EFFECT OF USE OF INSTRUCTIONAL MATERIALS ON LEARNER PARTICIPATION IN SCIENCE CLASSROOM IN PRESCHOOL IN KIINE ZONE KIRINYAGA COUNTY KENYA

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DECLARATION

This project is my original work and has not been presented to any other Universities for award of Diploma or degree.

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DEDICATION

To my lovely husband Stephen Wanjohi, for his support, patience and understanding while I was undertaking the Masters programme, and to my children Alex Gatumbu and Geoffrey Githui, for the encouragement and inspirations.

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ABBREVIATIONS & ACRONYMS

LPSC	Learner Participation in Science Classroom
KZKC	Kiine Zone Kirinyaga County
PSC	Participation in Science Classroom
GLP	Grouping of Learners and Participation
RMP	Record Management and Participation
LP	Learner Participation
AAIM	Availability and Adequacy of Instructional Material
IPP	Improving Pupils participation
KZ	Kiine Zone
U.K	United Kingdom
RC	Resource Centre
IM	Instructional Materials
ECE	Early Childhood Education
SC	Science Classroom
FPE	Free Primary Education
RK	Republic of Kenya
M.O.E	Ministry of Education
WB	World Bank
U.T	Untrained Teacher
N.A.C.E.C.E	National Centre for Early Childhood Education
DICECE	District Centre for Early Childhood Education
K.I.E	Kenya Institute of Education
UNESCO	United Nations Education Scientific and Cultural Organization
USA	United States of America
GOK	Government of Kenya

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ABSTRACT

Participation involves working with a partner or in a small group and brainstorming in order to create a stimulating learning environment. The role of instructional materials is to glue information into learners mind as what is seen is understood more than what is heard. During the formative years, learners add increasing qualities of knowledge to what is already learnt through explorations as they grow and expand horizon on the quality of content mastered. To widen mastery of concepts, rich leaning environment which is filled with a variety of instructional materials tend to foster faster acquisition of requisite skills for sustained learning and development. Such an environment should be enticing learners to observe, actively participate, make choices and experiment which in the process results in acquisition of additional knowledge. In the absence of reach learning environment modeled by the teacher to capture requisite skills, knowledge and competence. The purpose of the study was to determine the effectiveness of use of instructional materials on learners' participation in science lesson in preschool in Kiine Zone Kirinyaga county Kenya.

The objective of this study was to establish importance of grouping of learners on participation in science classroom, to study the extent to which availability and adequacy improve learners' participation and to determine the effect of management of records on the improvement in learners' participation in science classroom. The study reviewed literature on effectiveness of instructional materials on participation in science classroom. This study was guided by experiential learning theory. This theory was propounded by Kolb (2008). Kolb proposed a four-stage learning process with a model that is often referred to in describing experiential learning Beaty (2009). The study involved a descriptive survey research design where qualitative data was collected. The design was non-experimental soliciting information from teachers on the IM they use in teaching pupils in the pre-school. This study used stratified sampling since the population embraces a number of distinct categories of teachers' qualifications.

The study found that instructional materials are not effectively used in the study area due to large of number of learners per class, lack of enough compound in ECE centers, lack of learners confidence, language barrier, teachers' negative attitude, lack of professional skills and domestic violence. The study recommended that ECE centres be increased to cater for the large number of learners per class. On the same, the study recommended that more teachers be employed and deployed to various ECE centres in the study area. The study further recommended that more playing ground be purchased to enable learners be participating fully especially while experiencing moving air by the use of kites they need to run over to note the moving air. Learners should be encouraged to handle IM even in the absence of teacher that is at home to gain confidence. Parents of the learners who are shy should be improvising IM at home and encourage children to continue practicing what they learnt at school. The study recommended that teachers to ensure learners with language barrier get information taught in class by the use of language they understand better as English and Kiswahili is introduced slowly by slowly. The study further

recommended that GOK to employ ECE teachers with better pay. Finally the study recommended that the 5 untrained teachers and those with certificates work on the professional skills by going for Diploma course in ECE as lack of these skills deny any teacher the knowledge required in showing and teaching learners on how to handle IM during participation.

CHAPTER ONE: INTRODUCTION

This chapter begins with the introduction of the background of the study, followed by statement of the problem, purpose of the study, objectives and concludes with definition of terms.

1.1 Background of the Study

Participation involves working with a partner, or in a small group, and brainstorming in order to create a stimulating learning environment Cooke (2001). Participation in ECE involves use of different mechanisms for the public to express opinions and ideally exert influence regarding political, economic, management or other social decision. Participation is affected by the appropriate and relevancy of IM used, such as containers, kites, textbooks, strings and blackboard Armstein (2004). For examples, a teacher uses textbooks to get information needed and explains on the blackboard, learners use water in containers and blow it using straws to produce bubbles Pre-schools handbook (2008). Blowing water to produce bubbles shows learners that there is presence of air in water and this enables them gain the skills of observation.

According to Obanya (2001), IM are didactic materials things which are supposed to make learning and teaching possible. While in views of Abdullahi (2003) they are materials or tools locally made or imported that could make tremendous improvement of a lesson if intelligently used. In the same vein, Isola (2010), referred IM as objects or devices, which help the teacher to make a lesson much

clearer to the learner. In support of these views, Agina (2005), describe IM as concrete or physical objects which provide sound, visual or both to the sense organs during teaching.

The components to success in participation include availability and adequacy of IM Pre-school handbook (2008). In participation the teacher should ensure that materials to be used are enough for a particular science lesson by ensuring she/he has lesson plan before the lesson. According to Sasson (2009), the quantity of materials depends on the number of learners using them, organization of the materials, group arrangement, time management, and records management. Ensuring availability and adequacy of IM, the science lesson will be learner's centred instead of teachers centred and therefore motivate learners. This is because all of them will be involved in participation using the available IM instead of listening to the teacher explain in class. For example Adequacy of IM means that the teacher should ensure that materials to be used for a particular science class are enough depending on the number of learners using them Jacinta (2003).

According to Preschool handbook (2008), teacher need to group learners according to their different abilities so that they can assist one another. The teacher will also need to be guided by the lesson plan, where less time should be used on introduction and conclusion while most of the time should be left to learners to do the task at hand. In participation in a science lesson, IM can be used

for the learners to experience air by been engaged in activities such as flying balloons and kites. The movement of kites and balloons shows that there is air in a vacuum Esther (2009).Use of straws to blow soapy water helps produce bubbles, and these bubbles enable the learners to realize that there is air in water. These activities boost participation by involving all the learners during a science lesson Preschool handbook (2009).

Wales (2009) was of the opinion that the use of IM would make discovered facts glue firmly in the memory of learners. IM make them enjoy participating in science lessons and even make them repeat the activity during their free time. This enables the learners to keep the idea in their long term memory. According to Savoury (2003), a well planned use of IM in lessons should do much to banish apathy. In addition, he said that selection of IM which are related to the basic activity of a lesson helps in in-depth understanding of such a lesson by the learners, in that it makes the lesson attractive to them, thereby arresting their attention and thus, motivating them to learn and participate. Participation helps teachers to discover their learners' potential, to realize their talents and raise their self-esteem. In turn this can help them to question their boundaries and explore issues, voice aspirations, identify needs and facilitate their learning and personal development Clark (2005).

Education is a fundamental human right which every child is entitled to Constitution of Kenya (2010). It is critical to our development as individuals and

as societies. It helps pave the way for a successful and productive future Children's Act (2004). The government through the Ministry of Education (M.O.E) fund pre-schools with only one percent of the schools' annual budget. This amount cannot cater for buying adequate IM and paying teachers. Considering the significant role played by IM in participation in science lessons, teachers are forced to improvise different IM from the localities. According to DICECE database (2011), the government does not employ teachers, and therefore the burden is left to the parents and the society. This makes some parents unable to take their children to pre-school and wait until the age of primary school which is free.

1.2 Statement of Problem

According to Sasson (2007) a problem is an existing negative state of events that avoid in attaining the set goals, in this study the existing problem in ECE centres in Kiine zone is lack of effective use of IM during participation in science lesson. IM play a vital role in participation in a science lesson. They form a focal point and attract attention, arouse interest and promote a desire to learn, supplement description and help to explain words and processes, give an accurate impression of the concept, illustrate relationships, promote retention and memory, help to consolidate what has been learned, help to save teaching time, make learner to have self esteem, learners get motivated and have the idea of sharing in participation in science lesson Kothari (2001). The issue of concern in this study is the effort of IM on the general participation in Science lesson in public pre-schools in Kiine Zone Kirinyaga County.

1.3 Purpose of the Study

The purpose of this study is to determine the effectiveness of use of instructional materials on learner participation in science lesson in preschool in Kiine zone Kirinyaga county Kenya.

1.4 Objectives of the study

The study was guided by the following objectives:

1. To identify why IM are not effectively used during participation in science classroom.
2. To establish the importance of grouping of learners on participation in science classroom.
3. To verify the extent to which availability and adequacy of IM improve pupils' participation in Science lesson.
4. To study the effect of management of records on the improvement in pupils' participation in science lesson.

1.5 Research Questions

1. Why IM are not effectively used in SC during participation.
2. What are the advantages of grouping learners in science lesson during participation?
3. To what extent availability and adequacy of IM improve pupils' participation?
4. Effects of records management in the improvement of pupils' participation in science lesson

1.6 Significance of the Study

The study findings will enable the stakeholders realize the importance of IM in participation in science lesson activities. The teacher trainees will be guided by the study findings to choose the most efficient IM in sciences classroom activities. Also guided by the study, the parents will be able to choose pre-schools centers with the best IM. The findings of the study will also form a basis for further research on the role played by IM on participation in pre-schools science classroom.

1.7 Limitations of the Study

Limitations are aspects of the study that negatively affect the results of generalization of the study but which a researcher has no direct control over. The main limitation of the study arises from the fear of teachers which affected the filling of the questionnaires. The teachers feared that the information they gave in the questionnaire about participation in science classroom may threaten their job security. However, the researcher assured them that the information will be treated with confidentiality and will be used for the purpose of the research only. Due to the fact that the researcher is employed, the time available to do the research was not enough for excellent results.

1.8 Delimitation of the study

The study will be delimited to sampled ECE teachers in Kiine zone Kirinyaga county. The study will involve UT, diploma and certificate holders in ECE centres. The study leaves out the parents and guardians of the learners in the study

area together with the community since mainstreaming is expected to take place within the ECE set up.

1.9 Assumption of the Study

The researcher assumed that teachers working environment is conducive, they are motivated and therefore be able to respond to the research questions with an open mind. The respondents will respond positively and answer questions without being biased.

1.10 Definition of terms

Participation in science classroom: Participation involves working with a partner, or in a small group, and brainstorming.

Instructional Resources: They are didactic materials things which are supposed to make learning and teaching possible. They can also be defined as materials or tools locally made or imported that could make tremendous improvement of a lesson if intelligently used.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This section reviews literature on what has been observed about the importance of grouping learners on participation in science activities and the extent to which availability and adequacy of IM improve pupils' participation in science lesson. It further reviews the effect of management of records on the improvement in pupils' participation in science lesson. The section contains theoretical basis of the study and the conceptual framework. According to Joyce (2001), during the preschool and kindergarten years, learners add to what they have learned in the early explorations as learners' expands. The environment plays a critical role, the richer the environment the more concrete opportunities there are for learners to learn by interacting with IM. Teacher's role is to create an environment that invites learners to observe, to be active, make choices and to experiment Judy (2001). He further states that IM are tools used for teaching and learning hence, supports the teacher in delivery of knowledge or help to emphasize specific knowledge. According to Thungu (2008), IM meet the needs of learners, fulfill the requirements of the subjects and facilitate the teaching and learning process.

Piaget (2009) states that merely using IM does not guarantee effective teaching, to make teaching and participation effective, the IM must be appropriately selected and used. ECE teachers must, therefore become familiar with the types of IM if

greater value is to be derived from their use. He further states that the primary function of IM as a communication device is to serve as a more concrete reference to meaning than spoken or written word. According to Mwangi (2010), in the teaching learning process, IM serves functions of enhancing retention which makes learning more permanent. Equally, they stimulate and sustain interest in learning by providing first hand experience with the realities of the physical and social environment.

It is necessary to note that IM are important catalysts of social re-engineering and change in learners. It is obvious that effective instructions cannot be well accomplished without the use of instructional materials. The reason is not far-fetched: advances in technology have brought instructional materials especially the projected and electronic materials to the forefront as the most radical tools of globalization and social development which have affected the classroom teaching-learning situation positively. Such technological breakthroughs as networked and non-networked; projected and non-projected; visual, auditory, audio-visual electronic materials are important landmarks in knowledge transfer. With them both teaching and learning become very pleasant experiences.

According to Phyllis (2011), instructional materials possess some inherent advantages that make them unique in teaching. For one thing, they provide the teacher with interesting and compelling platforms for conveying information since they motivate learners to want to learn more and more. Also, by providing

opportunities for private study and reference, the learner's interest and curiosity are increasingly stimulated. Further, the teacher is assisted in overcoming physical difficulties that could have hindered his effective presentation of a given topic. They generally make teaching and learning easier and less stressful. They are equally indispensable catalysts of social and intellectual development of the learners.

Bolick (2003) pointed to a good relationship between effective teachings and using of instructional materials. He argued that ". . . while some educators have been fascinated by the potential of instructional materials to enhance teaching and learning, teachers lagged behind in using instructional materials during teaching and learning. Others expressed doubts that instructional materials will ever incite teaching reform on participation". Instructional materials are integral components of teaching-learning situations; it is not just to supplement learning but to complement its process. It then shows that, if there must be an effective teaching-learning activity, utilization of instructional materials will be necessary Kibe (2011).

Ema (2004) assert that, "teaching equipment and materials have changed over the years, not only to facilitate teaching learning situation but also to address the instructional needs of individuals and groups". Instructional materials are made up of objects such as printed, audio, visual that aid in the successful delivery of lesson Chuba (2000). To this end, instructional materials are said to be objects or

things the teacher can use in the classroom while teaching in order to ease off his teaching activities. However, instructional materials cannot address all the teaching-learning problems but it can go a long way in solving them, simply because, they are additional apparatus that can influence the reality of teaching and learning activities.

Joof (2005) explained that, “the concept of teaching aids has gone through several evolutionary stages from the simple aids, instructional technology, and media to communication and educational technology”. This however, tells us that instructional materials are not just objects or equipments used during teaching-learning process but there those objects improvised by the teacher to make conceptual abstraction more concrete and practical to the learners. Instructional materials are the relevant materials utilized by a teacher during instructional process for the purpose of making the contents of the instructions more practical and less vague Chuba (2000).

Ajayi (2006) opined that, “without the teacher who is knowledgeable, instructional materials cannot create change and progress, the only time it begins to make impact is when the teacher begins to make use of it and allows it to take over its values”. This portrays the professional attributes of the teacher and general knowledge or his creativity selecting, develop and use instructional materials effectively Esther (2009). Teaching and Learning Materials design, production and their use facilitate the teaching and learning outcomes. However,

the success of using IM to meet the teaching objectives demands, effective use and communication skills of the teacher to satisfy instructional delivery.

2.1 Use of IM on LPSC in ECE: Global perspective

According to Feshbach (2006), the M.O.E and the culture in England and Israel employ pre school supervisors, construct class rooms and equip classrooms with a variety of IM. In addition each pre school teacher is provided with a budget for the purchase of IM. Groodland (2009) reports that some parts of USA adopted the Montessori method while others used college laboratory preschools. One common feature about the two was the need for abundant IM. Cass (2007) conducted a research with 400 pre school teachers in London on their role in schools to provide the child with a live day where he can be living ,learning and growing all the time. From the pre school teachers responses , they all agreed that the children benefit, greatly from the active methods found in the child centered teaching methods. Teachers responded that children have the opportunity to develop at their own rate, gain confidence independence and prepared for all round development .

Usuala (2006) under took a study entitled, Education Technology in Africa .In his study, he reiterated the effectiveness of IM in pre school in Africa, for instance containers, straws and kites. He also expressed the recognition of the importance of these instructional aids by a number of African countries. This led to the establishment of educational technology centres in a number of African countries.

Allen and Hart (2009) states that beside using touching materials the teacher must ensure that variety of the same are available in class for effective teaching and learning. They say that the materials and equipment presented in early childhood setting should be chosen to provide many and varied opportunities for learners to practice and master familiar skills through a variety of materials. Hainich (2010) further support the subject by saying that the primary function of a visual aids as a communication device is to serve as more concrete referent to meaning than spoken or written word. They therefore conclude that visual aid is more clearly and easily understood than verbal messages.

Pre-school handbook (2008) defines teaching/learning aids as available means or assets which contain required information for the learner. They spell out the functions of instructional resources in a preschool child as, Stimulation of children to preserve and develop their cultural heritage and promotion of explanatory and discovery skills among preschool children. They also play the role of facilitation of self expression and creativity through experimenting with materials and promotion of self discovery and identification of special gifts and talents. More so, they assist in meeting socio-emotional needs on children and making learning more exciting. Equally, they enhance visual and auditory perception through manipulation of various learning skills.

Ayot (2006) in their advice to teachers, observed that the teaching resources are used to increase learning , to generate more interest and to create a situation where the learners would fully engage in classroom activities.

2.2 Availability and adequacy of IM and participation in science classroom

Materials for lessons are gathered and prepared ahead of time as pre-schools children cannot be expected to sit diligently while waiting for the teacher to prepare the materials and collect activity suppliers for lessons. Accessibility depends upon your available storage and upon your own usage habits Abdullahi (2009). Consider how much space you have for storing relevant IM for the activity to be carried out in participation in science lesson, and the location(s). Material that you need to refer to more frequently should be kept closer to hand, whether those are the materials from one or two previous terms or key reference materials you use during the participation. Some instructors frequently refer back to previous terms when preparing classes, and others do not Baganzi (2007).

The quality of the education and training on participation given to pre-schools learners depends greatly on the availability and adequacy of IM to adjust their educational content to the changing skill requirements of the nation. In other words, participation in science classrooms are expected to provide knowledge and training that satisfies the learners' demands of the nation and the nation's economy Mayindo (2008). Institutional training should aim to equip learners with useful skills and to improve their knowledge and capabilities in their participation

in science classroom national Policy on Education (2004). Awobodu (2001) has noted that availability and adequacy of IM in participation facilitates learning and enhances pupil achievement because every learner is involved in the activity given. Aromolaran (2003) noted that the lack of IM in participation was a significant problem in the Nigerian education system.

2.3 Self-esteem, effective use of IM and participation in science classroom

Self-esteem is a term in psychology to reflect a person's overall evaluation or appraisal of his or her own worth. Self-esteem encompasses beliefs (for example, "I am competent", "I am worthy") and emotions such as triumph, despair, pride and shame. 'The self-concept is *what* we think about the self; self-esteem, the positive or negative evaluation of the self, is how we feel about it'. A person's self-concept consists of the beliefs one has about oneself, one's self-perception, or, as Edina (2011) expresses it, "the picture of oneself". James (2009) described self-concept as totally perception which people hold about him/ herself. It is not the "facts" about one-self but rather what one believes to be true about one-self Sarah (2007). Early researchers used self-concept as a descriptive construct, such as 'I am an athlete' Rose (2006).

Recent theories adapted self-esteem with more evaluative statements like 'I am good at tennis' Harter (2005). The latter statement not only describes the self, as the individual identifies herself or himself, but evaluates the self by putting worthiness on it. Therefore, self-esteem is defined as both descriptive and

evaluative self-related statements. As a social psychological construct, self-esteem is attractive because researchers have conceptualized it as an influential predictor of relevant outcomes, such as academic achievement Marsh (2002) or exercise behavior Hagger (2001). In addition, self-esteem has also been treated as an important outcome due to its close relation with psychological well-being Marsh (2004). Self-concept (i.e. self-esteem) is widely believed to be composed of more than just perceived competence, and this leads to the relative degree of evaluative and cognitive beliefs of the construct.

According to Harter (2010) self-esteem is considered as the beliefs about perceived competence and self-evaluative in participation and handling of IM. Self-esteem can apply specifically to a particular dimension (for example, "I believe I am a good writer and I feel happy about that") or have global extent (for example, "I believe I am a bad person, and feel bad about myself in general"). Psychologists usually regard self-esteem as an enduring personality characteristic ("trait" self-esteem), though normal, short-term variations ("state" self-esteem) also exist.

2.4 Group arrangement and participation in science classroom

Pre-schools group can be an environment of fun if properly organized or arranged pre-schools learners are a busy bunch of people Norman (2001). The theory of Maria Montessori states that pre-schools group should be child sized. Shelving should be at such low level that the children can see every shelf, table and chair in

order for them to be comfortable. Group arrangement in pre-schools centre setting can be perfected by quality of material used. Quality IM are essential in teaching about evolution and the nature of science and participation in classroom activities preschool handbook (2008). It is also important to consider the context within which specific materials will be used. Before selecting specific materials to teach evolution and the nature of science, it is important to identify criteria that can help evaluate school science programs and the design of IM.

2.5 IM, motivation and Participation in science classroom

According to Sasson (2009), motivation is a term that refers to a process that elicits, controls, and sustains certain behaviors. Motivation is a group of phenomena which affect the nature of an individual's behavior, the strength of the behavior, and the persistence of the behavior. Motivation enables learners to willingly participate using IM in science lessons. According to Groodland (2001), in the USA pre-schools classrooms are normally divided into smaller sections called centres. There are basic seven Centres namely Art, Blocks, Dramatic play, Science, Library, Manipulative and Music Tina Teacher (2008). Some areas like for dramatic play and blocks require larger space while areas such as manipulative and library require a quieter atmosphere for learning.

The teachers ensure that the children can move from one activity to another without interfering with the other children's activities. According to Cobin (2001), in the U K, it has been realized that a carefully planned group

arrangement is an effective way to prevent behaviour problems before they occur. Assigned group helps teachers assert their authority by enabling the teacher to separate rowdy children or pair up children who could help one another in group activities.

Motivation is also defined as the force that activates, energises and sustains a specific goal-oriented behaviour Deci (2002). All behaviour of an organism is motivated (cause-effect), whether this motivation is known (*conscious*) or unknown (*unconscious*) to the organism Kinuthia (2009). It may also be attributed to less-apparent reasons such as altruism, selfishness, morality, or avoiding mortality (Alex 2008). According to Margaret (2010, motivation is important in participation as learners who are motivated participate more effectively. It will direct and regulate behaviour for example motivated learners work hard and focus their in achieving their goals. Motivation energizes and sustains behaviour.

According to William (2001), instinct is derived from our biological make-up. All learners are born with specific innate knowledge about how to learn and use IM in participation in science lesson. These innate tendencies are preprogrammed at birth, they are in our genes, and even if the spider never saw a web before, never witnessed its creation, it would still know how to create one. Humans have the same types of innate tendencies. We are also born with particular reflexes which promote learning and participation in science classroom Michael (2011).

An incentive is an external reward which is tangible or intangible which is presented after the occurrence of an action with the intent to cause the behaviour to occur again Deci's (2002). This is done by associating positive results to the behaviour. For example learners are presented with sweets at the end of the participation using IM in science classroom in ECE centre which acts as an incentive for them to continue participating willingly. Gavrav Akram (2010)'s studies show that if the learner receives the reward immediately, the effect would be greater, and decreases as the duration lengthens. Repetitive action-reward combination can cause the action to become habit Esther (2009).

The Drive Reduction grows out of the concept that we have certain biological drives, such as hunger that when not satisfied create a biological imbalance in the body Dewey (2007). As time passes the strength of the drive increases if it is not satisfied (in this case by participating). Upon satisfying the drive the drive's strength is then reduced. For instance when preparing IM to be used in participation in science classroom in ECE, the drive model appears to be compatible with sensations of rising the interest of participating as the IM are prepared. Thus specific behaviour is activated in an individual with the goal of reducing these drives.

According to Kendra (2000), arousal states that we are driven to maintain a certain level of arousal in order to feel comfortable. Arousal refers to a state of emotional, intellectual, and physical activity. It is at a balanced or optimal level

of arousal that people function best. If the levels of arousal are too low people strive to raise them by increasing the number of activities and vice versa. This theory is based on the idea that every learner performs better at different levels of arousal and each seeks out this optimum level. This optimum level of arousal is comfortable for learners on all emotional, intellectual and physical levels. Learners are motivated to maintain their optimal levels of arousal in order to be comfortable in participation using IM in science classroom in ECE centre John (2001). Cognitive dissonance is feeling of discomfort when simultaneously holding two or more conflicting cognitions, ideas, beliefs, values or emotional reactions Esther (2009). Learners have a motivational drive to reduce dissonance by altering existing cognitions, adding new ones to create a consistent belief system or alternatively by reducing the importance of any one of the dissonant elements Margaret 2001. It is distressing mental state that learners feel when they find themselves using IM that do not fit with what they know or having opinions that do not fit with other opinions they hold William (2001).

According Festinger (2000) learners engage in a process he termed dissonance reduction which can be achieved in one of three ways, lowering the importance of one of the discordant factors, adding consonant elements or changing one of the dissonant factors. Dissonance is aroused when learners are confronted with information that is inconsistent with their ability. If dissonance is not reduced by changing one's belief, the dissonance can result in restoring consonance through misperception, rejection or refutation of the information, seeking support from

others who share the beliefs and attempting to persuade others Clark (2008). For instance when learners are told they could freely participate in science classroom with whatever IM they wanted, the ones in the mild punishment condition are less likely to be used even though the threat had been removed. According to Jack (2001), learners who are only mildly threatened had to justify to themselves why they did not participate with the IM. The degree of punishment by itself is not strong enough, so the learners have to convince themselves the IM is not worth using it in participation in order to resolve their dissonance. Dissonance is aroused whenever learners voluntarily engage in an unpleasant activity to achieve some desired goal. It can be reduced by exaggerating the desirability of the goal.

Suggested by Leon Festinger (2001), dissonance occurs when an individual experiences some degree of discomfort resulting from an incompatibility between two cognitions. For example, a consumer may seek to reassure himself regarding a purchase, feeling, in retrospect, that another decision may have been preferable. Another example of cognitive dissonance is when a belief and behaviour are in conflict. A person may wish to be healthy, believes smoking is bad for one's health, and yet continues to smoke. A person may also believe that an extra marital is immoral though he/she is in one for certain benefits Carsmith (2004). This creates a dissonance or disharmony in the person which can only be reduced if the individual changes their way of looking at things or avoids the behaviour that is contradicting the belief system. According to Jane (2010) an individual's accruing behaviour is aimed at dissonance reduction.

Maslow proposed that learners have different needs which can be arranged in order of priority he called it a hierarchy of needs. Maslow's hierarchy of needs is often portrayed in the shape of a pyramid, with the largest and most fundamental levels of needs at the bottom, and the need for self-actualization at the top. The most fundamental and basic four layers of the pyramid contain what Maslow called "*deficiency needs*" or "*D-needs*": esteem, friendship and love, security, and physical needs. With the exception of the most fundamental (*physiological*) needs, if these "*deficiency needs*" are not met, the body gives no physical indication but the individual feels anxious and tense. Maslow's theory suggests that the most basic level of needs must be met before the individual will strongly desire (*or focus motivation upon)* the secondary or higher level needs.

Maslow also coined the term Metamotivation to describe the motivation of people who go beyond the scope of the basic needs and strive for constant betterment. Metamotivated people are driven by B-needs (*Being Needs*), instead of deficiency needs (*D-Needs*).

Physiological needs, **use of IM and LP in SC**

This need may be found in the science classroom, teacher needs to ensure that all the needs are satisfied so that participation can take place. IM can be arranged in a way that they are friendly to the learners. For the most part, physiological needs are obvious — they are the literal requirements for human survival. If these

requirements are not met, the human body simply cannot continue to function. *Air, water, and food* are metabolic requirements for survival in all animals, including humans. Clothing and shelter provide necessary protection from the elements.

Safety/ Security needs, use of IM and LPSC

The concern is learner to be free from fear and anxiety while using IM in participation in science classroom. The kind of language the teacher uses is very important because it can make a child fear the teacher and they prefer to keep quiet. The teacher must use good language and should be an encourager. Teachers should be sensitive to the learners mothering or fathering qualities are very important so that the learners can be able to tell the teacher everything for example if they have problems in handling IM while participating in science classroom. Generally develop good-teacher relationship based on mutual respect. Making sure that there is a cup-board in classroom to secure their things. With their physical needs relatively satisfied, the learner's safety needs take precedence and dominate behaviour.

These needs have to do with people's yearning for a predictable orderly world in which perceived unfairness and inconsistency are under control, the familiar frequent and the unfamiliar rare. In the world of work, these safeties needs manifest themselves in such things as a preference for job security, grievance procedures for protecting the individual from unilateral authority, savings

accounts, insurance policies, reasonable disability accommodations, and the like. Safety and Security needs include: Personal security; Financial security; Health and well-being; Safety net against accidents/illness and their adverse impacts Deci's (2002).

Love and belonging, use of IM and PSC

After physiological and safety needs are fulfilled, the third layer of human needs are social and involve feelings of belongingness. This aspect of Maslow's hierarchy involves emotionally based relationships in general, such as: Friendship, Intimacy and Family. In participation, learners need to have a sense of belonging in some of the activities for example sharing the available IM. In the class, teacher can encourage groups while participating he also need to learn the pupils names. Humans need to feel a sense of belonging and acceptance, whether it comes from a large social group, such as clubs, office culture, religious groups, professional organizations, sports teams, gangs, or small social connections (family members, intimate partners, mentors, close colleagues, confidants)

Edward (2009). They need to love and be loved (*sexually and non-sexually*) by others. In the absence of these elements, many people become susceptible to loneliness, social anxiety, and clinical depression. This need for belonging can often overcome the physiological and security needs, depending on the strength of the peer pressure; an anorexic, for example, may ignore the need to eat and the security of health for a feeling of control and belonging Deci's (2002).

Instructional Materials, Esteem needs and participation in science classroom

This is the desire for self respect and recognition for particular talents and qualities. Also known as the belonging need, esteem presents the normal human desire to be accepted and valued by others. Teachers should recognize learners talents and abilities for example a good leaner in participation should be given a present and most improve can be given a certificate. Teachers can build in learners self confidence by using encouraging remarks. Learners need to engage themselves to gain recognition and have an activity or activities that give the person a sense of contribution, to feel accepted and self-valued, be it in a profession or hobby. Imbalances at this level can result in low self-esteem or an inferiority complex.

People with low self-esteem need respect from others. They may seek fame or glory, which again depends on others. Note, however, that many people with low self-esteem will not be able to improve their view of themselves simply by receiving fame, respect, and glory externally, but must first accept themselves internally. Psychological imbalances such as depression can also prevent one from obtaining self-esteem on both levels. Most people have a need for a stable self-respect and self-esteem. Maslow noted two versions of esteem needs, a lower one and a higher one. The lower one is the need for the respect of others, the need for status, recognition, fame, prestige, and attention. The higher one is the need for self-respect, the need for strength, competence, mastery, self-confidence, independence and freedom. The latter one ranks higher because it rests more on

inner competence won through experience. Deprivation of these needs can lead to an inferiority complex, weakness and helplessness.

Instructional Materials, Self-actualization, and participation in science class

This is the motive to become all that a learner is able to be. Being given the opportunity to be the best learner in participation in science classroom one can be. A teacher can encourage the learner to be the best that a child is able to do, bring out the best from a child giving them self actualized activities that are pleasurable and can lead to self directed learning. The teacher should be a good role model in that regard by ensuring that learners are being helped to reach the self-actualized level. “What a man can be, he must be.” This forms the basis of the perceived need for self-actualization.

This level of need pertains to what a person's full potential is and realizing that potential. Maslow describes this desire as the desire to become more and more what one is, to become everything that one is capable of becoming. This is a broad definition of the need for self-actualization, but when applied to individuals the need is specific. For example one individual may have the strong desire to become an ideal parent, in another it may be expressed athletically, and in another it may be expressed in painting, pictures, or inventions. As mentioned before, in order to reach a clear understanding of this level of need one must first not only achieve the previous needs, physiological, safety, love, and esteem, but master these needs.

Instructional materials, intrinsic motivation and participation in science class room

Intrinsic motivation comes from inside of the learner Esther (2009). Intrinsic motivation entails doing something for internal satisfaction as opposed to external reward Fritz Heider's (2009). According to Ryan (2002), research has established that intrinsic motivation is usually associated with high educational achievement and enjoyment by learners and teachers while using IM in participation in science classroom. Learners are likely to be intrinsically motivated if they attribute their participation results to internal factors that they can control *(for example the amount of effort they put in*), believe they can be effective agents in reaching desired goals in participation in science classroom in ECE centre and are interested in mastering a topic rather than just rote-learning to achieve good grades Bandura's (2010). Teachers who enjoy their work are also likely to record a higher output compared to their counterparts who are only working for the external reward like money or fear of losing the job.

Instructional materials, extrinsic motivation and participation in science classroom

According to Deci's (2002), extrinsic motivation comes from outside of the learners. Here, learners perform a task for external reward. Money is the most obvious example of an extrinsic motivator, though coercion and threat of punishment are also common extrinsic motivations. Cheers, verbal praise, tours, parties and trophies also motivate the learner, to do well in participation in science

classroom in ECE centre hence they are extrinsic incentives. For example, while experiencing air in water using straws, the teacher can give sweets and biscuits to those who participated well. Competition is in general extrinsic because it encourages the learner to win not to enjoy the intrinsic rewards of the activity. Social psychological research has indicated that extrinsic rewards can lead to over justification and a subsequent reduction in intrinsic motivation Jacob (2010). In one study demonstrating this effect, learner who expected to be (and were) rewarded with a ribbon and a gold star for drawing pictures spent less time playing with the drawing materials in subsequent observations than children who were assigned to an unexpected reward condition and to children who received no extrinsic reward Bernard (2012). According to Edward (2011), intrinsic motivation is associated with higher performance.

Motivation is of particular interest to educational psychologists because of the crucial role it plays in learners teaching Esther (2009). Motivation in education can have several effects on how learners learn and how they behave towards participation in science classroom. It can: direct behavior toward particular goals, lead to increased effort and energy, increase initiation of, and persistence in activities, enhance cognitive processing, determine what consequences are reinforcing and lead to improved performance in participation in science classroom.

2.6 Instructional materials, time management and participation in science classroom

Proper time management leads to effective learning in class Robin (2010). Sasson (2007) points out that time management techniques and strategies have implication for using IM. Time management techniques have great implications for participation in pre-schools and if implemented well, can go a long way to optimizing time spent on instruction. Time management is the thread running through almost all aspect of teaching, organizing the day, organizing the time to be spent by learners while using a certain type of materials, deciding how long and how often to use various IM, recording learners' progress or keeping time consuming behaviour problems to a minimum.

Effective use of school time begins with efficient classroom organization and management. In the United States, teachers have made time management an integral part of those classroom procedures which they highly value. In the United Kingdom, teachers plan to set aside one hour daily for marking (grading), recording and filing their papers. They try to safeguard that one hour and keep it uninterrupted as much as possible. The teachers plan a regular work schedule and stick to it. Learners who otherwise waste time in class talking or fooling around may lose valuable hours that would be better spent on participation Robin (2010). Because most schools have less than eight hours a day in which learners are to learn, it is important that learners socialize only at recess or before and after school. Performing multiple tasks is another benefit of practicing time

management. When a teacher is able to structure his/her classroom to make optimal use of their time, they are able to use the extra minutes to help learners who have special needs. IM of different type used at different activities which influence the overall performance in participation of science classroom. The IM include strings, containers, kites and blackboard among others Pre-school handbook (2008).

2.7 Instructional materials, management of records and participation in science classroom

Accurate education records do not happen by accident. The teacher must use right materials and set up a system that would be easy to follow and track grades as well as the many paper records that must be kept in a file Suzzanne (2009). Records such as progress records kept on a regular basis enable the teachers to fully understand their learners and keep track of developmental milestones and other important events Karen (2009). This is crucial when there is concern about a child's development in participation. Proper record keeping would require a measure of performance in participation in a science classroom.

In United States of America, the type of record kept is the one in which a teacher records a child's actions, behaviour, verbalizations, learning style or process for a period of time. This documentation is strictly objective and leaves out the teacher's judgment about the child's intentions or motivations. The records show day to day development of the child as well as specific issues as they relate to each individual child. Some of these issues include specific behaviours especially

those that are a cause of concern. In Kenya, there are some records which are maintained in pre-schools centres to show what goes on in school Joseph (2006). They include the school logbook, teachers' records of work, and visitors' book among others. A logbook is a daily record of the significant happenings which take place when the school is in session during the school year.

In the United Kingdom the teachers assign specific days to observe the same children on the same days each week Karen (2009). To observe the children across a variety of times, activities and settings. The date and time of observation are put on notes after which the teacher transfers the notes to the children's permanent records in as timely a manner as possible. Once recorded, these notes become a part of children records and are used hand in hand with the use of IM in guiding the teacher on how to handle a certain child while participation in science classroom.

A teachers' record of work reminds the teacher of what he has covered in class to avoid asking learners where he had left. The record helps in coordinating teaching and monitoring the progress made by the teacher Karen (2009). The visitors' book is maintained in pre-schools centres and is usually presented to distinguished official visitors who usually write their names, addresses and anything of interest to them about the school. Its usefulness is in providing a permanent and useful record of interest taken in the school by outsiders. The punishment book controls the nature of punishment meted out to the children and

this prevents teacher from administering excessive punishment. It protects teachers from unwarranted criticism by parents or gives tangible evidence where a teacher is used by a parent for punishing a pupil. It also helps to check misbehaviour by learners.

Attendance registers for both learners and teachers are kept in pre-schools centres for various uses. They are used to check for learners' daily attendance in order to detect those who are frequently absent from school. The registers help in explaining the cause of poor participation in science classroom by a pupil as well as help in understanding of learners who are a cause of availability and adequacy of IM problems. The records are used to plan for the issuing of learning materials to a given class. The records are also kept in order to ensure that alternative arrangements are made to cater for the needs of learners where a teacher is absent.

2.8. Guidelines, requirement for the use of instructional materials and participation

Utilization judges the value of instructional materials, process or personnel by the degree they singly or collectively satisfy the derived instructional needs. The foresight instructional behavior controls, to a large extent, the means for achieving them. IM are not ends in themselves but means of attaining specific instructional functions. Teachers ability to effectively utilize the available IM and this optimize the attainments of instructional situation varies with their level of utilization.

However, once materials have been selected, careful preparation comes first by the user and other subsequent preparation.

Anyanwu (2003) identify three ways by which the teacher should prepare for the use of IM, these are: By previewing before they brought to the class, the teacher has to have a first knowledge by using it before the class, teacher should have a full knowledge of the parts, names, operational level of the intended instructional materials and actual presentation**.** This is the period the teacher operates and uses these materials in instructing the learners. The following however, are the basic guidelines and requirement for utilization and use of instructional materials in effective instructional delivery:

Specification-of objectives**:** clear objectives which are behaviorally stated are user ring guides in IM using process, they direct the sequence, methods, content and techniques of instructional processes. They provide scientific basis of valid evaluation instruments construction and administration.

Maximal fit with instructional tasks: Teaching aids must be appropriate to situationally determined and individually responsive Preparation and preview: For effective and successful use of teaching for proper teaching-learning situation, the teacher must in advance prepare himself, the learners and the environment, the materials as a matter of must should be previewed by the teacher in order to follow its process of presentation sequentially. Multi-dimensional presentation**:**

Proper and creative use of a variety of instructional materials or teaching aids at different level of lesson planning can be adequate in achieving various instructional objectives, reason because it will enrich variety of learners mind as they attain better goals more easily than with the use of a single medium

Environmental situation**:** The environmental variables such as physical cultural and social in which the teaching aids are utilized for learning have significant effect on their effectiveness. Sound-motion films for instance with their attention-complexly properties can be successfully presented in less quiet environment.

Measure for outcomes teaching aids should be evaluated in terms of their suitability, practicability to the instructional objectives, appeal to the cost effectiveness, learner achievement level, consistency with content call for improvement in utilization techniques.

2.9 Principles, Requirement for the selection of instructional materials and participation

The preceding discussion had shown that there are many teaching aids from various sources. It is therefore very important, of professional teachers to note and bear in mind that every instructional materials has its definite unique strength in teaching-learning situation that properly cannot be replicated by the use mother. It is necessary to note that through effective communication, better teaching and faster learning can only be facilitated or guaranteed by careful selection and skillful utilization of appropriate instructional materials by the users.

However, availability of the instructional materials, teacher's experience, terms of preference and the volume of instructions should constitute intrinsic consideration in their selection decision. Despite of that fact, the following principles should guide an effective teacher in the selection of instructional materials:

Instructional tasks; The behavioral objectives, contents, learning activities, evaluation instruments and techniques as element of instructional tasks, should be taken into consideration by an effective teacher in the selection and development of instructional materials. **Target audience attributes;** These consists the learners' features and their level of understanding, their developmental stages such as age, sex, physical skills, attitude towards self and others, the learners experiences, social-economic background should be considered.

The economy; The available resources, financial factors technological advancement, economic climate of society where the materials should be operated, the socio-cultural level of the materials users, degree of urbanization, feasibility and acceptability of the selected instructional materials are equally considered in the selection and development decision. **Dynamic variables;** These variables constitute the concentration and size of the target audience, the desired level of learners response and participation, the classroom social climate, sitting, viewing and listening arrangement, available time, space, teacher competence among others are to be seriously considered in the selection decision and development. **The environmental factors;** These consists the educational

community and the available educational infrastructure. Such as people, facilities, equipped library, workshops, laboratories, electricity, water supply and personnel should equally be considered in the selection and development.

Bozimo (2002) posited the following criteria in the selection of instructional materials: Appropriateness of the materials to instructional objectives; freedom of the content from bias, degree of the quality variety of the materials, quality of the format, print, sound or photography, availability of the materials to clarify objectives of and how to operate the materials, how reasonable the time, effort and expenses are for both the learners and the teachers

2.10 Problem solving, use of IM and PSC

Prevention is better than cure and therefore all stakeholders and concerned population in the study area are supposed to learn on problem solving which is a mental process and is part of the larger problem process that includes problem finding and problem shaping John (2010). Problem solving is considered the most complex of all intellectual functions. It has been defined as higher-order cognitive process that requires the modulation and control of more routine or fundamental skills Esther (2009). Problem solving occurs when an organism or an artificial intelligence system needs to move from a given state to a desired goal state. In science classroom teacher can improvise the materials which are not adequate in order to achieve the goal Kiragu (2011).

One of the most exciting aspects of life is the array of choices that we have on a daily basis. Some of our decisions are simple, like deciding what to eat for dinner or which IM to use for during participation in science classroom in ECE centre. However, some choices are challenging and take careful thought and consideration Edward (2010). When we are confronted with these types of decisions, it can be very difficult to decide on the best IM, and we may be plagued by indecision. We may be forced to choose between two equally good options, or perhaps, we may have to pick between two choices that both have drawbacks. We may waver back and forth between different alternatives and may feel paralyzed to make the decision.

This is a very normal reaction to tough choices in our lives, and we all, at times, experience a sense of being unable to decide on some option. According to Jane (2008) a technique that many learner have found useful when they are trying to make a difficult decision or solve a problem that seems unsolvable. This procedure involves a series of steps that you can go through on your own when you are confronted with a decision or problem that needs to be solved. This approach may help with many of the problems you are confronted with in your life though not all.

According to Gladys (2008), problem orientation is the first step in finding for a solution. This step involves recognizing that a problem exists and that solving the difficulty is a worthwhile endeavor. For example learner's weakness while

handling IM during participation in science classroom, should be detected before it is too late. It is important that you approach the decision-making process with a positive attitude and view the situation as an opportunity or challenge Esther (2009). You should try to approach the situation with confidence and with a willingness to devote some time and effort to finding an appropriate solution to your problem. Remember, you are a competent person, and the problem you are facing can likely be solved with a little hard work for example lack of enough IM in some ECE centre in the study area can be solved by improvising Preschool handbook (2008).

Problem definition is the second step Gladys (2008). Before you start to tackle the current problem, it is important to clearly understand the difficulty and why you are unhappy with the current situation. This may seem obvious, but it is important that you really think about and gather information about the problem, and make sure that the problem you are trying to solve is the "*real"* problem Esther (2009). That is, sometimes people find a different problem than the one that is really distressing them, and focus on this one, since it is easier than dealing with the real problem. This step really involves your thinking about the difficulty you are having, understanding the problem, and contemplating why the situation is distressing. Some people think of problems as a discrepancy between what they want and what the current situation is like. It is useful during this stage to think about how the current situation is different from how you would like it to be, and what your goals are for the state of affairs Anthony (2009). If you are currently

facing many difficult decisions, it may be helpful to prioritize those problems and deal with them one at a time.

Third step in problem solving is generation of alternative solutions Judy (2001). During this stage, you should ask yourself, "What have I done in this situation in the past, and how well has that worked?" If you find that what you have done in the past has not been as effective as you would like, it would be useful to generate some other solutions that may work better. Even if your behavior in the past has worked like you wanted it to, you should think of other solutions as well, because you may come up with an even better idea. When you start to think of possible solutions, don't limit yourself; think of as many possible options as you can, even if they seem unrealistic Esther (2009). You can always discard implausible ideas later, and coming up with these may help generate even better solutions. You may want to write a list of possible options, or ask others what some solutions they might have for your problem.

According to Joyce (2005), decision making is another step to be thought of while find for a solution for a certain problem in learners participation using IM in science classroom It is important that you examine each of the options, and think about how realistic each is, how likely you would be to implement that solution, and the potential drawbacks of each. For example, if your solution costs a great deal of money or requires many hours of effort each day, this may be too difficult to implement. You should also consider the likelihood that each option has in

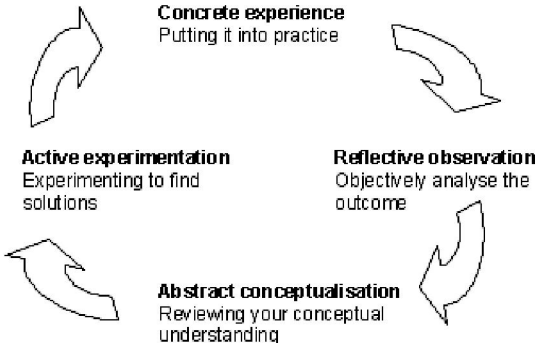
terms of your being able to achieve the goals that you want regarding the solution during participation in science classroom Esther (2009). As you start to narrow down your choices, remember, no problem solution is perfect and all will have drawbacks, but you can always revise the solution if it does not work the way you want it to work Gichina (2010).

Solution implementation and verification is the last step in problem solving Esther (2009) Once you have examined all your options and decided on one that seems to accomplish your goals and minimizes the costs, it is time to test it out. Make sure that when you implement this solution, you do so whole-heartedly and give it your best effort. During this stage, you should continue to examine the chosen solution and the degree to which it is "solving" your problem. If you find that the solution is too hard to implement or it is just not working, revise it or try something else. Trying to solve these problems is never an easy task, and it may take several solutions before something works. Do not give up hope, because with persistence and your best effort, many difficult decisions and problems can be made better Edward (2010).

2.11 Theoretical framework

This study was guided by experiential learning theory. This theory was propounded by Kolb (2008). Kolb proposed a four-stage learning process with a model that is often referred to in describing experiential learning Beaty (2009). The process can begin at any of the stages and is continuous, that is there is no

limit to the number of cycles you can make in a learning situation. In participation in science activity, learners begin from a step and then continue to the end of the activity. This theory asserts that without reflection we would simply continue to repeat our mistakes. This theory found that learners learn using IM in steps with the likelihood of developing one mode of learning more than another. The characteristics of this theory are through concrete experience, through observation and reflection, through abstract conceptualization and through active experimentation. For example, for learner to experience air in water, they observed bubbles from soapy water after they blow using IM like straws.



Source: (Kolb 2008), Experiential learning style model.

2.12 Conceptual Framework

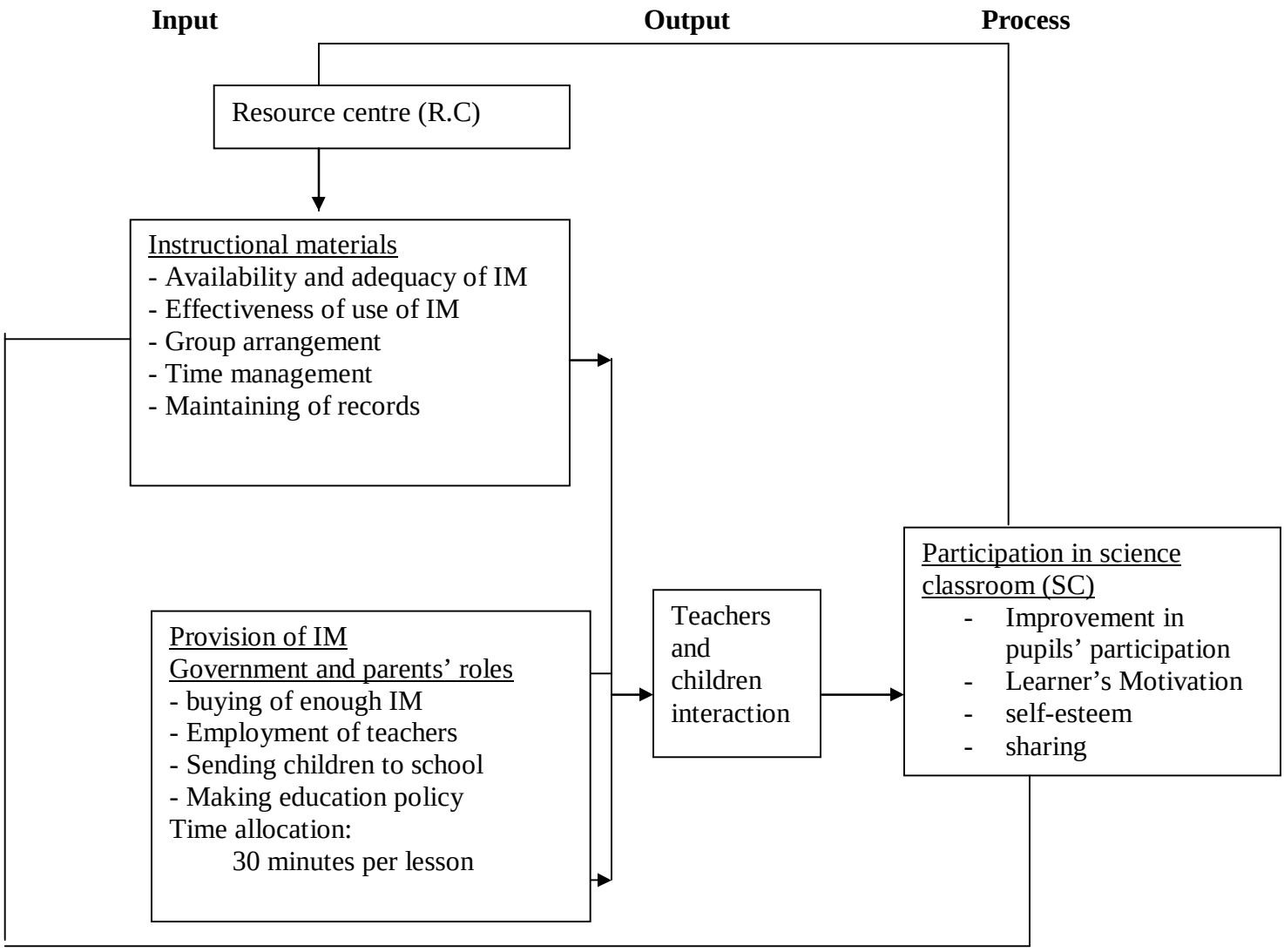
A conceptual framework is used in research to outline possible courses of action or to present a preferred approach to an idea or thought Isaiah Berlin. Conceptual frameworks are a type of intermediate theory that attempt to connect to all aspects of inquiry (e.g., problem definition, purpose, literature review, methodology, data collection and analysis).

Conceptual frameworks can act like maps that give coherence to empirical inquiry. Because conceptual frameworks are potentially so close to empirical inquiry, they take different forms depending upon the research question or problem. In a well organized participation activity, learners' performance is easily achieved. This is so since in such a classroom, there is no unnecessary waste of time, essential classroom records are maintained.

Well organized group arrangement enables the teacher to access the learners for individual attention. On the other hand, a poorly organized instructional material does not enhance understanding by the learners on what they are supposed to do as it lacks important components of participation. Teachers have duty to effect good participation in order to maintain a successful learners' performance. These teachers do so by using relevant instructional material in each activity. In Kiine zone Kirinyaga county, participation are carried by different IM in terms of activity to be carried out.

This study conceptualizes that pre-schools centres should only use IM with the high standard for the best participation in science classroom. Perfect participation will help to maintain and improve performance in science classroom in pre-schools centres.

Perceived framework of interrelationship between IM and participation in science classroom



The conceptual framework is based on the relationship between the independent variables and the depend variables.

CHAPTER THREE

RESEARCH METHODOLOGY: INTRODUCTION

The issues addressed in research methodology are the research design, target population, sampling procedure and data collection instruments. Validity and reliability are also issues discussed in the research methodology. Lastly, the methodology discusses the procedures of data collection and data analysis.

3.1 Research design

The study involved a descriptive survey research design where qualitative data was collected. The design was non-experimental soliciting information from teachers on the IM they use in teaching pupils in the pre-school. According to Dalen (2009) the design enables the researcher to collect data to assess current practices for improvement. According to James (2009), descriptive research is used to obtain information concerning the current status of phenomena to describe what exists with respect variables or conditions in a situation. Manion (2005) state that survey studies collect data with the intention of determining the relationships existing between specific events or variables. This study used descriptive survey design to collect and analyze data to determine the relationship between independent valuables and dependent valuables and further establish the effectiveness use of IM in participation in science classroom.

The data collected was qualitative since the techniques and measures to be used do not produce discrete numerical data Mugenda (2003). Mostly, in qualitative research techniques, the data are in the form of words rather than numbers and these words are often grouped into categories. According to Mugenda and Mugenda (2003), qualitative research is advantageous in that it permits the research to go beyond the statistical results usually reported in quantitative research. Knowledge generated by qualitative research is significant in its own right Adelman (2002).

3.2 Target population

Population refers to entire group of individuals, events or objects having common observable characteristics. The target population basically comprised all the pre-schools teachers in Kiine Zone. There are 60 teachers in all public pre-schools centers in Kiine zone. The zone has 20 diploma holders, 30 with certificate and 10 UT. Data was collected from the sample of these teachers.

Table 3.1 **Target population**

Qualifications	**Number of teacher (Target Population)**	**Percentage (%)**
Diploma	20	33
Certificate	30	50
Untrained	10	17
Total	60	100

Source: (Zone Education Office Database, 2010)

3.3 Sample and sampling procedures

According to Mugenda and Mugenda (2001) "Generally the sample size depends on factors such as the number of variables in the study, the type of research design, the method of data analysis and the size of the accessible population". This study used stratified sampling since the population embraces a number of distinct categories of teacher qualifications.

This helped in including the teachers of all levels of professional qualifications. There are diploma holders, certificates as well as untrained teachers in the study area. Each of these three categories of teacher's qualifications was sampled as an independent sub-population out of which individual teacher was randomly selected. Using simple random procedure 10 out 20 diploma teachers, 15 out of 30 certificate holders teachers and 5 out of 10 untrained teachers was selected as samples to represent each of the three strata of teacher qualification. According to Lilian (2006), the sample sizes will yield a 5% margin of error and a confidence of 95%. To select the sample, the research wrote on a piece of paper the numbers then cut into pieces and put them in a box for randomly selection of the teachers. For example for diploma holder, the research wrote number 1 to 20 then randomly selected the 10 teachers who picked number 1 to 10.

Table 3.2: Sample size

TARGET POPULATION	**Population**	**SAMPLE**
Diploma holders	20	10
Certificate holders	30	15
Untrained holders	10	5
TOTAL	60	30

3.4 Research instruments

Teachers' questionnaire

In this study one of the research instruments was the questionnaire for the teachers. Teachers were used to source information on the effectiveness use of IM on participation in science lesson. From the questionnaire the teacher answered questions regarding Information on independent valuables such as Availability and adequacy of IM, maintaining of classroom records for example progress records, Classroom time management and Group arrangement was also captured in the teacher's questionnaire.

Observation schedule

The researcher adopted observation schedule. This was done by attending some live lessons in order to witness the routines followed by the teachers in conducting science lessons. The researcher observed the availability and adequacy of IM and how time is managed while using them during the learner's participation lesson. The researcher also had the opportunity to observe learners participating in science classroom. The information in the observation schedule served the purpose of collaborating with information recorded in the teachers' questionnaire.

3.5 Piloting

Reliability refers to the consistency of measurement results and the extent to which they are accurate, error free, and stable. Reliable measurement results are reproducible and generalizable to other measurement occasions. Reliability evidence most often is reported as a correlation coefficient. Traditionally,

reliability has been categorized into several different types, including stability, equivalence, homogeneity, and scorer reliability. Reliability of research instruments is its level of internal consistency or stability over time Borg and Gall (2003). The term validity indicates the degree to which an instrument measures the construct under investigation Borg and Gall (2001). There are three types of validity tests: content, criterion-related and construct validity. One of the teachers' categories (diploma holders) was randomly selected for pilot study. Respondents were encouraged to make comments and suggestions concerning instruction, clarity of questions and relevance. This enabled the researcher to make alterations where necessary and improved the instruments.

3.6 Data Collection procedure

The study used descriptive survey design where data was collected through a questionnaire administered to pre-school teachers and observation which was done by attending some live lessons in order to witness the routines followed by the teachers in conducting science lessons. Permission to carry out the study was obtained from district education office before the researcher started collecting data. The pre-schools teachers were assured of the confidentiality of the information collected and security of their job.

3.7 Data analysis

Data obtained from the field in raw is difficult to interpret and therefore such data must be analyzed to give meaning. The collected data from field work through the use of questionnaires, interviews and observation schedule was coded first to enable the analyses. The results were tabulated using tables.

CHAPTER FOUR: INTRODUCTION

DATA ANALYSIS, PRESENTATION, INTERPRETATION AND DISCUSSION

In this chapter data pertaining effectiveness of use of IM on learner participation in science classroom in preschool in Kiine Zone Kirinyaga County was analyzed and interpreted using tables. The main instrument used to seek information on these questions was a self-administered questionnaire. A total of 30 respondents were sampled. All the sampled respondents responded by completing and returning the questionnaire within the stipulated time making a 100 percent response.

Table 4.1 indicates the number of respondents who filled the questionnaires and returned.

Table 4.1 **Response rate**

Category	**Sample**	**Male**	**Female**	**Percent (%)**
Diploma holder	10	2	8	33
Certificate holder	15	3	12	50
Untrained	5	1	4	17
TOTAL	**30**	**6**	**24**	**100%**

Out of 30 sampled respondents, 10 were diploma holders, 15 out of 30 certificates holders and 5 out of 30 were untrained. 30 responded, this gives a response rate of 100%.

4.1 Background characteristics of respondents disaggregated by gender

Respondents were asked to indicate their names, age, level of education, the effects of record management in the improvement of learners participation in science classroom, types of IM used in the study area, the number of learners per class and the challenges in acquiring IM for participation in science classroom. The findings of the study were presented in the subsequent sections.

4.2 Distribution of respondents' level of Education and experience

Table 4.2 summarizes the responses of question on distribution of respondents' level of Education and experience. This question sought to find the education level of respondents. Education gives the required skills in our day to day duties. Experience assist teachers to be conversant with the problems encountered during learners participation in science classroom. The past experience enable teacher to get solution for the current problem.

Table 4.2 Distribution of respondents' level of education and experience

Education level of respondents

Level of education	**Response rate**	**Percentages (%)**
O level	27	90
A level	3	10
None of the above	0	0
Total	30	100

Out of 30 respondents 27 (90%) were of O level while 3 (10%) were of A level. It was an indication that all of the respondents were of O and A level of education.

Professional education level of the respondents in ECE

Education level	**Response rate**	**Percentage (%)**
Diploma holder	10	33
Certificate holder	15	50
Untrained	5	17
TOTAL	**30**	**100%**

Respondents were asked to indicate their professional education and the study established that out of 30 respondents 10 (33%) were diploma holders while 15 (50%) were certificate holders and 5 (17%) were untrained teachers therefore, most of the respondents are certificate holders followed by diploma holders and few teachers were untrained.

Experience of the respondents

Experience	**Response rate**	**Percentages (%)**
0-5 years	5	17
6-10 years	20	66
11-15 years	5	17
Over 16 years	0	0
TOTAL	30	100%

Respondents were asked to indicate their years of experience in handling learners while participating in science classroom and the study established that out of 30 respondents 5 (17%) have between 0 to 5 years of experience while 20 (66%) have between 6 to 10 years of experience and 5 (17%) have between 11 to 15 years of experience. The results showed that no respondent had above 15 year of

experience. Most of the respondents in the study area who participated in the research have over 5 years of experience.

4.3 Use of Instructional Material and participation in ECE science lessons

Table 4.3 show response on use of instructional material in ECE. The question sought to find out if respondents know the reasons for the use of IM. IM play a vital role in participation as a topic can be supported and help learners to glue the information leant in their mind.

Table 4.3 **Use of Instructional Material in ECE**

Responses	**Number of respondents**	**Percentage (%)**
Help the learners to remember important information	11	37
When properly used, they help gain and hold the attention of the learners	15	50
They can be very useful in supporting a topic	1	3
They clarify the relationships between materials objects and concepts	1	3
Good instructional materials can help solve certain language barrier problem	2	7
Total	**30**	**100%**

Out of 30 respondents, 15 (50%) indicated that IM help gain and hold the attention of the learners engaging them in the activity given on participation in science lesson Esther (2009). 11 (37%) respondents indicated that handling the materials practically glue the information to learners' minds.

Out of 30 respondents, 1 (3%) indicated that IM clarify the relationships between material objects and concepts stating that, if relationships are presented visually, become much easier to comprehend Lenah (2010). IM can help teachers to avoid many words to explain sound, object, or function, and instead plays a recording of the sound, shows picture of the object, or presents a diagram of the function. Consequently, the learners learn faster and more accurately, and this saves time in the process Kirenge (2008).

Out of 30 respondents 2 (7%) stated that, good IM can help solve certain language barrier problems Esther (2009). Consider the continued expansion of technical terminology in everyday usage. This, coupled with culturally diverse backgrounds of today's learners, makes it necessary for teachers to be precise in their choice of terminology. Words or terms used in an IM should be carefully selected to convey the same meaning for the learners as they do for the instructor Nyokabi (2009). They should provide accurate visual imagined make learning easier for the learners while using IM on participation in science lessons.

4.4 Instructional materials, grouping and participation in science lesson

Table 4.4 illustrates the results posted by the sampled respondents on grouping of learners, use of IM and participation in science Class room. The question sought to determine the importance of grouping learners which help learners to grow relating with each other while using IM on participation in science lesson and therefore assist each other in sharing of ideas, and create friendship which avoid conflict in the absence of the teacher.

Table 4.4 **Grouping of learners, use of IM and participation in science class room.**

Importance of grouping learners	**Response rate**	**Percentage (%)**
Collaborative learning involves active learning.	5	17
Learners feel less isolated and alone.	12	40
Depending on the activities, it is possible to divide out components and share workload	3	10
Working successfully in groups assists in development of transferable skills	10	33
Total	**30**	**100%**

Out of 30 respondents, 5 (17%) indicated that collaborative learning involves active learning by encouraging sharing of ideas that avoid boredom. According to Jane (2010), when learners get actively involved in the materials deeper learning and understanding usually results. Further 12 out of 30 (40%) respondents

indicated that Learners feel less isolated and alone. Learners feel less isolated especially at the beginning of the activity in participation, they have support at the where to start stage Esther (2009). The results in table 4.4 shows that 3 out of 30 (10%) respondents indicate that depending on the activities, components are divided and workloads shared Kimaku (2001). The activity is done much faster and become easier. Less time is used in a certain activity and the learner manages to handle different tasks within a short time Edward (2008). The research shows that a group of 10 (30%) of the respondents indicated that working successfully in groups assists in development of transferable skills Emily (2009).

4.5 Types of grouping of learners during participation in science lesson

Table 4.5 indicates the summary of response on IM, grouping of learners and participation in ECE science classroom. The question sought to find out if learners are grouped while participating in science lesson. Grouping encourage sharing of skills that enable learners to use IM effectively as slow learners gain from quick learners.

Table 4.5 **IM, grouping of learners and participation in ECE science classroom**

Response	**Response rate**	**Percentages (%)**
By ability	16	53
By mixed ability	9	30
Random	3	10
Learners selected	2	7
Total	30	100

As shown in table 4.5, out of 30 respondents 16 (53%) said that grouping is based on learner's ability stating that, ability or homogeneous grouping combines learners with similar academic needs, allowing teachers to adjust or maintain the pace of instruction according to group progress. According to Esther (2009), this provides struggling learners access to additional reinforcement, while high achievers may pursue enrichment activities like independent research. Ability grouping is appropriate during participation science lesson or after assessments, when there are apparent gaps in learners understanding.

The results show that out of 30 respondents 9 (30 %) indicated that grouping is done by mixed ability stating that mixed ability, or heterogeneous groups, includes learners of all academic backgrounds, abilities, and readiness levels. This ensures diversity and high academic standards for all learners Edward (2009), therefore provides faster learners opportunities for skill modeling and peer teaching, while slower learners benefit from exposure to their teammates' higher level thinking skills. Mixed ability grouping is most appropriate when used in conjunction with other activities that support the needs of individual learners, particularly those who are academically gifted or low ability Nicholas (2010).

Out of 30 respondents 2 (7%) said that it is done through learners selected. Learner-selected groups place the responsibility of creating cooperative teams entirely on learners. This method works best in smaller classes with members who know each other well. Teachers may add structure by asking learners to write

down names of those they would most like to work with, and organizing them before informal activities like using IM on participation in science lesson. Learner -selected groups also form effective teams which function to support participation and review with classmates who have missed material due to absence.

The results illustrate that 3 (10%) out of 30 respondents indicated that grouping is done randomly they stated that this method ensures a blend of personality types, abilities, genders and ethnicities, as learners are not grouped using pre-planned criteria. rather, they are organized by birthdays, numbers, favorite animals or shirt colors. As a result, learners do not feel labeled as slow or fast learners on participation in science lesson, and are free to collaborate without preconceived expectations of their performance. Random grouping is most appropriate for impromptu collaborative work from which learners benefit from exposure to diverse perspectives.

4.6 IM, records management and participation in science lesson.

Table 4.6 explains the importance of records management in improving pupil's participation. The question sought to find out if teachers manage records for future use.

Table 4.6 **IM, records management and participation in science lesson**

Response	**Response rate**	**Percentages (%)**
Help the teachers to be conversant with the feeble areas of the learners hence strive to enhance it.	10	33
Enable the teacher to group according to abilities hence quick learning through confidence rather than intimidation of slow learners by quick learners	20	67
Total	30	100

Out of 30 respondents, 10 (33%) indicated that records management help teachers to be conversant with the feeble areas of the learners hence strive to enhance it. Records of performance on participation in science lesson remind the teacher the weakness and therefore always take relevant IM to assist needy leaners. For example, if a learner does not attain a set goal on participation in science classroom, the teacher uses the record as a reminder of where to start.

Out of 30 respondents 20 (67%) indicated that it assist the teacher to group according to abilities hence quick learning through confidence rather than intimidation of slow learners by quick learners on participation in science lesson. For example quick learners are grouped together to challenge each other and share ideas while weak learners can be grouped together for assistance from the teacher.

4.7 Number of learners per class

Table 4.7 indicates the number of learners per class in the study area. The study sought to find out the number of learners per class. The number of learners per class is very important in order to ensure that teachers get the right enrollment that is manageable.

Table 4.7 Number of learners per class, use of IM and PSC

Response	**Response rate**	**Percentages (%)**
10 - 30	0	0
31 - 40	7	23
41 - 50	20	67
51 and above	3	10
Total	30	100

Out of 30 respondents 20 (67%) said they handle over 40 learners in one class while 7 (23%) stated that they have over 30 learners and 3 (10%) stated that they have over 50 learners which is hectic in terms of using the available IM. They stated that they improvise some of the IM in order to cater for the large number of learners in one class. Concentrating on the weak learners individually is another challenge brought by the large number per class.

4.8 Types of IM used and participation in science classroom

Table 4.8 illustrates types of IM used and participation in science classroom by activity. The question sought to find out if IM used per activity is relevant in order to achieve the goal set while participating in science class room.

Table 4.8 Types of IM used and participation in science classroom by activity

Activity	Types of IM used	Number of the respondents	Percentages (%)
Experiencing air	containers, straws and water	21	70
Properties of matter	stones, leaves, papers and corks	9	30
Total		30	100

The results showed that one of the practiced activities in science lesson is experiencing air. This was given by 21 (70%) of the respondents who concentrated on giving answers concerning the activity indicating that the IM used in participation are containers, straws and water. Learners are given task of coming up with a container full of soapy water, use straws to blow in order to

observe bubbles coming out and therefore gain the knowledge that water has air.

Table 4.8 shows that out of 30, 9 (30%) of the respondents indicated that the activity they practice while participating in science class room is properties of matter indicating that IM used are stones, leaves, papers and corks. The learners put the IM provided inside a container full of water to find out what can float and sink in the water.

4.9 Appropriateness of instructional materials on participation in ECE science lesson.

Table 4.9 shows the response of the sampled respondents on the appropriateness of IM on participation in ECE science lesson. The question sought to find out whether IM avoid boredom and make the learners enjoy the lesson enhancing understanding and remembering of crucial information concerning the lesson.

Table 4.9 IM and participation in ECE science classroom

Response	**Response rate**	**Percentages (%)**
Yes	29	97
No	0	0
I don't know	1	3
Total	30	100

Out of 30 respondents, 29 (97%) said that learners enjoy using IM while 1 (3%) of the respondent stated that they are yet to realize whether they enjoy or not. According to Esther (2009) learners enjoy using IM as boredom is avoided by ensuring that they are all engaged in a certain activity rather than being seated and listening to the teachers explaining on the blackboard.

4.10 Effectiveness of use of IM and LPSC

Table 4.10 elaborates on the reasons for ineffective of use of IM on participation in science classrooms. The main objective of the study was to find out the reasons why IM are not effectively used. This was brought up by the issue of learners not achieving the goal at the end of participation in science classroom.

Table 4.10 Effectiveness of use of IM and PSC

Response	**Response rate**	**Percentages (%)**
Large number of learners per class	5	16
Lack of enough compound for the centres	5	16
Lack of learners confidence	2	7
Language barrier	2	7
Teacher's negative attitude	11	37
Lack of professional skills	3	10
Domestic violence	2	7
Total	30	100

Out of 30 respondents, 5 (16%) indicated that the reasons for not using the IM effectively was the large number of learners per class. The ECE center consist of learners under 10 years therefore teacher need to concentrate on each to ensure that the desired concept is glued into the mind. This means that if the number of learners is large, the teacher lack sufficient time to explain to each on how to use the IM during participation in science classroom. The large number of learners resulted from the introduction of free primary education.

Lack of enough field for the centres was a reason stated by 5 (16%) of the respondents. The compound set aside for ECE centres are very small compared to the number of learners enrolled per class annually. For example while experiencing moving air by the use of kites, learners do not get enough space to run in order for the kites to be blown by the moving air.

Out of 30 respondents, 2 (7%) indicated that lack of learners confidence was a reasons leading to lack of effective use of IM during participation in ECE centres. Some of the learners are shy and fearful while using IM alone during participation which in turn leads to intimidation by others learners. Some of the learners comes from rich families and are not taught how to handle things by their own they always rely on their house helps.

Language barrier was a reason indicated by 2 (7%) of the respondents. Speaking different languages resulted from the intermarriages in the study area make it difficult to progress or to achieve the intended objective. Teachers use English and Kiswahili while explaining during participation in the study area due to the fact the some learners are half cast been born by parents from different communities hence use Kiswahili at home, others are brought up from families using mother tongue since their childhood. Teachers find it difficult to communicate to those who are not yet fluent in English and Kiswahili.

Out of 30 respondents 11 (37%) indicated that teacher's negative attitude was a reason leading to lack of effective use of IM on participation in science classroom. This was brought up by the issue of lack of teachers' motivation. ECE teachers are not employed by government and the amount of money parents pay, do not commensurate with the teachers' workload. This leads to lack of morale in explaining fully while assisting learners during participation in science classroom.

Domestic violence was a reason indicated by 2 (7%) of the sampled respondents. Sometimes domestic violence separate parents during the night leading to one partner and children encounter sleepless night and in the morning children are sent to school hungry and tired. During participation, such learner cannot concentrate and even sleep without completing the assigned task.

Out of 30 respondents, 3 (10%) indicated that lack of professional skills was a reason for lack of effective use of IM. This was evidenced by the fact that 5 respondents were untrained. Lack of these skills deny any teacher the knowledge required in imparting learners on how to handle IM during participation in science classroom. Professional skills are the specific skills that are required for any person who is working. These skills have to be worked on like going for a diploma course in ECE.

4.11 Displaying of IM and participation in science classroom

Table 4.11 illustrate on when the teachers display the IM while handling ECE learners on participation in science classroom. The question sought to establish whether teachers explain before the start of the activity since explaining fist will give guideline on what to do.

Table 4.11 IM displayed during participation in science classroom

Response	**Response rate**	**Percentages (%)**
At the start of the lesson	5	17
During the lesson	25	83
At the end of the lesson	0	0
Total	30	100

Out of 30 respondents 25 (83%) stated that they display during the lesson while 5 (17%) of the respondents indicated that they display during the lesson. None of the respondents display the IM at the end of the lesson. Displaying of IM should be done either at the start or during the lesson in order to direct learners on how to use them. For example teacher should explain to the learners on how to use straw to blow in soapy water to experience the presence of air in water before they start using them.

4.12 AAIM in IPP in science classroom in ECE centres in KZKC

Table 4.12 explains AAIM in IPP in science classroom in ECE centers in the study area. The question sought to find out whether teachers know the reasons for using available IM on participation in science classroom in ECE centre.

Table 4. 12 AAIM in IPP in science classroom

Response	**Response rate**	**Percentages (%)**
Expose learners to the real world of learning	17	57
Assists learners in understanding and retention of information as what is seen is more remember than what heard	13	43
Total	30	100

The results indicate that 17 (57%) out of 30 stated that availability and adequacy of IM expose learners to the real world of leaning. Out of 30 respondents, 13 (43%) of the respondents argued that IM assists learners in understanding and retention of information as what is seen is more remembered than what heard. According to Judy (2008), practice make perfect meaning practically done will make learners to remember what they learnt.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter gives a summary of the study findings. The conclusions of the study are also given as drawn from the summary of the findings. Lastly, the study gives some recommendations.

5.2 Summary of findings

The overall objective of the study was to determine effectiveness of use of instructional materials on learner participation in science classroom in preschool in Kiine Zone Kirinyaga County. Out of 30 respondents that were sampled, 30 responded. This was a 100 percent response rate.

Effectiveness of use of IM and participation in science classroom

The question sought to find out the reasons as to why there was lack of effective use of IM during participation in science classroom. It was apparent that the 30 respondents sampled, posted different opinions of which, 5 (16%) indicated that the reason for not using the IM effectively was due to large of number of learners per class. The ECE centers consist of learners less than 10 years therefore teacher need to concentrate on each to ensure that the desired concept is glued into the

mind. This means that if the number of learners is large, the teacher do not devote sufficient time to each and explain on the usage of IM during participation in science classroom. The large number of learners was led by the introduction of free primary education.

Further, 5 (16%) out of 30 respondents indicated that lack of enough field for the ECE centres was a reason for lack of effective use of IM. The compound set aside for ECE centres are very small compared to the number of learners enrolled per class annually. For example while experiencing moving air by the use of kites, learners do not get enough space to run in order for the kites to be blown by the moving air.

The results showed that out of 30 respondents, 2 (7%) felt that lack of learners confidence was a reasons leading to lack of effective use of IM during participation in ECE centres. Some of the learners are shy while handling IM alone during participation. Some of the learners come from rich families and are not taught how to handle things by their own they always rely on other persons like house helps.

The study found that Language barrier was another hindrance indicated by 2 (7%) of the respondents. Communication barrier resulting from speaking different languages that make it difficult to progress or to achieve the desired objective. Teachers use English and Kiswahili while explaining during participation in the study area due to the fact that some learners are half cast been born by parents

from different communities hence use Kiswahili or English at home, others are brought up from families using mother tongue since their childhood. Teachers find it difficult to communicate to those who are not yet fluent in English and Kiswahili.

The findings showed that teacher's negative attitude was a reason leading to lack of effective use of IM on participation in science classroom. This was evidenced by 11 (37%) of the sampled respondents. This was brought up by the issue of lack of teachers' motivation. ECE teachers are not employed by government and the amount of money parents pay, does not commensurate with the workload. This leads to lack of morale in explaining fully while assisting learners during participation in science classroom.

The study established that domestic violence was a reason having indicated by 2 (7%) of the sampled respondents. Sometimes domestic violence separate parents during the night leading to one partner and children encounter sleepless night and in the morning children are forced to attend school while hungry and tired. During participation, such learner cannot concentrate and even sleep without completing the assigned task.

The results showed that 3 (10%) out of 30 sampled respondents indicated that lack of professional skills was a reason for lack of effective use of IM. This was evidenced by the fact that 5 respondents were untrained. . Lack of these skills deny any teacher the knowledge required in imparting learners on how to handle IM during participation in science classroom. Professional skills are the specific

skills that are required for any person who is working. These skills have to be worked on like going for a diploma course in ECE.

Grouping of learners on participation in science class room.

The study sought to establish the importance of grouping of learners on participation in science class room. It was apparent that the 30 respondents sampled, posted different opinions on the importance of grouping of which 5 (17%) indicated that collaborative learning involves active learning. when learners get actively involved in the materials they are using deeper learning and understanding usually results. Further 12 out of 30 (40%) respondents indicated that Learners feel less isolated and alone. Learners feel less isolated especially at the beginning of the activity in participation, they have support at the 'where to start' stage Esther (2009).

The study found that 3 out of 30 (10%) respondents indicate that depending on the activities, it is possible to divide out components and share workloads thus, do the activity much faster and become easier for them. Less time is used in a certain activity therefore enables the learner to handle different tasks within a short time while a group of 10 (30%) of the respondents indicated that working successfully in groups assists in development of transferable skills.

Availability and adequacy of IM in improving pupils' participation in science classroom in ECE centres in KZKC

The study sought to determine the extent to which availability and adequacy of IM improve pupils' participation. The study found that 17 (57%) respondents indicated that availability and adequacy of IM assists a lot in improving pupils participation in that it expose learners to the real world of learning. It was also found that availability of IM aids in understanding and retention as what seen is more remembered than what heard as indicated by 13 (43) respondents.

The effects of records management in participation in science classroom

The study found that records management help the teachers to be conversant with feeble areas of the learners hence strive to enhance it, this was indicated by 10 (33%) of the sampled respondents. The study established that 20 (67%) of respondents indicated that records management enable the teacher to group according to abilities hence quick learning through confidence rather than intimidation of slow learners by quick learners. According to Esther (2009), the teacher refers to the recorded progress report which is crucial in grouping learners in accordance to their abilities.

Uses of Instructional Material on learners' participation in science lesson in ECE centres.

The findings show that a higher percentage of 50 % of the respondents reported that the main reason for use of IM is to help gain and hold the attention of the

learners. Learners are engaged in the activity given on participation. The study further established that 37% indicated that IM help the learners to remember important information stating that handling the materials practically glue the information to their mind, with when properly used, they help gain and hold the attention of the learners, they can be very useful in supporting a topic and that they clarify the relationships between materials objects and concepts

The study also revealed that 1 (3%) indicated that IM are used to clarify the relationships between material objects and concepts stating that, when relationships are presented visually, it become much easier to comprehend. For example, the subsystems within a physical unit are relatively easy to relate to each other through the use of schematics or diagrams. Symbols, graphs, and diagrams can also show relationships of location, size, time, frequency, and value. By symbolizing the factors involved, it is even possible to visualize abstract relationships. Teachers are frequently asked to teach more and more in a smaller time frame. IM can help them do this. For example, instead of using many words to explain sound, object, or function, the teachers plays a recording of the sound, shows picture of the object, or presents a diagram of the function. Consequently, the learners learn faster and more accurately, and this saves time in the process.

Further the study established that 2 (7%) of the respondents indicated that, good IM can help solve certain language barrier problems. Consider the continued expansion of technical terminology in everyday usage. This, coupled with

culturally diverse backgrounds of today's learners, makes it necessary for teachers to be precise in their choice of terminology. Words or terms used in an IM should be carefully selected to convey the same meaning for the learners as they do for the instructor Nyokabi (2009). They should provide accurate visual imagined make learning easier for the learners while using IM on participation in science lessons.

Grouping of learners during participation in science lesson in ECE centres in Kiine zone Kirinyag County.

The findings show that grouping is done as all the respondents indicated how they group the learners during the participation in science lesson. Majority of the respondents 16 (53%) group learners by ability for which ability or homogeneous grouping combines learners with similar academic needs, allowing teachers to adjust or maintain the pace of instruction according to group progress. This provides struggling learners access to additional reinforcement, while high achievers may pursue enrichment activities like independent research. Ability grouping is appropriate during breakout sessions or after assessments, when there are apparent gaps in student understanding.

It is also most beneficial in subjects like reading and math where the largest discrepancies exist between academic abilities.

The study established that a simple majority of the respondent 9 (30%) added that they group learners by mixed ability. Mixed ability, or heterogeneous groups, includes learners of all academic backgrounds, abilities, and readiness levels. This ensures diversity and high academic standards for all learners. It provides faster learners opportunities for skill modeling and peer teaching, while slower learners benefit from exposure to their teammates' higher level thinking skills.

The study revealed that 2 (7%) of the respondents mentioned that they group them through learners selected. Learner-selected groups place the responsibility of creating cooperative teams entirely on learners. This method works best in smaller classes with members who know each other well. Teachers may add structure by asking learners to write down names of those they would most like to work with, and organizing them before informal activities like using IM on participation in science lesson. Learner -selected groups also form effective teams which function to support participation and review with classmates who have missed material due to absence Esther (2009).

The results illustrate that 3 (10%) out of 30 respondents indicated that grouping is done randomly they stated that this method ensures a blend of personality types, abilities, genders and ethnicities, as learners are not grouped using pre-planned criteria. rather, they are organized by birthdays, numbers, favorite animals or shirt colors. As a result, learners do not feel labeled as slow or fast learners on participation in science lesson, and are free to collaborate without preconceived

expectations of their performance. Random grouping is most appropriate for impromptu collaborative work from which learners benefit from exposure to diverse perspectives Martin (2008).

Displaying of IM during the lesson in participation in science classroom

The finding shows that most of the respondents 25 (83%) display the IM during the lesson. By doing this, they give guideline on how to do the activity by explaining what is supposed to be done. The findings further show that some of the respondents 5 (17%) display IM at the start of the lesson. The study revealed that none of the respondents display the IM at the end of the lesson.

5.3 Conclusions

Following the results of the study, it can therefore be concluded that there was lack of effective use of IM in the area. This was evidenced by the fact that respondents posted different opinions which showed the reasons for this problem as follows:

Large number of learners per class. The ECE center consist of learners below 10 years therefore teacher need to concentrate on each to ensure that the desired concept is glued into the mind. This means that if the number of learners is large, the teacher lacks sufficient time to explain to each on how to use the IM during participation in science classroom. The large number of learners was as the results of introduction of free primary education by GOK.

Lack of enough playing ground for the centres, the compound set aside for ECE centres are very small compared to the number of learners enrolled per class every year. For example while experiencing moving air by the use of kites, learners do not get enough space to run in order for the kites to be blown by the moving air.

Lack of confidence, some of the learners are shy and fearful while using IM alone during participation which in turn leads to intimidation by others. Some of the learners comes from rich families and are not taught how to handle things by their own they always rely on other persons like house helps. Language barrier, barrier to communication resulting from speaking different languages that make difficult to progress or to achieve objective. Teachers use English and Kiswahili while explaining during participation in the study area due to the fact the some learners are half cast been born by parents from different communities hence use Kiswahili even to the children, others are brought up from families using mother tongue since their childhood. Teachers find it difficult to communicate to those who are not yet fluent in English and Kiswahili.

Teacher's negative attitude was a reason leading to lack of effective use of IM on participation in science classroom. This was brought up by the issue of lack of teachers' motivation. ECE teachers are not employed by government and the amount of money parents pay, does not commensurate the workload. This leads to lack of morale in explaining fully while assisting learners during participation in science classroom. Domestic violence separate parents during the night leading to one partner and children encounter sleepless night and in the morning children are

forced to attend school while hungry and tired. During participation, such learner cannot concentrate and even sleep without completing the assigned task.

Lack of professional skills was a reason for lack of effectiveness use of IM. This was evidenced by the fact that 5 respondents were untrained. Lack of these skills deny any teacher the knowledge required in imparting learners on how to handle IM during participation in science classroom. Professional skills are the specific skills that are required for any person who is working. These skills have to be worked on like going for a diploma course in ECE

Following the results of the study it can also be concluded that grouping of learners is very important. This was evident as the respondents indicated that they knew importance of grouping in different ways. The grouping has benefited the learners to some extent of development of transferable skills as indicated by some of the respondents.

The study concluded that availability and adequacy of IM assist a lot in improving pupil's participation as learners are exposed to the real world of learning and enables them in understanding and retention of information as what is seen is more remembered than what is heard.

Finally the study concluded that management of records has effects in the improvement of pupils' participation in science classroom. This was evident as the respondents indicated that records help teachers to be conversant with feeble areas of the learners hence strive to enhance it, they further indicated that records management enable the teacher to group according to abilities hence quick learning through confidence rather than intimidation of slow learners by quick learners.

5.4 Recommendations

The study recommends that ECE centres be increased in number to cater for the increasing enrollment. The ECE center consist of learners below 10 years therefore teacher need to concentrate on each to ensure that the information is glued into the mind. This means that if the number of learners is large, the teacher lacks sufficient time to explain to each on how to use the IM during participation in science classroom. On the same issue, the study recommended that GOK employ ECE teachers in the study area.

The study further recommended that more playing ground be purchased to enable learners be participating fully especially while experiencing moving air by the use of kites as they need to run over a large area so as to note the effect of the moving air. Learners should be encouraged to handle IM even in the absence of teachers to gain confidence. Parents of the learners who are shy should be improvising IM at home and encourage learners to continue practicing what they had learnt.

The study recommended that teachers should ensure that learners with language barrier get information taught in class by the use of language they understand better as English and Kiswahili is introduced slowly by slowly. Domestic violence was a reason indicated by 2 (7%) of the sampled respondents. The study recommended that affected parents with domestic violence be encouraged to seek some counseling experts on domestic violence to avoid disruption of learning in ECE centers in the study area.

Finally the study recommended that the 5 untrained teachers and those with certificates improve on their professional skills by going for Diploma course in ECE as lack of these skills deny any teacher the knowledge required in imparting learners on how to handle IM during participation in science classroom.

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Appendix 1: Questionnaire

This questionnaire will be filled by pre-schools teacher at Kiine Zone Kirinyaga county.

The information revealed will be treated with confidentiality. Please fill or tick where appropriate.

1. What is your name (optional)…….
2. What is your duration of employment as a pre-school teacher?.....
3. Kindly select your age group:

i) ( ) 25 and under

ii) ( ) 26 - 35

iii) ( ) 36 - 55

iv) ( ) Above 55

4. Kindly select your highest level of education:

i) O level

ii) A level

iii) None of the above

5. What level are you trained in ECE

i) Diploma

ii) Certificate

iii) Nil (untrained)

6. What are the importances of grouping learners on participation in science classroom?

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7. Give reasons as to why IM are not effectively use on participation during science classroom.

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8. What are the effects of records management in the improvement of pupils' participation in science lesson?

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9. What are the types of IM used on participation in science classroom by activity?

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10. How is grouping of learners done while participating in science classroom?

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11. How many learners are in your class?

i) 10 - 30

ii) 31 - 40

iii) 41 - 50

iv) 51 and above

12. Give reasons why it is important to use IM in participation in science lesson.

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13. Do learners enjoy using instructional materials while participating in science lesson?

i) Yes

ii) No

14. At what point of teaching do you display your IM?

i) At the start of the lessons

ii) During the lessons

iii) At the end of lessons

15. What are the challenges in acquisition of IM you use in teaching during participation in science classroom.

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16. What are instructional materials?

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Appendix 2: Observation schedule for the researcher

Name of the school…….

Division……

Zone…….....

Classification of the teacher…….

1. Topic to be covered……
2. Instructional materials to be used……
3. What is the attitude of the teacher towards instructional materials……

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   ……..
4. How is the task being performed, individual/group work……

   …….....

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5. How time is being managed?

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6. Were the objectives achieved?

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7. How was the lesson concluded?.....