INFLUENCE OF USE OF INSTRUCTIONAL MATERIALS ON ACQUISITION OF MATHEMATICAL COMPETENCIES AMONG GRADE ONE LEARNERS IN NAKURU COUNTY, KENYA

NZII PRISCILLA MUENI

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MAY 2019
DECLARATION
I declare that this research project is my original work and has not been presented in any institution for consideration of any certification. This research project has been completed by referenced sources duly acknowledged. Where text, data (including spoken), graphics, pictures or tables have been borrowed from other sources, including the internet, these are specifically accredited and references cited using APA system and in accordance with anti-plagiarism regulations.

Signature_________________________ Date: ____________________
Nzii Priscilla Mueni
E55/OL/28440 /2013
Early Childhood and Special Needs Education

Supervisor
I confirm that the work reported in this project was carried out by the candidate under my supervision as University supervisor.

Signature……………………………………………Date……………………
Dr. Wanjohi Githinji
Department of Early Childhood and Special Needs Education
Kenyatta University
DEDICATION

This research work is dedicated to my husband John Mark and my children Speciosa
Maximilla and Grantham Mark for the support they gave me during the study. God
bless you.
ACKNOWLEDGEMENTS
I would like to acknowledge my university supervisor Dr. Wanjohi Githinji for his professional guidance and the time he devoted to me throughout the study. Thanks to all the staff members of Early Childhood and Special Needs Education Department, Kenyatta University for their support. I would also like to acknowledge the staff in Spema Academy for encouragement and filling up gaps in my absence. Their continued support made me work hard on this study. I wish to thank various school heads who allowed me in their schools to collect data. Thanks to grade one teachers and who squeezed their busy schedules to participate in the study. To grade one learners, thank you very much for taking an active part in this study. May God bless you all.
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<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>DQASO</td>
<td>District Quality Assurance Officer</td>
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<tr>
<td>FPE</td>
<td>Free Primary Education</td>
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<tr>
<td>IM</td>
<td>Instructional Materials</td>
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<td>MIM</td>
<td>Mathematics Instructional Materials</td>
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<td>MOE</td>
<td>Ministry of Education</td>
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<td>NARC</td>
<td>National Rainbow Coalition</td>
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<td>TLM</td>
<td>Teaching Learning Materials</td>
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<tr>
<td>TLR</td>
<td>Teaching Learning Resources</td>
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<tr>
<td>SACMEQ</td>
<td>Southern Africa Consortium for Monitoring Education Quality</td>
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ABSTRACT
Mathematics is an important aspect in life. Early development of mathematics skills leads to early acquisition of mathematical competencies. For effective acquisition of mathematical competencies in early years, instructional materials are required to enhance development mathematical skills. Studies conducted in Kenya have not adequately focused on the use of instructional materials to develop mathematical competencies. This has hindered learning, making learners assume a passive role in their learning. The purpose of this study was to investigate the influence of use of instructional materials on acquisition of mathematics competencies. The study was guided by Bruner’s theory of instruction. Correlation research design was used in this study. The independent variables were: types of mathematics instructional materials in grade one classrooms, utilization of instructional materials during mathematics instruction as well as investigating the influence of instructional materials on acquisition of mathematics skills. The dependent variable was acquisition of mathematical competencies. The study was carried out in Nakuru East Sub County, Nakuru County. The target population was both private and public primary schools in Nakuru East Sub County. Grade one learners and teachers were the participants. Purposive, stratified and random sampling methods were used to select an appropriate sample for the study. Research instruments used were: lesson observation schedule, interview schedule for teachers and a competency checklist. Pilot study to test the instruments was carried out in two private schools and two public primary schools from the study area. Data was qualitatively and quantitatively analyzed. The study established that few grade one teachers in public schools utilized instructional materials during mathematics instructions. It was also established that instructional materials influenced acquisition of mathematics competencies. The study recommends that teachers and other key stakeholders should invest more resources to ensure availability of adequate instructional materials for learners. It also recommends that school management should invest more to ensure adequate and right instructional materials are availed to enable learners and teachers have all the basic requirements required for better teaching and learning.
CHAPTER ONE
INTRODUCTION AND BACKGROUND TO THE STUDY

1.1 Introduction
This chapter presents the background to the study, statement of the problem, research
objectives, research questions, limitations and delimitations of the study as well as
significance of the study. Further, assumptions, theoretical and conceptual framework,
and operational definition of terms have been presented in this chapter.

1.2 Background of the Study
Mathematics is an important element in human life. Human beings use it daily as a
tool to facilitate their life. As a result of its significant value, teaching and learning of
mathematics should be approached in ways that help learners develop positive attitude
towards it, (Goktepe & Ozdemir, 2013). This helps children from an early age to
believe that, mathematics is part of life and that it makes life easier.

Major problems in development of positive attitude towards mathematics in early
years of primary school may come in when learners start dropping out of school and
others being forced to repeat classes (Arnold, Bartlett, Gowani & Merali, 2007). The
major contributing factor to this crisis is lack of appropriate instructional materials
(IM) to help maximize the benefits to learners during mathematics instructions. Such
IM are, for example, printed instructional media, non-print instructional media and
concrete materials.

Dale (1969) defined appropriate instructional media as resources that help teachers
and learners in making teaching and learning more real. They help in making
permanent concepts in learners’ minds. He added that use of IM solves teaching and
learning problems from pre-primary level to college level (Dale, 1949). In addition,
utilization of appropriate IM helps the teachers in complementing their work and getting feedback from their clients, during and after learning activities. More so, they help teachers achieve the set objectives of their subjects (UNICEF, 2011). Instructional resources make teaching and learning process complete and functional (Omuna, Onchera and Kimutai, 2016). Therefore, IM play a very important role in the process of teaching and learning.

Studies conducted in developed countries like United States of America (USA), Europe, Uruguay among others noted that, use of IM in teaching and learning mathematics is embraced. For instance, a study on strategies for improving mathematical instructions for students in short-term facilities in Washington DC, USA, Leone, Wilson & Mulcahy, (2010) showed that learners’ engagement in mathematics activities and learning was influenced by the inclusiveness of the classroom environment. An inclusive classroom environment enabled active participation of the learners. This meant that a variety of instructional materials was an ingredient. Use of instructional materials promoted their willingness to engage in the classroom activities. Leone et al, (2010) noted that use of instructional materials helped learners display positive attitude towards classroom activities, create favorable learning conditions and engage learners in the activities. It also enabled them have interest in this area and develop curiosity in wanting to learn more.

In third world countries, especially African countries, studies show that utilization of IM in the teaching and learning process has been embraced and its impact is evident. Iji, Ogbole & Uka (2013) posited that due to utilization of appropriate improvised instructional materials, acquisition of mathematical concepts improved thus improving their mean achievement scores. This was because the improvised IM
brought about competitiveness and enlivened learning for learners. Guloba, Wokadala & Bategeka (2010) asserted that inadequacy of teaching resources contributed to low quality of education. Appropriate IM should be used during the teaching and learning process to promote active understanding and not rote learning, (Machaba, 2013). Absence of adequate, appropriate IM would encourage passive learning. IM brings joy to teachers and enthusiasm to learners. Teaching and learning resources (TLR) help both teachers and learners in self-discovery. They promote child-centered approaches of teaching and learning through learner participation, (UNICEF, 2014).

Kenyan schools, like other schools in African country, embrace utilization of IM. Utilization of instructional materials promotes academic achievements, (Otieno, 2010). Ashiona, Mwoma and Murungi (2018) noted that utilization of ICT during lesson delivery increased learners’ participation in learning thus higher academic retention. Okongo, Ngao, Rop and Nyongesa (2015) posited that lack of adequate, appropriate IM symbolized abstract teaching of mathematics and portrayed passive learning. This would result in poor performance, (Wambua and Murungi, 2018). Kariuki (2013) posited that IM make teaching more effective, make lesson plans richer and help in meeting varying needs of learners, thus impacting positively on learners as well as the school performance. He added that their unavailability cripples acquisition of the key aspects of education.

These numerous studies mostly focused on IM and general performance at different levels of learning. A few studies focused on performance of mathematics and acquisition of specific mathematical concepts. None of these focused on the influence of instructional materials on acquisition of mathematical competencies among grade one learners. It was therefore, this gap of inadequate, inappropriate and unutilized
mathematics instructional materials that prompted the researcher to conduct a study to investigate the influence of use of IM on the acquisition of mathematical competencies in Nakuru East Sub County, Nakuru County. To achieve this, the study was carried out among grade one learners.

1.3 Statement of the Problem

Mathematics is regarded as one of the most important subjects in the school curriculum. In almost all the schools, mathematics is among the subjects which are practically taught. Its good performance is an indication of successful academic achievement. Studies carried out on the issue of mathematics and instructional materials showed that, use of instructional materials improve performance of mathematics. Some of these studies found out that, although instructional materials were used during mathematics instruction, they were inadequate and inappropriate. This brought challenges to the process of teaching and learning. It hindered acquisition of mathematics skills as it made learners play a passive role in learning of mathematics.

Most of the available studies focused on performance and academic achievement, while others dealt with retention of learners in schools. Yet other studies have focused on the final performance in primary level and secondary level. A few studies have focused on grade three performances in mathematics but not on the influence of utilization of MIM on acquisition of mathematical competencies. Others have focused on readiness to learn mathematics in grade one. However, all these studies did not focus on the influence of instructional materials on acquisition of mathematical competencies. Although few were based on grade one, they did not focus on the influence of mathematics instructional materials on acquisition of mathematics.
competences. Therefore, it was necessary to carry out this study to investigate the influence of mathematics instructional materials on the acquisition of mathematical competencies among grade one learners.

1.3.1 Purpose of the Study
The purpose of this study was to investigate the influence of different types of mathematics instructional materials on acquisition of mathematics competencies among grade one learners. The study also sought to establish the extent to which utilization of mathematics instructional materials have on acquisition of mathematics competencies.

1.3.2 Objectives of the Study
i. To find out the types of instructional materials available for teaching mathematics in grade one classrooms.

ii. To find out whether instructional materials are utilized during mathematics instruction in grade one.

iii. To establish the influence of utilization of mathematics instructional materials on development of mathematical competencies.

1.3.3 Research Questions

i. What types of instructional materials are available for teaching mathematics in grade one classrooms?

ii. Are instructional materials utilized during mathematics instruction in grade one?

iii. What is the influence of utilization of mathematics instructional materials on development of mathematical competencies among grade one learners?
1.4 Significance of the Study

Since it is the role of the Ministry of Education (MOE) to provide instructional resources to all public primary and secondary schools in Kenya, it is hoped that, the findings of this study will be useful. The findings of this study may be useful in improving on the policies that govern the allocation and disbursement of funds by MOE to public primary schools. Policies may be reviewed at different levels in the education sector, to increase on the allocation of funds to each child. This may lead to increased supply of IM to public schools thus improving acquisition of mathematics concepts.

The findings of this study might also be of benefit to the, guardians and donors. They could willingly be involved in provision of instructional materials in grade one classrooms. This would form a strong educational bond between learners, teachers and their/guardians when the pupils see their participation in ensuring acquisition of mathematics skills.

In addition, the study might also help in upgrading the policies governing mathematics instruction. It may help teachers and school heads to put more emphasis on the use of MIM during instruction of mathematics. This would help in attaining set mathematics objectives, increase learners’ involvement in mathematics activities, thus improving performance and development of positive attitude towards this discipline.

Furthermore, it is anticipated that data collected from this study would add more information and knowledge to the existing literature about MIM. Researchers and other educationists can benefit from this data and add to what the researcher would have started. Researchers can as well identify gaps in this study which they would like to fill.
1.5 Limitations and Delimitations of the Study

This section presents the limitations and delimitations of the study.

1.5.1 Limitations

The study was limited to acquisition of mathematics competencies among grade one learners in Nakuru East Sub County. The findings therefore would only be generalized in grade one in the Sub County and not the other Sub Counties. In some cases, return of data collection instruments was delayed and some were not returned by participants. To reduce this, the researcher visited the sampled schools from time to time to encourage the participants to complete filling the instruments. Getting for focus group discussion was not easy. The researcher was helped by the teachers by calling a meeting where time was created for discussion.

1.5.2. Delimitations

The purpose of this study was to investigate the influence of different types of instructional materials and their utilization on acquisition of mathematical competencies among learners in grade one in Nakuru East Sub County. The study focused on one activity area, acquisition of mathematics competencies. This meant that, other activity areas in grade one were not included. The different types of instructional materials focused on were mathematics instructional and the concept they enhanced. The other instructional materials were not studied. In addition, performance of learners in mathematics in the previous levels was not studied, that is, learners’ performance in pre-primary, simply because, enrollment of the learners to grade one was from various preschools. More so, teachers in pre-primary were not included in the sample, neither were teachers in grade two nor three. The study focused only on grade one learners, their teachers and their’ participation.
1.6 Assumptions of the Study

It was assumed that, grade one parents understood their responsibility in participation of their children’s academic work. It was also assumed that grade one teachers embraced sourcing of instructional materials for teaching and learning and used them during instruction. It was also assumed that school administration in both public and private primary schools understood that the availability of instructional materials was their input.

1.7 Theoretical and Conceptual Framework

This section presents the theoretical and conceptual framework.

1.7.1 Theoretical Framework

This study was guided by the Theory of Instruction by Jerome Bruner (1966). In his theory of instruction, Bruner insisted on creating autonomous learners, learners who create knowledge independently. He says that schooling of children should bring out important outcomes like problem solvers and critical thinkers rather than only giving them concepts and categories as per the culture. Bruner (1966) explained that, for knowledge to be stored and encoded in the memory, learning has to move from enactive through iconic to symbolic representation of the world around. He called this, “three modes of representation”. In enactive representation (from 0-1year) learning is action-based where children learn through materials. They learn through manipulation of materials. During iconic representation (1-6 years) knowledge is stored in form of images. Diagrams or illustrations accompanied by verbal information make learning effective. This is the level of preschoolers. Finally, in symbolic representation (from 7 years and above) learning is mainly in form of
symbols. Grade one learners learn best when all the modes of representation are employed, (Bruner, 1966).

This theory was relevant to this study because appropriately organized instruction promotes appropriate acquisition of concepts. When teaching is well planned, good results emerge. Bruner emphasized that, a learner of a very young age is capable of learning any concept in mathematics so long as the instruction was appropriately organized. One of the ways of organizing instructions is by providing appropriate instructional materials.

According to Bruner’s modes of representation, grade one learners are between iconic representation and symbolic representation. They learn better through manipulations of instructional materials combined with use of illustrations and symbols. Teachers should ensure availability of different types of instructional materials to ensure full participate of learners in learning and maximize on the acquisition of mathematics competences.

1.7.2 Conceptual Framework
The conceptual framework (figure 1.1) shows the influence of instructional materials in acquisition of mathematics in grade one. The conceptualized variables that are likely to influence acquisition of mathematical competencies among preschool learners include the availability and appropriate use of mathematics instructional materials available in grade one classrooms, utilization of instructional materials and their effects on performance of mathematics. When these factors are considered, the possible outcomes include improved performance in mathematics, learners’ independence during instruction and thus positive attitude towards mathematics. This leads to overall academic achievements.
Figure 1.1: Factors influencing use of Instructional Materials on Acquisition of Mathematical Competencies.

Source: Researcher (2017)

Key
- Study variables
- Non study variables

Fig 1.1 above shows the relationship between the independent and dependent variables. Instructional materials and utilization of instructional materials constitute the independent variables while acquisition of mathematical competencies constitutes the dependent variable. When the available instructional materials are appropriately utilized, positive educational outcomes are achieved, but when there is unavailability of instructional materials, there will be less utilization of them during instruction. Thus, negative educational outcomes.
1.8 Operational Definition of Terms

**Academic achievement** – This entailed good performance as a result of changes in instruction of activities. After the utilization of the instructional materials, mathematics performance was expected to improve thus improving academic achievement.

**Acquisition of mathematical competencies** – this is grasping the concepts or the understanding of mathematical concepts by learners. The use of instructional materials during instruction facilitated the understanding of skills.

**Inclusive classroom** – This was the classroom environment that actively involved the learner in the process of learning. A class was made inclusive by provision of instructional materials.

**Instructional materials** – These were the teaching and learning aids used in grade one. They were also referred to as resources. They facilitated easier teaching and understanding of mathematics concepts. They include books, charts, models, counters, programmed videos, wall clocks and many more.

**Mathematical competencies** – These were the mathematical concepts acquired by grade one learners as they interacted with instructional materials. Utilization of instructional materials helped grade one learners acquire mathematics concepts like addition, taking way, geometry and many more.
CHAPTER TWO
REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter presents the review of related literature relevant to the study. It consists of types of mathematics instructional materials available in grade one and utilization of instructional materials in acquisition of mathematical competencies. In addition, the chapter has reviewed literature on influence of utilization of instructional materials on acquisition of mathematical competencies and it has lastly summarized the literature reviewed.

2.2 Types of Materials Available for Teaching and Learning Mathematics

Instructional materials are important elements in the teaching and learning process. Availability and appropriate Instructional Materials (IM) in a mathematics classroom signifies use of most senses and use of learner centered approaches of teaching. A variety of IM are used for mathematics instruction including manipulative materials for example concrete materials, printed materials, and non-print materials. Dale (1969) classified IM into visual materials, audio materials and audio-visual materials. Availability of appropriate IM is important in the process of teaching and learning. Dale (1969) in his theory of instruction posits that, learning is a process in which concrete and abstracts interact. The question to ask is, what enables learners to understand concepts without much difficulty and increase their retention rate?

Various studies, both locally and internationally have been done on different types mathematical instructional materials (MIM). In developed countries like United States of America (USA), Norway and Turkey, studies on mathematics IM have been carried out. In USA for example, Cetin & Neslihan (2015), noted that instructional materials like flashcards and printed books are available and are used during
mathematics lessons. Drew & Hansen (2007) added that manipulative instructional materials were also available in classrooms. Calculators and programmed computers were also availed for learners to use in the classrooms (Raven, 2016). These materials/resources reinforce learning of mathematics concepts (Raven, 2016). Drew & Hansen added that adequate and appropriate teaching/learning materials make mathematics real. Raven added that appropriate instructional materials reinforced appropriate concepts among young learners. Concepts reinforced included classification, number relationships, geometry, place value, time, among others. Although these studies focused on instructional materials and reinforced mathematics concepts, they are similar to the local concepts according to grade one design. Despite the similarity, these studies were carried out in developed countries where economic and technology factors are advanced. There is therefore, a need to carry out a similar study in Kenya, Nakuru East Sub County, particularly among grade one learners, to find out the types of mathematics instructional materials available, how they are used and their influence on acquisition of mathematics competencies.

Different studies in African countries like Nigeria, Ghana, Mauritius, South Africa, and Uganda show that a variety of MIM are used during teaching and learning. In Ghana, for example, Yeboah (2011) in a report about learning to teach reading and mathematics and its influence on teaching practice found out that just as they had been trained on, majority (94.23%) of the student teachers and newly qualified teachers had the perception that use of concrete and practical examples was one of the best ways to help children understand basic concepts in mathematics. However, when dispersed to the field for practice and teaching, they reported otherwise. In their observation, they never saw any of the experienced teachers teaching using any teaching and learning materials (TLM), (Yeboah, 2011). Teachers used teacher-
centered approaches to teach reading and mathematics which are inappropriate approaches for teaching young children. Despite the study being conducted among student teachers in colleges, it did not indicate whether the student teachers were expected to observe presence of instructional materials in the classrooms or to observe whether the experienced teachers were using them to teach. Further, the study did not indicate the level the students were particularly referring to when the study said that the experienced teachers were using teacher-centered approaches to teach reading and mathematics.

In Uganda, Uwezo (2011) reported that one out of every five (22%) of all grade three children could not solve numerically written division sums of grade two correctly. More than one out of every ten (11%) of all grade seven children could not solve numerically written division sums of grade two correctly. Some of the reasons given by Uwezo (2011) for poor performance in arithmetic were the type of schools attended whether government or private schools, level of education, presence of feeding program in the school among others. Although the report focused on performance in mathematics among lower primary school learners, it did not have screen shots on the appearance of the classrooms to show the presence of instructional materials. Neither did the report shed light on types of MIM used during instruction. More so, the report did not mention mathematics performance among grade one learners. This gave the researcher the urge to carry out this study.

Since the inception of Free Primary Education (FPE) in Kenya in 2003 by National Rainbow Coalition (NARC) government, the Ministry of Education (MOE) has been disbursing funds to all public primary schools to ensure availability of appropriate IM. In the budgetary allocation, 35% is meant for textbooks and 5% for supplementary readers and reference materials per pupil. Only 0.5% is allocated for charts and wall
images (Hakijamii, 2010). These allocations are inadequate to support purchase of enough appropriate instructional materials for a full school term. Misappropriation of the funds by school heads may also lead to failure to buy appropriate instructional materials or buying less (Bunyi et al, 2012). Delay in the disbursement of the funds also may contribute to late purchase of instructional materials. Thus, there is a need to find out how learners acquire mathematical competencies amid these issues. For instance, in a study done in Butere by Wekesa (2015) on early intervention on mathematics difficulties and performance of grade three showed that, 20% of the learners with difficulties in mathematics experienced difficulties in carrying over numbers while 20% had problems borrowing numbers in subtraction and other difficulties. In addition, the study found out that 37.5% and 25% of teachers in private and public schools respectively conducted a paid tuition as an intervention to curb difficulties in mathematics. Although different intervention measures were taken to curb difficulties in mathematics, the study did not indicate whether instructional materials were among the strategies to curb these difficulties. Yet, the study did not show the impact of instructional materials on the improvement of performance of mathematics. In addition, the target population for the study was grade three learners as opposed to the target population of this study which was grade one learners. Therefore, there was need to conduct this study, to determine the influence of IM on acquisition of mathematical competencies.

In Mombasa County, Ashiona, Mwoma and Murungi (2018) in their survey on whether ICT empower teachers to teach mathematics better in lower primary found out that ICT complemented teachers’ classroom work and makes learning activities manageable. Although the study was on mathematics activities, it was a mixed survey whose participants were lower primary school teachers. Therefore, it is
important to carry out this study in Nakuru County, Nakuru East Sub County, to find out whether ICT services were available in grade one classrooms and whether these services promoted acquisition of mathematics competences.

In a survey conducted by Wambua and Murungi (2018) in Kibwezi Makueni County on teaching and learning materials, teacher pupil’s ratio and its influence on pupils’ performance in social studies found out that different teaching and learning materials were available for teaching and learning social studies. Among the available materials were; course books (42.86%), charts (57.14%), syllabus (71.43%), chalkboard (71.43%), pupils exercise books (71.43%) and teacher’s guide (85.71%). The researchers found out that these instructional materials were not enough for the learners thus poor performance of social studies. Despite the study being conducted in Kibwezi Zone, Makueni County, the study was also conducted to find out on teaching and materials that affected social studies performance. A similar study therefore prompted the researcher to focus in Nakuru East Sub County to find out the types of available teaching and learning materials mathematics in grade one classrooms.

Jeptanui’s (2011) survey on efficiency of instructional materials in public schools in Wareng Sub County, Uasin Gishu County found out that, 75% of learners had one textbook in mathematics. Jeptanui further found out that 53% of the learners borrowed the textbooks they did not have, 38% of them reported that they used teachers notes and 8% bought the missing books. This is a clear indication of inadequacy of instructional materials. This is likely to handicap learning of mathematics in public primary schools in Wareng Sub County. However, the survey was not specific about the class or level under study. Although the survey focused on efficiency of IM, it did not focus on any specific discipline. It was on general efficiency of instructional materials. Therefore, there was need to carry out this study
which focused on mathematics instructional materials and acquisition of mathematics competencies among grade one learners.

In a survey conducted by Njenga (2014) on factors influencing pupils’ performance in national examination in Nakuru North Sub County which borders Nakuru East Sub-County, showed that 78.6% and 50% of teachers in public primary schools indicated inadequacy and unavailability respectively of books, charts and learning reference books. On the other hand, teachers from private schools stated adequacy, appropriateness and availability of instructional materials. These differences affected the outcome of KCPE examination results in public and private schools in the Sub County. However, Njenga’s survey focused on the general final performance in national examinations. It is therefore likely that the study was carried out among standard eight learners. Thus, need to focus on grade one learners, types of instructional materials in their classrooms and acquisition of mathematics competences.

2.3 Utilization of Instructional Materials during Mathematics Instruction


Studies conducted in developed countries like USA, Europe, Turkey and Uruguay noted that, utilization of IM during mathematics instruction was embraced. For instance, in a study on strategies for improving mathematics instruction in USA, Leone et al (2010) posited that IM influenced learner’s interest to engage in
mathematics activities. They promoted inclusive classrooms. They added that IM created favorable learning conditions and classroom climate that engage learners. At the same time, Barak (2012), an American educator, emphasized that the use of IM during instruction enhanced hands-on activities. However, these studies were conducted among youth in Juvenile centers. Neither did the report indicate the process of instruction among young children in the center, nor did it mention anything to do with elementary education.

In South Africa, SACMEQ III (2010) reported that IM increases classroom participation in teaching and learning activities. The report added that instructional resources impact positively on the quality of teaching and learning. Although some lights were shed on presence and utilization of instructional materials, the report was exclusively based on grade six. It did not focus on other levels of learning particularly grade one mathematics instruction which is a crucial stage in formal learning.

In other African countries like Uganda, UNICEF (2014) reported that for a school to be friendly, the environment should help children find joy in learning activities. The report revealed that, teaching learning resources (TLR) promoted enthusiasm in the process of teaching and learning. The report further showed that, TLR helped both teachers and learners in self-discovery. Further, it posited that TLR promoted child-centered approaches of teaching and learning through learner participation. Although, the report was based on child friendly learning environment, it showed utilization of instructional materials through pictures of learners interacting with materials such as charts, books and other manipulative materials (UNICEF 2014). However, no specifications on the level of learning were indicated. The report focused on the general child friendly classrooms and school environment. It did not indicate anything on mathematics, neither did it specify on materials used for acquisition of
mathematical competencies. This report therefore, created a need to find out more of the utilization of these instructional materials in acquisition of mathematical competencies in Nakuru Sub East County among grade one learners.

In Kenyan schools, use of TLR is given a lot of importance. This gives the reason as to why the Ministry of Education has taken the sole responsibility of providing instructional materials to all public primary schools (Hakijamii Trust, 2010). Many studies have been done in Kenya to find out the utilization of instructional materials in classrooms. For example, a study in Isinya Sub County by Nsiza and Murungi (2017) on strategies that can be used to enhance teachers’ use of teaching aids in teaching and learning posited that for teachers to use teaching aids during instruction, adequate teaching aids should be availed in the classrooms to avoid fighting for the few resources. They said that adequate teaching aids saved time and made learning livelier. However, their study was based on preschool teachers and general teaching among preschool children in Isinya Sub County. In Nakuru East Sub County, more light needed to be shed on the utilization of instructional materials by grade one learners that would lead to acquisition of mathematics competences.

In a survey by Ashiona, Mwoma and Murungi (2018) on whether ICT empower teachers to teach mathematics better in lower primary in Mombasa showed that teachers utilized tablets during instruction. They found out that due to utilization of ICT during instruction, lesson were more interactive and broke monotony brought about by rote instructions. Despite the study being conducted in lower primary school, still, there was need to focus on grade one and acquisition of mathematics competences. Thus, the researcher was prompted to conduct this study in Nakuru East Sub County to find out whether teachers in grade one utilized instructional during instruction to enhance acquisition of mathematics competences.
In a study in Nairobi by Magoma (2016) on readiness to learn mathematics by grade one learners showed that 68.3% of the learners studied were able to write dictated numbers, 85.4% were able to put together objects, 69.9% were able to take way operations with simple numbers, while 52.8% were able to recognize provided Kenyan currency. This study however did not show whether the objects provided for calculation were provided by the researcher or they were available in the classroom before the study. Although the study focused on readiness to learn mathematics among grade one learners, the purpose of the study was to establish grade one learners’ readiness to learn mathematics at the start of primary school education. The study also aimed at exploring the influence of the learners’ family economic class, level of education among others in Kasarani Sub County, while this study wishes to find out the influence of instructional materials on acquisition of mathematical competencies among grade one learners in Nakuru East Sub County.

Another study by Wanjiru (2015) in Murang’a, posited that IM were used to teach and learn mathematics vocabulary. As a result, performance of mathematics improved. However, the study used a non-equivalent control group pretest-posttest quasi-experimental design which was suitable for experiment. This study however employed correlation research design which will enable comparisons between two competency checklists to examine progress in mathematics competencies.

In Nakuru North Sub County, Njenga (2014) noted that, IM enable learners to perform better in national examinations. The study noted that, resources make teaching and learning easier by complementing the teachers’ role as a guide. It continued to show that, lack of resources makes the process of teaching and learning rigid. Due to this, teachers might result to rote methods of teaching which places
pupils in a passive role. However, the purpose of the study was to investigate the factors influencing pupils’ KCPE performance, where instructional materials were among the findings. Nevertheless, the study did not focus on performance of mathematics only, but on general performance on national examinations. In addition, the study did not show findings on the influence of instructional materials on acquisition of mathematical competencies. Furthermore, the target population of the study was grade eight learners as compared to the grade one learners, who formed the target population of this study. This prompted the researcher to conduct this study on influence of IM on acquisition of mathematics competencies.

2.4 Influence of Utilization of Mathematics Instructional Materials

Utilization of IM during instruction of any learning activity enables learner to understand, enjoy and manipulate abstract concepts (Adipo 2015). The ultimate goal of using IM during teaching and learning process is to enable learners make abstract concepts a reality.

Studies conducted in Germany, England and United States showed that use of teaching/learning materials supported instructional practices. A study by Mischo & Maab (2013) in Germany, for instance found out that instructional materials affected teaching and learning of mathematics. In addition, they noted that IM aided in improving performance in mathematics by 85.3%. Although instructional materials had a relationship with performance of low achieving grade six learners who were the target population of the study, the target population of this study was grade one learners in Nakuru East Sub County. In addition, the purpose of the study was focused on the modeling performance of low achieving students from families with a low socio-economic status as compared to the purpose of this study which was to find out
the effects of instructional materials on acquisition of mathematical competencies among grade one learners in Nakuru East Sub County.

In African countries, studies have shown that, use of mathematics instructional materials has been embraced. A paper by Iji, Ogbole & Uka (2013) in Nigeria reported that due to utilization of improvised instructional materials, learners taught in geometry improved their mean achievement scores. This was because the improvised IM brought about competitiveness and enlivened learning for students. This paper showed that acquisition of the intended skill was achieved, but the focus was only one concept, geometry. It did not cover other areas in mathematics. Further, the study was carried out among upper basic education level students in Nigeria. Thus, there was a need to carry out this study to find out the influence of instructional materials on acquisition of mathematics skills as per the syllabus among grade one pupils in Nakuru East Sub County.

In South Africa, Smith & Hardman (2014) noted that, use of computer based software had helped pupils develop higher levels of geometric thinking and to learn geometric concepts and skills. They also showed that sixth grade learners who were taught concepts of area and volume using a computer-based program improved overall performance than eighth grade learners taught traditionally. According to this study, only one type of teaching aid was focused on, that is, computer software loaded with teaching programs. In addition, the population under study was grade six learners as compared to grade one learners, the target population of this study. This study focused on the influence of utilization of all MIM on acquisition of mathematical competencies among grade one learners.
Guloba, Wokadala & Bategeka (2010) in Uganda found out that inadequate teaching resources resulted to teacher-centered approaches of teaching. This contributed to low quality of education. The findings also showed that availability of instructional materials provided motivating conditions for teaching and learning thus promoting better outcomes. However, the study was carried out in Uganda among grade three and grade six learners in their performance in literacy and numeracy. This study was carried out among grade one learners. In addition, the study employed the baseline survey conducted between July and August in the districts under study. All these studies were carried out in areas outside Kenya. There was therefore a need to focus on Kenya and find out the influence of instructional materials on acquisition of mathematics competencies.

In Kenya, most studies carried out on relationship between IM and acquisition of mathematics competences show that IM have great impact on mathematics performance. For example, a study done in Masaba by Nyamongo, Sang, Nyaoga & Matoke (2014) on the relationship between school based factors and students’ performance showed that inadequate resources and irregular training led to poor student performance. They added that textbooks are a major input for performance in examinations. Inadequate teaching and learning materials led to teachers using other methods of teaching leading to inactive learners. This study was carried out at secondary school level unlike this study which focused on primary school level of education particularly grade one learners. In addition, their study was based on overall performance in the final secondary school examination unlike this study which focused on acquisition of mathematical competencies among grade one learners.
A study conducted in Bondo by Otieno (2010) reported that, IM strengthens learning. He also noted that, academic achievements were realized through appropriate use of IM. He found out that, IM helps teachers to enjoy the process of teaching while learners find it exciting. This encourages exploration and manipulation which in turn bring forth improved performance in mathematics. Although Otieno’s study focused on the effects of teaching/learning resources on mathematics performance, his target population was senior four learners, teachers and head teachers in secondary school. This study focused on grade one learners and teachers and the influence of instructional materials on acquisition of mathematics competencies.

In yet another study carried out in Nakuru North Sub County, Gichohi (2014) found out that 53% of the teachers agreed that inadequate TLR affects teaching and learning processes as well as the concentration of pupils. Njenga (2014) agrees with Gichohi’s findings by confirming that 78.6% of teachers indicated inadequacy of TLM. Their studies established that inadequate IM affected performance of primary national examination because TLM promoted better understanding of concepts thus better performance in examination. Nevertheless, Gichohi’s purpose was to investigate the institutional factors affecting pupils’ retention in public primary schools as compared to the purpose of this study which was to find out the influence of instructional materials on acquisition of mathematical competencies among grade one learners. In addition, the study adopted a survey research design owing to its versatility and generalization as contrasted to correlation research design which this study adopted. As Gichohi’s study focused on secondary school final national examinations, this study focused on grade one acquisition of mathematical competencies. Therefore, there was a gap to be filled in Nakuru East Sub County to find out whether utilization of instructional materials influenced acquisition of mathematics competencies.
2.5 Summary of Literature Review

Mathematics is a key aspect in life. Competences in mathematics can lead to greater academic achievements. The area on influence of instructional materials on acquisition of mathematics competences has not been widely explored. Most of the available studies have focused on the general academic performance and achievement most especially in the final level examination other than grade one. Some studies have been based in pre-primary and primary level while others on secondary school level and tertiary institutions of a country. Furthermore, other studies have focused on effects of IM on final examinations, influence of IM on learner retention in school, teachers’ attitude on mathematics at different levels, among others.

Although much literature has been reviewed, there is a limitation on the utilization of instructional materials to acquire mathematics competences and particularly among grade one learners. More study is needed to focus on grade one classroom where formal education begins.
CHAPTER THREE
RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction
This chapter presents methodology of the study which includes research design, location of the study, target population, sampling techniques, and sample size. Research instruments, pilot study, data collection, procedure, data analysis, logistical and ethical considerations are also explored in this chapter.

3.2 Research Design
This study adopted correlation research design. This design was appropriate because it allowed testing the relationship variables and making predictions. Thus the design allowed the researcher to check the relationship between influences of instructional materials on acquisition of mathematics competencies. This was through an observation between a checklist before and after the utilization of instructional materials among grade one learners.

3.3 Variables
There are two categories of variables in this study; independent variables and dependent variables.

3.3.1 Independent Variables
There are three independent variables. They include;

a) **Types of Materials available for Teaching and Learning Mathematics.** This considered the availability of different types of resources used in the process of instruction. This included instructional materials like concrete materials, printed and non-print resources. It was measured on whether it was available and not
available. Frequency of availability was given and compared against each type available.

b) **Utilization of Mathematics Instructional Materials.** The consideration on this variable was whether the available instructional materials were used during instruction of mathematics. It was measured on whether often used, less often used or not utilized at all. Frequencies on often used, less often used and not used at all were given.

c) **Influence of Utilization of Instructional Materials.** This was considered on the basis of the learner’s ability to perform a skill at hand. A tick was used to show ability to perform and a cross was used to inability to perform a skill in mathematics.

### 3.3.2 Dependent Variable

The dependent variable of this study was acquisition of mathematical competencies. A checklist of mathematics concepts taught in grade one was prepared by the researcher. Each learner’s ability was ticked or crossed upon observation of the learner’s ability. Similar checklist was prepared for observation of learner’s ability three weeks later. A tick was used for those who were able and a cross was used for those not able. The three week’s observations were compared with the earlier on observation.

### 3.4 Research Methodology and Specific Data Collection Methods

This study used correlation research design. This design allows comparison of variables to see the extent their relationship. Therefore, it was an appropriate design which allowed the researcher to compare the influence of instructional materials on acquisition of instructional materials.
3.5 Location of the Study

This study was conducted in Nakuru East Sub County, Nakuru County. Nakuru East sub county borders Nakuru North sub county to the north and Nakuru West to the west. The region was selected because a study by Uwezo Kenya (2011) showed that Nakuru district had an outstanding performance in numeracy than other regions in the county. This performance could be as a result of utilization of IM. However, the report was on performance in grade three. It was therefore necessary to carry out this study among grade one learners to investigate whether they were performing the same and if so, find out whether the performance was as a result of influence of instructional materials on acquisition of mathematics competencies.

3.6 Target Population

The target population of this study was grade one learners in private and public schools. Grade one teachers were also targeted. Table 3.1 presents the target population.

Table 3.1 Target Population of the Study

<table>
<thead>
<tr>
<th>Population Category</th>
<th>Total Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public primary schools</td>
<td>62</td>
</tr>
<tr>
<td>Private primary schools</td>
<td>72</td>
</tr>
<tr>
<td>Learners in public primary schools (grade one)</td>
<td>3630</td>
</tr>
<tr>
<td>Learners in private primary schools (grade one)</td>
<td>3721</td>
</tr>
<tr>
<td>Teachers in public primary schools (grade one)</td>
<td>66</td>
</tr>
<tr>
<td>Teachers in private primary schools (grade one)</td>
<td>74</td>
</tr>
</tbody>
</table>

As shown by Table 3.1, the targeted population was grade one learners in both private and public primary schools. There are 62 public primary schools and 72 private primary schools in Nakuru East Sub County. As shown in the table, public
primary schools have 3630 grade one learners while private primary schools have 3721 learners. Since most of lower primary school teachers teach all the activity areas, all the grade one teachers were targeted. Nakuru East Sub County has 66 teachers in public primary schools and 74 teachers in private primary schools.

The choice of this population was due to the fact that, strong foundation and positive attitude towards mathematics is laid in early classes of formal education. Failure to lay strong foundational skills in mathematics early enough, may lead to negative attitude towards the academic area. Therefore, for a strong foundation to be laid, teachers should be fully involved in the affairs of the learners. Thus, the researcher preferred to choose grade one learners and the grade one teachers.

3.7 Sampling Techniques and Sample Size

The sampling techniques and sample size are described in the following sub-sections.

3.7.1 Sampling Techniques

This study used three sampling techniques; purposive, stratified sampling and random sampling technique. Nakuru County and Nakuru East Sub County were purposively selected owing to the previous information about performance of mathematics (Uwezo, 2011). Stratified and random sampling was used to sample the schools. Therefore, public and private schools formed the two strata. Randomly, a proportional sample size was drawn from both the private and public primary schools. For schools with more than a stream, random sampling was used to select a class. Teachers in the selected grade one classes were automatically part of the sampled population. This is because teachers in grade one teach all the activity areas in the assigned classes.

3.7.2 Sample Size

The sample size was presented in Table 3.2.
<table>
<thead>
<tr>
<th>Primary School Category</th>
<th>Total No. of Schools</th>
<th>Sample Size of Schools (15%)</th>
<th>Sample Size of Learners (15%)</th>
<th>Sample Size of Teachers (15%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public</td>
<td>62</td>
<td>10</td>
<td>545</td>
<td>10</td>
</tr>
<tr>
<td>Private</td>
<td>72</td>
<td>11</td>
<td>559</td>
<td>11</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>134</strong></td>
<td><strong>21</strong></td>
<td><strong>1104</strong></td>
<td><strong>21</strong></td>
</tr>
</tbody>
</table>

**Source:** Nakuru Education Office

As indicated by Table 3.2, the sampled schools were 21 both public and private primary schools. Sampled learners were 1104 in both categories of schools. Sampled grade one teachers were 21 in both public and private schools.

### 3.8 Research Instruments

Data was gathered using a classroom observation schedule, interview schedule and an observation checklist. These instruments were considered the most appropriate in collecting data which enabled investigation of influence of IM on acquisition of mathematical competencies among grade one learners. The use of the instruments is described below:

#### 3.8.1 Classroom Observation Schedule

The classroom observation schedule was used to collect data during lesson delivery. It consisted of three sections. Section A was on general information about the type of the school and number of streams of grade one. Section B consisted of specific observation on availability and utilization of instructional materials during lesson delivery. See appendix I
3.8.2 Interview Schedule

Interview schedule for the teacher – It consisted of two sections. Section A focused on teacher’s background information like name, gender and other personal information. Section B consisted of semi-structured questions on availability and utilization of instructional materials in their classroom. The questions in the interview schedule acted as a guide to make the discussion between the researcher and the teacher to continue. See appendix II.

3.8.3 Learner’s Competency Checklist

Competence checklist was used to assess development of mathematics skills and competences among the learners. It consisted of two parts. Section A consisted of background information of the learner and section B consisted of mathematics skills to be observed from the learners. See appendix III.

3.9 Pilot Study

The instruments were pre-tested to allow for necessary adjustments and corrections. Two private schools and two public schools from the study location were selected. Grade one learners in these schools were observed for different competences in mathematics skills. Teachers in the selected schools were also observed during mathematics lessons. Afterwards, these teachers were interviewed. The pilot study schools were excluded from the actual study. After the pilot study, views which came up during piloting were considered for addition or subtraction or alteration on the instruments.

3.9.1 Validity

Content validity was established through administration of the instruments during pilot study. Views from other researchers (peer review) also established content
validity. Further, advice sought from my supervisor established content validity. This enabled the researcher to identify items that needed to be included and those that needed adjustment or replacement. Thus, accurate and adequate information of the variables, methods and objectives under this study was collected.

3.9.2 Reliability
Reliability of this study was established through various activities. This ensured classroom observation schedules, teachers’ interview schedules and learners’ competence checklist addressed the same issues. Test-retest was done during the pilot study. The pilot study was repeated in the sampled schools and later after a time interval of three weeks to check whether they produced the same results. Pearson Product Moment Correlation coefficient was used to compute the correlation between two competency checklist scores of the learners. The reliability results were a positive correlation coefficient of +0.77.

Data collected and methods used to collect the data were also compared and contrasted. More so, the researcher considered specialists’, peer reviews and supervisor’s comments. They helped in establishing gaps in the data collection methods. Their critiques helped in modifying the instruments to ensure reliability. Participants’ feedback was also used to add left out items and remove ambiguity from the instruments.

3.10 Data Collection Techniques
This was done in two phases.

3.10.1 Pre-visit to Study Schools
The researcher pre-visited every sampled school and took time to familiarize herself with grade one teachers and learners. This helped in removing any anxiety and
developing trust among the participants. The researcher participated in activities done by participants to make them feel free even during the actual study. The researcher helped teachers in their activities especially in assisting learners when working with IM during mathematics lessons. Furthermore, the researcher helped in guiding learners when handling mathematics problems.

3.10.2 Actual Data Collection Procedure

After obtaining permission from the District Education Officer’s office, the researcher visited the sampled schools and introduced herself to the head teachers. The researcher explained the purpose of the study and requested the head teachers to allow entry to grade one classrooms for observations and administration of competency checklist to learners. Data was collected in three stages:

**Stage One: Classroom Observation Schedule**

Data on the types of instructional materials available and the utilization of the mathematics instructional materials was collected using an observation schedule. Lesson observation on whether the teacher utilized instructional materials during teaching and learning was done in the morning during the normal mathematics lesson according to the timetable. As observations on utilization of materials was being made, observations on available types of instructional materials were done and notes taken. At the same time, voice recording was taking place. Short responses were also made in the observation schedule.

**Stage Two: Conducting Interview Schedule with grade one Teachers**

Teachers’ interviews were conducted during break time. Grade one teachers observed during lesson delivery were automatically chosen for interviews. Interviews were
conducted as face to face discussions between the researcher and the teachers. The discussions took duration of at most thirty minutes. The researcher was not to ask questions sequentially as they appear in the interview schedule, rather, questioning was carried out in such a way as to enhance discussion. Short responses were filled in the schedule where necessary, but mostly note taking was used so as to take note of other issues arising during the discussion on availability, utilization and acquisition of mathematical competencies.

**Stage Three: Administration of Learners’ Mathematics Competency Checklist**

Data on learners’ mathematics competencies was obtained from grade one learners using a competency checklist. A mathematics competence checklist was prepared by the researcher with the help of grade one teachers during the pre-visit to the chosen schools. The then prepared competency checklist was used during the first visit to the sampled schools to assess the learners mathematics competencies in the beginning of actual data collection procedure. A similar competency checklist was administered three weeks later to assess whether there was any improvement in the development of mathematics competencies.

**3.11 Data Analysis**

Data was sorted out, coded and summarized for easy analysis. Data was organized according to the objectives that guided the study. Themes formed the bases of analysis. An extensive data was obtained through the observation schedule, interview schedule and the learners’ mathematics competency. It was sorted and grouped according to the themes. Both qualitative and quantitative data was collected. This data was then entered into the Statistical Package for Social Sciences (SPSS) computer programme for analysis. Data on the availability of different instructional
materials was presented using a table, figures of frequency and percentages. Data on the utilization of mathematics instructional materials was presented using a table, figures of frequency and percentages. Data collected learners’ mathematics competency checklist was presented in tables, figures of frequencies and percentages.

3.12 Logistical and Ethical Considerations

The following considerations were made.

3.12.1 Logistical Considerations

The researcher was authorized by the Graduate School, Kenyatta University to carry out this study. This enabled the researcher seek a research permit from the Ministry of Education through National Commission for Science, Technology and Innovation (NACOSTI). The permit was presented to the County Director of Education who offered a letter granting permission to visit sampled schools and an introduction letter to school head teachers. The researcher then wrote to the head teachers of the sampled schools through the District Education Officer requesting them to allow her into the grade one classroom to collect data.

3.12.2 Ethical Considerations

During the collection of data for the study, informed consent of the parents to grade one learners was sought (See Appendix V). Participants’ anonymity and confidentiality was assured. Therefore, codes were used for the schools, teachers and learners. The teachers were informed that the information gathered was for the purpose of this study and not for any other motive.

Further, the researcher ensured minimal interference with the sampled schools’ routine during the period of the study. Lessons were not re-scheduled to fit the interests of the researcher. Rather, observations were made during the scheduled time
in the time table. In addition, special meetings for teachers were not called to inform them about the purpose of the study, rather, the researcher explained individually to every teacher. Finally, permission to use the audio tape recorder was sought from the teachers.
CHAPTER FOUR  
FINDINGS, INTERPRETATION AND DISCUSSION

4.1 Introduction

In this chapter, findings, interpretations and discussions are presented. The findings and the interpretations are based on the objectives of the study. The discussions are related to the literature reviewed. The study sought to achieve the following objectives:

i. To find out the types of instructional materials available for teaching mathematics in grade one classrooms.

ii. To find out whether instructional materials are utilized during mathematics instruction in grade one.

iii. To establish the influence of utilization of mathematics instructional materials on development of mathematics competencies.

4.2 General and Demographic Information

The general and demographic information on the respondents was as discussed below.

4.2.1 General Information on the Respondents

Teachers’ general information is summarized in Table 4.1 below.
Table 4.1: Teachers Sampled

<table>
<thead>
<tr>
<th>Type of school/age of teachers</th>
<th>Professional Level</th>
<th>Total</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Certificate</td>
<td>Diploma</td>
<td>Degree and above</td>
</tr>
<tr>
<td>Private {25-35}</td>
<td>4</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>{36-45}</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>{46-55}</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Public {25-35}</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>{36-45}</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>{46-55}</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As indicated by Table 4.1, most of the sampled teachers were below 45 years of age. This was a clear indication that grade one teachers are young and active in teaching. In addition, it was an indication that they were recently trained and could remember what was expected of them during instruction. It was also an indication that they were energetic to engage in sourcing of more instructional materials to be utilized during instruction. The few teachers above 45 years of age could have been trained in the old systems of teaching though they could be more experienced in teaching grade one learners. On the professional level, all the sampled teachers had been trained and owned Certificates, Diplomas and Degrees. This implied that all the sampled teachers went through colleges and were not quacks. They were aware of the appropriate teaching approaches, that is, teaching using instructional materials which enabled development of learning skills.

4.2.2 Teachers’ Teaching Experience in Grade One

Table 4.2 shows the teachers’ experience in teaching grade one learners.
Table 4.2: Teachers’ Experience in Grade One

<table>
<thead>
<tr>
<th>Category</th>
<th>Teaching Experience</th>
<th>Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private</td>
<td>1-5 years</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>6-10 years</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>11 years and above</td>
<td>0</td>
</tr>
<tr>
<td>Public</td>
<td>1-5 years</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>6-10 years</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>11 years and above</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 4.2 indicates that, all the sampled teachers had experience in teaching grade one learners. This implied that all the sampled teachers were not new in grade one classrooms and they were aware how young learners learn and create knowledge.

4.2.3 Demographic Information on Sampled schools

The sampled schools in Nakuru East Sub County have been presented in Table 4.3

Table 4.3: The Sampled Schools

<table>
<thead>
<tr>
<th>Type of school</th>
<th>Number of schools</th>
<th>Sample size of the schools(15%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private</td>
<td>72</td>
<td>11 (A-K)</td>
</tr>
<tr>
<td>Public</td>
<td>62</td>
<td>10 (I-X)</td>
</tr>
<tr>
<td>Total</td>
<td>134</td>
<td>21</td>
</tr>
</tbody>
</table>

Eleven (11 labeled as A to K) private schools while ten (10 labeled as I to X) were visited for data collection. Random sampling was used to select a class in cases of more than one streams in grade one.

4.2.4 Learners’ Gender and Age

The gender and age of learners who participated in the study are presented in Table 4.4 below.
Table 4.4: Learners’ Gender and Age

<table>
<thead>
<tr>
<th>Learners’ Gender</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Girls</td>
<td>579</td>
<td>52</td>
</tr>
<tr>
<td>Boys</td>
<td>525</td>
<td>48</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1104</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

**Learners’ Age**

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below age (below 6 years)</td>
<td>121</td>
<td>11</td>
</tr>
<tr>
<td>Right age (6 years)</td>
<td>632</td>
<td>57</td>
</tr>
<tr>
<td>Above age (7 years and above)</td>
<td>351</td>
<td>32</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1104</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

As shown in Table 4.4, boys and girls were almost the same proportion (48% and 52% respectively). This implied that more girls participated in the study. The table also showed the ages of the learners. The ages were categorized into three groups. As shown by the table, most of the learners (89%) were of the right age (six years and above) for grade one, as recommended by the Ministry of Education in Kenya.

4.3 Types of Instructional Materials Available in Grade One Classrooms

The study sought to find out the types of instructional materials available in grade one classrooms. The objective was stated as:

Objective one: To find out the types of instructional materials available for teaching mathematics in grade one classrooms.

To achieve this objective, the researcher used the classroom observation checklist. Different instructional materials available in the classrooms were noted in the checklist and on the notebook. Classification on the available instructional materials
was done to identify mathematics instructional materials and the results presented in Table 4.5.

Table 4.5: Types of Mathematics Instructional Materials

<table>
<thead>
<tr>
<th>School type</th>
<th>Type of materials</th>
<th>Available</th>
<th>Not available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private</td>
<td>Concrete/Realia</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Counters (bottle tops, sticks, corks, stones, feathers, etc)</td>
<td>11</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Abacus</td>
<td>3</td>
<td>27.3</td>
</tr>
<tr>
<td></td>
<td>Models</td>
<td>8</td>
<td>72.7</td>
</tr>
<tr>
<td></td>
<td>Shape board</td>
<td>2</td>
<td>18.2</td>
</tr>
<tr>
<td>Printed</td>
<td>Flash cards</td>
<td>9</td>
<td>81.8</td>
</tr>
<tr>
<td></td>
<td>Number cut outs</td>
<td>10</td>
<td>90.9</td>
</tr>
<tr>
<td></td>
<td>Shape cut outs</td>
<td>10</td>
<td>90.9</td>
</tr>
<tr>
<td></td>
<td>Mathematics textbooks</td>
<td>11</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Wall charts</td>
<td>11</td>
<td>100</td>
</tr>
<tr>
<td>Audio-visual</td>
<td>IPAD tablets</td>
<td>0</td>
<td>00</td>
</tr>
<tr>
<td></td>
<td>DVD players</td>
<td>5</td>
<td>45.5</td>
</tr>
<tr>
<td></td>
<td>Computers</td>
<td>5</td>
<td>45.5</td>
</tr>
<tr>
<td></td>
<td>TV</td>
<td>8</td>
<td>72.7</td>
</tr>
<tr>
<td></td>
<td>Calculators</td>
<td>0</td>
<td>00</td>
</tr>
<tr>
<td>Public</td>
<td>Concrete</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Counters (bottle tops, sticks, corks, stones, feathers etc)</td>
<td>10</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Abacus</td>
<td>3</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Models</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Shape board</td>
<td>0</td>
<td>00</td>
</tr>
<tr>
<td>Printed</td>
<td>Flash cards</td>
<td>4</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Number cut outs</td>
<td>4</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Shape cut outs</td>
<td>3</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Mathematics textbooks</td>
<td>7</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>Wall charts</td>
<td>9</td>
<td>90</td>
</tr>
<tr>
<td>Audio-visual</td>
<td>IPAD tablets</td>
<td>10</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>DVD players</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Computers</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>TV</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Calculators</td>
<td>0</td>
<td>00</td>
</tr>
</tbody>
</table>
As it can be seen in Table 4.5 on the types of instructional materials available in grade one classrooms, the results showed that there were different types of instructional materials in grade one for teaching and learning mathematics. The results also showed that some instructional materials were unavailable or inadequate in some schools.

These current study findings were consistent with the findings of Leone, Wilson & Mulcahy, (2010) in Washington DC which revealed that different types of instructional materials were available in classrooms which promoted active participation of learners in learning, thus inclusive classrooms. These findings also supported the findings of Cetin & Neslihan (2015) in USA who also noted that different types of instructional materials were available in mathematics classrooms. According to their findings, availability of different types of instructional materials promoted development of different mathematics skills. Njenga’s (2014) findings and Bunyi’s (2012) findings agree with the findings of this study, that in some schools, instructional materials like mathematics textbooks were inadequate and learners were forced to share the resource when required to refer to them for some activities. The findings of this study also agree with the findings of Wambua and Murungi (2018) in Kibwezi Makueni County which revealed that different teaching and learning materials were available for teaching and learning social studies.

The findings of this study partly agreed with Raven’s (2016) findings in USA, that, programmed computers and calculators were availed to learners for use in their classroom activities. This study found out that, although some schools availed programmed computers for use, no calculators were available for grade one learners. The unavailability could be as a result of lack of guidelines by the Ministry of Education to utilize the resource in grade one. The findings of this study also partly agree with the findings of Jeptanui (2011) in Wareng Sub County, Uasin Gishu
County, which revealed that there were no available mathematics textbooks and mathematics wall charts in some sampled schools. The study revealed that teachers and learners borrowed the resource from friends, others were bought by individual parents. The reasons for the differences in findings could be attributed to differences in the study settings and purposes.

4.6 Instructional Materials utilized during Mathematics Instruction

This study also sought to find out whether instructional materials were utilized during mathematics instruction in grade one. The objective was stated as below:

**Objective two: To find out whether instructional materials are utilized during mathematics instruction in grade one.**

To achieve this objective on whether instructional materials were utilized during mathematics instruction, both classroom observation checklist and teachers’ interview schedule were used. During classroom observation, the researcher observed whether the teacher utilized or did not utilize instructional materials during instruction and noted down. During the teacher’s interview, notes were taken on whether the teacher utilized instructional materials during instruction. The types of instructional materials often utilized, less often utilized and not utilized at all were also noted on a notebook. As the interview was being carried out, audio recording was also being done which was listened to later on to get clear results. Table 4.6 presents the results on the utilization of instructional materials during instruction.
Table 4.6: Utilization of Mathematics Instructional Materials during Instruction

<table>
<thead>
<tr>
<th>Type of resource</th>
<th>Private primary schools</th>
<th>Public primary schools</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Often</td>
<td>Less often</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>%</td>
</tr>
<tr>
<td>Realia(real money and counters)</td>
<td>11</td>
<td>100</td>
</tr>
<tr>
<td>Learning corner</td>
<td>9</td>
<td>82</td>
</tr>
<tr>
<td>Text Books</td>
<td>10</td>
<td>91</td>
</tr>
<tr>
<td>Charts</td>
<td>9</td>
<td>82</td>
</tr>
<tr>
<td>Cut outs</td>
<td>8</td>
<td>73</td>
</tr>
<tr>
<td>Computer based software</td>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td>Downloaded education apps</td>
<td>1</td>
<td>09</td>
</tr>
</tbody>
</table>

Table 4.6 above indicates utilization of instructional materials during mathematics instructions. The results were that, some materials were often utilized while others were less often utilized. The results also show that some mathematics instructional materials were not at all utilized in some sampled schools.

These findings confirmed Magoma’s (2016) findings in Kasarani Sub County, Nairobi County that revealed that realia and concrete materials were often utilized to enhanced development of mathematics skills like putting together objects, taking away operations in mathematics and recognizing Kenyan currency. Njenga’s (2016) findings in Nakuru North Sub County also confirmed the findings of this study. The study revealed that teachers in Nakuru North Sub County utilized textbooks and charts more often to influence performance in the national examinations. The findings
of this study also agree with Jepanui’s (2011) findings that revealed that textbooks in Wareng Sub County were often utilized during instruction in some schools and less often utilized in some schools due to their unavailability.

The findings of this study disagree with the findings of a study in South Africa by Smith & Hardman (2014) which revealed that, computer based software helped grade six learners in geometry. This study found out that computer based softwares were less often used and others did not use them at all. Interviewed teachers revealed that they used computer based software in teaching concepts such as colour, elements of weather and animals. However, these skills are not available among mathematics skills in grade one designed concepts. This disagreement could be as a result of reasons attributed to undeveloped computer based software. Another reason for less utilization and not using them at all could be as a result of unavailability of the resources in the sampled schools.

4.7 Influence of Utilization of Instructional Materials to Develop Mathematics competencies.

This study also sought to establish the influence of instructional materials on development of mathematics competencies. The objective to be achieved was:

Objective three: To establish the influence of utilization of mathematics instructional materials on development of mathematics competencies.

To achieve this objective, a learners’ competency checklist was prepared during piloting. With the help of the teachers in the piloted schools and grade one curriculum design, different skills were included in the learners’ competency checklist including rote counting, number recognition, geometry/shape recognition among others. The checklist prepared during piloting was used in the sampled schools during the first visit to schools to check learners’ competency at the beginning of the study. To
establish whether there was development of mathematics competencies, a similar competency checklist with little alterations was prepared and used to check learners’ competency three weeks after the first one. Table 4.7 below presents the results of learners’ competency during the first visit to the sampled schools.

**Table 4.7: Learners’ Mathematics Competency Checklist at the Beginning of the Study**

<table>
<thead>
<tr>
<th>School Category</th>
<th>Those Capable</th>
<th>Not Capable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Public</td>
<td>Private</td>
</tr>
<tr>
<td>Rote counting</td>
<td>489</td>
<td>513</td>
</tr>
<tr>
<td>Geometry/Shape recognition</td>
<td>462</td>
<td>492</td>
</tr>
<tr>
<td>Number arrangement</td>
<td>412</td>
<td>463</td>
</tr>
<tr>
<td>Addition</td>
<td>401</td>
<td>441</td>
</tr>
<tr>
<td>Take-away</td>
<td>345</td>
<td>445</td>
</tr>
<tr>
<td>Recognition of Kenyan currency</td>
<td>413</td>
<td>485</td>
</tr>
<tr>
<td>Recognition of numbers</td>
<td>382</td>
<td>474</td>
</tr>
<tr>
<td>Filling in missing numbers</td>
<td>361</td>
<td>478</td>
</tr>
<tr>
<td>Putting together objects</td>
<td>404</td>
<td>494</td>
</tr>
<tr>
<td>Counting shaded parts</td>
<td>410</td>
<td>503</td>
</tr>
</tbody>
</table>

Table 4.7 above was a learners’ checklist prepared during piloting by the researcher with the help of teachers in the piloted schools. The skills included in the competency checklist were derived from grade one curriculum design. The results in this competency checklist were to be compared with the results in a similar competency checklist done by grade one learners three weeks after the first one. The skills in the
latter competency checklist were similar to those in the first one but with little alterations.

Table 4.8: Learners’ Mathematics Checklist

<table>
<thead>
<tr>
<th>Skill</th>
<th>School Category</th>
<th>Those Capable</th>
<th>Not Capable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Public F</td>
<td>Public F</td>
</tr>
<tr>
<td></td>
<td></td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Rote counting</td>
<td></td>
<td>513</td>
<td>94</td>
</tr>
<tr>
<td></td>
<td></td>
<td>32</td>
<td>6</td>
</tr>
<tr>
<td>Geometry/Shape recognition</td>
<td></td>
<td>506</td>
<td>93</td>
</tr>
<tr>
<td></td>
<td></td>
<td>39</td>
<td>7</td>
</tr>
<tr>
<td>Number arrangement</td>
<td></td>
<td>422</td>
<td>77</td>
</tr>
<tr>
<td></td>
<td></td>
<td>123</td>
<td>23</td>
</tr>
<tr>
<td>Addition</td>
<td></td>
<td>479</td>
<td>88</td>
</tr>
<tr>
<td></td>
<td></td>
<td>66</td>
<td>12</td>
</tr>
<tr>
<td>Subtraction</td>
<td></td>
<td>424</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td></td>
<td>121</td>
<td>22</td>
</tr>
<tr>
<td>Recognition of Kenyan currency</td>
<td></td>
<td>482</td>
<td>88</td>
</tr>
<tr>
<td></td>
<td></td>
<td>63</td>
<td>12</td>
</tr>
<tr>
<td>Recognition of numbers</td>
<td></td>
<td>459</td>
<td>84</td>
</tr>
<tr>
<td></td>
<td></td>
<td>86</td>
<td>16</td>
</tr>
<tr>
<td>Filling in missing numbers</td>
<td></td>
<td>420</td>
<td>77</td>
</tr>
<tr>
<td></td>
<td></td>
<td>125</td>
<td>23</td>
</tr>
<tr>
<td>Putting together objects</td>
<td></td>
<td>492</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td></td>
<td>53</td>
<td>10</td>
</tr>
<tr>
<td>Counting shaded parts</td>
<td></td>
<td>471</td>
<td>86</td>
</tr>
<tr>
<td></td>
<td></td>
<td>74</td>
<td>14</td>
</tr>
</tbody>
</table>

Table 4.8 presents results of a learners’ competency checklist carried out three weeks after the first one. Capability in the skill was measured using points the learner got correctly. If a learner was capable of scoring six points and above, he was considered having acquired mathematics competence. Another way in which acquisition of mathematics competencies were measured was by comparing the number of learners who are capable of performing skills in both competency checklists. The results, as it can be seen from Table 4.7 and Table 4.8 showed that, the number of learners capable in the latter competency checklist was bigger than the number of learners in the first competency checklist. The results were shown by comparing the scores of learners in
both competency checklists. Pearson’s product moment co-efficient was used to tabulate the correlation between utilization of instructional materials and development of mathematics skills. Table 4.9 below presents the results.

**Table 4.9: Mean, Standard Deviation and Correlation Coefficient of Mathematics Competencies**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean in the first checklist (N)</td>
<td>443.4</td>
<td></td>
</tr>
<tr>
<td>Mean in the second checklist(N)</td>
<td>488.7</td>
<td></td>
</tr>
<tr>
<td>Standard deviation from mean of first checklist</td>
<td>28.9</td>
<td></td>
</tr>
<tr>
<td>Standard deviation from mean of second checklist</td>
<td>23.7</td>
<td></td>
</tr>
<tr>
<td><strong>Correlation coefficient</strong></td>
<td><strong>+0.77</strong></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.9 presents the relationship between utilization of instructional materials and development of mathematics skills. The results show that there was increased mean in the second competency checklist. This implied that learners in the second competency checklist improved in the scores. The results also showed a positive correlation coefficient of +0.77 which implied that there was a relationship between utilization of instructional materials and development of mathematics skills.

The findings of this study agree with findings of a study in Germany by Mischo & Maab (2013) that revealed that teaching and learning materials improved development of mathematical skills that led to acquisition of mathematics competencies. The findings of this study also confirmed the findings by Leone et al (2010) in USA who found out that, instructional materials created a favorable learning condition and a classroom climate that engaged learners in their learning. Their study revealed that a
favorable classroom climate correlates to a positive attitude towards what is being engaged in, thus, positive results.

This study also revealed that there are learners with low scores and these learners added very few points in the latter competency checklist. This could have been as a result of inadequate instructional materials in the classroom which could lead to inappropriate teaching methods. These findings agree with Yeboah’s (2011) findings in Ghana in a report that student teachers, upon being released in the field for teaching practice, never found any of the experienced teachers teaching with any teaching and learning materials. This shows that scoring good points in any form of assessment correlates with proper and appropriate teaching method. Njenga’s (2014) findings in Nakuru North Sub County confirmed that, private primary schools had higher scores than public primary schools that could have led to better academic performance in private schools. Njenga’s findings conclude that, utilization of instructional materials during teaching and learning correlates with development of mathematics skills which promotes acquisition of mathematics competencies.
CHAPTER FIVE
SUMMARY OF FINDINGS, CONCLUSIONS AND
RECOMMENDATIONS

5.1 Introduction

This chapter summarizes the findings of this study. In addition, conclusions and recommendations for further study are also presented.

5.2 Summary of the Findings

Based on the first objective, the study revealed that, there were different types of instructional materials available in grade one. The results showed that, some materials were 100% available while others were less/not available. The most readily available materials were the realia/concrete materials. The printed materials like charts and textbooks were also available although not available in some schools. The less available were the audio-visual materials.

On the second objective, the study also revealed that various instructional materials were utilized during mathematics instruction. The results of the study showed that some materials were often utilized while others were less utilized or not utilized at all. Those often utilized were; concrete/realia, textbooks and charts. The less often utilized or not used at all in some schools were computer-based software and downloaded apps. Among those which could be improvised and be used during instruction were charts and cut outs. Unfortunately some schools observed did not utilize any of the materials at all. Some schools had blank walls and no material existed in the mathematics learning corner.

The third objective of the study revealed that, utilization of instructional materials had influences on the acquisition of mathematical competencies. As revealed by the
increased mean score in the second competency checklist, utilization of instructional materials influence acquisition of mathematics competencies. A positive correlation of +0.77 showed that instructional materials influence acquisition of mathematics. Therefore, as revealed by the findings of this study, it can be concluded that utilization of instructional materials influence acquisition of instructional materials.

5.3 Conclusions

The study came up with the following conclusions. Firstly, the study established that there were different types of instructional materials available grade one classrooms. They were used in teaching and learning different mathematical concepts that enabled development of different skills. This indicated acquisition of different competencies in activity areas taught and learned. Secondly, the study revealed that teachers utilized instructional materials during teaching and learning mathematics. The study found out that some materials were often utilized while others were less often utilized during teaching and learning. Other materials were not utilized at all in some schools. The study revealed that utilization of instructional materials during teaching and learning process made learners active participants in the process of their learning.

Thirdly, it was evident from the study findings that instructional materials influenced development of mathematics skills. This was revealed by the increase of the mean score in the latter competency checklist. Therefore, it can be concluded that instructional materials influence acquisition of mathematics competencies.

5.4 Recommendations

Based on the findings and conclusions, the researcher made the following recommendations:
5.4.1 Ministry of Education

The government, through the Ministry of Education, should ensure early disbursement of funds meant for the provision of instructional materials in public primary schools. This would ensure purchase of enough instructional materials and avail them to learners as early as the term begins. The results from this study revealed that some public primary schools had inadequate instructional materials due to late disbursement of government resources meant for purchase of instructional resources.

The Ministry of Education, through the District Quality Assurance Officers (DQASO) should also ensure that the head teachers buy the right and adequate textbooks. The results of this study revealed that inadequate textbooks could have been as a result of mishandling of funds meant for purchase of textbooks.

5.4.2 Teachers

Grade one teachers and other lower primary school teachers should enroll for short courses and in-service courses to equip them on the recommended methods of lesson delivery which involve utilization of instructional materials during instruction. This study revealed some materials were available in the environment like the realia/concrete materials yet some grade one teachers did not have them in the mathematics learning corner.

5.4.3 Parents and the Community

Parents and the community should be willing to participate in a material development day set apart for development of instructional materials. During parents meeting together with teachers, they should also come up with the best textbooks which should be bought as reference books to be used at home and school. This study revealed that
some schools had inadequate textbooks and charts. Parents’ and community’s participation could contribute to the availability of this teaching and learning resource.

5.5 Recommendations for Further Research

Based on the objectives and findings of this study, the following recommendations were made:

5.5.1 Recommendations for Teachers

Objective one sought to find out the types of instructional materials available for teaching and learning in grade one classrooms. The findings of this study revealed that different types of instructional materials were available in some schools and missing some schools. The study therefore recommends that:

i. Teachers together with their learners should ensure that teaching and learning materials readily available in the school environment should be collected, sorted and well arranged in the mathematics learning corner ready to be utilized during instruction.

ii. Teachers should work hard to ensure the unavailable teaching and learning materials are sourced and put in the mathematics learning corner ready for use during instruction.

5.5.2 Recommendations for Parents

Based on objective one that sought to find out the types of instructional materials available for teaching and learning in grade one classrooms, the study found out that different types of instructional materials were available and others not available in some schools. This study recommends that:

i. Parents should set apart a day in each term to volunteer and make teaching and learning resources in schools where their children attend.
ii. Parents with teachers’ guide should purchase textbooks that would help boost the availability of this teaching and learning resource in schools.

iii. Parents if requested by teachers to purchase a type of an instructional material, they should purchase without hesitation.

iv. Parents should avail some instructional materials for their children to use at home.

5.5.3 Recommendations for Teachers

Objective two sought to find out whether instructional materials are utilized during mathematics instruction in grade one. This study revealed that some materials are often utilized and others were less often utilized. Others still were not utilized at all. This study recommends that:

i. Teachers should always utilize instructional materials when teaching to enable learners take part in their learning.

ii. Teachers should give time to learners to interact with instructional materials and solve their mathematical problems during instruction.

5.3.4 Recommendations for School Management

Objective three sought to establish the influence of utilization of mathematics instructional materials on development of mathematics competencies. This study found out that utilization of instructional materials influenced development of mathematics competencies. Therefore, the study recommends that:

i. The school management should ensure that there are adequate instructional materials for utilization during teaching and learning. They should ensure worn out materials are repaired and those that are completely destroyed are replaced without delay.
ii. The school managers should ensure that funds disbursed by the government through the Ministry of Education are used to purchase the right textbooks.

iii. The school management should embrace further training of teachers. They should support teachers financially to attend seminars and workshops organized by the Ministry of Education.

iv. School managers should regularly hold meetings with teachers to hear out the challenges teachers could be facing in their teaching.

v. The school management should regularly hold meetings with parents of particular classes to liaise on way forward in enhancing progressive development of mathematics competencies in their schools.
REFERENCES


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Gichohi, F. M. (2014). *Institutional Factors Affecting Pupils’ Retention in Public Primary Schools in Nakuru North District* (M.Ed, University of Nairobi)


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Kenyatta University (2013). Revised Proposal Writing Guidelines. Kenyatta University


Magoma. P. M. (2016). Determinants of Grade One Pupils’ Readiness to Learn Mathematics in Primary Schools. (M.Ed, Kenyatta University)


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APPENDICES

Appendix I: Classroom Observation Schedule

Section A: General Information

1. Code of the school……………………..

2. Type of school: Public ( ) Private ( )

3. Streams in Grade One: One ( ) Two ( )
   Three ( )

Section B: Utilization of Instructional Materials

<table>
<thead>
<tr>
<th>Item</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are there any instructional materials in the classroom</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are any concrete instructional materials available?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are any printed instructional materials available?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are there any audio visual materials in the classroom?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are the instructional materials adequate and appropriate for the learners?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the teacher use instructional materials during lesson delivery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the teacher give learners time to interact with the instructional materials during the lesson</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Any other relevant observation

____________________________________________________________________
____________________________________________________________________
____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

60
Appendix II: Interview Schedule for the Teacher

Section A: Background information

1. Code of the school .................................
2. Teacher’s code ......................................
3. Type of school: Public ( ) Private ( )
4. Gender: Boy ( ) Girl ( )
5. Level of education .................................
6. Duration of teaching Grade One .................
7. Number of streams ...............................
8. Employer .............................................

Section B: Utilization of instructional materials

1. Utilization of instructional materials
   - Types of instructional materials available in the classroom.
   - Adequacy of instructional materials in the classroom.
   - Utilization of instructional materials during lesson delivery.
   - The most available instructional materials and how often utilized.
   - The reaction of learners on instruction with instructional materials.
   - Comparison of instruction with instructional materials and when without

2. Sources of your instructional materials
   - Sources of instructional materials in your classroom
   - Ways of getting those that are not available in the surrounding
   - The role of the school administration in the provision of instructional materials
   - Parents’ involvement in the provision of instructional materials.
3. Benefit to the learner

- Learners’ reaction when instructional materials are utilized.
- Learners and participation or creation of knowledge
- Improved performance in classroom activities
- Creation of knowledge through interaction with instructional materials.

4. Benefits to the teacher

- Importance of instructional materials to you
- Performance and mean score
Appendix III: Learner’s Mathematics Competency Checklist

Section A: Background Information

Tick or write the learner’s response

1. Code: ………………………………………………….
2. Type of primary school: Public ( ) Private ( )
3. Gender of the learner: Boy ( ) Girl ( )
4. Learner’s Date of Birth……………………………..

Section B: Mathematics Abilities

Cross Yes where the learner has abilities or No where the learner is not capable.

1. Rote count 1-50 Yes/No
   Notes: ______________________________________________________

2. Recognize shapes
   Yes/No
   Yes/No
   Yes/No
   Notes: ______________________________________________________

3. Shade the biggest number. Yes/No
   13   9   5   16
   Notes: ______________________________________________________

4. Recognize the following Kenyan currency
   20   40   5   100   50
   Yes/No  Yes/No  Yes/No  Yes/No  Yes/No
   Notes: ______________________________________________________

5. Add:
1 + 8 = 2 + 7 = 6 + 4 =
Yes/No Yes/No Yes/No
Notes: ____________________________________________________________

6. Take-away:
8 − 3 = 9 − 2 = 6 − 5 =
Yes/No Yes/No Yes/No
Notes: ____________________________________________________________

7. Count and write the number of the shaded part

Notes: ____________________________________________________________

8. Put together

Notes: ____________________________________________________________

9. Read the following numbers
Yes/No
13 17 4 9 20
Notes: ____________________________________________________________

10. Fill the missing numbers
<table>
<thead>
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<th></th>
<th></th>
<th></th>
<th></th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes/No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>9</th>
<th></th>
<th></th>
<th>12</th>
<th>13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes/No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: _________________________________________________________
Appendix IV: Parent’s Consent

Dear parent,

I am a post graduate student in the Department of Early Childhood and Special Needs Education undergoing a Masters Degree in Kenyatta University. My topic of study is “Influence of Instructional Materials on Acquisition of Mathematics Competencies among Grade One Learners”. The main aim of this study will be to find out whether utilization of instructional materials in teaching and learning mathematics is connected to performance.

I am therefore, requesting for your permission to involve your son/daughter in the study. Kindly, show your acceptance by signing this form in the space provided below.

I, _____________________________________________ the parent/guardian of_______________________________ hereby give consent for my child to participate in the study.

PARENT’S SIGNATURE______________

Yours Faithfully,

Priscilla Mueni Nzii

The Researcher.
Appendix V: Approval from Graduate School

KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke
Website: www.ku.ac.ke

FROM: Dean, Graduate School
TO: Nzil Priscilla Mueni
C/o Early Childhood Studies Dept.

DATE: 24th January, 2018
REF: E55/OL/28440/2013

SUBJECT: APPROVAL OF RESEARCH PROJECT PROPOSAL

This is to inform you that Graduate School Board at its meeting of 10th January, 2018 approved your Research Project Proposal for the M.Ed Degree Entitled, “Influence of use of Instructional Materials on Acquisition of Mathematical Skills to Standard one Learners, Nakuru County, Kenya”.

You may now proceed with your Data Collection, Subject to Clearance with Director General, National Commission for Science, Technology and Innovation.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed Supervision Tracking Forms per semester. The form has been developed to replace the Progress Report Forms. The Supervision Tracking Forms are available at the University’s Website under Graduate School webpage downloads.

Thank you.

KENNETH MAINA
FOR: DEAN, GRADUATE SCHOOL

c.c. Chairman, Early Childhood Studies Department.

Supervisors:
1. Dr. Wanjohi Githinji
C/o Department of Early Childhood Studies
Kenyatta University
Appendix VI: Authorization Letter from Kenyatta University Graduate School

KENYATTA UNIVERSITY
GRADUATE SCHOOL

Our Ref: E55/OL/28440/2013

DATE: 24th January, 2018

Director General,
National Commission for Science, Technology
and Innovation
P.O. Box 30623-00100
NAIROBI

Dear Sir/Madam,

RE: RESEARCH AUTHORIZATION FOR NZILI PRISCILLA MUELI – REG. NO.

I write to introduce Ms. Nzili Priscilla Mueli who is a Postgraduate Student of this University. She is registered for M.Ed degree programme in the Department of Early Childhood Studies.

Ms. Nzili Priscilla intends to conduct research for a M.Ed Project Proposal entitled, “Influence of use of Instructional Materials on Acquisition of Mathematical Skills to Standard one Learners, Nakuru County, Kenya”.

Any assistance given will be highly appreciated.

Yours faithfully,

[Signature]

MRS. LUCY N. MBAABU
FOR: DEAN, GRADUATE SCHOOL
Appendix VII: Research Authorization from The Ministry of Interior and Co-Ordination of National Government

THE PRESIDENCY
MINISTRY OF INTERIOR AND
CO-ORDINATION OF NATIONAL GOVERNMENT

Telegram: “DISTRICTER” Nakuru
Telephone: Nakuru 851-2212516

Ref No. EDU.12/10 VOL.V/204

TO WHOM IT MAY CONCERN

RE:- RESEARCH AUTHORIZATION
PRISCILLA MUENI NZII

The above named has been authorized to carry out research on “Influence of use of instructional materials on acquisition of mathematical skills to standard one learners” in Nakuru East Sub County for a period ending 8th February 2019.

Please accord her all the necessary support to facilitate the success of her research

EDITH KOECH
FOR DEPUTY COUNTY COMMISSIONER
NAKURU EAST SUB COUNTY
Appendix VIII: Research Authorization from Ministry of Education State

Department of Basic Education

MINISTRY OF EDUCATION
STATE DEPARTMENT OF BASIC EDUCATION

Telegram: "EDUCATION",
Telephone: 051-2216917
When replying please quote

Ref.CDE/NKU/GEN/4/21/VOL.VI/71

COUNTY DIRECTOR OF EDUCATION
NAKURU COUNTY
P. O. BOX 259,
NAKURU.

13th January, 2018

TO WHOM IT MAY CONCERN

RE: RESEARCH AUTHORIZATION – PRISCILLA MUENI NZII
PERMIT NO. NACOSTI/P/18/55089/21189

Reference is made to letter NACOSTI/P/18/55089/21189
Dated 8th February, 2018

Authority is hereby granted to the above named to carry out research on
"Influence of use of instructional materials on acquisition of mathematical
skills in standard one learners, Nakuru County, Kenya," for a period ending
8th February, 2019

Kindly accord her the necessary assistance.

DICKSON OYIEKO
FOR: COUNTY DIRECTOR OF EDUCATION
NAKURU COUNTY

Copy to:

- Kenyatta University
  P.O Box 43844-00100
  NAIOROBI
Appendix IX: Research Authorization from National Commission for Science, Technology and Innovation

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Ref. No. NACOSTI/P/18/55088/21189
Date: 8th February, 2018

Priscilla Mueni Nzii
Kenyatta University
P.O. Box 43844-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on “Influence of use of instructional materials on acquisition of mathematical skills to standard one learners, Nakuru County, Kenya,” I am pleased to inform you that you have been authorized to undertake research in Nakuru County for the period ending 8th February, 2019.

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

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

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

Copy to:
The County Commissioner
Nakuru County.

The County Director of Education
Nakuru County.
Appendix X: Research Permit

THIS IS TO CERTIFY THAT:
MS. PRISCILLA MUENI NZIJI
of KENYATTA UNIVERSITY, 43844-100
NAIROBI, has been permitted to conduct
research in Nakuru County

on the topic: INFLUENCE OF USE OF
INSTRUCTIONAL MATERIALS ON
ACQUISITION OF MATHEMATICAL SKILLS
TO STANDARD ONE LEARNERS, NAKURU
COUNTY, KENYA.

for the period ending:
8th February, 2019

[Signature]

Director General
National Commission for Science,
Technology & Innovation

CONDITIONS
1. The License is valid for the proposed research,
research site specified period.
2. Both the License and any rights thereunder are
non-transferable.
3. Upon request of the Commission, the Licensee
shall submit a progress report.
4. The Licensee shall report to the County Director of
Education and County Governor in the area of
research before commencement of the research.
5. Excavation, filming and collection of specimens
are subject to further permissions from relevant
Government agencies.
6. This Licence does not give authority to transfer
research materials.
7. The Licensee shall submit two (2) hard copies and
upload a soft copy of their final report.
8. The Commission reserves the right to modify the
conditions of this Licence including its cancellation
without prior notice.

RESEARCH CLEARANCE
PERMIT

Serial No.A 17394

CONDITIONS: see back page