopted a correlational research design. This design was appropriate for the study because it seeks to find out whether there is relationship between variables that is the independent variables and the dependent variable. The dependent variable (the frequency of use of improvised instructional materials) and the independent variables (availability of IIM, pre-primary teachers’ level of training, teaching experience and the level of head teachers support). The research design points out the basic organization of the study, the nature of hypothesis and variables used in the study (Gay, 1996). Quantitative approach was adopted.
3.1.1 Research Variables
The study had two variables, the independent and dependent variables as shown in the table 3.1 below:

Table 3.1 study variables

<table>
<thead>
<tr>
<th>Types of variable</th>
<th>Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Independent variable</strong></td>
<td>Availability of IIM</td>
</tr>
<tr>
<td></td>
<td>Teachers training level</td>
</tr>
<tr>
<td></td>
<td>Teachers teaching experience</td>
</tr>
<tr>
<td></td>
<td>Head teachers level of support</td>
</tr>
<tr>
<td><strong>Dependent variable</strong></td>
<td>Frequency of use of IIM in science instruction</td>
</tr>
</tbody>
</table>

Independent variable

Independent variables comprise of the following and how they were measured:

i. **Availability of IIM** was measured by indicating of the on the questionnaire whether the materials are available or not.

ii. **Pre-primary teachers’ level of training** – this was scored according to the teachers’ level of training including primary teacher certificate, ECDE certificate, Diploma and Degree.
iii. **Pre-primary teachers’ teaching experience** referred to the number of years a teacher has taught. This was measured by the recordings that the teachers had indicated on the questionnaires. This was scored into three levels as follows: 5 and below years was scored as short, 6-10 years was scored as average and 11-15 years was scored as long teaching experience.

iv. **Head teachers’ support in improvisation of materials** - referred to the ways in which the head of the school were involved in the improvisation of science IM and its use such as providing funds, providing IIM and mobilizing the community in improvisation. This was scored into three levels as follows: 1-3 was scored as low, 4-5 was scored as average and 6-8 was scored as high level of support.

**Dependent variable**

The dependent variable was the frequency of use of improvised instructional materials in science instruction by pre-primary teachers. The researcher established the frequency of use of IIM by tallying the number of times the materials were used during instruction. This was scored in three levels as follows: 10-15 was scored as low, 16-20 average and 21-29 was scored as high use of IIM.

**3.2 Location of the Study**

The study was conducted in Bungoma East Sub County, Bungoma County which was purposefully selected due to its high pre-primary and primary enrollment and also rapid increase in the number of pre-primary schools (MOE, 2013). The county
has a rich environment of natural resources like Mt Elgon vegetation and forest where materials like plants can be collected and used in teaching and learning science. Bungoma East Sub County was purposefully selected. Bungoma East Sub County was chosen for the study because of its diversity in ownership of the pre-primary schools such as private and public. In addition it has consistently registered poor performance in science related subjects in primary and secondary schools. It is also affected by inadequate funding from the parents due to their poor economic status.

3.3 Target Population
This study targeted teachers of all pre-primary schools in Bungoma East Sub County, Bungoma County. The sub county comprises of 58 pre-primary schools which are categorized as 34 public and 24 private (Bungoma East District Education Office, 2013). As for the teachers, all the 130 of them (86 from public and 44 from private) were targeted. The pre-primary teachers were chosen for the study since the study was limited to pre-primary level.

3.4 Sampling Technique and Sample Size
The sampling techniques and sampling size of the study are discussed in the following sub sections. To select the desired sample size of the study, the following sampling technique was used as described below.
3.4.1 Sampling Technique
Purposive sampling was used to select Bungoma County and Bungoma East Sub County because of the unique nature in generosity of natural vegetation, diversity in ownership of pre-primary schools and poor performance in science related subjects in national examinations. Stratified random sampling was used to select the schools from stratas both private and public. From the stratas simple random sampling was used to get 17 public schools and 12 private schools. Random selection gives every member of the population an equal chance to be included in the study. Data collected from the sampled population can be generalized to the entire population. 50% of the target population was used. 50% gave the researcher appropriate number of schools for the study. Simple random sampling was used to select two teachers from the sampled schools. Since each school had two or more than two teachers.

3.4.2 Sample Size

A sample size of 29 (50%) of the total population of schools was used for this study and was appropriate as (Suter, 1981) suggest. specifically 17 public and 12 private pre-primary schools were used. Two pre-primary school teachers were also chosen from each sampled school making a total of 58 teachers. Table 3.1 below shows the sample size.
Table 3.2 Sample Size of the Study

<table>
<thead>
<tr>
<th>Type of school</th>
<th>Target preschools</th>
<th>Sampled Preschools</th>
<th>Target teachers</th>
<th>Sampled teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public</td>
<td>34</td>
<td>17</td>
<td>86</td>
<td>34</td>
</tr>
<tr>
<td>Private</td>
<td>24</td>
<td>12</td>
<td>44</td>
<td>24</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>58</strong></td>
<td><strong>19</strong></td>
<td><strong>130</strong></td>
<td><strong>58</strong></td>
</tr>
</tbody>
</table>

3.5 Research Instruments

The study made use of questionnaires and observation checklist.

3.5.1 Questionnaires for the Teachers

Questionnaires were administered to collect demographic information from the teachers and also to acquire information about the availability of improvised instructional materials, frequency of use of IIM in science instruction and the level of head teachers support that teachers get towards the use of IIM during science instruction (Appendix II). Questionnaires were ideal because they gathered a large sample of data over a short period of time, it also encourages honest answers to sensitive questions since it guarantees confidentiality. Respondents were able to share their beliefs, attitudes, opinions and values concerning the use of IIM and the level of head teachers support on the questionnaires. The teachers were able to give correct information regarding availability and frequency of use of IIM and also the
level of support they get from their head teachers towards improvisation and use of IIM.

The instrument had four parts A, B, C, and D. Part A sought demographic information from teachers, part B measured the availability of improvised instructional materials in pre-primary schools, part C measured the frequency of use of IIM during science instruction and part D sought the information on the level of head teachers support towards the use of IIM during science instruction.

3.5.1.1 Scoring of the Questionnaires

Part A contained demographic information of teachers in pre-primary schools such as teachers’ age, level of training and teaching experience. Part B the teachers responded to the checklist indicating the availability of IIM, the teachers indicated if the materials were available or not. The score for availability was 1 and no availability was 0. Section C contained the frequency of use of IIM, the teachers indicated the number of times each material was used by showing the frequencies and tallies. Part D had a list of things that the head teachers were likely to do in offering support towards the use of IIM. The teachers were to indicate by a tick if they received the support and cross if they didn’t. Scoring was done by counting the number of ticks out of nine items and rating the as follows: 1-3 indicated low level of support, 4-5 average level of support and 6-9 indicated high level of support.
3.5.2 Observation Checklist

An observational schedule was used to collect information on the availability and the frequency of use of IIM during science instruction in the classroom. (See Appendix III). The observation was used because it enabled the researcher to obtain accurate information and verify the information provided by teachers.

3.5.2.1 Scoring of the Observation Checklist

Observation checklist regarding collection of data to verify the information obtained through the questionnaires involving the availability and frequency of use of improvised instructional materials during science instruction in pre-primary schools. Through the use of tallies after which their frequencies/percentages were calculated as per the checklist.

3.6 Piloting of the Research Instruments

Pilot study was done in two schools, one from each of the two different categories public and private. The purpose of piloting the instruments was to determine the validity and reliability of the research items with an aim of strengthening the instruments. The two schools involved in piloting were not included in the final sample of the study.
3.6.1. Validity of the Instruments

Content validity was used to test the validity of the instruments. It was achieved by ensuring that test items covered all variables and objectives of the study. A test is considered valid if it measures what it is expected to measure successfully. Content validity refers to the degree to which the test actually measures the traits for which it is designed. Item analysis was used to establish content validity of the instruments. In this study, individuals knowledgeable in this area were consulted and requested to assess the content of the instruments. They also gave their advice, opinion and judgment which were incorporated in the research objectives and instruments. These were my supervisors and other lecturers from the Department of Early Childhood Studies, Kenyatta University.

3.6.2 Reliability of the Instruments

A reliable instrument is the one that gives consistent results. To test for reliability of research instruments, the researcher used test-retest method. This was done by administering the same questionnaires twice to the same group of teachers between a period of two weeks to ascertain whether the responses from the questionnaires are similar. Then the correlation coefficient of scores from both tests was calculated using Pearson’s product moment formula in order to establish the extent to which the contents of the instruments were consistent in eliciting the same responses every time the instrument is administered. The correlation coefficient of 0.75 was
established during the pre-test. From the coefficient, the instruments were considered reliable enough to be used in the study.

3.7 Data Collection Procedures

A permit to conduct the study was obtained from NACOSTI. The researcher sought permission to collect data from District Educational Officer. Data collection took one month. First the researcher visited the sampled schools and sought permission from head teachers and teachers to conduct the research. Teachers were given the consent form to go through and sign showing their willingness to participate. The researcher also got to familiarize herself with the teachers and set a date of collecting data that was convenient before noon. Data was collected in two stages as follows:

Stage One: Administration of the Questionnaires

The researcher administered questionnaires personally to pre-primary school teachers in their respective schools during break time for them to have an ample time to fill the questionnaires. Teachers were given sometime to fill the questionnaires. The researcher then collected the questionnaires after break before the next lesson commenced.

Stage Two: Conducting Observation

On collecting questionnaires from teachers, the researcher conducted a classroom observation during science lessons to determine the availability and the frequency of use of IIM during science instruction in the classrooms. The researcher recorded
the observation to ascertain to what extent the teachers used IIM and the IIM that were available.

3.8 Data Analysis

The study employed inferential statistics to analyze data. Data preparation involved giving data a thorough check, coding it and tabulating it. This was done to ensure accuracy, consistency, uniformity and identification of illegibility. The tabulated and classified data was according to study objectives. Data was analyzed by arranging them according to research hypotheses and objectives. Data was analyzed by arranging them according to research hypotheses and objectives. Analyzed data was presented using frequency tables, pie charts and percentages. Inferential statistics was calculated and tested using Chi-square. Chi-square was used because the independent and dependent variables in the hypotheses were categorical. The following hypotheses were tested:

Ho1: There is no significant relationship between pre-primary school teachers’ level of training and the frequency of use of improvised instructional materials in science instruction at 0.05 level of significance.

Ho2: There is no significant relationship between pre-primary school teachers’ level of teaching experience and the frequency of use of improvised instructional materials in science instruction at 0.05 level of significance.
Ho3: There is no significant relationship between head teachers’ level of support and the teachers’ frequency of use of IIM during science instruction at 0.05 level of significance.

3.9 Logistical and Ethical Consideration

Following the approval of the proposal from the department of Early Childhood Studies, the researcher obtained the letter to carry out the research from relevant authorities that include: Kenyatta University graduate school, Kenyatta University Ethics review Committee (KU-ERC). The researcher also obtained a research permit from National Commission for Science Technology and Innovations (NACOSTI) to enable collect data in Bungoma East Sub County pre-primary schools. The researcher was given authority to visit the sampled schools from the Bungoma East Education Office. Head teachers of the pre-primary schools were briefed on the purpose of research so that they can give their consent. Pre-primary teachers were also briefed so that they can make an informed decision about their participation in the study. They signed a consent form. Confidentiality was upheld by ensuring that the respondents do not write their names on the questionnaire and that all information given will be used for academic purpose only.

3.9.1 Care and Protection of Research Participants

This study was for academic purpose for Masters in Education, Early Childhood Education Kenyatta University. Participation in the study was completely voluntary where participants were free to withdraw from the study at any time without any
consequences. The researcher was to do a follow up to ascertain the reason for withdrawal to avoid similar actions in future. The researcher was then required to purposively select another participant to fill the gap.

### 3.9.2 Protection of Research Participants Confidentiality

Confidentiality was upheld by ensuring that teachers did not write their names on the questionnaire and all information given was used for academic purpose only. Before collecting data, teachers were informed about the research purposes and that each individual information given on the questionnaires was confidential and was not shared in any way.

### 3.9.3 Informed Consent Process

The researcher sought consent from all the participants at the beginning of the study and they confirmed their participation willingly without being coerced. The information in the consent was well clarified to the participants. Their questions were addressed carefully and they were free to withdraw from the study at any time and they were not to be intimidated in any way.

### 3.9.4 Community Considerations

The researcher sought permission from the area education officer to sample the schools in the division. The study provided enriched information on the frequency of use of IIM in science instruction. On completion of the study, the researcher had a seminar in the community to discuss the findings.
CHAPTER FOUR

PRESENTATION OF FINDINGS, INTERPRETATION AND DISCUSSIONS

4.0 Introduction

This chapter presents the analysis of the study findings according to the data collected from the field. It provides information on the determinants of pre-primary school teachers’ use of improvised materials in science instruction in Bungoma East Sub County, Bungoma County, Kenya. It begins with instrument return rate, demographic data of the respondents, while the other sections are based on the five research objectives of the study as follows:

i. To establish availability of improvised instructional materials used during science activity in pre-primary classrooms.

ii. To determine the frequency of use of IIM used during science instruction in pre-primary schools

iii. To establish the relationship between teachers’ level of training and frequency of use of improvised science instructional materials in the classrooms.

iv. To determine the relationship between teachers’ teaching experience and frequency of use of improvised materials in teaching science in pre-primary.
v. To determine relationship between the level of head teacher’s support and the teachers level of use of improvised science instructional materials in the classroom.

4.1 General and Demographic Information

In the study, 29 pre-primary schools were sampled out of 58 pre-primary schools in Bungoma East Sub County. 17 were public while 12 were private pre-primary schools. The sampled teachers were two in every sampled school. The demographic information required from teachers was: professional qualifications, teaching experience and age.

4.1.1 Instrument Return Rate

Questionnaire tools were used to collect data from pre-primary school teachers in both public and private schools in Bungoma East Sub County of Bungoma County. A total of 58 questionnaires were issued to pre-primary school teachers. All the questionnaires were returned giving a response rate of 100%. The return rate was thus considered adequate enough to provide required information for the purpose of data analysis.

4.1.2 Demographic Data

The study sought to find out the demographic information of the pre-primary teachers with respect to their teaching experience and level of academic qualifications. The purpose of this information was to establish the background
information of the respondents and their ability to report on the determinants of pre-primary school teachers’ use of improvised materials in science instruction.

4.1.3 Distribution of teachers’ by level of training

Professional qualification is one of the key factors that determine teacher’s effectiveness in teaching in pre-primary schools. Distribution of the teachers in the division by the level of educational attainment was as shown in Fig 4.1

![Fig4.1 Distribution of teachers by level of training](image)
Fig 4.1 shows that many teachers were professionally qualified since they had ECDE training at various levels. Majority (53%) of teachers had ECDE certificates followed by a good number of teachers (34%) with diplomas in ECDE, a small proportion (9%) had a university degree where they specialized in ECDE. The higher proportion of EDCE certificate teachers in the sub county could be attributed to the low entry grade of D- (Minus) for certificate holders. The findings of this study indicated that Bungoma East Sub County had a high percentage of pre-primary teachers with ECDE certificate and ECDE diploma. These were the ones actively teaching in pre-primary schools.

Professional competence often transforms into high quality of teaching with prospect that this will influence learning of the pupils. This impressive turn out of trained teachers is as a result of county government employing trained teachers in all public pre-primary schools in the county. Each pre-primary school was given at least three trained ECDE teachers by Bungoma County in 2014. From fig 4.1 there are a small proportion of P1 teachers (3.45%) who were also employed to teach in pre-primary schools. Their low number could be attributed to lack of required skills and knowledge in dealing with young children and they were only considered on the basis of their accumulated experience in teaching pre-primary children.
4.1.4 Distribution of teachers by teaching experience

Distribution of the teachers by teaching experience was established and presented, the results are as shown in Figure 4.2. The purpose of this information was to find out if ECDE programmes in the division were implemented by experienced professionals who would give factual information on teachers’ extent of use of improvised instructional materials in pre-primary science classes.

![Distribution of teachers teaching experience](image)

**Fig 4.2. Distribution of teachers teaching experience**

As shown in Fig 4.2 all teachers in the division had at least one year of teaching experience. Majority (46.55%) of teachers had average teaching experience of 6-10
years. Few (22.4%) teachers had long teaching experience of 11-15 years. This finding implied that majority of teachers had enough exposure and work experience in teaching ECDE. They were therefore in a position to give factual information on the use of improvised instructional materials in science in their respective schools. The increased experience in teaching could be attributed to the fact that majority of the teachers were teaching in various schools before the county government employed them, so they had adequate experience in teaching pre-primary schools. From the findings, Bungoma East Sub County had a high percentage of teachers with average teaching experience of 5-9 years.

4.2 Availability of improvised instructional materials used during science activity

The first objective was to establish availability of improvised instructional materials during science activity in pre-primary classrooms. To achieve this objective, teachers in both 17 public and 12 private schools indicated the availability of IIM in their schools on the questionnaires provided to them. To confirm this, the researcher also carried out the observation during science lessons to ascertain the availability of IIM. Then the researcher recorded what was observed. A list of IIM for science activities was presented to them and they were required to indicate whether they were available or not. The responses were coded as; “available” =1 and “not available” =0. Data was summarized and the results were as shown in Table 4.1.
Table 4.1. Availability of improvised instructional materials used for science activities in schools

<table>
<thead>
<tr>
<th>Improvised instructional material</th>
<th>Proportion of schools where IIM was available%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sand</td>
<td>100%</td>
</tr>
<tr>
<td>water</td>
<td>100%</td>
</tr>
<tr>
<td>Models (plants, animals, human body)</td>
<td>100%</td>
</tr>
<tr>
<td>Drawings and pictures (plants, animals etc)</td>
<td>100%</td>
</tr>
<tr>
<td>Flowers and leaves</td>
<td>100%</td>
</tr>
<tr>
<td>Bottles and bottle tops</td>
<td>100%</td>
</tr>
<tr>
<td>Charts (animals, plants, human body etc)</td>
<td>100%</td>
</tr>
<tr>
<td>Sticks and wood</td>
<td>100%</td>
</tr>
<tr>
<td>Small plants</td>
<td>95%</td>
</tr>
<tr>
<td>Sinking and floating items (stones and feathers etc)</td>
<td>95%</td>
</tr>
<tr>
<td>Calabashes and empty containers</td>
<td>95%</td>
</tr>
<tr>
<td>Different types of food we eat</td>
<td>90%</td>
</tr>
<tr>
<td>insects (not harmful one) butterfly</td>
<td>82%</td>
</tr>
<tr>
<td>Garden</td>
<td>58%</td>
</tr>
<tr>
<td>Animals (Pets)</td>
<td>53%</td>
</tr>
<tr>
<td>Sources of wind such as fans</td>
<td>47%</td>
</tr>
</tbody>
</table>

Table 4.1 show findings on the availability of improvised instructional materials. All the schools had adopted improvisation for sand, water, models (plants, animals and human body), drawings, flowers and leaves, bottles and bottle tops, charts, nature corner and sticks. Physical observations confirmed that they were available in all the sampled schools. This finding implies that teachers in both private and public schools had embraced improvisation of instructional materials for teaching science. The availability of these IIM in schools could be attributed to the fact that majority of the teachers were well trained with relevant skills and knowledge on
improvisation. They were also well experienced in teaching pre-primary schools and how to effectively use IIM in teaching.

The findings are similar to Waigera (2013) who found out that real object like water, soil, leaves among others were the most available for teaching science in pre-primary schools followed by pictures. These materials were widely used in teaching to enhance the acquisition of various skills and concepts in science. The materials were most available because they are easily found in the local environment, cheap and easy to maintain. Similar results were found by Ngure (2014) which shows that a variety of instructional media for pre-primary teachers training colleges were available and used in teaching. Common ones were writing materials like blackboard followed by realia and pictures.

However the above findings contradict with Ngasike (2010) on Turkana children’s sociocultural practices of pastoralist lifestyle and science curriculum and instruction in Kenyan early childhood education, which established that pre-primary classrooms in Turkana were always empty and the blackboard was the only instructional material available in the classrooms. Milimu and Indoshi (2008) also found out that there were minimal materials for teaching science in pre-primary schools. The unavailability of the materials in the schools could be because many teachers were not trained and they did not have experience in improvising materials and using them in teaching and learning process in pre-primary schools.
From Table 4.1, it was established that majority of schools had further improvised small plants, sinking and floating items (stones and feathers), calabashes and empty containers, different types of food, wood and non-harmful insects like the butterflies. Table 4.1 again shows that a few schools had adopted gardens, animals pets and sources of wind such as fans in the teaching of science. The diminished availability of these resources in many schools could be due to the fact that many schools lacked adequate land to make a garden and they also believe that pets are harmful to children in school and they can also interfere with learning.

4.3 Frequency of use of IIM during science instruction in pre-primary schools

The frequency of use of IIM was established by the total tallies of the frequency indicated on the questionnaires by the teachers and from the observation recorded by the researcher. The scoring of the frequency was done as follows: 10-15 was scored as low frequency of use, 16-20 was scored as average frequency of use and 20-29 was scored as high frequency of use. The results are shown in fig 4.3 below.
Fig 4.3 Frequency of use of IIM

Fig 4.3 shows some variations in the frequency of use of IIM by pre-primary teachers. Majority (44.83%) of teachers used IIM most frequently, followed by (29.31%) who used IIM averagely while (25.86%) used IIM minimally. The high frequency of use of IIM by majority of teachers was attributed to their enriched experience in teaching and the readily availability of materials from the local environment.

The study findings contradict those of Ngure (2014), on utilization of instructional media for quality training in pre-primary school teacher training college which
revealed that there were a variety of instructional media used for teaching but they were not used effectively. This was similar to a study done by Kadzera (2006), who found out that instructional materials were available for teaching in the classrooms but they were rarely used in teaching. The inability to use materials may be because the teachers had no experience in using materials during instruction.

4.4 Relationship between teachers level of training and the frequency of use of improvised materials

The third objective was to establish the relationship between teachers’ level of training and frequency of use of improvised science instructional materials in the classrooms. To achieve this, information was sought from the teachers in both public and private schools on the frequency of use of improvised instructional materials in their schools. This information was then tabulated against teacher’s level of training as shown in the table 4.2.
Table 4.2 Teacher's Level of Training and Frequency of use of IIM

<table>
<thead>
<tr>
<th>Teacher's Level of Training</th>
<th>Frequency of use of IIM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average</td>
</tr>
<tr>
<td>Degree</td>
<td></td>
</tr>
<tr>
<td>% within Teacher's Level of Training</td>
<td>20.0%</td>
</tr>
<tr>
<td>% within Frequency of use of IIM</td>
<td>5.9%</td>
</tr>
<tr>
<td>% of Total</td>
<td>1.7%</td>
</tr>
<tr>
<td>Diploma</td>
<td></td>
</tr>
<tr>
<td>% within Teacher's Level of Training</td>
<td>30.0%</td>
</tr>
<tr>
<td>% within Frequency of use of IIM</td>
<td>35.3%</td>
</tr>
<tr>
<td>% of Total</td>
<td>10.3%</td>
</tr>
<tr>
<td>ECDE Certificate</td>
<td></td>
</tr>
<tr>
<td>% within Teacher's Level of Training</td>
<td>29.0%</td>
</tr>
<tr>
<td>% within Frequency of use of IIM</td>
<td>52.9%</td>
</tr>
<tr>
<td>% of Total</td>
<td>15.5%</td>
</tr>
<tr>
<td>Primary Teacher Certificate</td>
<td></td>
</tr>
<tr>
<td>% within Teacher's Level of Training</td>
<td>50.0%</td>
</tr>
<tr>
<td>% within Frequency of use of IIM</td>
<td>5.9%</td>
</tr>
<tr>
<td>% of Total</td>
<td>1.7%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>% within Teacher's Level of Training</td>
<td>29.3%</td>
</tr>
<tr>
<td>% within Frequency of use of IIM</td>
<td>100.0%</td>
</tr>
<tr>
<td>% of Total</td>
<td>29.3%</td>
</tr>
</tbody>
</table>

Table 4.2 shows the various levels of pre-primary teachers training level and the frequency of use of IIM during science lessons. All teachers used IIM in various
levels such as high, average and low in their various categories of training. The table shows that the teachers with degrees used IIM more frequently (60%) while a few others scored averagely and low (20.0%) each. Diploma holders scored (40.0%) on high use while the rest of the proportion used IIM averagely and low at 30% each. Teachers with ECDE certificate used IIM much similar with diplomas. They used IIM more frequently at (45.2%), others averagely and lowly at (29%) and (25.8%) respectively. Primary teacher certificate used IIM highly and average at 50% each. The significant variations in the use of IIM could be interpreted by their differences in their teaching experiences and the training institutions they went to where they got different exposure, training facilities and resources.

Primary teacher certificate used IIM more frequently than those teachers with ECDE diploma and certificate, yet primary teacher certificate did not get any training in ECDE. This could be explained to mean that primary teacher certificate teachers are more creative, innovative and possess high improvisation skills than ECDE diploma and certificate teachers. Teachers with degrees also scored highly on the use of IIM (60%). The high frequency of use could be attributed to the advanced and complex knowledge and skills at the higher levels of learning.

To test the relationship between pre-primary teachers’ level of training and the frequency of use of IIM, the following hypothesis was formulated and tested.
Ho1: There is no significant relationship between pre-primary school teachers’ level of training and the frequency of use of improvised instructional materials in science instruction at 0.05 level of significant.

The Chi-square test was used to test this hypothesis. The results of the chi-square test are presented in table 4.3 below.

Table 4.3: Chi-square test results for relationship between teachers training level and frequency of use of IIM at .005 level of significant.

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>1.534a</td>
<td>6</td>
<td>.957</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>1.996</td>
<td>6</td>
<td>.920</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>58</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.3 shows the chi-square value for relationship between pre-primary school teachers’ level of training and the frequency of use of IIM in science instruction was not significant at (p value= .957). The null hypothesis was thus accepted. It was concluded that there was no relationship between teachers’ level of training and frequency of use of IIM. This possibly means that the level of training did not influence the teachers’ frequency of use of IIM. The variations in the use of IIM could be caused by the kind of training acquired from college, the attitude towards improvisation and their level of creativity in using IIM during instruction.
The study findings are similar to those of Mwololo, Koech, Begi and Mutweleli (2012) on preschool teachers’ knowledge and attitudes toward visual media concluded that all trained teachers at all levels used visual media in teaching and learning at the same way as compared to those who were untrained. There was no significant relationship between the professional training of preschool teachers and the attitudes towards teaching. The study concluded that professional training does not significantly determine pre-primary schools teachers’ attitude towards teaching. The findings concur with those ones of Aila (2005) which found out that trained teachers used instructional visual aids frequently. All the trained teachers of certificate, diploma and degree were able to use instructional materials in their teaching and learning process. Waigera (2013) also confirmed that there is no significant difference between teachers’ level of training and use of culturally relevant instructional materials in pre-primary schools. This was because the teachers at all levels of training were possibly trained on the use of materials in teaching and learning.

4.5 Relationship between teachers’ level of teaching experience and frequency of use of improvised instructional materials

The fourth objective was to determine the relationship between teachers’ teaching experience and frequency of use of improvised materials in teaching science in pre-primary. The teachers’ teaching experience was measured in three categories as short experience from 1-5 years, average experience from 6-10 years and long experience
from 11-15 years of teaching in pre-primary schools. The teachers teaching experience was tabulated against the three categories of the frequency of use that include low, average and high frequency of use of IIM. The results are shown in table 4.4 below.

Table 4.4 shows the distribution of teachers’ teaching experience and the frequency of use of IIM in pre-primary schools. Teachers with different teaching experience scored differently on the frequency of use of IIM. The table shows that teachers with average teaching experience scored a little higher on the frequency of use of IIM (48.1%) and others scored averagely at (33.3%) and a few others used IIM less frequently (18.5%). Teachers with long teaching experience scored highly on the use of IIM (84.6%) and the rest used materials on average and low basis at the same proportion (7.7%). Teachers with short teaching experience scored highly on the low use of IIM (50.0%), followed by average use (38.9%) and a few (11.1%) used IIM highly. The high frequency of use of IIM with teachers who have long teaching experience could be interpreted to mean that prolonged exposure in teaching equips teachers with relevant skills and knowledge on how to improvise and appropriately use IIM during instruction. Perhaps also the appreciation of the role of IIM such that even when they are not provided, the teachers improvise them.
To test the relationship between teachers’ levels of teaching experience and the frequency of use of IIM, the following hypothesis was formulated and tested.

H₀₂: There is no significant relationship between pre-primary school teachers’ teaching experience and the frequency of use of improvised instructional materials in science instruction at 0.05 level of significance.
To test the hypothesis, Chi-square test was used. The results are as shown in Table 4.5 below

Table 4.5. Chi-square tests results for the relationship between teachers teaching experience and the frequency of use of IIM

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>18.285a</td>
<td>4</td>
<td>.001</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>19.955</td>
<td>4</td>
<td>.001</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>58</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Results of the chi-square in Table 4.5 show significant relationship (p=0.001) between pre-primary school teachers’ teaching experience and the frequency of use of IIM in science instruction. The null hypothesis was therefore not accepted, leading to the conclusion that there is significant relationship between pre-primary school teachers’ experience and the frequency of use of IIM in science instruction. The more teaching experience a teacher had, the more she/he used IIM in teaching and learning. The results imply that teachers with longer experience may have gained more skills and expertise on how to improvise and use improvised materials in teaching. Those teachers with lesser teaching experience were not in a better position to use improvised materials in teaching because of their inadequate exposure.

The findings are similar to those of Ngure (2014) & Adegbija (2012), which reported that the skills accumulated by teachers with the years of exposure to
instructional materials equipped them to produce and utilize instructional media. The teachers teaching experience influences the way they use materials in teaching the learners. Onasanya’s (2006) study on preparing primary school teachers on selection, production and use of instructional media for effective classroom teaching in Nigeria, also found that the skills accumulated by teachers with years of exposure to IM equipped them to produce and utilize instructional media.

The findings however do not agree with Rotumoi (2013), who reported that majority of teachers had teaching experience of over 5 years and they were not using instructional materials adequately. This indicated that the teaching experience did not have any impact on the use of instructional materials in teaching and learning. Another study by Waigera (2013) on pre-primary school teachers use of culturally relevant instructional materials in teaching also revealed that there was no significant relationship between teachers teaching experience and the use of culturally relevant instructional materials. In addition Aila (2005) study indicated that there was no significant relationship between teachers’ level of using visual aids and their teaching experience. Implying that as the teaching experience increased the use of visual aids decreased. This could mean that teachers lacked motivation and creativity to improvise and use materials and they were blind to the great importance of using materials in teaching.
4.6 Relationship between head teacher’s level of support and the teachers’ use of improvised instructional materials

The forth objective was to determine the level of head teacher’s support in the use of improvised science instructional materials in the classroom. To achieve this objective, teachers were required to indicate the support they receive from their head teachers towards the use of improvised instructional materials in their schools. A list of the most likely support activities was presented to them and they were required to indicate whether they were supported or otherwise. The total numbers of items were nine, they were scored as follows: 1-3 was scored as low level of support, 4-5 was scored as average level of support and 6-8 was scored as high level of support. The results are shown in the fig 4.4 below.

From Fig 4.4, It was established that majority (48.28%) of the head teachers offered average level of support to their teachers towards use of IIM in various pre-primary schools in Bungoma East Sub County. A significant number (27.58%) of head teachers gave their maximum support to the teachers concerning the use of IIM. The minimal level of head teachers support to the teachers could be attributed to the fact that majority of them are not aware of the ECDE curriculum and what it entails so they don’t offer their support as required. Head teachers support is vital in empowering the teachers and providing them with necessary materials that brings about effective learning in pre-primary schools. Fig 4.4 also shows that majority of the head teachers supported their teachers averagely at 48.28%, their moderate level of support could be due to their low acquired knowledge and information on the
importance of early years.

Fig 4.4 Head teachers level of support to pre-primary teachers towards the use of IIM
The head teachers support was seen in terms of provision of funds, provision of learning resource centers, participation in improvisation of materials, mobilizing community members in improvisation, organizing material making day in school, creating time for teachers to improvise materials, planning seminars and training sessions for teachers to learn on improvisation and ensuring proper storage and safety of IIM.
The level of head teachers support was further computed against how teachers used IIM during science instruction in pre-primary schools. The level of head teachers support was analyzed alongside the way teachers used improvised materials during science instruction in pre-primary schools. The response was coded as below: 3 low level of support, 4-5 average level of support and above 6 as high level of support. The results are shown in table 4.6.

Table 4.6 shows the level of head teachers’ support and the teachers’ frequency of use of IIM. Teachers who received average level of support from their head teachers used IIM most averagely (39.3%) while a few others used highly (32.1%) and the minority used less frequently (28.6%). The teachers that got high level of support from the head teachers used IIM more frequently (93.8%) and only a few used averagely (6.3%). While those teachers that received low level of support from the head teachers used IIM less frequently (50.0%). A few others scored averagely (35.7%) and others scored highly (14.3%). The high frequency of use of IIM by the teachers who got high level of support possibly means that the head teachers’ role is very critical, they seemed to be friendly, encouraging, concerned and supportive to the teachers.
Table 4.6 Level of head teachers support and pre-primary teachers’ frequency of use of IIM

<table>
<thead>
<tr>
<th>Level of Head teachers' Support</th>
<th>Average</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% within Level of Head teachers' Support</td>
<td>39.3%</td>
<td>32.1%</td>
</tr>
<tr>
<td></td>
<td>% within Frequency of use of IIM</td>
<td>64.7%</td>
<td>34.6%</td>
</tr>
<tr>
<td></td>
<td>% of Total</td>
<td>19.0%</td>
<td>15.5%</td>
</tr>
<tr>
<td>High</td>
<td>% within Level of Head teachers' Support</td>
<td>6.3%</td>
<td>93.8%</td>
</tr>
<tr>
<td></td>
<td>% within Frequency of use of IIM</td>
<td>5.9%</td>
<td>57.7%</td>
</tr>
<tr>
<td></td>
<td>% of Total</td>
<td>1.7%</td>
<td>25.9%</td>
</tr>
<tr>
<td>Low</td>
<td>% within Level of Head teachers' Support</td>
<td>35.7%</td>
<td>14.3%</td>
</tr>
<tr>
<td></td>
<td>% within Frequency of use of IIM</td>
<td>29.4%</td>
<td>7.7%</td>
</tr>
<tr>
<td></td>
<td>% of Total</td>
<td>8.6%</td>
<td>3.4%</td>
</tr>
<tr>
<td>Total</td>
<td>% within Level of Head teachers' Support</td>
<td>29.3%</td>
<td>44.8%</td>
</tr>
<tr>
<td></td>
<td>% within Frequency of use of IIM</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td></td>
<td>% of Total</td>
<td>29.3%</td>
<td>44.8%</td>
</tr>
</tbody>
</table>

To establish the relationship between the level of head teachers’ support towards improvisation of materials and the teachers’ use of IIM during science instruction, the following hypothesis was formulated and tested.

Ho3: There is no significant relationship between head teachers’ level of support and teachers’ frequency of use of improvised instructional materials at 0.05 level of significance.
Chi-square test was used to test this hypothesis. The results are shown in table 4.7.

Table 4.7. Chi-square test results for the relationship between the level of head teachers’ support and the teachers’ frequency of use of IIM during science instruction.

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>23.882</td>
<td>4</td>
<td>.012</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>27.726</td>
<td>4</td>
<td>.000</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>58</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Results of the Chi-square test in table 4.7 show significant relationship (p=0.012) between pre-primary school head teachers’ level of support and the teachers’ frequency of use of improvised instructional materials in science instruction. The null hypothesis was thus rejected. It was concluded that there was a significant relationship between the level of head teachers’ support and the teachers’ frequency of use of IIM at 0.05 level of significance.

This could be attributed to the fact that head teachers were the key stakeholders of pre-primary education and their support was highly evident through what teachers offered to learners. They played a very critical role in influencing the teachers’ instruction process and on the learners learning outcomes. Head teachers provided curriculum support materials, teaching and learning materials, motivated teachers, monitored and controlled the entire learning process in the school. This vital responsibility possibly reflected on the way teachers used IIM in the study.

The findings of this study are similar to a study by Kiragu (2014) on primary school
head teachers’ role in implementation of early childhood curriculum in Makuyu Division. It was established that head teachers provided pre-primary schools with curriculum support materials such as teaching and learning materials that enhanced curriculum implementation. They also provided classrooms for pre-primary children, which were equipped with desks, blackboard, chairs etc. as well as providing outdoor play equipment such as swings, slides, sea saws, merry go rounds and tunnels. The findings are also in agreement with University of Zimbabwe (1995) that confirmed that head teachers provided teaching and learning materials such as classrooms, chalk, desks, and blackboard to pre-primary schools. These provisions enabled the teachers to work more effectively in their instruction process. Their support could be because they have realized that what goes on in pre-primary level affects the future academic achievements of children in the primary level.

However the findings of the current study deviates from Olembo (1992) who asserted that head teachers did not seem to be interested with what goes on in pre-primary classrooms concerning instructional materials. The head teachers did not bother to provide teaching and learning materials to pre-primary and this heavily interfered with the way teachers used materials in classes. This deviation could be due to the fact that primary school head teachers are not in any way answerable to academic achievements of pre-primary children. Yet in this study it is very evident that the level of head teachers support is very vital to the academic achievement of learners and productive instruction of teachers.
CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction
This chapter presents the summary and conclusions of research findings, recommendations to various stakeholders and further research to be done based on the findings of the study.

5.1 Summary of the Findings
The first objective of the study was to determine the availability of improvised instructional materials used during science instruction in pre-primary schools. The results revealed that there were variety of improvised instructional materials available for teaching science that includes: sand, water, models of plants, animals and human body, drawings, flowers etc. according to the second objective, the IIM were used by teachers in several levels that is, the teachers used materials highly, averagely and lowly. Majority of teachers used the materials highly and averagely.

With regard to the third objective which was to determine the relationship between teachers’ level of training and the frequency of use of improvised instructional materials during science instructional. Teachers with degree used IIM more frequently followed by primary teacher certificate and diploma holders used materials less frequently. It was found out that there was no significant relationship between teachers’ level of training and the use of improvised instructional materials
in science instruction at (P=.957) level of significant. Teachers with degree, 
diploma, ECDE certificate and primary teacher certificate used IIM all the same. 
This suggested that teachers irrespective of their level of training used IIM all the 
same. This could imply that teachers received adequate training and skills that 
enabled them to adequately improvise and use the materials during science 
instruction in all level of training.

The fourth objective was to determine the relationship between teachers’ level of 
teaching experience and the frequency of use of science improvised materials in the 
classrooms. There was significant relationship between teachers teaching 
experience and the use of science improvised materials in the pre-primary 
classrooms at (P=.001) level of significant. Teachers who were highly experienced 
used IIM more often than those who had shorter experience in teaching young 
children. Accumulated experience perhaps leads teachers to appreciate use of IIM 
during instruction in pre-primary classrooms.

The fifth objective was to ascertain the relationship between head teachers’ level of 
support towards improvisation and the pre-primary teachers’ frequency of use of 
IIM during science instruction. It was established that there was significant 
relationship between head teachers level of support and the teachers of use IIM in 
the classrooms at (P=.012) level of significant. Teachers who received high support 
from their head teachers used materials more frequently than teachers who received 
low level of support from their head teachers.
5.2 Conclusions

The study shows that there was a variety of IIM used in science instruction by teachers and learners. This may be contributed to the availability of resources from the local environment round the school. Available materials were used by teachers differently. Majority of the teachers used materials more frequently and averagely. The study findings on teachers training level indicated that primary teacher certificate and teachers with degrees scored high on the use of IIM. The finding further confirms that there was no significant relationship between the teachers’ level of training and the frequency of use of IIM. This implies that irrespective of teachers training level, there frequency of use of IIM is the same. The frequency of use of IIM is similar among all teachers.

The pre-primary school teachers teaching experience influenced the frequency of use of IIM in teaching. The findings indicated that there was a significant relationship between teachers’ teaching experience and the frequency of use of IIM. It means that prolonged exposure in teaching equips teachers with appropriate skills on how to improvise materials and use them effectively in teaching and learning. This implies that more experienced teachers use IIM more frequently than those who are less experienced. Therefore, learners in schools with more experienced teachers benefit a lot from frequent exposure to IIM. It was also found that the level of head teachers support to teachers concerning the use of IIM affects the way they use IIM. The study finding shows a significant relationship between head teachers level of support and teachers frequency of use of IIM. This means that the more
support the teachers get from their head teachers, the more they use IIM in teaching and learning process.

5.3 Recommendations
The findings of this study leads to recommendations for various stakeholders in pre-primary school education.

5.3.1 Recommendations for pre-primary school teachers
The study found that majority of teachers are ECDE certificate and diploma holders, this particular group of teachers used IIM less frequently. Therefore, pre-primary teachers are encouraged to continually improvise materials from the local environment to facilitate learning in the classrooms and use the materials frequently in teaching. This is because locally improvised materials are cheap, locally available, learners are familiar with and they can easily relate to their daily life activities to, develop self-identity and help them to build on the knowledge that they already know. Materials that can be locally improvised include charts made from sacks, real objects from the local environment, small plants, and models from clay. The findings also reported that teaching experience influences the use of IIM during instruction. Teachers after completion of their training should attach themselves to schools and offer their services so as to acquire the skills, experience and expertise on how to improvise materials and use them effectively.
5.3.2 Recommendations for the head teachers

Finding revealed that majority of head teachers offered their support averagely towards improvisation and use of IIM. It was also evident that the levels of head teachers support influences the way teachers use IIM during instruction. They are therefore encouraged to provide maximum support to teachers so as to enhance the teachers’ use of IIM during instruction. They can engage in the improvisation process, mobilize community members to improvise materials, organize seminars and workshops for teachers to be equipped with skill for improvisation, provide storage facilities for the improvised materials, and provide funds to purchase some of the materials and to organize for material improvisation day in the school. Head teachers are also advised to employ well experienced teachers having skills and knowledge on the use of IIM to be able to use materials well in helping the learners understand the concepts well.

5.3.3 Recommendations for District Centre for Early Childhood Education

The finding shows that head teachers level of support affects the use of IIM by teachers in teaching and learning. Therefore, education officers for early childhood in the county and district should collaborate with head teachers to organize workshops, seminars and capacity building forums for pre-primary teachers and head teachers on improvisation of materials from the local environment that can be used in the teaching and learning process. Through this the teachers will be equipped
with more knowledge and skills on improvisation of materials and how to effectively use the improvised materials.

5.4 Suggestions for Further Research

The current study found out that primary school certificate teachers used IIM more frequently than ECDE trained teachers making it an area that requires further research. This study focused on use of improvised materials in science instruction, more research studies should be done in other activity areas like mathematics, language, music, social studies, religious etc. Further studies could also be done in other counties apart from Bungoma County. The studies could also be done in primary schools on the use of improvised instructional materials. Many other factors could determine the teachers’ use of improvised materials in science instruction. Availability of science improvised instructional materials, teachers’ level of training, teachers teaching experience and the level of head teachers support were investigated in this study. More studies could be done on other factors that might influence the use of improvised instructional materials in science instruction in pre-primary schools.
REFERENCES


Kangori, B. N. (2014). Teacher related factors in the implementation of science activities in preschools in Nairobi County. (Unpublished research project). Nairobi University.


Onwioduokit, F. A. (2013). The ordeal of science teaching in the contemporary society: A need for paradigm shift for the new generation. 36th inaugural lecture series of the University of Uyo Uyo.


APPENDICES

APPENDIX I  INFORMED CONSENT FOR TEACHERS

My name is Eckline Lydia Makokha, I am a masters student from Kenyatta University. I am conducting a study on determinants of preprimary school teachers’ use of improvised materials in science instruction in Bungoma sub county, Bungoma County. The information from the study may be used by the ministry of education to encourage pre-primary teachers to improvise and use locally available materials during instruction.

Procedures to be followed

Participation in the study will require that you kindly answer some questions in form of a questionnaire concerning the use of improvised materials during science instruction. All the information will be recorded in a questionnaire.

Kindly note that your participation in the study is voluntary. You have a right to refuse to participate in this study without any consequences or intimidation from me or the school management. You are free to ask any question related to the study at any given time. You may also refuse to respond to any question in the questionnaire at any time. You may also stop being in the study at any time with no regrets.

Discomforts and risks

In case some of the questions asked may be embarrassing or make you uncomfortable, you are free to seek for more clarification from the researcher or refuse to answer the questions. Filling the questionnaires may take approximately 10-20 minutes and your patience will be highly appreciated.

Benefits

If you participate in this study you will help enable us know if improvised materials are used in pre-primary schools and offer the necessary training on improvisation of materials. This is because improvised materials are cheap and locally available.

Rewards
Teachers who participate in the study will be given a token for appreciation.
Confidentiality

Names of the participants will not be written on the questionnaires. You are requested to fill the questionnaire at your own free time and at a private place. The information given on the questionnaires will be kept private and only be used for academic purposes.

Contact information

If you have any question, you may contact Miss Eckline Makokha on ecklinem@gmail.com. You may also contact Dr. Wambiri. Supervisor 1 on wambiri.gladwell@ku.ac.ke or Dr. Ngasike. Supervisor 2 on ngasike.john@ku.

The above information regarding my participation in the study is clear to me. I have been given the chance to ask questions and my questions have been answered to my satisfaction. My participation in this study is entirely voluntary. I understand that confidentiality will be upheld and I can leave the study any time without any intimidation or consequences.

______________________
Signature or thumbprint           Date

Investigators statement

I, the undersigned, have explained to the volunteer in a language s/he understands the procedures to be followed in the study and the risks and benefits involved.

Name of the Researcher:............................................

_____________________
Researchers Signature             Date
APPENDIX II: QUESTIONNAIRES FOR THE TEACHER

These questionnaires are aimed at gathering information about the availability and frequency of use of science improvised instructional materials in pre-primary. Please tick where appropriate.

**SECTION A**

Gender

Male [ ]  Female [ ]

Age bracket

20-30 [ ]

30-40 [ ]

40-50 [ ]

50 and above [ ]

Teachers’ level of training and professional qualifications:

Masters [ ]

Degree [ ]

Diploma [ ]

ECDE Certificate [ ]

P1 [ ]

Any other. [ ]
Teachers’ teaching experience.

4 year and bellow [  ]

5-9 years [  ]

10 years and above [  ]

SECTION B: Checklist for availability of improvised instructional materials

Please indicate with a tick if the material is available in the class for science

<table>
<thead>
<tr>
<th>Materials</th>
<th>Available</th>
<th>Not available</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Small plants</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Animals(pets)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Sand</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Water</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Models (plants, animals, human body)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Drawings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Flowers and leaves</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Wood and sticks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 Sinking and floating items i.e. stones and feathers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Insects(not harmful ones) butterfly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 Calabashes and empty containers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 Bottles and bottle tops</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 Charts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14 Sources of wind such as fans</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 Maize and beans seeds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 Different types of food</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17 Garden</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### SECTION C: Checklist for frequency of use of IIM.

<table>
<thead>
<tr>
<th>Materials</th>
<th>Tally</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Small plants</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Animals (pets)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Sand</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Water</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Models (plants, animals, human body)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Drawings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Flowers and leaves</td>
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<tr>
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<td></td>
<td></td>
</tr>
<tr>
<td>16 Different types of food</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17 Garden</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SECTION D: Level of head teachers’ support

i. Do you provide funds to purchase IIM?

ii. Do you have learning resource center in your school?

iii. Do you participate in improvisation of science IM?

iv. Do you mobilize the community to improvise science instructional materials?

v. Do you have other stakeholders that support you in improvisation of materials?

vi. Do you organize science materials day in your school?

vii. Do you help in ensuring safety and proper storage of IIM?

viii. Do you organize seminars and training sessions for your teachers on improvisation of materials?

ix. Do you create time for your teachers to improvise materials?

Thanks for your cooperation
APPENDIX III: OBSERVATION CHECKLIST

SECTION A: Availability of improvised instructional materials

Please indicate with a tick if the material is available in the class for science

<table>
<thead>
<tr>
<th></th>
<th>Materials</th>
<th>Available</th>
<th>Not available</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Small plants</td>
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<td></td>
</tr>
<tr>
<td>2</td>
<td>Animals(pets)</td>
<td></td>
<td></td>
</tr>
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<td>3</td>
<td>Sand</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Water</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Models (plants, animals, human body)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Drawings</td>
<td></td>
<td></td>
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<tr>
<td>7</td>
<td>Flowers and leaves</td>
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<td></td>
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<td>Wood and sticks</td>
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<td></td>
</tr>
<tr>
<td>9</td>
<td>Sinking and floating items i.e. stones and feathers</td>
<td></td>
<td></td>
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<td>10</td>
<td>Insects(not harmful ones) butterfly</td>
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<td>Charts</td>
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<td>16</td>
<td>Different types of food</td>
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<td></td>
</tr>
<tr>
<td>17</td>
<td>Garden</td>
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<td></td>
</tr>
</tbody>
</table>
SECTION B: Observational Checklist for Frequency of Use of IIM

<table>
<thead>
<tr>
<th>Materials</th>
<th>Tally</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
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<td></td>
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