

**RELATIONSHIP BETWEEN PRE-PRIMARY SCHOOL LEARNING
ENVIRONMENT AND UTILIZATION OF INSTRUCTIONAL MATERIALS BY
TEACHERS IN NYERI COUNTY, KENYA**

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**A THESIS REPORT SUBMITTED IN PARTIAL FULFILLMENT OF THE
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DECLARATION

I confirm that this research report is my original work and has not been presented for a degree in any other university/institution for certification. The report has been completed, and all referenced works duly acknowledged. Where text, data, graphics, pictures, and tables have been borrowed from other works, including the internet, the sources were correctly accredited through referencing in accordance with anti-plagiarism regulations.

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DEDICATION

This thesis is dedicated to my family, the education fraternity and all other beneficiaries. God bless them all.

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ABBREVIATIONS AND ACRONYMS

ANBER	American National Bureau of Economic Research
CTML	Cognitive Theory of Multimedia Learning
DAP	Developmentally Appropriate Practices
ECCE	Early Childhood Care and Education
ECDE	Early Childhood Development Education
ECE	Early Childhood Education
FGM	Female Genital Mutilation
ICT	Information Communication Technology
IM	Instructional Materials
KUERC	Kenyatta University Ethics Research Committee
NACECE	National Centre for Early Childhood Education
NACOSTI	National Commission for Science, Technology and Innovation
NAEYC	National Association for Education of Young Children
NCEOP	National Committee on Educational Objectives and Policies
PPS	Pre-Primary Schools
PPST	Pre- Primary School Teachers
QRIS	Quality Rating and Improvement Systems
SPSS	Statistical Package for Social Sciences
TSC	Teachers Service Commission
UK	United Kingdom
UNESCO	United Nations Education Scientific and Cultural Organization

ABSTRACT

Studies show that public pre-primary schools in Kenya are characterized by understaffing, congested classrooms, inadequate instructional materials and poor working conditions for staff which contribute to poor teaching and learning processes in ECDE. The current research was designed to fill existing gaps in knowledge on the determinants of utilization of instructional materials by ECDE teachers in Nyeri County. The research was guided by the Cognitive Theory of Multimedia Learning Framework (CTML) and Ecological Systems Theory. The specific objectives of the research were to: assess the demographic characteristics of ECDE teachers, determine the teachers' attitude to utilization of instructional materials, assess the availability of teaching-learning resources, establish the availability of educational media and establish the teachers' level of utilization of instructional materials. The study applied a correlational research design on a random sample of 164 teachers drawn from 132 public pre-primary schools in Nyeri County. Questionnaires were used for gathering data. Thematic approach was used to analyze qualitative data while quantitative data was summarized using descriptive statistics such as frequencies and percentages. There were four variables whose effect on the dependent variable was studied namely teachers' age, experience, teachers' attitude scores and class size. Hypotheses were formulated and tested in order to establish whether teachers' age, years of teaching experience, teachers' attitude scores and number of pupils in a class were significantly related to utilization of instructional materials in ECDE. The inferential statistics selected included Chi-square test, Pearson correlation coefficients and regression. Findings showed that female teachers were predominant and had attained a diploma or undergraduate degree, majority were professionally trained teachers in ECDE with long teaching experience and had positive attitudes to instructional materials in ECDE. The findings showed that pre-primary schools had adequate teaching-learning resources and diverse instructional media for use in curriculum delivery. The number of pupils ranged from seven to forty nine children in a pre-primary class. The hypothesis test results revealed that years of teaching experience and teachers' positive attitudes were strong positive predictors of utilization of instructional materials. However, large numbers of pupils in class was found to be a strong negative predictor of utilization of instructional materials. It was concluded that the factors that had the greatest contribution to utilization of instructional materials were teaching experience, teachers' positive attitudes and a small class size. Teachers' age was not a significant predictor. It was recommended that in order to enhance effective instruction at ECDE level, there is need to adhere to the recommended teacher-pupil ratio for early learners, and to develop a policy on the provision and use of instructional materials.

CHAPTER ONE: INTRODUCTION

1.1 Introduction

This chapter comprises the background to the study, problem statement, objectives, research hypotheses, significance, limitations, delimitations and assumptions of the study, theoretical and conceptual frameworks and operational definition of terms.

1.2 Background to the Study

The global changes which are taking place in the field of formal education are revolutionary (Kelley & Camilli, 2007). This is evidenced by the degree in different countries are involved in the review of their respective systems of education to equip the youth with desirable knowledge, skills, and attitudes required for the individual as well as societal development (Bomer, 2015). According to Mayer (2008a), the central issue in the Cognitive Theory of Multimedia Learning framework (CTML) is to assist pupils to learn. CTML approach works by preparing children's intellectual development through manipulation of learning materials (Brophy, 2013). The key task of a teacher is to select the appropriate technique to inspire pupils to participate in active learning without overworking the visual and audio senses (Djamila, 2013). Instructional materials used during teaching and learning help children to process the concepts being taught.

Educational resources refer to concrete materials used by an instructor to simplify new ideas being introduced to pupils (Mayer, 2009). Conventionally, instructors have used the lecture method in their interaction with learners. However, in contemporary society, a variety of resources are used to transmit new knowledge to learners using different techniques (Abaya, 2017; Chepkonga, 2017).

Further, the instructional materials also provide children opportunities to broaden and deepen their knowledge by providing a variety of first hand and developmentally appropriate experiences. Afolabi, (2018) observed that instructional materials for children should appeal to their natural curiosities as well as the desire to explore and experiment. According to Feder, Shouse, Lowenstein, and Bell, (2009), the learning environment covers the teaching resources within the immediate, local, and extended environments. Al-zaidiyen (2011) define the school environment as the physical, biological, and cultural elements found in both the immediate and the surroundings of the school. Harjunen (2012) feels that the bridge between the classroom and the environment is of great importance because it gives purpose to classroom studies. The Gachathi Report (1976) revealed that one of the basic requirements in making education relevant to the learners was to observe the phenomena of the environment, gather data, and use them to solve problems.

Educationists have adopted Piaget's (1956) ideas in planning for instruction, bearing in mind the various stages of development. Many would agree, even if Piaget did not entirely convince them that the child learns with ease and more effectively if he or she is provided with an environment, one can grapple with hands and solve problems on their own. In a school setting, therefore, all elements constituting the environment should be provided with adequacy and appropriateness to ensure that instructional materials are utilized accordingly (Abdu-Raheem, 2014). This will succeed if a variety of concrete instructional materials are provided to the learner to interact with. This study sought to establish how the pre-primary school learning environment affect the utilization of instructional materials by teachers in ECDE centers in Kenya.

Instructional materials can offer stimulation of the senses. Further studies have shown that early exposure, stimulation, and experience in the manipulation of a variety of materials prepare children for problem-solving skills and make them well-adjusted in life (Yalcin, Kahram & Yilmaz, 2011). It is, therefore, essential that children are introduced to a variety of instructional materials early enough to help them develop an interest in them and to be able to use them accordingly. Early childhood teachers who do not adopt appropriate instructional procedures and utilization of materials available to the children fail in their professional duty. Hence, they are likely to make the learners lose interest in the learning process.

Instructional materials are fundamental to the implementation of effective teaching and learning processes in early childhood education (Waigera, 2013). Appropriate learning activities should accompany their uses in the pre-primary class. Therefore, the teacher has the responsibility of tailoring the content and instructional procedures around suitable learning activities. However, most early childhood teachers do not have the capacity or merely fail to connect learning activities and instructional procedures. Gachathi (1976) revealed that there were gaps in knowledge of the availability and appropriateness of teaching and learning materials used in ECDE. This study, therefore, attempted to assess the association of the ECDE learning environment and utilization of instructional materials in ECDE.

Improvised instructional materials (IIM) are gained from the local environmental setting, either inside or outside the school environment (Adebayo & Adigum, 2018). They are sourced by instructors, guardians, students, community members, and other charity organizations. Improvisation includes the procedure of selection and formation of significant instructional components for instructing and learning procedures to accomplish the educational objectives

and goals (Mohamed, 2012). Science IIM is compelling in educating and learning processes in light of the fact that the students know about them henceforth, they enjoy learning. They need material for background information regarding the subject they are teaching. Instructional materials are used for lesson planning as well as the use of teachers to assess the knowledge of their learners (Tety, 2016).

Teachers often assess students by assigning tasks, creating projects, and administering exams. Instructional materials are thus very essential for all of these activities. Mayer (2008) stressed that; a professionally qualified science teacher, no matter how well trained, would be unable to put his ideas into practice if the school setting lacks the equipment and instructional materials necessary for him or her to translate his competence into reality. Basssey (2002) described instructional materials media as a system component that may be used as part of the instructional process which is used to disseminate informative message and ideas which make communication possible in the teaching-learning process.

Globally, studies done in USA have shown evidence that good quality ECDE has a direct effect on children's cognitive outcomes (Wong, Cook, Barnett, & Jung, 2008). This is supported by adults who are trained in early childhood development and education and effectively transmit new knowledge to young learners (Burchinal, 2008; Yoshikawa 2013). In addition another study done in Maryland State in the United States of America showed disparities in the academic qualifications and competencies among kindergarten teachers (Allen & Kelly, 2015). The researchers advocated incorporation of educational materials during instruction to ease the learning process as well as help achieve the instructor's goals making the system effective and efficient while educating and assessing learners. IIM is acknowledged globally and used in pre-

primary curriculum delivery, and Africa, let alone Kenya, should similarly adhere to these best practices.

In Nigeria, the government has attempted to place a few systems to boost science execution in the nation. Regardless of all endeavors to ensure students perform well in science, the academic outcomes have been consistently low in the subject. Poopola (2002) demonstrates that the issue can be tracked to the ineffective teaching methods in the early years. The best practice in delivering effective science lesson is to allow learners to discover knowledge through experiments. Esu, Enuokoha, and Umorem (2004) affirmed that practical materials are core to the learning process. They help to advance factual information and students' inventiveness in science lessons (Igwe, 2005). In Kenya, Mwaniki (2015) carried out a study on learners' performance in number work and established that learners attained better outcomes by manipulating concrete materials in the classroom.

Instructional materials are not generally utilized in schools by instructors and students. Ezeasor (2012) reported that teachers failed to prepare or to improvise practical materials for science lessons. This is ascribed negative attitudes, poor time management, absence of imagination, and poor creative abilities. Additionally, Ofoegbu (2012) opines that the instructors utilize just course readings and writing slate during guidance. This represses the pre-primary students in building up their natural potential and the utilization of senses in learning science. Therefore, there is a need to incorporate the improvisation of IM from the immediate pre-primary school setting in the Kenyan context.

Many studies conducted locally have concentrated on utilization of IIM and educator-related components that influence their utilization. Investigations conducted have concentrated on use

of culturally relevant materials (Waigera, 2013), effects of learner participation in science activities (Wambui, 2013) and educators' connected factors in usage of science exercises in preschools (Kangori, 2014). A few studies also focused on preschool educator information, and utilization of visual media (Mwololo, 2012).

Research by Ngasike (2012) focused on science guidance in pre-elementary schools in Turkana County. The findings determined that ECDE teachers adhered to the curriculum guidelines for science lessons by stimulating children to learn through discovery of naturally occurring materials within the school. While a study by Kathure (2011) revealed that there was a significant association between preschool science exercises and children's learning outcomes. From the foregoing, there is need to determine whether there is an association between pre-primary school learning environment and utilization of IM.

1.3 Statement of the Problem

The background to this study has demonstrated that ECDE centres are characterized by ineffective and inefficient instructional procedures, lack of adequate learning materials and poor enabling learning environment. Other factors such as understaffing, classroom congestion, poor school curriculum delivery, inadequate and reduced utilization of instructional materials, and poor working conditions for staff have been persistent challenges pointed out as factors contributing to poor teaching and learning processes. There are gaps in knowledge on utilization of instructional materials at the ECDE level in Kenya. It is against this backdrop that the current research sought to fill the existing information gaps by conducting research on ECDE learning environment and utilization of instructional materials by ECDE teachers.

1.4 Purpose of the Study

The purpose of the current research was to determine whether there was a relationship between PPS learning environment comprising of the teachers' qualifications, attitudes and years of experience, teaching-learning resources, educational media and the number of pupils per class on the level of utilization of IM in ECDE in Kenya.

1.5 Objectives of the Study

The specific objectives of the study were to:

1. Establish the demographic characteristics of ECDE teachers.
2. Determine the teachers' attitude towards utilization of instructional materials.
3. Determine the status of teaching-learning resources in PPS.
4. Establish the availability of educational media (audio, visual, audio-visual, realia, print and locally improvised materials) in PPS.
5. Establish the status of utilization of IM in ECDE.
6. Determine the effect of teachers' age on utilization of IM.
7. Determine the relationship between the years of experience and the level of utilization of instructional materials.
8. Assess the relationship between the teachers' attitude rating scores and the level of utilization of instructional materials.
9. Investigate the relationship between the number of pupils per class and the level of utilization of instructional materials.
10. Establish whether teachers' age, the years of teaching experience, teachers' attitude rating scores and number of pupils per class predict utilization of IM.

1.6 Research Hypotheses

The following research hypotheses were tested:

1. Teachers' age is not significantly related to utilization of IM.
2. Teachers' experience is not significantly related to utilization of IM.
3. Teachers' attitude is not significantly related to utilization of IM.
4. Class size is not significantly related to utilization of IM.
5. Teachers' age, the years of teaching experience, teachers' attitude rating scores and class size predict utilization of IM.

1.7 Significance of the Study

The research yielded useful data that will be used by early childhood educators and policymakers as they develop guidelines on the preparation and use of instructional materials for pre-primary school level of education. The study yielded useful information that can improve the refresher courses for upgrading teachers. Furthermore the results of this study will be useful in addressing issues related to the use of locally improvised materials by ECDE teachers to enrich learning by their pupils. Pre-primary school teacher trainers may disseminate the research findings to enlighten trainees on the importance of instructional materials during their training and as practicing teachers. This information may also be useful to ECDE quality assurance assessors who are concerned with promoting the quality and relevance of early childhood education. Kindergarten managers, teachers, and parents may adopt the findings of this research as a guide for the acquisition of instructional materials for young children.

1.8 Limitations of the Study

The researcher encountered were methodological constraints in the use of survey which yielded limited data on use of IM in pre-primary schools. However, the choice of a correlational research design was considered appropriate for this research because the focus was on the relationship between the PPS learning environment and teachers' utilization of instructional materials. There were other variables related to use of instructional materials in ECDE which were not covered in the scope of the current research such as children's characteristics and their interaction with learning materials in ECDE activity areas. There were limitations in sampling of one County out of 47 Counties in Kenya and therefore generalization to other Counties can only be done with caution. The study was confined to public ECDE centers and therefore the findings should not be generalized to their private and religious-sponsored counterparts. Some respondents were not available on the prior agreed date of appointment, and therefore alternative meeting schedules were done to seek their informed consent and voluntary participation.

1.9 Delimitations of the Study

The research concentrated on the assessment of the determinants of utilization of IMs by teachers drawn from public preschools in Nyeri County. Most of the challenges of the school learning environment and instructional materials are dominant in public schools. Therefore other categories of pre-primary schools such as private and religious sponsored pre-schools were not included in the research. The current study focused on five specific factors namely, teachers' qualifications, attitudes, teaching-learning resources, instructional media and class size. The study did not focus on other factors that could have been related to utilization of instructional materials. Therefore, these extraneous factors could form part of future research.

1.10 Assumptions of the Study

The assumptions included:

- a) Pre-primary schools provide diverse resources for teaching and learning in various ECDE activity areas.
- b) ECDE teachers utilize a variety of instructional materials to facilitate learning in early childhood activities.

1.11 Theoretical and Conceptual Framework

The focus of the research was on the relationship between the school learning environment and ECDE teachers' utilization of IM. Utilization of instructional materials occurs within a school learning environment with the facilitation of teachers. Therefore, the ecological systems theory by Bronfenbrenner (1979) was chosen to help explain the interaction between the teacher and the surrounding learning environment which enhances the utilization of instructional materials. The study was also informed by the Cognitive Theory of Multimedia Learning Framework (CTML) by Mayer (2005a). The central focus of the CTML theory demonstrates how teachers can facilitate the learner to learn.

1.11.1 Ecological Systems Theoretical Framework

The first theory which is applicable to this research is the ecological systems theory by Bronfenbrenner (1979). The theory focuses on human development and education based on five concentric systems or levels which include the Mesosystem, Microsystem, Chronosystem, Exosystem, and Macrosystem. According to Bronfenbrenner (1992), the development of the child occurs within these five diverse settings.

The mesosystem involves the interactions between the factors within the immediate environment. This theory states that the inter-dependence between the family and the school influences each other and assists the child to grow. The chronosystem refers to experiences a person gathers throughout their lifetime. The child and his or her environment as well as the interaction between the two undergo change through time which enables the child to grow and develop over time. The exosystem is a setting beyond the child's immediate environment but influences the child. It consists of parents, employers, local government, the community, social welfare and the mass media. Therefore, the exosystem environment such as the parents' workplace should be conducive thereby contributing towards a positive impact on the child.

The ecological systems theory was appropriate to the current research because the theory takes into consideration that human development occurs as a result of the interaction between an individual and the surrounding environment. The present study has demonstrated that teachers' utilization of IM materials depended on the individual teachers' interaction with the learning environment which included the accessibility of educational materials, the type of media used for instruction and the number of pupils enrolled in ECDE.

1.11.2 Cognitive Theory of Multimedia Learning Framework

The second theory applied to this research is Cognitive Theory of Multimedia Learning Framework (CTML) by Mayer (2005a). The central focus of the theory is how to help the learner to learn. CTML demonstrates that education works by preparing suitable cognitive processes in pupils. This is done by teachers through guiding the learners, selecting and organizing relevant instructional materials. Instructional materials used during teaching and

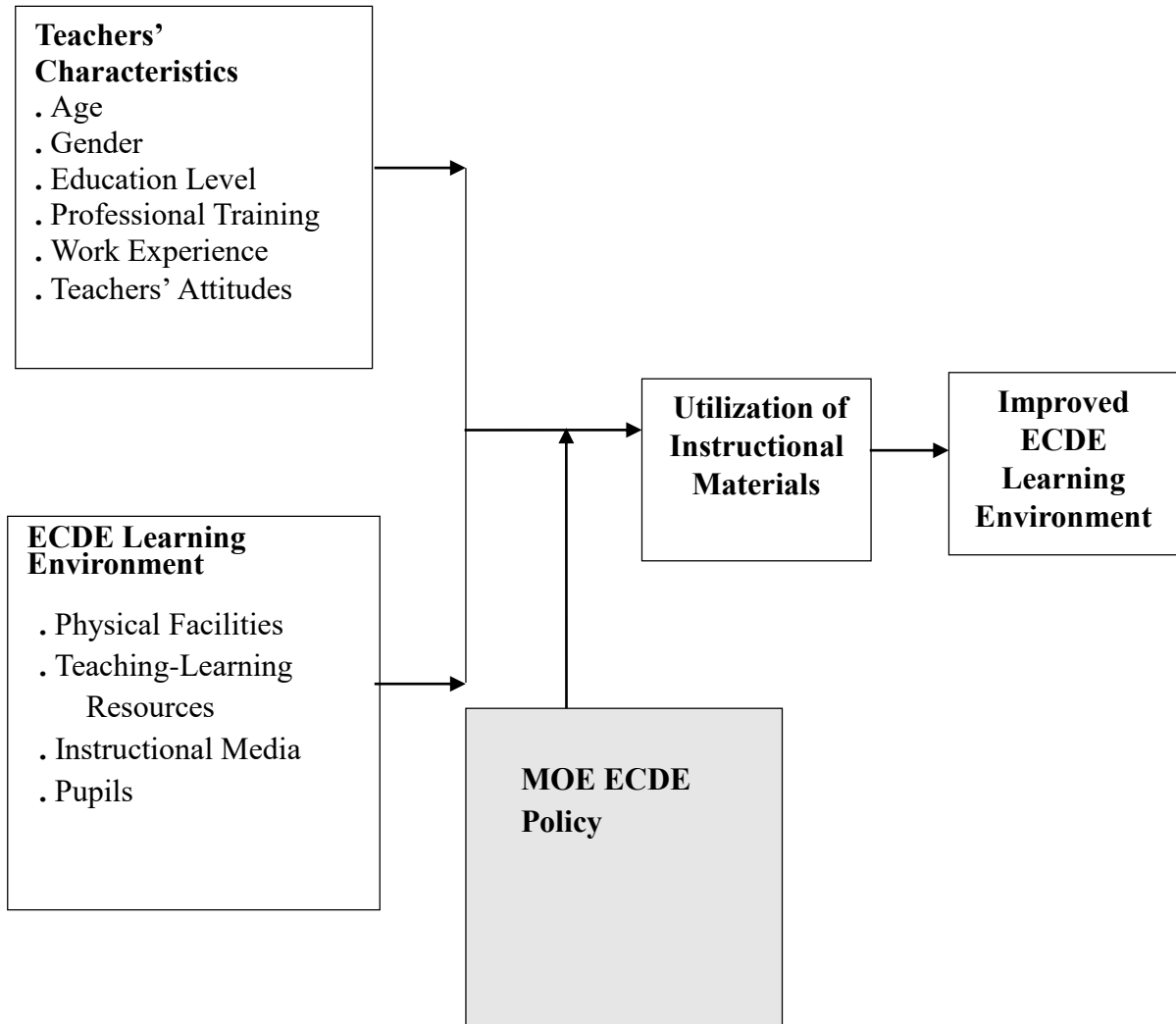
learning process stimulate children to acquire new knowledge and to internalize what is being taught. CTML was considered appropriate to the investigation because it describes the responsibility of teachers in facilitating learning. Given that key variables for this research were teacher-related factors, the PPS learning environment and utilization of IM, the two theories helped to conceptualize how these variables interacted in this study.

1.11.3 Conceptual Framework

This research developed a framework in which there were three components representing the independent, intervening and dependent variables. The independent variables comprised of teacher-related factors such as age, sex, level of formal schooling, professional qualifications in ECDE, duration of teaching experience and teachers' attitudes. The second component comprised of the pre-primary school learning environment represented by the educational materials, instructional media and number of pupils per class. The intervening variables were represented by the policy on training of ECDE teachers and the ECDE curriculum. Utilization of IM constituted the dependent variable. Figure 1.1 show relationships between variables in this research.

INDEPENDENT VARIABLES

DEPENDENT VARIABLE



Key

□ Study variables

■ Non study variable

Intervening Variables

Figure 1. 1 : Hypothesized relationships among variables

1.12 Operational Definition of Terms

Educational media: refer to audio-visual, print, realia, audio, visual, role-play, locally improvised materials and commercially produced materials.

Instructional materials: refers to all materials that are used for teaching and learning purposes.

Level of Utilization of IM: refers to the extent of application of educational materials across ECDE activity areas.

Pre-primary school learning environment: refers to the teaching personnel, teaching-learning resources and educational media that a learner interacts with while at the pre-primary school.

Pre-primary school teacher's attitudes to IM: refers to the teachers' mind-set towards instructional practice and the use of IM in ECDE.

Pre-primary schools: These are ECDE centers that enroll pupils under six years. These institutions are also known as nursery schools, Kindergartens, day-care centers, Crèche's, and pre-primary school units.

CHAPTER TWO : LITERATURE REVIEW

2.1 Introduction

This chapter presents the literature related to this research including: teachers' characteristics such as qualifications and experience, teachers' attitudes, teaching-learning resources, educational media, class size and utilization of instructional materials in pre-primary schools.

2.2 Teachers' Characteristics and Utilization of IM

The first aim of this research was to assess relationship between teachers' characteristics such as education qualifications and teaching experience and utilization of instructional materials. According to Ngeru (2015), the characteristics of teachers play a major role in how they interact with learners and how they teach. Adeyemo (2015) observes that teacher characteristics influence teaching and learning of pupils in classrooms and the utilization of instructional materials. Oleleye (2011) further suggested that there is a relationship between teacher characteristics that included teachers' knowledge of the subject, their communication abilities, the teacher's interest in the job, emotion and stability of the teacher affected pupils' utilization of instructional materials. Ali (2017) reported that student academic achievement is positively related to teacher characteristics.

2.2.1 Teacher Qualifications

Research on teacher qualification show that, a certified teacher is one who has qualified as per the requirements of the professional body, which licenses teachers to practice in their field of specialization (Darling-Hammond, 1998; Ruthland & Bremer, 2002; Hardy & Smith, 2016). In Kenya, the TSC is mandated to register qualified teachers in ECDE, primary, secondary and

teacher training colleges. There are various qualification levels for certification such as certificate, diploma or undergraduate and postgraduate degree in education. To qualify for primary teacher certification, one must have obtained a minimum of a primary teacher education certificate (PTEC). The minimum qualification for high school teachers is a diploma in education. However, majority of secondary school teachers have a bachelor of education degree or postgraduate Diploma in education while others have higher degrees in education (Teachers Service Commission, 2016).

2.2.2 Teachers' Education Level

Various researchers have studied the effect of teacher educational level on pupils' academic achievement with contrasting findings. A study done in the United Kingdom showed that teaching experience, rather than educational achievement had the greatest effect on pupils' learning outcomes (Salomon, 2007). While another study conducted in the United Kingdom (UK) revealed that the higher the academic credentials of a teacher, the higher the educational outcomes of the pupils (Kelley & Camilli, 2007). Other studies showed that kindergarten teachers were not trained in ECDE (Early, Bryant, Pianta, Clifford, Burchinal, Ritchie, Howes & Barbarin, 2006).

A study done in China by (Wong & Rao, 2015) on preschool teachers showed that at least one-fifth of the teachers were holders of a certificate in ECE while one-tenth of the preschool managers were holders of a bachelors' degree in ECE. Research done on teachers' academic credentials showed that a majority of ECDE instructors had the requirements of professional training qualification in early childhood education (Achola, et al., 2016).

2.2.3 Teaching Experience

Experience in teaching has a positive impact on learning outcomes at all levels of instruction. Research shows that experience increases teacher proficiency in curriculum delivery. According to Gibbons, et al., (1997) and Rotumoi (2012), teacher experience and student academic achievement are highly correlated. Experience teachers have accumulated knowledge and skills in pedagogy and pupil management. They apply diverse class techniques to stimulate student academic performance for differently abled learners. They are able to bridge the gaps for students with deficient entry behaviour in their lessons (Stringfield & Teddlie, 2011). This research is investigating teachers' formal schooling, ECDE training status and duration of employment. The foregoing review of existing literature showed that there is scanty information in Kenya on the variables under investigation.

2.3 Teachers' Attitude and Utilization of Instructional Materials

The second purpose of this research was to assess teachers' attitudes and utilization of IM. An attitude is inclination to react positively or negatively to stimuli. An attitude is enduring system that includes a cognitive component of a feeling component and an action tendency. Teachers' attitudes play a vital role in how they teach and how they utilize of instructional materials. A study in Turkey by Cavas, Karaoglan, and Kislak (2010) explored teachers' attitudes to application of (ICT) in education. The study determined the relationship between the teachers' attitudes and ownership of ICT devices. The results showed that the majority of teachers had positive attitudes toward the integration of ICT in education. A similar research was done by Bakr (2011) on the attitude of Egyptian educators to the integration of ICT in public learning institutions. The research showed teachers' attitudes were significantly related to ICT application in instruction.

Research in Nigerian secondary schools revealed shortage of class texts, magazines, newspaper cuttings, projected materials, and radio lesson programs in most schools (Adebayo & Adigum (2016). The study further revealed that teachers were generally not interested in developing materials for use in instruction since they lacked positive attitude and experience in the use of instructional materials. Al-Zaidiyeen (2010) did a study on the correlation between teachers' attitudes and adoption of ICT in Jordan Rural schools. The study demonstrated that respondents with positive attitudes to ICT were more likely to integrate ICT in teaching compared to their counterparts with negative attitudes. These two researches by Adebayo and Adigum (2016) and Al-Zaidiyeen (2010) revealed that teachers' attitudes was correlated to the interest in the use of ICT in schools, however, these two studies did not focus on the effect of teachers' attitudes and utilization of IM. Hence, this research sought to investigate the correlation of ECDE teachers' attitude and use of IM.

A study done in Kenya by Mwololo (2009) showed that preschool teachers' attitude had a significant association with the assimilation of instructional media in Art and Craft, Music and Movement, Social Studies, Science and Maths. The target population was all practicing pre-school teachers in the Kibwezi district. The researcher established that positive attitude was critical to teachers' use of instructional media. However, the existing research did not investigate the degree of correlation between teachers' attitude and use of IM which is a variable in the current study. This research filled these gaps in knowledge by assessing the correlation between attitudes and use of IM.

2.4 Teaching-Learning Resources and Utilization of Instructional Materials

The third aim of the research was to determine if T/L resources were correlated with IM utilization. According to Bakar (2011), teaching and learning resources are critical to positive

learning outcomes. Print materials are globally accepted resources in all learning institutions throughout the history of formal education. This implies that the teaching-learning resources must be of good quality, durable, appropriate, cost effective and adequate for instruction to take place (Boke, 2014).

Stigler and Herbert, (2009) maintain that educational materials are core to effective learning. Therefore, teachers should select instructional aids that appeal to visual, audio and tactile sensations. Olufemi (2014) underscored the fact that educational resources should be legible, spacious and colourful. However, the researcher did not investigate whether teaching learning materials influenced the usage of the same in the classroom. This research covered the gap in existing information by assessing the correlation between availability of teaching-learning materials and their use in ECDE.

According to Olufemi (2014), appropriate teaching-learning resources must have some of the following characteristics: appeal to the visual and audio senses of pupils during instruction of concepts in a lesson and be flexible. This means that an ECDE trainer is expected to utilize different materials and pedagogies for the early learners. Appearance is an important characteristic of teaching and learning materials. Since bright colors attract pupils, different shades, tints and hues should be applied in the development of teaching materials.

The educational resources should be straightforward and demonstrate a limited number of concepts in a lesson (Effiong & Igiri, 2015). This will enable pupils to assimilate the concepts over time. Where drawings are used in a lesson, they should be visible and show a limited

number of terms or activities that are easily understood by the learners (Karaka, 2007). According to Okoruwa and Oladebinu (2015), good quality instructional materials should be sufficient and adequate for use by all learners. The words should be clearly written for ease of readability and appeal to the learners. Learning aids should be appropriate to the concept being taught and assist learners to assimilate the new knowledge being transmitted.

According to Stigler (2009), teaching-learning aids should have the following characteristics. First they should be accurate that is information presented on every visual aid should be up to date in every aspect, appropriate and relevant to the lesson. They should be artistic that is pictorial information should be realistically produced to the extent that it will make the same meaning or impression to every learner. The researchers further added that instructional materials should be bold such that information should be boldly presented so that the viewers or learners can see them (Omayio, 2013).

Okobia (2011) further adds that instructional materials should be bold such that information should be boldly presented so that the viewers or learners can see them. Small pictures may not be visible from the back of the large class. They should be brief, that is, only essential information needs to be inserted in the visual aids to avoid over-crowdedness and irrelevance. As a rule, the main ideas should be few and stand out clearly for effective communication. They should be bright in that bright vision may brighten the learner's view of contents, while dull ones may cause a dull effect that may lead them to doze off. The visual aid should be clear so that every learner or viewer can quickly grasp its content (Olufemi, 2014). They should also be clean because dirty work is unattractive and may put off the learners. Visual aids should be

clean and well covered to avoid damages. Finally, teaching-learning materials should be carefully handled so as to give a deserved impression of excellent visual aids. Finally, a good teaching aid will provide for adequate interaction between the teacher and the learner. If these qualities were observed, then the materials would be of great use to the learners who were the consumers of these instructional materials. The global studies reviewed have described the characteristics of teaching learning resources but did not establish whether availability of educational materials had an influence on usage of IM. This research covered this deficiency in existing knowledge by examining the association between availability of teaching-learning materials and the level of usage in ECDE.

A research carried out in Ethiopia by Hailu and Biyabeyen (2014) on the availability of instructional materials and their effect on the quality of education revealed that the learning materials were insufficient and of poor quality. Consequently, there were poor learning outcomes among students. According to Ebrahim (2003), teaching and learning aids are critical tools in educational institutions and therefore schools should facilitate teachers in the development and improvisation of IM.

Studies conducted in Kenya by Ikumi (1985) on the preschool learning environment, reported that educational materials used for ECDE are core to the development of the child. The ECDE learning context should stimulate growth of the early learners. Wambua (1988) reported that preschools should provide a variety of learning centres that allow learners to manipulate materials to stimulate multiple learning processes. However, there were challenges in funding for procurement of educational resources and lack of teacher skills in material development in Kenya.

Ruthiri (2009) conducted research on availability of educational materials in English language in primary institutions in Kenya. The results revealed that pupils' textbooks were provided by the Ministry of Education, but they were seldom used in classroom instruction. The available teaching-learning resources were also not effectively utilized in teaching. Methods of teaching chosen by teachers were influenced by instructional materials available in schools. Rotumoi (2012) conducted a study on availability of teaching-learning materials and pedagogical techniques in Baringo County. Findings revealed that access to learning materials in sufficient numbers to cater for all learners had a significant effect on the choice of pedagogical techniques used by teachers. Lack of educational resources impedes the instructional processes at all level of learning. Ogott, Indoshi, and Okwara (2010) carried out a research in language instruction in Gem District. The findings showed that there was lack of resources for language training and consequently there was low performance among early learners. This study focused on language learning and excluded other early childhood education activity areas. Therefore, justifying the rationale for the current research.

Research has been conducted in teacher-training institutions in Kenya on utilization of instructional materials. Kimui (1990) did a study on the accessibility and usage of educational resources in teacher training institutions in Kenya. The study was carried out in seven teacher-training colleges. The findings showed that the equipment and materials available in resource centers were under-utilized, and tutors were lacked confidence in preparation and usage of teaching materials. To ensure resources were available, parents, teachers, and the community in which learning is taking place should join the effort to produce them. Ndalo (1991) reported that procurement of IM is not cost effective in public schools compared to improvised IM.

Utilization of community resources by primary schools provides learning experience among pupils. A study was done by Digolo (1986) on the adoption of locally available resources by teachers showed that teachers did not exploit the resources available within the local community. The findings showed there was decreased use of local materials by majority of teachers that contributed to poor retention of children in schools.

Lack of adequate educational materials hinders the learning process. A research carried out by Karimi (1993) on the teaching of social studies showed that lack of resources led to the lecture method and poor comprehension, thereby leading to poor learning outcomes. Use of educational resources is important in enabling learning. Ikumi (1985) surveyed resources used for teaching Kiswahili language in selected basic education institutions in Machakos County. The aim of the research was to assess the resources that were available for Kiswahili instruction. The study was also to investigate how teachers acquired the resources and used them in the actual classroom teaching. The study found that initially, the Ministry of Education used to provide textbooks and wall charts as aids for teaching in the past but had stopped doing so. It further reported that teachers knew the importance of using teaching-learning aids in teaching of other subjects but not in Kiswahili lessons. The findings showed that teachers did not properly store their materials and did not have a proper recording system. Due to a lack of interest in teaching Kiswahili, teachers did not meet to share ideas on how to use and produce teaching-learning materials resulting in low use of teaching aids in language teaching.

Availability of educational resources can largely affect curriculum delivery. Wambua (1988), who researched the utilization of teaching-learning resources in teacher training institutions, found that there was a lack of resources in training institutions.

For effective curriculum delivery, the utilization of instructional materials was necessary. A study by Bolick, Berson, Coutts and Heinecke (2003) discovered that there was a positive association between educational attainment and the frequent usage of educational materials. UNESCO established educational resource centers known as Teachers' Advisory Centers which serve as centers of excellence for the training of teachers in preparation and improvisation of materials to support the educational process (UNESCO, 2014). Waithaka (2008) noted that teachers failed to prepare and improvise instructional aids and did not give students opportunity to manipulate concrete learning aids. These findings are consistent with reports by Ema and Ajayi (2006) who observed that instructional aids benefit learners when given opportunity to manipulate them. However, the existing research focused on primary, secondary schools and teacher training institutions but did not focus on the foundational level at ECDE. The current study was designed to cover these gaps in knowledge at ECDE level.

A research conducted in marginalized areas of established that ECDE centers in West Pokot County were in deplorable condition and lacked basic structures such as classroom and appropriate furniture for children (Sitati, Mwangi, Bota & Rapongo, 2016). The ECDE physical environment was not conducive for learning thereby affecting learning outcomes. Research by Biyabeyen (2014) reported that school physical facilities positively affect learning outcomes. This finding is supported by Boke (2014), Duruji, et al, (2014) and Ngode (2014) who reported that inadequate school facilities impair academic performance. Previous researchers focused on

adequacy of physical resources in school and not the utilization of instructional materials which is the goal of the current research.

The context of learning is critical for growth and development of the learner (Waithaka, 2005). Furthermore, Timothy and Wislar (2012) defined learning environment as a classroom setting that facilitates the exchange of information using diverse content and supporting aids. UNESCO (2005) and the Republic of Kenya (RoK), (2012) recommended that children should be taught in their first language in ECDE rather than in the second or subsequent languages. Begi (2014) carried out a study on culturally-relevant instructional materials in ECDE and discovered that children did not have access to learning aids in their first language. Scarcity of instructional aids hinders attainment of positive learning outcomes (Ogott, Indoshi & Okwara (2010). This study focused on language learning and excluded other early childhood education activity areas therefore, justifying the need for the current research.

2.5 Educational Media and Utilization of IM

The fourth goal of the research was to assess the correlation between educational media and usage of IM. Media encompasses a diversity of channels such as electronic, print, audio and visual modes of instruction (WebCrawler, 2013; Salomon, 2007). Research done by Ruthiri (2009); Adegbija and Fakomogbon (2012) reported that multiple channels of instruction improve comprehension and retention of information. The most common IM in ECDE are textbooks, photographs, drawings and role play (Barkley, Cross & Major, 2014). Textbooks were among the major sources from which information can be obtained in teaching and learning.

According to Mohamed (2012), a textbook remains, after the teacher, the learner's chief aid, support, and companion throughout a learning course. Perneger (2015) asserts that textbooks indicate what the teacher must teach and what students must learn. Mohamed (2012) maintains that this resource has more influence on teaching content and methods than all other instructional materials. This view is also held by Onasnya (2008), Quiggin (2004) and Robinson (2009) who found that pictures and photographs represent more accurately than words such concepts like human life, occupation, dress, dwellings, means of transport and types of crafts. From the foregoing review of existing literature, the other researchers have not focused on the utilization of instructional materials.

Role-play, as a method of instruction, has won support from many educationists. Djamila (2013) defines a role to play as a structured activity permitting learners to assume the role of a person in a hypothetical situation and to play a role realistically as possible. Ngure (2019) indicates that role play involves acting out an idea by a study team. According to Major (2014), role-play encourages group work which fosters participatory learning. Role-play also helps learners to develop empathy, skills and attitudes, creativity, and enquiring minds (Stanley, 2014). Above all, role play helps one to find personal meaning within the world and to resolve personal dilemmas (Bomer, 2015).

A variety of instructional materials should be available for teachers to use in teaching. In Nigeria, Okobia (2011) reported that teachers used multiple resources in delivery of social studies lessons. The most commonly available IM materials were class texts and black boards. Ruthiri (2009) investigated the media used for teaching English as a second language and discovered that teachers relied on class texts as there were no other media accessible to pupils

for learning. The author affirmed that available IM were not effectively utilized in teaching. Aila (2005), in his study on adoption of visual media in ECDE discovered that only one-third of the teachers were competent in the application of visual media in the class, and, their use was hindered by lack of finances among other factors. Stanley (2014) found that teachers were not adequately exposed to different types of instructional materials, and this limited the ways and means of teachers acquiring educational media. Furthermore, teachers had low knowledge of the relevant instructional media to use. Aila (2005) was interested the type of visual aids used in ECDE while Tomlinson (2014) focused on whether the media in available in schools were adequate. The two studies centered on types and adequacy of educational media rather than application of the media in lesson delivery. Methods of teaching chosen by teachers were influenced by instructional materials available in schools. Rotumoi (2012) conducted a study on factors influencing teaching methods in ECDE. The author determined significant influence of IM and pedagogy.

2.6 Pre-Primary School Class Size and utilization of IM

The fifth objective was to investigate correlation between the class size and use of IM in ECDE. Class size is an important aspect for teaching and learning process. According to Adeyemi (2008), class size denotes the number of pupils enrolled in an academic program or the number of learners in the care of one teacher in an educational setting. According to NAEYC (2014), the best indicator of a good quality ECE program is a small class size with a low teacher-pupil ratio in a preschool setting. NAEYC (2014) advocate for developmentally appropriate class size and a small teacher-pupil ratio to facilitate adequate teacher-pupil interaction and constructive child activity in the classroom. According to NAEYC, the recommended teacher-pupil ratio by age is 1:6 for children whose ages range from 30-36 months, 1:8 for 37-48 months, and 1:10 for 49-60

months. The maximum teacher-pupil ratio is 1:10 for preschools in the USA. The factors that determine the teacher-pupil ratio are pupils' ages and type of ECDE curriculum. Children learn better in an educational setting with a small teacher-pupil ratio because it ensures sufficient monitoring and supervision of each child. According to research findings by the American Bureau of Economic Research (NBER, 2019), the benefits of a small class size and a low teacher-pupil ratio included individual attention, optimum child safety, personalized learning, better quality of education and enhanced educational achievement in ECDE.

The Ministry of Education in Kenya recommends small class sizes for early childhood education. The teacher-child ratio in ECDE centers/pre-primary school is categorized according to the age of children as indicated: 1:4 for children under 24 months, (ii) 1:10 for 24-36 months, 1:15 for 36-48 months, 1:25 for 48-60 months and (v) those ranging between 5 – 6 years – 1:30. Besides, an ECDE assistant teacher is a requirement for each of the ECDE groups of learners. If the above requirements are not fulfilled, effective facilitation of learning and appropriate child development may be compromised to a great extent (Republic of Kenya, 2006).

Quiggin (2004) reported that quality of teaching can be measured by among other factors, the class size. Optimizing the size of a preschool class can have a positive impact in the quality of ECDE program. Further, managing a preschool class size is important in creating a safe environment where children can learn, socialize and grow. This implies that class size is important in educational process. The class enrollment has an effect utilization of teaching resources, hence affecting overall learning by children. From the review of literature, there is scanty information in existing knowledge about the effect of ECDE enrollment on IM utilization conducted in Kenya. This knowledge gap led to the need and justification for carrying out the current study in pre-primary schools.

2.7 Summary of Gaps in Literature

From the analysis of previous research, there were information gaps in the existing literature. For example, there was limited information on the relationship between pre-primary school learning environment and utilization of IM in ECDE in Kenya. Existing research focused on limited variables such as availability of community resources or instructional media for teaching a specific subject. There were other factors that are related to the usage of IM in ECDE which were not covered in the existing research. This research was developed in an effort to fill this deficiency in knowledge by including multiple variables within the pre-primary school learning environment such as teachers' characteristics, teachers' attitudes, teaching-learning resources, educational media and pre-primary class size as independent variables that were hypothesized as having a significant relationship on utilization of instructional materials.

The existing research focused on studies conducted in educational institutions for pupils above six years of age. There was limited focus on pre-primary school level and therefore extrapolating findings conducted in secondary schools and teacher training colleges poses a challenge of relevance at the pre-primary school level which constitutes the foundational level in formal schooling. This formed the justification for the current research which centered on ECDE level.

Existing research focused on investigating the use of instructional materials on one specific subject area such as language in primary and high school curriculum. This posed knowledge gaps in the sense that ECDE focused on holistic development of the child and therefore, there was need to investigate utilization of instructional materials on all ECDE activity areas rather than on specific subject content. This research filled the deficient information on utilization of instructional materials on all activity areas offered in the ECDE curriculum. The current research

was designed to explore identified paucities in knowledge by establishing the relationship between pre-primary school learning environment and utilization of instructional materials by teachers in Kenya.

CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

The chapter describes research design, research variables, target population, sample, data gathering procedures, analytical methods, research ethics and logistics in this study.

3.2 Research Design

Correlational design was chosen because of its appropriateness for the present investigation. According to Creswell (2010) correlation research may generate three outcomes where some independent variables are not significantly related to the dependent variable, others may have positive correlation while still others may show negative correlation.

3.3 Description of Study Variables

The following section describes the independent and dependent variables used in this study.

3.3.1 Independent variables

The five independent variables in this research included:

- a) **Teachers' demographic characteristics.** In order to determine teachers' demographic characteristics, a research questionnaire was developed where respondents filled in the data for their respective age, gender, level of formal schooling, professional training in ECDE, and duration of teaching experience.
- b) **Teachers' Attitude Scores:** For the determination of teachers' attitude scores, counts of answers to five elements along a 3-point Likert questions were aggregated. Responses on the Likert scale were coded as: one (1) count for "Strongly Disagree", 2 counts for "Somewhat Agree," and 3 counts for "Strongly Agree". The range of counts participant could achieve was 5 and 15 points respectively. Respondents who achieved a range of 5

to 9 counts were rated as having a negative attitude while those who attained 10 to 12 counts were classified as having a moderately positive attitude and those who achieved 13 to 15 counts were categorized as having positive attitudes.

- c) **Teaching-Learning Resources' Scores:** For determination of scores for the teaching-learning resources, counts of responses to five (5) characteristics of teaching-learning resources on a 3-point Likert questions were tallied. Questions measured the general status and condition of teaching-learning resources. The answers were coded as: "1-Point = Low Rating", "2-Points = Moderate Rating" and "3-Points = High Rating".

- d) **Educational Media Scores:** To determine the extent to which teachers used a variety of educational media in PPS, scores of responses to 8 types of media used in ECDE were calculated using a 3-point Likert questions. Questions measured the degree to which ECDE teachers used the different types of media. The answers on the Likert questions were coded as: 1-Point for "Rarely", 2-Points for "Often" and "3-Points for "Very Often." The results showed that teachers used a variety of media for instruction, which included: Print, Realia, Audio, Visual, Audio-Visual, Role Play, locally improvised and commercially acquired materials for teaching in ECDE.

- e) **Class Size** was measured by the number of pupils enrolled in a class per teacher. This data was used to compute the teacher-child ratio in pre-primary school.

3.3.2 Dependent variable

Level of Utilization of IM: The dependent variable constituted the level of utilization of IM by teachers. In order to determine the levels of utilization of IM, the counts of the answers to eight items on a 5-point Likert scale were analyzed. The questions measured the degree to which ECDE teachers used IM. The answers were coded as: "1 for None", "2 for Little", "3 for Moderate," "4 for Large" and "5 for Very Large." The lowermost and uppermost frequencies respondents were likely to achieve for the 15 questions was 8-40, correspondingly. According to the tallies analyzed, scores less than 20 were categorized as low, 21-30, moderate and 31-40 high level of IM utilization.

3.4 Study Location

Nyeri County which is the regional headquarters for the five Counties of Central Kenya namely: Kiambu, Murang'a, Kirinyaga, Nyandarua and Nyeri (Nyeri County Education Office, 2015). Nyeri County has eight administrative Sub-Counties, namely: Kieni East and West, Mathira East and West, Mukurwe-ini, Othaya, Tetu, and Nyeri Central. According to the 2019 Kenya census, Nyeri County had a total population 759,164, occupying a land area of 3,325 square kilometers. The County is mainly rural with agriculture as the mainstay of the economic activities (Kenya Open Data Survey, 2014). This location of the study was chosen because it has a high enrollment of children in public ECDE facilities in the Central Kenya. The 2019 census data showed that there were 58,236 children aged between 3 to 5 years attending pre-primary schools (KNBS, 2019). Furthermore, there was limited research on the factors influencing utilization of IM in PPS in Nyeri County thereby justifying the need for the study (Waigera, 2013).

3.5 Target Population

ECDE teachers employed in public PPS in Nyeri County were the target population. According to Nyeri County Education Office, 2015) there were 225 public PPS in the County. Table 3.1 is a presentation of the target population.

Table 3. 1 : Target population

Target population	Frequency
Public PPS	225
Public PPS Teachers	270

Source: Nyeri County Education Office, 2015)

3.6 Sampling Technique and Sample Size

Description of sampling method and how sample size was determined is outlined in the subsections that follow.

3.6.1 Sampling Technique

A multistage sampling technique was applied whereby Nyeri County was randomly chosen in stage one. The next stage involved random selection of four Sub-Counties namely Kieni West, Kieni East, Mukurwe-ini, and Othaya. At the third stage, 225 ECDE schools in zones covering four Sub-Counties were chosen to take part in the research. At the fourth stage, proportionate sampling was chosen to identify 132 PPS classes to take part in the research. At the final stage, all the 168 PPS teachers in previously identified pre-primary classes were chosen as participants in the investigation.

Table 3.2 shows that there were 132 (58.6%) ECDE centers selected to participate in the study out of 225 public ECDE centers within 4 Sub-Counties included in the investigation. Teachers constituted 168 (62.2%) from a total population of 270 PPS teachers working in their respective pre-primary schools.

Table 3. 2 : Sampling Frame

Sub Counties	Eligible PPS	Proportion included in the sample	Per Cent (%)	Total number of PPS teachers (N)	Sample of participating PPS teachers (n)	Per Cent (%)
Kieni-West	50	29	58.0	70	43	61.4
Kieni-East	45	26	57.7	50	32	64.0
Mukurwe-ini	70	41	58.5	80	50	62.5
Othaya	60	35	58.3	70	43	61.4
Total	225	132	58.6	270	168	62.2

3.7 Determination of Sample Size

Considering the target population was below 10,000, the expected sample (nf) was computed using the Fisher (1995) Formula as follows:

$$nf = \frac{n}{1 + (n/N)}$$

Where, nf=the desired sample size, where the target population is above 10, 000.

N= the desired sample size, where the target population is below 10,000.

= 168 teachers

Therefore all 168 PPS teachers were chosen to participate in the research. However, only 164 teachers participated in the study comprising 97.6 % of the sample. Response rate of 80-85% is considered acceptable for surveys (Timothy & Wislar, 2012).

3.8 Research Instrument

Data were gathered through self-administered structured questionnaires. It was considered suitable for gathering large amounts of data over a short time (Borg & Gall, 1989). The researcher developed Likert scale type questionnaires for teachers according to guidelines by Brown (2010) and Jamieson (2004). The questionnaire had six parts. Part A: covered location of research, Part B: assessed teachers demographic characteristics, Part C: measured teachers attitude towards IM, Section D: focused on rating of teaching learning resources, Section E: assessed the teaching learning media, Section F: rated the utilization of instructional resources in the ECDE activity areas, while Section G: focused on the number of pre-primary school pupils per class.

3.9 Pre-testing of Research Instrument

According to Perneger, Courvoisier, Hudelson and Ageron (2015), pre-tests are preliminary tests of the measures used on a small sample of the target population under investigation. Perneger, et al. (2015) ascertains that pre-testing is critical to the research procedure. Converse and Presser (2006) assert that a pretest is used to pin point problem areas in the research instrument and decrease measurement errors. According to Converse and Presser (2006), the pretest provide feedback on quality of the tool. Questionnaire was pretested using 10 randomly selected ECDE teachers drawn from two ECDE centers in Mathira Sub-County that were omitted in the actual research. The findings of the pre-test were used to revise the research tool accordingly.

3.10 Validity and Reliability

3.10.1 Validity

Validity means the degree to which findings represent the phenomenon being examined (Creswell and Clark, 2010). The research tools were assessed for accuracy, meaning that the tools had achieved internal validity. The tools were also assessed for external validity in that generalizations could be derived from the study sample to similar populations outside the study location. Construct validity which is concerned with how well the concepts were understood by respondents were verified through scrutiny of the pre-test findings by supervisors. The findings of the pre-test were the basis for review of the study tools. As recommended by Kombo and Tromp (2006), the researcher discussed the findings of the pre-test with supervisors and revised the instruments according. The pre-test schools were excluded from the final research.

3.10.2 Reliability

Reliability of the research tool was determined through split-half reliability test. In order to establish whether the research tool was reliable, the correlation between the two halves should be at least 0.70 (Cronbach, 1951; Larry, 2013; Mugenda & Mugenda, 2003; Robinson, 2009 & Whitley, 2002). The findings of the pre-test results were computed and yielded coefficient of 0.716. Although no absolute rules exist for internal consistencies, a number of researchers (Whitley, 2002, Robinson, 2009; Field, 2009 and Mugenda and Mugenda, 2011) agree that internal consistency coefficient of 0.70 and above is considered reliable.

Field (2009) reported that, an instrument with Cronbach alpha (α) of 0.7 or better is accepted as reliable. Table 3.3 presents the cut-off points for internal consistency.

Table 3. 3 : Levels of Internal Consistency

Cronbach Alpha	Internal consistency
$\alpha \geq 0.9$	Very high
$0.8 \leq \alpha \leq 0.9$	High
$0.7 \leq \alpha \leq 0.8$	Average
$0.6 \leq \alpha \leq 0.7$	Below Average
$0.5 \leq \alpha \leq 0.6$	Insignificant
$\alpha \leq 0.5$	Objectionable

3.11 Data Collection Procedure

The investigator obtained research approval at Director of Education office in Nyeri County and respective school head-teachers before collecting data from the participating teachers. Appointment to visit each school was made prior to the date scheduled for meeting the participants. During the material day, the investigator visited the head teachers and was given a chance to clarify the aim of the visit to the ECDE teachers in a staff meeting. The researcher then described the objectives of the research and sought informed consent from the respondents who voluntarily signed the consent form. The survey form was distributed to respondents. Participants then filled the questionnaires which took approximately 30 to 45 minutes and then submitted the filled instrument to the researcher on the same day.

3.12 Null Hypothesis and Data Analysis Techniques

The following null hypotheses were subjected to statistical testing:

Ho-1: Teachers' age is insignificantly related to utilization of IM at $p \leq 0.05$.

Ho-2: Duration of teaching experience age is insignificantly related to utilization of IM at $p \leq 0.05$.

Ho-3: Teachers’ attitude score is insignificantly related to utilization of IM at $p \leq 0.05$.

Ho-4: Pre-primary class size is insignificantly related to utilization of IM at $p \leq 0.05$.

Ho-5: Teachers, age, duration of teaching experience, teachers’ attitude scores and pre-primary class size do not predict of utilization of IM at $p \leq 0.05$.

SPSS (Version 24) was used to analyze quantitative data was analyzed while qualitative data were coded and categorized into themes. Hypothesis testing was conducted using Pearson correlation coefficient, chi-square test and regression statistics. Table 3.4 is a summary of the research objectives and analytical techniques.

Table 3. 4 : Objectives and Data Analysis Methods

Research Objectives	Type of information/ Variables	Data Collection Tool	Respondent	Measurement Scale	Data Analysis Technique
Assess teachers’ age and Utilization of IM	Duration of teaching experience in years	Structured questionnaire	Teachers	Continuous data	Pearson Correlation Coefficient Chi-Square Regression

Establish the relationship between years of teaching experience and Utilization of IM	Duration of teaching experience in years	Structured questionnaire	Teachers	Continuous data	Pearson Correlation Coefficient Chi-Square Regression
Assess the correlation between teachers' attitude scores and Utilization of IM	Computed Teachers' attitude scores	Structured questionnaire	Teachers	Continuous data	Pearson Correlation Coefficient Chi-Square Regression
Investigate the correlation between number class size and Utilization of IM	number of pupils per class	Structured Questionnaire	Teachers	Continuous data	Pearson Correlation Coefficient Chi-Square Regression
Establish whether teachers' age, experience, attitude scores and number of pupils predict utilization of IM		Structured Questionnaire	Teachers	Continuous data	Pearson Correlation Coefficient Chi-Square Regression

3.13 Logistical and Ethical Considerations

The logistical considerations included obtaining approvals by Graduate School, KUERC, and NACOSTI. Besides, permission was granted by the relevant authorities, including Nyeri County Director of Education and the respective school head-teachers, before the data gathering exercise commenced.

The investigator adhered to research ethics by observing confidentiality of respondents identity and responses throughout the research process, possible discomfort, risks and benefits prior to data collection. The ethical considerations included getting informed consent from respondents by signing the Informed Consent Form (Appendix I). In order to protect the identity of respondents, ID numbers were written on the questionnaires instead of names throughout the research process. In addition, the respondents were cognizant that the research exercise was voluntary and that they could withdraw from the research at their own free will. The contact information of the Researcher, Supervisors and KUERC Secretariat were provided to participants for ease of communication. The respondents were informed in advance that there would be no monetary reward for taking part in the investigation. A word of gratitude was given to the participants at the end of each data gathering session.

CHAPTER FOUR: PRESENTATION OF FINDINGS, INTERPRETATION AND DISCUSSION

4.1 Overview

The findings of the investigation are discussed in this chapter. Objectives of the investigation were:

1. Establish the demographic characteristics of ECDE teachers.
2. Determine the teachers' attitude towards utilization of IM.
3. Investigate the status of instructional aids in ECDE centers.
4. Investigate availability of educational media (audio, visual, audio-visual, realia, print and locally improvised IM).
5. Determine the level of utilization of IM by ECDE teachers
6. Determine whether teachers' age is associated with utilization of IM.
7. Determine relationship between years of experience and the levels of utilization of IM.
8. Assess the correlation between Levels of IM and teachers' attitude scores.
9. Determine the correlation between class size and the level of utilization of IM.
10. Establish whether teachers' age, years of teaching experience, teachers' attitude rating scores and number of pupils per class predict utilization of instructional materials.

4.1.1 Return rate

A total of 168 survey forms were given out to ECDE teachers, however, only 164 were returned comprising 97.6% return rate.

4.2 Teachers' Demographic Characteristics

The first task was to depict demographic characteristics of respondents. Demographic information of the ECDE teachers from Nyeri County who took part in this study is presented in this section.

4.2.1 Distribution by Gender

Frequency distribution by gender is shown in Table 4.1.

Table 4. 1 : Frequency of Gender of the Respondents

Gender	Frequency	Percent
	N	(%)
Females	151	92.1
Males	13	7.9
Total	164	100.0

Table 4.1 revealed that females comprised 92.1% of the respondents while males were 7.9%. This infers that there are more females recruited as ECDE teachers than males. It was observed that the female teachers dominated the teaching positions as head teachers and also as regular class instructors.

4.2.2 Distribution by Age

The frequency distribution by age is shown on Table 4.2.

Table 4. 2 : Frequency Distribution by Age

Respondents' Age Group	Frequency	Percent
	N	(%)
Below 20	1	0.7
21 to 30 Years	40	24.2
31 to 40 Years	65	39.6
41 to 50 Years	32	19.5
Above 50 Years	26	16.1
Total	164	100.0

Table 4.2 revealed that 39.6% of the pre-primary teachers were 31-40 years, 24.2% were between 21 and 30 years, 19.5% were between 41-50 years, 16.1% were above 50 years and one respondent was below 20 years of age.

4.2.3 Educational Background of the Respondents

Table 4.3 shows 61.6% of the ECDE teachers were holders of ECDE certificates and diplomas while, 31.1% were university degree holders, 3.7% had high school certificates, and 2.4% dropped out of high school, while the minority comprising 1.2% had completed primary level.

Table 4. 3 : Frequency Distribution by Education

Education	Frequency	Percent
	N	(%)
Primary Completed	2	1.2
Partial Secondary	4	2.4
Secondary Completed	6	3.7
College/Diploma in ECE	101	61.6
University Degree in ECE	51	31.1
Total	164	100.0

Table 4.3 indicates that majority had attained post-secondary level of schooling. Respondents who had earned a college diploma were 61.6% while those with university degree were 31.1% accounting for 92.7%.

4.2.4 Respondents' Professional Training Status

The frequency distribution of professional training is depicted on Table 4.4.

Table 4. 4 : Frequency of Respondents' Professional Training

Training	Frequency N	Percent (%)
Untrained teacher aides	11	7.0
Certificate in E.C.E	30	18.6
Primary Teacher Certificate (P1)	4	2.6
Diploma in E.C.E	77	46.2
University Degree in E.C.E	42	25.6
Total	164	100.0

Table 4.4 shows 46.2% were diploma holders , 25.6% degree holders, 18.6% certificate holders while the 2.6% had attained primary teacher education certificate (PTEC) and 7.1% were teacher aides.

4.2.5 Teaching Experience

Duration of work is displayed on Table 4.5. The findings reveal that 42.2% had experience of 6 to 10 years, 28.6% , five years or less, 14.9%, 15 years and above while 14.3% had an experience of 11-15 years.

Table 4. 5 : Frequency of Teaching Experience

Teaching Experience	Frequency N	Percent (%)
Below 5 Years	47	28.6
6 to 10 Years	70	42.2
11 to 15 Years	23	14.3
15 Years and above	24	14.9
Total	164	100.0

Most ECDE teachers had worked for six to ten years (42.2%) or more and slightly over one-quarter (28.6%) had worked for less than five years. The long teaching experience was because most respondents had taught in private institutions before transferring to work in public sector ECDE centers.

4.3 Teachers' Attitudes

The second task in this investigation was assessment of ECDE teachers' attitudes to IM. As described previously in chapter three, for the determination of teachers' attitude scores, counts of answers to five Likert questions were tallied. Responses were coded as: one (1) count for "Strongly Disagree", 2 counts for "Somewhat Agree," and 3 counts for "Strongly Agree". Lowest and highest possible counts were 5 and 15 points correspondingly. Counts from 5 to 9 were rated as having a negative attitude while those who attained 10 to 12 counts were classified as having a moderately positive attitude and those who achieved 13 to 15 counts were categorized as positive attitudes.

Based on this classification described previously, the research determined that 11.5% had negative attitudes, 1.8% had moderately positive attitudes, while 86.7% had highly positive attitudes to utilization of IM in ECDE. The frequency distribution for teachers' attitude scores is presented in Table 4.6. Research findings indicated that most teachers had positive attitudes across all items assessed while only a few had a moderately positive attitude, and about 10 percent had a negative attitude to the use of IM in ECDE.

Table 4. 6 : Frequency of Teachers' Attitudes to IM

Teachers' attitudes towards instructional materials	Strongly Disagree (1) N (%)	Somewhat Agree (2) N (%)	Strongly Agree (3) N (%)
It is the responsibility of the teacher to improvise local materials for facilitating learning	7 (4.2)	5 (3.0)	154 (92.8)
Teachers should not introduce new concepts without teaching aids	38 (22.9)	2 (1.2)	126 (75.9)
It is the responsibility of the teacher to prepare teaching materials for every lesson	28 (16.8)	2 (1.2)	136 (81.9)
Pupils learn better when they manipulate learning materials	9 (5.4)	4 (2.4)	153 (92.2)
It is the duty of teachers to encourage pupils to handle materials to facilitate learning	13 (7.9)	2 (1.2)	153 (90.9)
Mean Rating of Teachers' Attitude Scores	19 (11.4%)	3 (1.8%)	144 (86.7%)

4.3 1 Assessment of Teachers' Attitude Rating Scores

The study sought to assess the teachers' attitude rating scores in each of the ECDE activity areas. The results of teachers' attitude rating scores for various ECDE activity areas are depicted on Table 4.7.

Table 4. 7 : Frequency by Teacher Attitude Scores

Variable	Mean	Standard deviation
IM in math activities help learners to understand concepts better	3.71	.997
IM in language activities make learning interesting	4.00	.438
IM in science activities help learners to understand better	3.71	.997
IM in social studies activities motivates pupils to learn better	1.70	1.011
IM in creative work makes learners innovative	1.47	1.062
IM in music and movement activities helps learners to be active	1.70	1.011
IM for outdoor activities are easy to improvise	4.40	.493
IM for indoor activities help learners to be more active	3.40	2.022
Use of IM in teaching CRE motivates the pupils to learn	2.94	2.124
Use of IM in life skills help teachers to be more creative	3.71	.997
Mean scores (N=164)	2.533	1.016

According to Table 4.7, the rating of teachers' attitudes scores ranged from a mean of 1.47 to a mean of 4.40 out of a possible maximum score of 5. The cut-off point used for categorizing teachers as having either positive or negative attitude was mean score of 2.533 with standard

deviation of 1.016. Participants who scored 2.533 or more were grouped as having positive attitudes, while those who attained less than the mean score of 2.533 were categorized as having negative attitudes. The classification of respondents by attitude rating score is displayed on Table 4.8.

Table 4. 8 : Frequency of Teachers’ Attitudes

Variable	Frequency (N)	Percent (%)
Positive attitude	135	82.4
Negative attitude	29	17.6
Total	164	100.0

Table 4.8 revealed that most participants (82.4%) had positive attitudes, while 17.6% had negative attitudes. This implies that teachers with positive attitudes were more likely to use IM in their instruction compared to those with negative attitudes.

4.4 Rating of Instructional Resources

The investigative task was to score teaching-learning resources in terms of quantity, adequacy, durability, manipulation by pupils and affordability. For the purpose of determining the scores for the teaching-learning resources, counts of responses to five (5) characteristics of teaching-learning resources across a 3-point Likert scale were determined. The items measured the general status and condition of teaching-learning resources. The Likert opinions were coded as: “1-point = Low Rating”, “2-points = Moderate Rating” and “3-points = High Rating”. The results of rating scores of the teaching-learning resources are depicted on Table 4.9.

Table 4. 9 : Rating of Teaching-Learning Aids

Rating of T/L Resources	Low	Moderate	High	TOTAL
Quantity of T/L Resources	22 (13.5)	109 (66.9)	32 (19.6)	163 (100)
Adequacy for Pupils	41 (25.2)	83 (50.9)	39 (23.9)	163 (100)
Durability	32 (19.8)	98 (60.5)	32 (19.8)	162 (100)
Manipulation by Pupils	12 (7.5)	70 (43.8)	78 (48.8)	160 (100)
Cost/Affordability	21 (14.6)	67 (46.5)	56 (38.9)	144 (100)

Table 4.9 indicates that 13.5% had low quantities, 66.9%, moderate quantities while 19.6% had high quantities of educational resources. In terms of adequacy, 25.2% of the respondents rated the adequacy as low, 50.9% as fairly adequate and 23.9 as highly adequate. In assessing the durability, 19.8% reported that the materials had low durability, 60.5% of the respondents rated the instructional materials as moderate while 19.8% of the respondents rated the materials as having high durability. In terms of manipulation of IM by pupils, 7.5% of the teachers rated the pupil interaction with IM as low, 43.8 as moderate and 48.8% as high. In terms of the cost, 14.6% of the respondents rated the cost as low and therefore affordable, 46.5% as fairly affordable, and 38.9% perceived the cost of teaching-learning resources as expensive.

4.5 Teachers' Use of Educational Media

The fourth purpose was establishing how frequently educational media was used. To achieve this aim, scores of reactions to 8 types of media used in ECDE were calculated. The questions measured the frequency of different types of media used in ECDE. The answers were coded as:

1-Point for “Rarely”, 2-Points for “Often” and “3-Points for “Very Often.” The results showed that teachers used a variety of educational media for instruction, which included: Print, Realia, Audio, Visual, Audio-Visual, Role Play, locally improvised and commercially acquired materials for instruction in pre-primary schools. The findings on educational media is shown on Table 4.10.

Table 4. 10 : Frequency of Educational Media Usage

Educational Media	Rarely N (%)	Sometimes N (%)	Frequently N (%)	Totals N (%)
Locally Improvised Materials	6 3.7%	47 29.2%	108 67.1%	161 100.0%
Print media	6 3.7%	53 32.9%	102 63.4%	161 100.0%
Role Play Materials	7 4.5%	82 52.9%	66 42.6%	155 100.0%
Visual	17 11.0%	87 56.1%	51 32.9%	155 100.0%
Realia	17 10.8%	92 58.2%	49 31.0%	158 100.0%
Audio	60 38%	59 37.3%	39 24.7%	158 100.0%
Audio- Visual	63 41.2%	71 46.4%	19 12.4%	153 100.0%
Commercial materials	54 34.2%	89 56.3%	15 9.5%	158 100.0%

According to Table 4.10, the type of instructional media that were used to a large extent were locally improvised materials (67.1%) followed closely by print media (63.4%). The type of

media that were least used were audio-visual media (12.4%) and commercially acquired instructional materials (9.5%). This was mainly because the locally improvised materials were readily available for children to manipulate to enhance their learning experiences.

4.6 ECDE Class Sizes

The fifth objective of this research was to analyze ECDE class sizes in the study area. The PPS Class size was measured by obtaining data on the pupil enrollment per teacher in a class. The frequency distribution of pre-primary school class sizes is depicted on Table 4.11.

Table 4. 11 : Distribution of PPS Class Sizes

Class Size		Frequency	Percent
		N	(%)
Below 10		1	0.7
11-20		26	17.7
21-30		84	57.1
31-40		34	23.1
Above 40		2	1.4
Total		147	100.0
PPS Class range	Minimum	7	
	Maximum	49	
	Mean class size	26.6	
	Standard deviation	6.77	

The pre-primary class enrollment was as low as 7 to as high as 49 pupils per class, and the average class size was 27 pupils with only one teacher per class. The class sizes, in this case, were relatively larger than the recommended pre-primary class size in Kenya.

4.7: Utilization of IM in ECDE

The sixth objective of this research was to determine the level of utilization of IM across the eight ECDE activity areas by ECDE teachers. Table 4.12 depicts the data on IM utilization.

Table 4. 12 : Utilization of IM across ECDE Activity Areas

ECDE Activity Area	Very Little N (%)	Little Extent N (%)	Moderate extent N (%)	Large extent N (%)	Very Large Extent N (%)	Total N (%)
Language	3 (1.9)	18 (11.3)	46 (28.8)	65 (40.6)	28 (17.5)	160 (100)
Math	1 (0.6)	22 (13.0)	44 (27.0)	40 (25.2)	52 (32.7)	159 (100)
Science	1 (0.6)	23 (14.6)	43 (27.2)	51 (32.3)	40 (25.3)	158 (100)
Social Studies	1 (0.6)	35 (22.0)	42 (26.4)	51 (32.1)	30 (18.9)	159 (100)
Creative Work	2 (1.2)	27 (16.8)	28 (17.4)	51 (31.7)	53 (32.9)	161 (100)
Music and Movement	7 (4.4)	26 (16.3)	43 (26.9)	57 (35.6)	27 (16.9)	160 (100)
Outdoor Activities	3 (1.9)	12 (7.4)	21 (13.0)	58 (35.8)	68 (42.0)	162 (100)
Others (Improvised, Life skills, CRE)	0 (0.0)	3 (27.3)	1 (9.1)	2 (18.2)	5 (45.5)	11 (100)
Mean Score for IM usage	8 (6.7)	16 (13.3)	24 (20.0)	32 (26.7)	40 (33.3)	120 (100)

Results reveal that 33.3% of participants used instructional materials to a very large level, 26.7% to a large level, and 20.0% to a moderate level, 13.3% to a little level and 6.7% to a very little level. These findings implied that about three-quarters of the respondents used IM frequently across all ECDE activity areas while about one-quarter used IM minimally. The high rate of

utilization of improvised IM was attributed to the fact that they were readily available within the school environment.

4.8 Level of Utilization of Instructional Materials

The final aim of the investigation was assessment of utilization of IM in ECDE in Nyeri County.

The outcome is shown on Table 4.13.

Table 4. 13 : Levels of Utilization of Instructional Materials

IM Utilization	Frequency N	Percent (%)
Lowest	0	0.0
Moderate	88	53.7
Highest	76	46.3
Total	164	100.0

Findings reveal none of the respondents (0.0%) was categorized under low level of utilization of IM, 53.7% were moderate users, and 46.3% achieved high level of utilization of IM.

4.9 Inferential Statistics

Null hypothesis test results are presented and discussed in this section.

4.9.1: Null hypothesis testing

The null hypotheses tested include:

Ho-1: Teachers' age is insignificantly related to utilization of IM at $p \leq 0.05$.

Ho-2: Duration of teaching experience is insignificantly related to utilization of IM at $p \leq 0.05$.

Ho-3: Teachers' attitude score is insignificantly related to utilization of IM at $p \leq 0.05$.

Ho-4: Teachers' attitude rating scores do not predict utilization of IM at $p \leq 0.05$.

Ho-5: No statistically significant variation exists in utilization of IM by teacher attitude rating scores at $p \leq 0.05$.

Ho-6: Pre-primary class size is not significantly related to utilization of IM at $p \leq 0.05$.

Ho-7: Pre-primary class size does not predict utilization of IM at $p \leq 0.05$.

Ho-8: There is no statistically significant variation in utilization of IM by pre-primary class size at $p \leq 0.05$.

Ho-9: Teachers' age, duration of teaching experience, teachers' attitude rating scores and pre-primary class size do not predict of utilization of IM at $p \leq 0.05$.

Hypothesis Testing Results

The following null hypotheses were tested to determine the significance of the relationship between the independent and dependent variables.

Ho-1: Teachers' age is insignificantly related to utilization of IM at $p \leq 0.05$.

The finding of the Pearson Correlation Coefficient is displayed on Table 4.14.

Table 4. 14 : Correlation between teachers’ age and utilization of instructional material

Variables		Teachers’ ages	Utilization of IM Scores
Teachers’ ages	Pearson Correlation	1.000	.090
	Sig. (2-tailed)	.	.301
	N	164	164
Utilization of IM Scores	Pearson Correlation	.090	1.000
	Sig. (2-tailed)	.301	.
	N	164	164

The correlation coefficient obtained was insignificant at $p \leq 0.05$. The findings showed correlation between age of teachers and utilization of IM scores was insignificant at $p \leq 0.05$.

The null hypothesis was accepted. Conclusion was drawn that teachers’ age had no significant correlation to utilization of IM.

Discussion

Current research outcome is consistent with Mwaniki (2015) and Ngeru (2015) (2018) who reported that youthful teachers comprised most respondents who had less experience in preparing and using instructional materials efficiently and effectively. However, Kiboro (2018) observed that age was significantly related to utilization of IM in ECDE because the older teachers had interacted with instructional materials for a considerable time in comparison with younger instructors. These findings are consistent with Waigera, Mweru & Ngige (2020a), research on the relationship between age and levels of utilization of IM. The study established that older and more experienced teachers achieved high levels of utilization of IM compared to younger teachers with less teaching experience.

Ho-2: Duration of teaching experience is insignificantly related to utilization of IM at $p \leq 0.05$.

The outcome obtained is shown on Table 4.15.

Table 4. 15 : Correlation for teaching experience and utilization of IM

Variables		Years of teaching experience	Utilization of IM Scores
Years of teaching experience	Pearson Correlation	1.000	.690
	Sig. (2-tailed)	.	.034*
	N	164	164
Utilization of IM Scores	Pearson Correlation	.690	1.000
	Sig. (2-tailed)	.034*	.
	N	164	164

*sig. at 0.05 level

Significant correlation was obtained at $p \leq 0.05$. The findings revealed statistically significant correlation between years of teaching experience and utilization of IM and at $p \leq 0.05$. The null hypothesis was rejected and the alternate accepted. Conclusion was reached that utilization of IM was significantly related to years of teaching experience.

Discussion

The findings are supported by previous research conducted by Ngeru (2015) in Nairobi County, Kenya, where the researcher was investigating the association of duration of teaching and utilization of IM in maths in preschools. The researcher reported that teaching experience and adoption of IM were correlated. Similar findings were documented by Mwaniki (2015) in Embu County and Makokha (2016) in Bungoma County where most teachers with five or more years of experience attained high level of utilization of IM.

Ho-3: Teachers' attitude score is insignificantly related to utilization of IM at $p \leq 0.05$.

χ^2 -statistic was used to test the hypothesis whose outcome is depicted on Table 4.16.

Table 4. 16 : χ^2 -Statistic for Teachers' Attitude Scores and Utilization of IM

Variable		Level of utilization of IM			
		Moderate Level	High Level	Total	
Teachers attitude Rating Scores	Positive Attitude	N	100	34	134
	Percent	%	61.3%	20.9%	82.2%
	Negative Attitude	N	20	9	29
	Percent	%	12.3%	5.5%	17.8%
Total		N	120	43	163
Percent		%	73.7%	26.3%	100.0%

$\chi^2=4.094$; $df=1$; $p=0.043^*$; Sig. at $p<0.05$

The χ^2 -statistic obtained was significant at $p \leq 0.05$ level ($\chi^2=4.094$; $df=2$; $p=0.043$). The null hypothesis was rejected and alternate accepted. Conclusion was drawn that utilization of IM was significantly related to teachers' attitude scores.

Discussion

This research established that respondents' attitudes were significantly related to utilization of instructional materials at the 0.05 level. This outcome agrees Al-Zaidiyeen (2010) observation that attitudes were significantly related to the use of ICT in Jordan secondary schools. Similar research by Yalcin, Kahraman and Yilmaz, (2011) showed that respondents with positive

attitudes performed better in application of instructional technologies compared to their respondents who had negative attitudes. The current results are also supported by Ngure (2014) which showed that trainers' attitude and utilization of instructional media were highly significant.

4.10: Regression model for Teachers' Attitude Rating Scores and Levels of Utilization of IM.

Ho-4: Teachers' attitude scores do not predict utilization of IM at $p \leq 0.05$.

Further testing was conducted using a simple linear regression model between teachers' attitude scores (independent variable) and levels of utilization of IM (dependent variable). The outcome is displayed on Table 4.17.

Table 4. 17 : Regression Coefficients for Attitude Rating Scores

Regression Coefficients for Teachers' Attitude Rating Scores

Model for Teachers' Attitude Rating Scores		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	10.799	3.414	.	3.163	.002
	Positive Attitudes	0.530	0.169	0.255	3.137	0.002*
	Negative Attitudes	.218	.131	.126	1.655	.100

Dependent Variable: Utilization of IM

Predictor: Attitude Scores

*sig. at $p < 0.05$

Findings showed attitude rating scores and levels of utilization of IM were significantly related ($\beta = 0.530$; $p = 0.002$). Null hypothesis was rejected and alternate retained. Conclusion was that

utilization of IM was significantly related to teachers' attitudes. These findings implied that the more positive the attitude, the higher the levels of utilization.

Discussion

These findings are supported by Midigo, Ronnie and Mwanda (2018) who observed that adoption of instructional media was significantly related to teachers' positive attitudes towards teaching oral skills in ECDE. They observed that teachers with positive attitudes demonstrated the value of picture books in making learning fun, presenting learners with opportunities to show their oral skills, stimulating learner creativity as well as encouraging collaborative learning among pupils. These findings are consistent with Waigera, Mweru & Ngige (2020b) report which determined respondents' attitudes has a direct effect on Use of IM in ECDE.

Further regression test was done to verify extent of explanatory power of teachers' attitudes scores on levels of utilization of IM. Regression model is presented on Table 4.18.

Table 4. 18 : Regression Summary Model for Teachers' Attitude Rating Scores

Regression Summary Model for Teachers' Attitude Rating Scores

Model	R	R-Square (R ²)	Adjusted R-Square	Std. Error for Estimate
1	.318 ^a	.101	.090	6.258

Predictor), Teachers' Attitudes Scores

Dependent Variable: Utilization of IM

The findings revealed that the teachers' attitude rating scores had an explanatory power on the utilization of IM as indicated by the computed R-Square results ($R^2 = 0.101$). Teachers' attitudes were found to explain 10.1% of the variation of the utilization of IM in ECDE. This implies that there were other variables that contributed to utilization of IM in ECDE besides teachers' attitudes. This outcome is sustained by Omayio (2013) who revealed that classwork overload has a negative effect on selection, preparation and use of instructional materials in ECDE. This report is consistent with those of Bernard (2007) who observed that teachers' attitudes to IM was critical for efficient integration of teaching aids in ECDE.

Ho-5: Class size is not significantly related to utilization of IM at $p \leq 0.05$.

χ^2 -statistic was performed on the null hypothesis and the outcome is shown on Table 4.19.

Table 4. 19 : χ^2 -Statistic for Class Size and Utilization of IM

PPS Class size		Level of Utilization		Total
		Moderate level	High level	
11-20	N	17	9	26
	%	11.8%	6.3%	18.1%
21-30	N	65	18	83
	%	45.1%	12.5%	57.6%
31-40	N	29	6	35
	%	20.2%	4.2%	24.3%
Total	N	111	33	144
	%	77.1%	22.9%	100.0%

Chi-Square results ($\chi^2=3.804$; $df=4$; $p=0.045$) Sig. at $p \leq 0.05$.

The results ($\chi^2=3.804$; $df=4$; $p=0.045$) revealed that class size and level of utilization of IM were significantly related at $p \leq 0.05$. Null hypothesis was rejected and alternate retained. Conclusion was drawn that utilization of IM was significantly related to pre-primary class size. These findings implied that teachers with smaller class sizes utilized IM more than those with larger classes.

Discussion

These results are supported by a research conducted in the USA by Pertman, Fletcher, Falenchuk, Brunsek, McMullen, and Shah (2017) that showed that small class sizes and a low teacher-pupil ratio are a quality indicator of child developmental outcomes in early childhood development programs. The study showed that there were positive child outcomes, such as increased child-teacher interaction, cognitive, social-emotional, and psychomotor outcomes.

4.11 Regression between class size and Levels of Utilization of IM

Ho-6: Pre-primary class size does not predict utilization of IM at $p \leq 0.05$.

Further analysis was conducted using simple linear regression between class size and levels of utilization of IM. The findings of the regression model for class size are on Table 4.20.

Table 4. 20 : Regression Coefficients for pre-primary class size

Regression Coefficients for pre-primary class size						
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig. (p)	
	B	Std. Error	Beta			
1	(Constant)	11.687	3.362	3.476	.001	
	Class Size	.353	.087	.301	4.037	.000*

Dependent Variable: Utilization of IM
Predictor: Class size

*Significant at $p < 0.05$

The findings revealed that class size and level of utilization of IM were significantly related ($p = 0.000$). Null hypothesis was rejected and alternate retained. Conclusion was made that those two variables were related. Further regression test was conducted to determine the degree of explanatory power of class size on levels of utilization of IM. The result of the regression model for class size is on Table 4.21.

Table 4. 21 : Regression Model for pre-primary class size

Regression Model for pre-primary class size				
Model	R	R Square (R^2)	Adjusted R Square	Std. Error of Estimate
1	.301 ^a	.090	.085	6.275

^aPredictor: Pre-primary Class Size

Dependent Variable: Utilization of IM

The findings revealed that pre-primary class size had an explanatory power on the utilization of IM, as indicated by a computed R-Square ($R^2 = 0.090$). The class size was found to explain 9%

of the variation in the levels of utilization of IM in ECDE. This implies that there were other variables besides class size that contributed to the utilization of IM.

Ho-7: There is no statistically significant variation in utilization of IM by pre-primary class size at $p \leq 0.05$.

ANOVA was conducted to verify if significant variance existed in utilization of IM by pre-primary school class size. The ANOVA findings are on Table 4.22.

Table 4. 22 : ANOVA for pre-primary class size and Utilization of IM

ANOVA results for pre-primary class size						
Model		Sum of Squares	Df	Mean Square	F	Sig.
	Regression	641.630	1	641.630	16.296	.000*
1	Residual	6457.195	164	39.373		
	Total	7098.825	165			

a. Dependent Variable: Levels of Utilization of IM

b. Predictor: (Constant), Pre-primary class Size

*Significant at $p < 0.05$

The ANOVA findings determined that class size and utilization of IM were significantly related ($p = 0.000$). Null hypothesis was rejected and alternate determined. Conclusion was drawn that utilization of IM in ECDE varied significantly according to pre-primary class size. These results implied that teachers who had small class sizes achieved better utilization of IM compared to teachers managing large class sizes.

Discussion

This study established that pre-primary class enrollment and use of IM were significantly related at $p \leq 0.05$. The pre-primary class sizes ranged from seven to 49 pupils per class, and the average class size was 27 pupils with only one teacher per class. The class sizes, in this case, were relatively larger than the recommended pre-primary class size in Kenya. According to MOE (Republic of Kenya, 2018), the recommended class size should be a maximum of 25 learners per teacher (1:25). These findings showed a contrast with the recommended class size in American preschools. With reference to NAEYC (2014), the recommended class size for children aged 4-5 years is a maximum of 10 pupils per teacher. The current findings are consistent with a study by Foster, Anthony, Clements, Sarama and Williams, 2016 on use of computer-assisted learning for improving mathematics learning by kindergarten pupils. The researchers reported that ECDE class size and effective computer-assisted instruction were significantly related. These results are supported by a research conducted in the USA by Pertman, Fletcher, Falenchuk, Brunsek, McMullen, and Shah (2017) that showed that small class sizes and a low teacher-pupil ratio are a quality indicator of child developmental outcomes in early childhood development programs. The study showed that there were positive child outcomes, such as increased child-teacher interaction, higher cognitive, social-emotional, and psychomotor outcomes.

Ho-8: Teachers' age, the years of teaching experience, teachers' attitude rating scores and pre-primary class size do not predict of utilization of IM.

Regression model consisting of the hypothesized predictor variables namely teachers' age, years of teaching experience, teachers' attitude rating scores and pre-primary class size was tested. The findings are shown on Table 4.23.

4.12 Regression Model for Utilization of IM

Table 4. 23 : Predictor Model for Utilization of IM

Predictor variables	Unstandardized Coefficients		Standardized Coefficients	T	Significance
	B	Std. Error	Beta	T	p-value
(Constant)	1.370	0.379		3.617	0.000 ^a
Teacher's Age	.680	.747	.109	.910	0.364
Years of Teaching Experience	.516	.147	.266	3.506	0.001*
Teachers' Positive Attitude Scores	0.530	0.169	0.255	3.137	0.002*
PPS Class size	-0.081	0.049	-0.134	-1.653	0.011*

Dependent Variable: Level of IM utilization

Predictors: Teachers' Age, Years of Teaching Experience, Teachers' Positive Attitudes, Class Size

*Significant at $p < 0.05$

Findings presented on Table 4.23 revealed that years of teaching experience ($\beta = 0.516$; $p = 0.001$) and teachers' positive attitude rating scores ($\beta = 0.530$; $p = 0.002$) were strong positive predictors of utilization of IM. However, class size ($\beta = -0.081$; $p = 0.011$) was found to be a strong

negative predictor of utilization of IM indicating that the larger the class size, the less the likelihood of utilizing instructional materials among the study participants. The findings showed that the teachers' age was not a significant predictor of utilization of instructional materials. Therefore, the three significant predictors of utilization of IM were years of experience, and teachers' positive attitudes and class size. The two strong and positive significant predictors of utilization of instructional materials were years of teaching experience and teachers' attitudes. However, the pre-primary class size yielded a negative regression coefficient, which indicated a negative relationship. This implied that the smaller the class size, the higher the level of utilization of IM. The hypothesis stating that there were no statistically significant predictors of utilization of instructional materials was therefore rejected. It was concluded that, years of teaching experience, teachers' positive attitude scores and pre-primary class size predicted utilization of IM.

The following regression model for predictors of utilization of IM was developed:

$$\text{Utilization of IM} = [1.37 + 0.516\text{EXP} + 0.530\text{ATT} - 0.081\text{CLASS}]$$

Where: **EXP** – Years of Teaching Experience
 ATT - Teachers' Positive Attitude Scores
 CLASS – Pre-primary Class Size

According to the regression model for the level of utilization of instructional materials, an increase of one (1) year of teaching experience led to an increase in the utilization of IM by 51.6% and a positive rating of teachers' attitude scores by one (1) point led to an increase in the utilization of IM by 53.0%. However, an additional pupil had a negative effect of decreasing the utilization of IM by 8.1% in pre-primary schools. This implied that the larger the class with more than 20 pupils per teacher, the lower the level of utilization of IM. The hypothesis stating that

years of teaching experience, teachers' positive attitudes, and pre-primary class size were not significant predictors of utilization of instructional materials was therefore rejected. Conclusion was drawn teaching experience, teachers' positive attitudes, small pre-primary class size were statistically significant predictors of utilization of IM in ECDE.

CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Introduction

This section covers summary, conclusion, and recommendations of the investigation.

5.2 Overview of Results

This section offers the summary of the investigation on the correlation of ECDE learning environment and utilization of instructional materials by teachers.

5.3 Summary

Findings determined that more than ninety percent of participants were female teachers in their mid-thirties and had attained a college diploma and higher levels of education, majority were professionally trained teachers in ECDE with a long teaching experience. In terms of teachers' attitudes, majority demonstrated positive attitudes towards the use of IM in ECDE.

Respondents reported that they had adequate teaching leaning resources and educational media. Class size ranged from a seven to 49 children in a pre-primary class. One of the outcomes of this study was that the larger the ECDE class of more than 20 learners, the less the utilization of IM. This implied that smaller class sizes of less than 20 pupils per teacher achieved higher levels of utilization of IM in comparison with larger class sizes. The hypothesis test results showed teachers' positive attitudes, ECDE experience and class size were significantly related to utilization of IM. The hypothesis test results revealed that ECDE experience and positive attitudes were strong positive predictors of utilization of IM. However, the large numbers of pupils in a class was found to be a strong negative predictor of utilization of IM implying that the larger the class size, the less the likelihood of utilizing IM.

5.3 Conclusion

Predictors that had the greatest contribution to utilization of instructional materials were teaching experience, teachers' positive attitudes and a small class size. The findings of this study, has demonstrated the critical implications for enhancing utilization of IM in ECDE.

5.4 Recommendations

Specific recommendations derived from the study for various groups of stakeholders in ECDE in Kenya were drawn as follows:

5.4.1 Recommendations for Policy Makers

- KICD ought to develop policy on preparation of IM for ECDE in all Counties.
- The recommended teacher-pupil ratio (1: <20) for pre-primary classes should be implemented by the Teachers' Service Commission that should recruit adequate teachers in order to enhance effective instruction at the early formative stage

5.4.2 Recommendations for ECDE Trainers

- This research has established that attitudes have a positive impact on preparation and utilization of IM among ECDE instructors. Therefore, ECDE trainers should carry out routine assessment of the effect of teacher attitude on instructional practice in ECDE.

5.4.3 Recommendations for ECDE teachers

- This research established that the more experienced the teacher, the higher the level of usage of IM. There is need for highly experienced teachers to mentor newly recruited teachers in IM preparation for ECDE.

5.5 Further Research

1. This study revealed that there are other factors besides the variables under investigation that contribute to use of IM in ECDE. Future studies may focus on effect of pupil characteristics on utilization of IM.
2. Comparative research may be conducted in other ECDE institutions such as private-sponsored and faith-based pre-primary schools in other Counties in Kenya.

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APPENDIX A: INFORMED CONSENT FORM

1.1 Introduction

I am Joseph Waigera, doctoral student Early Childhood Studies at KU undertaking research entitled “*Relationship between Pre-primary School Learning Environment and Utilization of Instructional Materials by Teachers in Nyeri County, Kenya.*” This information will be made available to early childhood education stakeholders who are mandated to ensure better instructional methods for pre-primary school pupils and more effective teaching.

1.2 Procedure

Your will be asked some questions, which will be recorded for academic use. Participation in the research is voluntary and you can opt out at will.

1.3 Discomforts and risks

If you experience any discomfort with any question feel free to decline to answer or stop the research altogether. The survey will take about one hour to complete.

1.4 Benefits

Your contribution to this research will help us to learn how pre-primary school environments and instructional materials can be utilized to make early childhood education more effective.

1.5 Rewards

A word of appreciation will be given to participants, but there is no monetary reward.

1.6 Confidentiality

The survey will be done at public pre-primary schools. Your identity will not be disclosed on the survey form.

1.7 Contact information

For more details, please contact Dr. Maureen Mweru at macharia.mweru.@ku.ac.ke or Dr. Lucy Ngige at ngige.lucy@ku.ac.ke or Kenyatta University Ethical Review Committee Secretariat on kuerc@ku.ec.ke.

1.8 Participants’ Statement

I am fully informed about my involvement in the research and my right to disengage in this activity without penalty. I have been assured that my identity will remain anonymous. My participation in the research is voluntary.

Participant Name:

.....
Signature Date

1.9 Researcher statement

I have informed the participant in a language s/he comprehends the research process and the threats and rewards involved.

Name of Researcher: Joseph Waigera



Researcher’s signature

05/09/2016

Date

APPENDIX B: TEACHERS' QUESTIONNAIRE

This questionnaire intends to collect data on various aspects of ECDE teachers and the school learning environment. The information will remain confidential. Kindly fill the gaps provided or tick the response that applies to you.

SECTION A: STUDY LOCATION

Study Location:

Name of the Pre-Primary School:

Questionnaire No.:

Researcher's Code: Date:

SECTION B: TEACHERS' DEMOGRAPHIC CHARACTERISTICS

Please fill in the gaps provided or tick the response that applies to you.

1. Sex: Female Male

2. Age in years:

3. State current marital status?

Single

Married

Separated

Divorced

Widow/widower

4. Kindly specify the highest level of formal schooling attained.

None Partial Primary Primary Completed Partial Secondary

Secondary Completed College Diploma University Degree Other:

5. Describe your ECDE training status?

No training ECDE Certificate ECDE Diploma B.Ed. (ECE) Other

(Specify): _____

6. How long in years or months have you practiced as ECDE teacher?

SECTION C: RATING OF TEACHERS' ATTITUDES TOWARDS IM

1. Tell us the level of agreement or disagreement with the statements about the use of instructional materials for ECDE. Kindly tick only ONE answer in the boxes shown.

RATING OF TEACHERS' ATTITUDES TOWARDS IM			
Teachers' attitudes towards instructional materials	Strongly Disagree	Somewhat Agree	Strongly Agree
It is the responsibility of the teacher to improvise local materials for facilitating learning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Teachers should not introduce new concepts without teaching aids	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It is the responsibility of the teacher to prepare teaching materials in every lesson	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pupils learn better when they manipulate learning materials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It is the duty of teachers to encourage pupils to handle materials to facilitate learning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION D: RATING OF TEACHING-LEARNING RESOURCES

2. Fill in the table below by indicating the score for rating of Teaching-Learning Resources in your classroom. [Please tick ONE answer in the spaces provided].

RATING OF TEACHING-LEARNING RESOURCES			
Description of T/L Resources	Lowest (1)	Moderate (2)	Highest (3)
Quantity of T/L Resources			
Adequacy for Pupils			
Durability			
Manipulation by Pupils			
Cost/Affordability			

SECTION E: FREQUENCY OF USE OF EDUCATIONAL MEDIA

9. How frequently in a week do you use the following educational media with your pupils?

[Please tick ONE answer in the space provided]

FREQUENCY OF USE OF EDUCATIONAL MEDIA			
Educational Media	Rarely (1-score)	Sometimes (2-scores)	Frequently (3-scores)
Audio-Visual			
Print			
Realia			
Audio			
Visual			
Role Play Materials			
Locally improvised Materials			
Commercially			
Others (specify)			

SECTION F: PRE-PRIMARY SCHOOL CLASS SIZE

10. State the class enrollment and the teachers assigned to each class in ECDE Unit.

PPS Class Code	No. of Pupils	No. of Teachers
A		
B		
C		
D		
E		

SECTION G: UTILIZATION OF INSTRUCTIONAL MATERIALS

11. State the level of interaction with IM in teaching each ECDE Activity Areas listed here below? (Please tick the answer applicable to you in the space provided).

LEVEL OF UTILIZATION OF IM					
ECDE Activity Area	Very Little (1)	Little (2)	Moderate (3)	Large (4)	Very Large (5)
Language	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Math	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Science	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Social Studies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Creative Work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Music & Movement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Outdoor Activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other(specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

YOUR CONTRIBUTION IN THIS STUDY IS APPRECIATED

APPENDIX C: RESEARCH APPROVAL BY KU



KENYATTA UNIVERSITY
GRADUATE SCHOOL

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

Website: www.ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 810901 Ext. 57530

Internal Memo

FROM: Dean, Graduate School

DATE: 10th February, 2016

TO: Waigera Joseph Karaigua
C/o Early Childhood Studies Dept.
Kenyatta University

REF: E83/25909/2013

SUBJECT: APPROVAL OF RESEARCH PROPOSAL

This is to inform you that Graduate School Board at its meeting of 27th January, 2016 approved your Research Proposal for the Ph.D. Degree Entitled, "Influence of School Environment and Characteristics of Instructional Materials on their levels of Utilization by Pre-Primary School Teachers in Nyeri County".

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.

By copy of this letter, the registrar (Academic) is hereby requested to grant you Substantive registration for your Ph.D studies.

Thank you.


EDWIN OBUNG'U
FOR: DEAN, GRADUATE SCHOOL

c.c. Chairman, Early Childhood Studies Department.

Registrar Academic – Att: J. Likam

Supervisors:

1. Dr. Maureen Mweru
Department of Early Childhood Studies
Kenyatta University
2. Dr. Lucy W. Ngige
Department of Community Resource Management and Extension
Kenyatta University

EO/rwm

APPENDIX D: RESEARCH PERMIT BY NACOSTI


THIS IS TO CERTIFY THAT:

MR. JOSEPH KARAIGUA WAIGERA
of KENYATTA UNIVERSITY, 1768-10101
karatina, has been permitted to conduct
research in Nyeri County

on the topic: INFLUENCE OF SCHOOL
ENVIRONMENT ON UTILIZATION OF
INSTRUCTIONAL MATERIALS BY
PRE-PRIMARY SCHOOL TEACHERS IN
NYERI COUNTY, KENYA

for the period ending:
22nd July, 2017

Permit No. : NACOSTI/P/16/58272/12043
Date Of Issue : 22nd July, 2016
Fee Received :Ksh 2000



Applicant's Signature

Director General
National Commission for Science,
Technology & Innovation

APPENDIX E: RESEARCH AUTHORIZATION BY NACOSTI



NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone: +254-20-2213471,
2241349, 3310071, 3219420
Fax: +254-20-318245, 318249
Email: info@nacosti.go.ke
Website: www.nacosti.go.ke
when replying please quote

9th Floor, UAKS House
Uhuru Highway
P.O. Box 30623-00100
NAIROBI-KENYA

Ref. No:

Date:

NACOSTI/P/16/58272/12043

22nd July, 2016

Joseph Karaiua Waigera
Kenyatta University
P.O. Box 43844-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on "*Influence of school environment on utilization of instructional materials by pre primary school teachers in Nyeri County, Kenya.*" I am pleased to inform you that you have been authorized to undertake research in **Nyeri County** for the period ending **22nd July, 2017.**

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

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


BONIFACE WANYAMA
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Nyeri County.

The County Director of Education
Nyeri County.