

---

# Relationship Between Improvised Instructional Resources and Teaching of Literacy Skills Among Early Childhood Development and Education Learners in Public Institutions

Wacuka Mary Wambui, Kangara Hannah Wanjiku, Ogembo John Otieno

Department of Education, Chuka University, Chuka, Kenya

## Email address:

wacuka105@gmail.com (Wacuka Mary Wambui), hkangara@chuka.ac.ke (Kangara Hannah Wanjiku),

jogembo@chuka.ac.ke (Ogembo John Otieno)

## To cite this article:

Wacuka Mary Wambui, Kangara Hannah Wanjiku, Ogembo John Otieno. Relationship Between Improvised Instructional Resources and Teaching of Literacy Skills Among Early Childhood Development and Education Learners in Public Institutions. *International Journal of Elementary Education*. Vol. 12, No. 1, 2023, pp. 24-31. doi: 10.11648/j.ijeedu.20231201.14

**Received:** February 28, 2023; **Accepted:** March 21, 2023; **Published:** March 31, 2023

---

**Abstract:** Resources play an important role in the instructional process especially among young learners with the need to develop manipulative skills. In emerging economies such as Kenya where lack of adequate financial resources especially among public institutions limit provision of sufficient resources, teachers have been advised to improvise in order to compliment for the inadequacies. Limited empirical literature on the extent as well as the relationship between use of improvised instructional resources limits a discourse on efficacy of use of such resources especially in the instruction of literacy. The purpose of this study was therefore to establish the relationship between improvised instructional resources and teaching of Early Childhood Development and Education (ECDE) literacy skills. The study adopted descriptive survey research design. A census survey was conducted to collect data from 130 ECDE teachers using questionnaires and classroom observation. Descriptive and inferential statistics were used to analyze quantitative data with the aid of SPSS version 25.0 while qualitative data was analyzed thematically. Findings indicated that most learners were aided to interact freely with improvised instructional resources (IIR), the most accessible IIR being visual aids such as charts and flash cards. Regression results ( $t=10.511$ ,  $p<0.001$ ) indicated a significant positive relationship between IIR and teaching of literacy skills. The study therefore recommends that ECDE teachers utilize a variety of IIR during teaching and learning of literacy skills to provide multi-sensory learning experiences to the young learners.

**Keywords:** Literacy Skills, Improvised Instructional Resources, Early Childhood Development and Education

---

## 1. Introduction

Provision of quality education is essential in ensuring equity and equitability in every society. In appreciation of this, United Nations Conventions on the Rights of the Child recognized and enshrined education as a fundamental right of all children [1]. A consensus was also reached at the World conference on Education for All (EFA) in Jomtien, Thailand (1990) on providing educational services to every child. In addition, the World Education Forum (WEF) in Dakar, Senegal in 2000 and Sustainable Development Goals (SDGs) in September 2015 also emphasized on providing education to all including the vulnerable children. The instruments jointly advocate for the right to an equitable and inclusive education system and provision of continuous support to learners

throughout their schooling to promote and sustain development.

In response to these initiatives, most governments, Kenya included, committed themselves to provide high standards of educational practice as a right for all their children at the basic education level. In Kenya, this commitment is enshrined in the government's policy documents for education including The Kenyan constitution, Sessional Papers and the Education Act [2]. For instance, the Constitution of Kenya (2010) articles 43 and 55 (a) states that education is a right of every Kenyan child [3]. Attainment of this policy involves provision of compulsory and free education of all children at the elementary level although attainment of this at the ECDE level remains a challenge.

Early Childhood Development and Education (ECDE) refer to

a program which provides young learners with a motivating environment that encourages holistic development. It is a service that offers diverse programs that broadly combine education and care in one coherent experience for young learners [4]. This is achieved through provision of resources, care and first-hand experiences to the young children. This is achieved through provision of resources, care and first-hand experiences to the young children. Evidence shows that allocating and providing both financial and human resources in pre-school education lays a firm basis for a sustainable and prosperous community [5]. Similarly, studies on pre-school investments show that learning during the early years is important as it lays a foundation for learning during the middle or high level [6]. Hence, high quality investment in education has lasting effects on learning especially considering the fact that it is in pre-school level that children learn fundamental skills that form the foundation for further learning [7]. These fundamental skills forming the foundation for further learning include numeracy, life skills, environmental skills and literacy skills.

The ECDE curriculum is designed with reading and writing at its heart because of the ability of learners to grasp such concepts this early in their development [8]. Literacy skills are gained by involving ECDE learners in literacy activities such as tracing letters, listening to stories, reading picture books, news telling among others. Literacy activities are among the major learning areas offered in all ECDE set-ups. They aim at equipping learners with skills such as reading, writing, listening, speaking, comprehension, vocabulary and spelling [8]. Literacy refers to the ability to use language proficiently especially while reading or writing. It involves the creation, interpretation, communication, identification and understanding of a text associated with varied contexts [9].

The National ECD Policy Framework [10] cites that to succeed in education, an enabling quality environment which is learner friendly need to be created. This includes accessibility and use of relevant instructional resources. There are two types of instructional resources: conventional (standard) and improvised [11]. Conventional resources are imported or factory made and they are designed to serve a specific purpose during instruction. They include text books, stencils, photographs and electronic media. Standard resources lack versatility in their use as they may not be prepared to serve various purposes such as photographs. The teacher may not have the option of customizing the resource to fit the lesson objectives. For example, while introducing letters to learners in Kenyan ECDE centers, a procured chart with 'A' for 'alligator', 'Y' for yacht may not suit the learners needs and interests. On the other hand, a chart that is made from locally available materials will portray things that are familiar to the learners and can be observed in the surroundings such as 'A' for Ant, 'B' for Ball 'C' for Cat among others. This justifies the need to develop various ways by which locally available materials can be used for improvising instructional resources.

Improvised instructional resources (IIR) refer to a range of teaching and learning materials collected from the surroundings with familiar content and with a high application

to the syllabus. They are also known as self-made teaching and learning resources. Examples include flip charts, mystery bags, flashcards, sand paper sounds. Due to socio-economic factors such as insufficient funds, teachers and learners face several challenges during acquisition of standard instructional resources required for use during literacy activities. This therefore, necessitates the need for improvised resources to serve as substitutes for the scarce standard resources. Improvisation refers to the process of selecting and development of appropriate IR for instructional purposes to facilitate the achievement of the expected learning outcomes [11]. This means that the teacher improvises instructional resources based on the specific lesson objectives. Therefore, IIR helps in meeting the teacher's unique instructional needs. Improvisation allows learners to participate in developing resources and this promotes skills such creativity and innovation which promote learning in all areas. In the same breath, improvisation help instructors to utilize affordable, effective and efficient pedagogies of facilitating the instructional experiences which in turn makes it easier for learners [12]. Improvised instructional resources are collected from the surrounding environs whether at home or school. According to KIE [13], improvised instructional materials helps young children to cope with schooling once they find familiar objects in school. This makes learning relevant as they connect new knowledge acquired at school to their own daily life experiences.

Resources for instruction in pre-school are carefully chosen, collected and prepared prior to the lesson since pre-school learners have very short attention span to sit and wait for the teacher to prepare resources during the lesson. This is achieved through lesson planning which is done the day before and it allows the teacher to gather the necessary resources. However, accessibility of materials is highly dependent on the teacher's own usage habits and the available storage of materials after use or after improvisation [14]. The use of instructional resources involves two processes; resource preparation and resource implementation. Resource preparation deals with what the teacher needs to prepare before teaching while resource implementation is the actual use of resources in class [15]. On the other hand, resource implementation refers to the actual use of resources in class by both the teachers and the learners. It includes resource organization and the degree of use of various types of instructional resources [16].

Productive teaching process is closely related to the use of teaching resources [17]. The researcher 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" [17]. Instructional resources are crucial elements of teaching-learning process since they not only complement instruction but also supplement its process [18]. Therefore, use of instructional resources is necessary for effective and efficient instructional process.

Instructional resources have been shown to play critical role in teaching and learning. Instructional resources perform significant roles such as providing diverse multi-sensory experiences, reinforce and concretize the teacher's oral presentations thus improving the learner's understanding of abstract and complex concepts [19]. Use of the sense of sight, touch, smell and hearing are the features of improvised instructional resources and are the gateways of children's instruction in the 21<sup>st</sup> century [20]. In addition, instructional materials help in content delivery, cater for individual differences leading to greater achievement in performance among learners [21]. The utilization of instructional resources during the instruction process encompasses the sense of hearing, sight as well as touch. Based on the educational practices the Chinese proverb says that; I hear-I overlook, I see-I remember, I do-I comprehend [22]. This saying additionally underscores that the learner should take an active part during reading and writing activities in the classroom.

Research has previously endeavored to examine the relationship between the use of IIR and management of instructional process. At the global level, existing literature show studies linking use of IIR with learning activities. A study was done to assess the effect of the Montessori curriculum on learners' achievement among public schools in South Carolina, USA. The study compared the Montessori and non-Montessori learners' achievement in various aspects including numeracy, literacy and life skills. The findings indicated that Montessori learners performed better in all activities. The study attributed the huge discrepancy in achievement to the varying classroom environment in terms of availability of resources. The Montessori classes had sufficient and diverse materials for use during the instructional process [23]. In addition, a study on methods of teaching math's lessons in USA found out that the use of instructional resources influences the learner's interest to actively participate in mathematics activities. The study observed that use of instructional resources promoted students' active participation in classrooms and promoted inclusion of all learners [24].

Research done in Nigeria observed that instructional resources have the capacity to influence the motivation, perceptions and attitudes of the learners. IR helps the teacher to achieve the following during instruction: motivation and attention, classroom control, content delivery, retention, recalling and evaluation of performance [25]. Instructional resources are seen as significant elements during instruction. Utilization of IR in teaching promotes effective learning since learners are active participants in the instructional process not just mere recipients of knowledge [26].

A study conducted on the role of instructional materials as a tool of effective early childhood education in Agona region, central Ghana observed that most public Early Childhood Education (ECE) centers lacked adequate instructional resources. The inadequacy of instructional resources resulted to minimal use of IR during the teaching and learning process [27]. This implies that when instructional resources are unavailable, teachers and learners cannot utilize them during

the instructional process and this affects the quality of early childhood education.

In Winneba, Tanzania a study was done to determine the extent to which instructional resources were utilized during instruction primary schools. The study findings indicated that eight out of ten teachers in primary schools used only text books and chalkboard during the teaching and learning process. Instructional resources were unavailable for use during instruction. The study observed that the unavailability of IR resulted to teachers using only chalkboards and text books as the only IR and this led to reduced interest in learning activities thus poor academic performance [28].

A study was carried out to establish the effect of instructional materials on number writing among ECDE learners in Kamukunji District, Nairobi Kenya. The study adopted quasi experimental design. Learners who utilized instructional materials during number writing exercises scored higher marks than their counter parts in the control group. The children's skills in writing numbers, number sequence, number shaping, number sizing and number alignment performance improved tremendously due to active involvement in activities that used instructional materials. The children's level of number reflection errors, number omission, number sizing, number spacing significantly reduced. The use of instructional materials helped the children use their senses and develop children with motor muscles and eye-hand coordination [29]. To assert these findings, a study conducted on the effect of instructional resources on learner's early literacy performance in public ECDE centers in Kanduyi Sub-County Bungoma County concluded that the use of instructional resources had a positive effect on the learners' acquisition of literacy skills [30]. The study employed descriptive survey design and it was based on Jean Piaget's constructivist theory.

In addition, a study was conducted to establish the impact of instructional resources on the implementation of ECDE science curriculum in Naivasha Sub County, Nakuru County, Kenya. The study used the descriptive survey research design. The target population consisted ECDE teachers and ECDE learners. The researcher observed that availability and use of instructional resources had a positive impact on the effective delivery of ECDE science curriculum [31]. In the same vein, a study on the effect of utilization of IM on learner involvement in environmental activities in pre-school in Kiine Zone, Kirinyaga County, Kenya observed that instructional materials were not utilized effectively in teaching and learning due to overcrowded classes and this affected how the learners participated in science activities [32].

Similarly, a study was conducted on the impact of instructional resources on early childhood learners' oral skills in central zone Kisumu County Kenya. The target population consisted of 42 headteachers, 126 teachers and 3180 learners. The study findings indicated that the use of IR significantly increased the learners' performance in various learning activities such as recognition of letters, repetition of words, and the ability to write dictated words. The learners' performance improved from 11% to 18% [33]. This

corroborates with the findings that good instructional materials stimulate the thinking of children and motivates them to participate in classroom activities thus improved performance [34]. From the foregoing, it is evident that scarce literature on the relationship between use of improvised instructional resources and instruction of ECDE literacy skills exists. Thus, this study sought to contribute by attempting to provide empirical evidence on the existing relationship between the elements. It sought to establish the relationship between use of IIR and teaching of ECDE literacy skills with a specific focus on public ECDE centers in Kiambaa Sub-County, Kiambu County Kenya.

## 2. Theoretical Framework

The study was guided by the constructivist theory based on the work of Jean Piaget. Constructivism is a principle in ECDE which views learners as active participants in the process of constructing knowledge and meaning rather than mere recipients of knowledge. The child experiences the physical environment through interaction with concrete objects which helps the child to conceptualize, develop creative thinking and problem-solving skills. The child therefore acquires skills that help in solving complex. Jean Piaget's cognitive development theory of learning indicates that mental abilities increase with age following an innate maturational schedule. There are two mental processes helps in promoting cognitive development in children. The cognitive processes that complement each other and they include assimilation and accommodation. In assimilation, learners use what they already know as a framework for assimilating new experiences through the use of IIR from the local environment. On the other hand, accommodation involves the modification of what we already know so that new knowledge can fit in better. Therefore, for children to assimilate new information, they should be encouraged to carry out hands-on activities and actively explore their environment [35]. This implies that children should be given variety of IIR to enable them acquire literacy skills on their own.

The theory comprises of four stages of cognitive development including sensory-motor (0 to 2 years), pre-operational (2 to 7 years) concrete operational stage (7 to 11 years) and formal operational (12 and older). This implies that ECDE teachers should use instructional resources which are developmentally appropriate for the learners of a particular age. When the IIR are too complicated for the learners, the learners easily get frustrated while too simple IR may lead to boredom among learners. Therefore, learning materials should be matched with the learner's developmental age if the learners are to benefit. Piaget also perceived children as individuals. The theorist cites that children are born with individual differences and therefore, each child should be attended to as an individual.

According to Piaget's theory, ECDE learners are in pre-operational stage. Learners at this age have difficulties in thinking abstractly or doing mental manipulation exercises. They have to be practical activities by availing IIR to them and this will assist them to understand complex concepts during

the learning process. Learners at pre-operational stage are self-centered [36]. This means that children at this stage have difficulties with sharing materials during teaching and learning. Therefore, ECDE teachers should provide adequate IIR during instruction to minimize conflicts as the children fight for the insufficient IIR. Once the instructional resources are adequate, lessons become enjoyable and learner's attention is sustained throughout the lesson. The theory also posits that symbolic and abstract concepts should be taught after the learners have had several concrete experiences through experiential activities hence making abstract thinking easier for the young minds [37]. The teachers' role therefore, include provision of IR, catering for individual differences, providing varied activities and ensuring that all learners are safe and they fully participate in learning activities.

## 3. Methodology

The study adopted descriptive survey research design. Census survey was used to include 130 ECDE teachers from 26 public ECDE centers in Kiambaa Sub- County. Data was collected through questionnaires and classroom observation. Qualitative data obtained was analyzed thematically while quantitative data was screened, coded and analyzed with the aid of SPSS version 25.0 computer software using descriptive and inferential statistics Descriptive statistics such as frequencies and percentages were applied while inferential analysis involved Chi-Square analysis to establish the relationship between IIR and the teaching of ECDE literacy skills.

### 3.1. Research Questions

The study sought to answer the following questions.

- 1) What is the extent of use of improvised instructional resources during the instruction of literacy skills in ECDE classrooms?
- 2) What is the relationship between improvised instructional resources and instruction of literacy skills among ECDE learners?

### 3.2. Study Variables

The study utilized the following variables:

*Extent of use of IIR* was assessed using a set of twelve Likert scaled statements where 1=None to 5=Very great extent. The variable attained reliability index of 0.859 thus was found to be reliable for use.

*Teaching and Learning of Literacy skills* was assessed using a set of six Likert scaled statements where 1=None to 5=Very great extent. The variable attained reliability index of 0.673 thus was found to be reliable for use.

## 4. Results and Findings

Information on respondents' demographics illustrated that all ECDE teachers were females, a majority (42.0%) being middle aged (30-45 years old) who were trained as ECDE

teachers with at least 5 years teaching experience. Age of the respondents ( $R^2=-0.222$ ;  $p=0.019$ ) and their length of service ( $R^2=-0.112$ ;  $p=0.238$ ) were found to be negative correlated with teaching of literacy skills, age being significant. At the same time, qualification ( $R^2=0.050$ ;  $p=0.608$ ) and extent of use of IIR ( $R^2=0.708$ ;  $p<0.001$ ) were positively correlated with instruction of literacy skills, extent of use being significant. Findings imply that female teachers are preferred as teachers for young learners due to their inherent caregiving

qualities of compassion, politeness and warmth toward young children compared to their male counterparts.

**4.1. Extent of Use of Improvised Instructional Resources**

The study sought to inquire on extent to which ECDE teachers used IIR during instruction of ECDE literacy skills. The findings are presented in Table 1.

*Table 1. Extent of Use Improvised Instructional Resources.*

Statement	NE	SE	AE	GE	VGE	Total
Teachers engage learners to interact freely with IIR	0.9	3.6	10.7	17.9	67.0	100.0
Teachers and learners use IIR to demonstrate concepts during literacy activities	0.0	2.7	14.3	29.5	53.6	100.0
Teachers use IIR to assess learners during literacy activities	1.8	16.1	33.9	33.0	15.2	100.0
Teachers involve learners in literacy projects using IIR	1.8	7.1	17.9	33.0	40.2	100.0

Key NE-No extent SE-Small extent AE-Average extent GE-Great extent VGE-Very great extent.

Data obtained show that majority of teachers (84.9%) engaged learners to interact freely with IIR during the teaching and learning of literacy skills. Similarly, teachers and learners used IIR to demonstrate concepts during literacy activities at a great extent (83.1%) while most teachers (73.2%) involved learners in literacy projects using IIR. However, teachers who used IIR during assessment of learning during literacy activities were slightly below average (48.2%). Findings indicate that most teachers used IIR during the teaching and learning of ECDE literacy skills. The resources were frequently used for teaching, demonstrations, projects and assessment of learners. This is in consistence with the

assertion that instructional resources enable the teacher to simplify complex content with ease thus enhances learner’s understanding [38]. Similarly, availability of appropriate instructional materials facilitates learner-centered instructional process which equips the learners with exploration and self-discovery skills which enables them to construct their own knowledge and skills [37].

In addition, the respondents were also asked to indicate the extent to which they used the specific instructional resources during the teaching of literacy skills and the responses are presented in Table 2.

*Table 2. Extent of Use of Specific Types of IIR.*

Type of IIR	NE	SE	AE	GE	VGE	Total
Sandpaper sounds	56.3	31.3	7.1	2.7	2.7	100.0
Letter models	22.3	31.3	19.6	19.6	7.1	100.0
Letter stencils	42.0	41.1	9.8	4.5	2.7	100.0
Flash cards	0.9	9.8	8.9	35.7	44.6	100.0
Charts	0.0	2.7	4.5	17.0	75.9	100.0
Pocket boards	38.4	29.5	20.5	9.8	1.8	100.0
Voice recording	33.0	56.3	9.8	0.9	0.0	100.0
Video recording	65.2	29.5	2.7	0.9	1.8	100.0

Key: NE-No extent SE-Small extent AE-Average extent GE-Great extent VGE-Very great extent.

Data obtained show that sand paper (5.4%), letter stencils (7.2%), voice recording (0.9%) and video recording (2.7%) were used by very few teachers to a great or very great extent. Resources such as letter models (26.1%) and pocket boards (11.6%) were used by few teachers to a great or very great extent. However, flash cards (80.3%) and charts (92.9%) were used by a majority of the teachers in teaching literacy skills to a great or very great extent. This means that the most commonly used IIR in teaching literacy skills were flash cards and charts. Data obtained from classroom observation indicated that voice and video recordings were very few in most schools thus their low use.

The findings are consistent with those of a study conducted to establish the link between instructional resources and delivery of ECDE science curriculum in Naivasha Sub County.

The study used the descriptive survey research design with a target population comprised of ECDE centers, ECDE teachers and ECDE learners. The researcher concluded that availability and use of IR is important for successful science lessons [31]. On the contrary, a study observed that schools with adequate materials may not always use them efficiently and thus fail to improve the learner’s achievement in education. However, schools with insufficient materials may utilize what is available thus improving the learner’s academic achievement [38]. Therefore, teachers and learners should be able to use the available resources maximumly so as to adequately improve the learners’ academic achievement. These findings affirm the fact that ECDE teachers should not only improvise instructional resources, but should also use them during teaching and learning in all activity areas.

#### 4.2. Improvised Instructional Resources and Instruction of Literacy Skills

The second objective sought to establish the relationship

between use of IIR and instruction of literacy skills. To achieve the study objective, cross-tabulation of the data on extent of use of IIR and instruction of literacy skills was done. The results were as presented in Table 3.

**Table 3.** Influence of IIR on Teaching of ECDE Literacy Skills.

		Teaching of literacy skills		
		Negative	Positive	Total
Extent of use of IIR	Low	43.8%	17.0%	60.7%
	High	6.2%	33.0%	39.3%
Total		50.0%	50.0%	100.0%

Generally, more respondents (60.7%) reported low extent of use of IIR compared to those reporting high extent of use of IIR (39.3%). Cross tabulated results show that very few respondents (6.2%) with high extent of use perceived that use of IIR in instruction of literacy skills to be negatively related

compared to those who reported low use (43.8%) of the IIR. However, about twice as many respondents (33.0%) who used the IIR highly reported a positive relationship between the variables compared to those indicating low use. Table 4 provides regression analysis interpretation of this observation.

**Table 4.** Relationship Between IIR and TLS.

Model	Unstandardized Coefficients		Standardized Coefficients			F	Sig.	R
	B	SE	Beta	T	Sig.			
(Constant)	12.979	.844		15.377	.000	110.476	.000	.708
EIIR	.427	.041	.708	10.511	.000			

a. Dependent Variable: TLS

Results of the model summary,  $R=0.708$  showed that utilization IIR in teaching of literacy skills accounted for 50.1%, the model being significant,  $F(1, 110)=110.476$ . Regression results ( $t=10.511$ ,  $p<0.001$ ) indicates a significant positive relationship between IIR and teaching of literacy skills. Findings imply that there is a positive and significant relationship between use of IIR and teaching of ECDE literacy skills. These findings were consistent with the findings of a study conducted in South Carolina which observed that Montessori learners performed better in all activity areas as compared to those who attended non-Montessori schools. The study attributed the huge discrepancy in achievement to the varying classroom environment in terms of availability of assorted resources [23]. The study findings also agree with the observations of a study conducted in Nigeria that posited instructional resources have the capacity to influence the motivation, perceptions and attitudes of the learners. IIR helps the teacher to achieve the following; improving learners' motivation and attention, maintaining classroom control, enhancing lesson delivery, boosting retention and recalling and facilitating evaluation of learners [25].

## 5. Conclusion

Based on the findings, a majority of teachers engaged learners to interact freely with IIR. Specifically, flash cards and charts were reported to be the most commonly used IIR. It can therefore be concluded that visual resources such as flashcards and charts are the most commonly integrated IIR in teaching literacy skills among ECDE teachers in Kiambaa Sub-County. In addition, the study sought to establish the influence of improvised instructional resources on teaching of

ECDE literacy skills in Kiambaa sub-county. Inferential analysis based on regression analysis indicated a significant positive relationship between use of IIR and teaching of ECDE literacy skills. It can therefore be concluded that the use of IIR positively and significantly relates to teaching of ECDE literacy skills. The study therefore recommends that public ECDE centers should be equipped with adequate instructional resources to ensure that every learner has access to instructional resources thus increasing the frequency of interaction with the resources. ECDE teachers should also utilize various types of improvised instructional resources during teaching and learning of literacy skills. Specific attention should be given to utilization of concrete, audio and audio-visual in addition to visual resources. This will provide multi-sensory learning experiences to the young learners and improve the teaching of ECDE literacy skills.

## References

- [1] UN Commission on Human Rights, *Convention on the Rights of the Child*, 7 March 1990, E/CN.4/RES/1990/74, available at: <https://www.refworld.org/docid/3b00f03d30.html> [accessed 10 February 2023].
- [2] Republic of Kenya, ECD Service Standard Guidelines for Kenya, 2006.
- [3] Republic of Kenya, Constitution of Kenya, 2010.
- [4] Shonkoff Jack & Richmond Julius. (2009). Investment in Early Childhood Development Lays the Foundation for a Prosperous and Sustainable Society. Retrieved from <http://www.child-encyclopedia.com/sites/default/files/dossiers-complets/en/importance-of-early-childhood-development.pdf>

- [5] James Heckman. (2004). Invest in the very young. In: Tremblay RE, Barr RG, Peters RDeV, eds. *Encyclopaedia on Early Childhood Development* [online]. Montreal, Quebec: Centre of Excellence for Early Childhood Development; 2004: 1-2.
- [6] Skinner Kay, Sarah Hyde, Kerstin McPherson & Maree Simpson. (2016). Improving students' interpersonal skills through experiential small group learning. *Journal of Learning Design*, 9 (1), 21-36. doi: <http://dx.doi.org/10.5204/jld.v9i1.232>
- [7] ECDE Policy Guideline, 2008. *Handbook for Early Childhood Development Education Syllabus*, Nairobi, K. I. E.
- [8] UNESCO, 2017 Reading the past, writing the future: fifty years of promoting literacy. Paris UNESCO.
- [9] Republic of Kenya, A Policy Framework for Education, Training and Research, 2005.
- [10] Engida, Temechegn (2012). Development of low-cost educational materials for chemistry. *Africa Journal of Chemistry Education*. 2 (1) 51-53.
- [11] Attah Francis (2014). Effects of two teaching methods on secondary school students' achievement in writing and balancing chemical equations in Nsukka Education Zone of Enugu State. Unpublished M. ed Thesis, Department of Science Education, University of Nigeria Nsukka.
- [12] KIE. 2008. *Early Childhood Development and Education Handbook*. Nairobi: Government Press.
- [13] Abdullahi Nur. (2015). Factors influencing students' performance in mathematics at Puntland secondary school certificate examinations in Puntland State, Somalia: University of Nairobi.
- [14] Byrd Pat. (2001). Textbooks: Evaluation for selection and analysis for implementation. In M. Celce-Mucia (ed.) *Teaching English a Second Foreign Language*, 3rd ed.) (pp. 415-424). Boston: Heinle & Heinle/Thompson Learning.
- [15] Graves Micheal & Bonnie, B. (2003). *Scaffolded Reading Experiences: Designs for Student Success*. Christopher: Gordon.
- [16] Cheryl Bolick, Micheal Berson, Christopher Coutts & Walter Heinecke. (2003). Technology applications in social studies teacher education: A survey of social studied methods faculty. *Contemporary Issues in Technology and Teacher Education*, 3 (3), 300-309.
- [17] Karaka K. (2007). *Effective Teaching in School*. London: Oxford University Press.
- [18] Onasanya Samuel (2012). *Practical handbook on instructional media* (2nd Ed.). Nigeria: Graphon Publishers, Ilorin.
- [19] Jenipher Adipo. (2015). Impact of instructional materials on academic achievement in mathematics in public primary schools in Siaya County, Kenya. University of Nairobi.
- [20] Jane Thungu, Kezziah Wandera, Lizzie Gachie & Gladys Alumande (2008). *Mastering Pte Education*. Nairobi: Oxford University Press.
- [21] Culclasure Brooke, David Fleming, Ginny Riga & Alexis Sprogis. (2018). *An evaluation of Montessori education in South Carolina's Public Schools: 2015-2016 educator survey results summary*. Greenville, SC: The Riley Institute at Furman University.
- [22] Peter Leone, Micheal Wilson, Calyn Fink & Mulcahy Candace. (2010). *Making It Count: Strategies for Improving Mathematics Instruction for Students in Short-Term Facilities*. Strategy Guide. National Evaluation and Technical Assistance Center for the Education of Children and Youth Who Are Neglected, Delinquent, or At-Risk.
- [23] Fakomogbon, M., & Adegbija, M. (2006). Instructional media and their sources for teaching and learning in tertiary institutions: A Nigeria perspective. *African Journal of Educational Studies* 4 (2), 128-132.
- [24] Kadzera Micheal. (2006). *Use of Instructional Technologies in Teacher Training Colleges, Malawi*. (PhD Dissertation) in Virginia Polytechnic Institute and State University, Blacksburg, Virginia.
- [25] Opong Frimpong. (2021). The role of teaching and learning materials and interaction as a tool to quality early childhood education in Agona East District of the Central Region of Ghana. *African Educational Research Journal*, 9 (1): 168-178.
- [26] Ghanney Robert. (2008). "The use of instructional materials in the teaching and learning of environmental studies in primary schools: A case study of Winneba". *International Journal of Educational Research*, Vol. 4, No. 1, pp. 135-140.
- [27] Jane Muiruri. (2014). *Impact of instructional materials on performance of number writing among pre-school children in Kamukunji district of Nairobi County* (Doctoral dissertation, University of Nairobi).
- [28] Betty Chepkoech. (2019). *Influence of instructional resources on children's early literacy performance in public pre-schools in Kanduyi sub-county, Bungoma: Kisii University*.
- [29] Paul Gitau. (2013) *Relationship between instructional materials and science curriculum delivery in pre-primary schools in Naivasha sub-county, Nakuru county*: Unpublished Masters Research Thesis, Kenyatta University.
- [30] Stephen Wambui. (2013). *Effects of use of instructional materials on learner participation in science classroom in preschools in Kiine*. (Unpublished thesis), Nairobi University.
- [31] Rose Okune. Caleb Gudo & Benson Odongo. (2016). Implications of instructional materials on oral skills among early childhood learners in central zone, Kisumu County, Kenya. *International Journal of Educational Policy Research and Review*, 3 (2), 20-28.
- [32] Josephine Omaiyo. (2013). *Effect of Instructional Resources on Children's Number Work Performance in Pre-Schools in Isibania Zone, Migori, County*. University of Nairobi, Nairobi, Kenya.
- [33] Fidelis Onwioduokit. (2013). *The ordeal of science teaching in the contemporary society: A need for paradigm shift for the new generation*. 36<sup>th</sup> inaugural lecture series of the University of Uyo Uyo.
- [34] Piaget Jean. (1980). *Cognitive theory of Development*. New-York, Will and Sons.
- [35] Joseph Rotumoi. & Jackson Too. (2012). Factors influencing the choice of approaches used by ECDE Teachers in Baringo County, Kenya. *International Journal of Academic Research in Progressive Education and Development*, 1 (2), 177-187.

- [36] Omwonyo, R. (2003): *Primary science and teaching handbook*. Nairobi, Jomo Kenyatta Foundation.
- [37] Fuller Bruce. 2006. Raising School Quality in developing countries. What investments boost learning. *Review of Educational Research*, 57, (3): 255-92. World Bank. Washington DC: USA.
- [38] Kitheka, M. (2005). *Factors contributing to students' poor performance in the Kenyan Certificate of Secondary Education*. Unpublished Master of Education Thesis, Kenyatta University. Retrieved from [ir-library.ku.ac.ke/](http://ir-library.ku.ac.ke/)