

INFLUENCE OF SELECTED FACTORS ON ACADEMIC PERFORMANCE OF PUBLIC PRESCHOOL LEARNERS IN NYERI CENTRAL SUB-COUNTY, NYERI COUNTY, KENYA

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Abstract

Early childhood education has increasingly become the foci of many governments around the world as they work towards the achievement of the United Nations Sustainable Development Goal number four (SDG4) of ensuring inclusive and equitable quality education and promotion of lifelong learning opportunities for all. In Kenya, despite the government effort to ensure provision of quality Early Childhood Development Education (ECDE) in order to give children a head start for later formal education, there are certain factors that hamper the progress. The purpose of the study was to examine the influence of adequacy of instructional materials, teachers' attitude in use of instructional materials, and the head teachers' support of preschool teacher professional development on learners' academic performance in public preschools in Nyeri Central Sub County, Kenya. The study was guided by Perry's Cognitive Constructivism learning theory which advances that the role of the teacher of facilitating discovery by providing the necessary resources and by guiding learners as they attempt to assimilate new knowledge to old and to modify the old to accommodate the new. The study employed both descriptive survey and correlation research designs. Ten head teachers and 35 preschool teachers took part in the study. Data was collected through preschool teachers' questionnaire, head teachers' interview guide, preschool learners test and preschool instructional materials observation schedule. Content validity of research instruments was ascertained through pilot testing and review by a panel of University lecturers. Using test-retest method a Pearson correlation coefficient of 0.78 was obtained for teachers' questionnaire. Both descriptive and inferential statistics were used to analyze the data. The study three formulated null hypotheses were tested using Pearson correlation analysis. Qualitative data was thematically analyzed. The study found that adequacy of teaching and learning resources had a strong positive influence on learners' academic performance ($r = 0.74, p < 0.05$). Similarly, head teachers' support of preschool teachers' professional development had a positive strong influence on learners' academic performance ($r = 0.674, p < 0.05$). However, preschool teachers' attitude towards the use of teaching and learning activities had a very weak and insignificant influence on learners' academic performance ($r = 0.025, p > 0.05$). Since Early Childhood Education (ECE) is a fundamental right to every child, and an indispensable element for learning at the subsequent levels as the child goes through the education system, this study recommends that the County government should have a vote head in its budgetary allocation to not only remunerate and in service teachers, but also to provide teaching and learning materials.

Keywords: Early Childhood Development Education, Preschool learners, Academic performance, Teachers' professional development,

I. Introduction

According to UNESCO (2013), Early Childhood is defined as the period from birth to six years. The terms pre-school education and Kindergarten emphasize education around the ages 3-6 years. Early childhood education (ECE) is a fundamental right to every child and an indispensable element for learning at the subsequent levels as the child goes through the education system (UNESCO, 2013). Thus, just like the higher tiers of the education system, early childhood education deserves priority. The issue of when the schooling of little children ought to start has been an intense debate since 1970s (Lee & Hayden, 2009). Some researchers maintain that growth and development begins at birth or even during the prenatal phase.

However, in spite of the initial preliminary point, there is a consensus among brain development scientists that learning during early years is vital (Gallagher, Clifford & Maxwell, 2014).

As observed by Mustard (2013) during this period the child's brain is most malleable and also highly impressionable hence the time when children need high quality personal care and learning experiences. It is the period when it is very easy to mould the character of children by inculcating values, social norms and habits as well as regulation and control of emotions.

Thus, investing in early childhood is one of the best ways in which governments can reduce primary school drop-out rates and the number of children who repeat classes (UNESCO, 2012). The Early Childhood Development Education (ECDE) sector is run differently in different parts of the world. While in some countries it has received the full support from the Government, in others the ECDE sector receive little or no support from the Government. In some European countries, the ECDE sector is fully supported by the state. In the Czech Republic and Poland, for example, Kindergartens are state operated (Graves & Gargioulo, 1994) as cited in Githuthwa (2011). Consequently, infant and pre-school programmes are free of charge. However, in many other countries, governments hardly fund the ECDE sector and it is left in the hands of Non-Governmental Organizations, private sector and the community.

In Latin America ECDE investment does not exceed 0.6% of the Gross National Product (UNESCO, 2014). In South Africa the Government mostly deals with registration, policies and supervision leaving the management to the ECDE providers (UNESCO, 2012a). In Ghana government funding of ECDE is also to the minimum leaving the private providers to be in the fore front.

In Kenya, just like most of the countries in Africa, ECDE has been run by communities and private sector. For public ECDE centres, communities establish and provide physical facilities such as land, building materials, furniture, labour, equipment and above all provide management. The type and adequacy of the physical facilities therefore largely depend on the economic ability of the community. There is also the issue of teachers' training where the teachers are trained by different organizations thereby acquiring different approaches to ECE (Githuthwa, 2011; Kamau, 2014; Mureithi, 2015; Ogutu, 2015).

Thus, without the government direct involvement, most public ECDE centres are characterized with very low quality education due to acute shortage of physical facilities, lack of trained personnel, teachers' lack of accountability due to poor supervision, haphazard curriculum implementation and high teachers' turnover due to lack of support and low pay (Makau, 2016). It is no wonder then that private sector has almost a monopoly in offering ECDE, albeit the fact that over 90% of Kenya's primary school children receive education in public primary schools (Republic of Kenya/UNICEF, 2012).

However, in an endeavour to ensure enhanced financing, access, quality, equity and efficient management of ECDE services, the Kenya government has made several strides. The National Early Childhood Development Policy Framework was formulated in 2006 (Republic of Kenya,

2006). Among other things, the framework explicitly defines the roles of parents, communities, various government ministries and departments, development partners and other stakeholders in the provision of ECDE. Further, the fourth schedule of the Kenya constitution, 2010 and the Basic Education Act 2013, places the roles of funding and development of the necessary infrastructure for conducting pre-primary education under County Government (Republic of Kenya, 2010, 2013). In addition, though the public ECDE centres are yet to be fully mainstreamed into the primary cycle, most of them have already been attached to public primary schools.

Currently, almost all public primary schools have ECDE centres supported by parents and County Government and the primary school head teacher being the chief administrator (Wangila, 2017). In a bid to ensure provision of quality ECE, the head teacher is obliged to accomplish certain management tasks. These tasks include: provision of teaching and learning materials, and support of the preschool teachers in professional development through instructional supervision and facilitating in service training. And above all, the head teacher is expected to mobilize funds from parents and other sources including the County Government in order to run the ECDE centre (Wangila, 2017).

According to Nyeri Central Sub County schools' census report 2016 (MOE, 2016), the Sub County has more private than public ECDE centers with most parents shunning public ECDE centres citing lack of quality education. However, it is important to note that some of the best performing and preferred primary schools in Nyeri Central Sub County are public.

Makau (2016) notes that although public ECDE centres are known to lack essential learning resources and little supervised teachers, there are some centres whose amenities surpass the best in private sector accompanied with well trained and supervised personnel. Makau further notes that while some schools were endowed with teaching and learning materials, the teachers' attitude played a key role in the level of their usage. In regard to the differentials in preschool teachers' professional qualification and training colleges, Chege (2015) maintains that it is the intensity of continuous professional support and in service training that has the greatest potential to create impact on the quality of education provided to the learners. The current study set out to examine the influence of availability of teaching and learning materials, preschool teachers' attitude towards the use of instructional materials and the head teachers support for the preschool teacher professional development.

II. Statement of the Problem

In Kenya, the establishment of guidelines for early Childhood Development (Republic of Kenya, 2012) and devolution of the ECDE sub-sector to County level has yet to reduce the numerous challenges afflicting the public ECDE centres. This has greatly jeopardized provision of quality ECE education. The Nyeri Central Sub County schools' census report 2016 (MOE, 2016), shows that while some schools (both private and public) are well endowed in learning materials, others operate in a very precarious situation in terms of materials and qualified teachers. However, Uwezo (2015) and Melly (2017) found that numeracy and literacy levels remain very low in some schools, despite the adequacy of teaching and learning materials and having teachers trained at degree level and above. To that end this study embarked

examining the influence of instructional materials, teachers' attitude towards use of teaching and learning materials, and head teachers' support of preschool teacher professional development on academic performance of preschool learners in Nyeri Central Sub-County, Nyeri County, Kenya.

III. Objectives of the Study

The study was guided by the following objectives:

- a. To examine the influence of adequacy of teaching and learning materials on the academic performance of preschool learners in Nyeri Central Sub-county, Kenya.
- b. To establish the influence of teacher's attitude towards the use of teaching and learning materials on academic performance of preschool learners
- c. To assess the influence of head teacher support of preschool teacher professional development on academic performance of preschool learners.

IV. The Study Null Hypotheses

The following null hypotheses were formulated:

H₀₁: Adequacy of teaching and learning materials has no significant influence on preschool learners' academic performance

H₀₂: Teacher's attitude towards use of teaching and learning materials has no significant influence on preschool learners' academic performance

H₀₃: Head teacher support of preschool teacher professional development has no statistical significant influence on preschool learners' academic performance

V. Literature Review

Adequacy of Teaching and Learning Materials (TLM) at preschool level refers to satisfactory or acceptable quality and quantities of material resources (UNESCO, 2014). Further since children at preschool tend to be egocentric, it is recommended that each child should have its own item (Ngure, 2014). Material resources include textbooks, maps, charts, Music instrument, drawing instruments, audiovisual and electronics such as tape recorder, radio, video tape recorder and television. Other category of material resources consists of paper supplies and writing materials such as exercise books, pens, crayon, eraser, chalk, drawing books, notebooks, ruler, pencil, workbooks slate, and so on. Were (2014) posit that for effective teaching and learning, textbook and other resource materials are basic tools, their inadequacy or absence prompts a teacher handle subjects in an abstract manner, portraying it as dry and non-exciting. Kinyua (2015) conducted a study on influence of instructional resources on preschool children's performance in number work in Kairuri zone, Embu County. Among other things, the study found that instructional resources influence children's performance in number work. However, the study was not comprehensive since it considered only number work. The current study went beyond the performance of number work and focused in all the key learning areas in ECDE curriculum such as science activity, creative activity, language activity and social environmental activity.

Khochen and Radford (2012) regards the term attitude as the sum total of man's inclination and feelings, pre-conceived notions, prejudice or bias, fears, ideals, threats, and convictions about specific topic. Thus, attitude is a personal disposition that impels an individual to react to an object, situation or proposition in favourable or unfavourable way. Coles and Scior (2012) emphasizes that an attitude is an organized and consistent manner of feeling, thinking and reacting to people, groups, or to any event. From the various definitions of attitude, it implies that the preschool teacher attitude towards the use of instructional materials will determine

whether the teaching will be enhanced by various teaching aids and practical oriented or the teaching will be the drill and rote learning type. Attitudes influence teachers' thinking, behavior, and motivation and as such the intensity of teachers' attitudes has an overarching influence on the duration spent on a certain activity, the effort and energy expended, and the perseverance when faced with obstacles (Van Hoorn, Nourot, Scales & Alward, 2011). Teachers are the most important personnel in the implementation of any school programme. Wanzare (2013) postulates that the actions of individual teachers in their classrooms are instrumental in determining the success or failure of implementation or improvement of a programme regardless of the school manager's talents and expertise. The teachers' action mainly depends on the attitude they possess towards the programme.

Sergiovanni and Starratt (2007) views instructional supervision as a co-operative venture in which supervisors and teachers engage in dialogue for the purpose of improving instruction leading to student improved learning and success. According to Osman and Mukuna (2013), instructional supervision roles performed by head teachers include; monitoring of teachers' attendance during lessons, preparation and use of lesson plan, checking and ensuring adequacy of teaching resources.

Voss, Kunter, & Baumert, (2011), opine that professional development improves teacher skills, knowledge, and pedagogy translating into enhanced performance in examinations. It is therefore, important for to ensure professional development is content focused, intensive, well defined, coherent, and strongly implemented. Duflo, Dupas & Kremer (2011) observe that where the acquired knowledge from professional development is effectively utilized, learners in preschools are likely to experience quality instruction, effective curriculum implementation and improved school performance.

The reviewed literature on the influence of adequacy of teaching and learning materials on preschool learners' academic performance has revealed that material resources do have a significant effect on student's achievement since they facilitate the learning of abstract concepts and ideas and discourages rote-learning. However, while some schools have been found to post dismal results albeit being well endowed in instructional materials as is the case in Nyeri Central Sub County preschools, no study has investigated the situation. The current study aimed at examining and explore through head teachers interview and researcher's observation the preschool dynamics which influence the learners' performance. Further, most of the studies ignored the aspect of the preschool teachers' attitude towards the use of the instructional materials. The reviewed literature on head teachers' support of preschool teacher professional development showed that although regular in service training and lesson observation has been recommended by most studies, most head teachers' pay less attention to preschool issues considering it as a separate entity run by parents and county government. To this end the current study embarked on examining the influence of adequacy of instructional materials, the preschool teachers' attitude towards the use of instructional materials and the head teachers' support of preschool teacher professional development.

VI. Methodology

The study employed both descriptive survey and correlation research designs. Descriptive survey research seeks to establish factors associated with certain occurrences, outcomes or outcome conditions (Borg & Gall, 2006). Correlation research design uses inferences to explain relationships among variables systematically and emphatically without direct control of independent Variables (Orodho, 2009). This hybrid design was found appropriate in this study since apart from seeking opinion, attitude and knowledge about the issue at hand, the study

also sought to establish the degree to which each independent variable influences the dependent variable. According to Nyeri Central Sub County schools census report 2016, there were 38 public ECD centres with a population of 75 teachers and 38 head teachers (MOE, 2016). Thus, the study's target population was the 75 preschool teachers and 38 head teachers. Teachers were targeted because the study focused mainly on teachers' characteristics as the determinants and predictors of learners' academic performance. Head teachers were also targeted since they are the chief administrators entrusted in ensuring preschools have the required teaching and learning materials and that teachers are implementing the government recommended syllabus.

The preschool teacher was purposively sampled from each school. In a school with more than one teacher, the simple random sampling was used to select one teacher. Thus, 38 preschool teachers constituting 50.7% of all preschool teachers were sampled from 38 ECDE centres. Orodho (2012) maintains that unlike questionnaires, interview schedules take more time and one should use a manageable number and which is representative of the population. Further, Gay, Mills & Airasian (2009) posit that a sample size of 10% to 30% of the population is sufficient for reliable findings. Thus, the study selected ten (26%) head teachers for interview through simple random sampling. Thus, the sample consisted of 38 preschool teachers and 10 head teachers.

VII. Results and Analysis

Out of the sampled 38 preschool teachers and 10 head teachers, thirty-five teachers filled and returned the questionnaires while all the ten head teachers were interviewed posting a return rate of a response rate of 92% and 100% respectively. Babbie (2014) postulates that a response rate of more than 70 per cent is considered sufficient for a study. The study findings showed that, only five teachers (4.3 %) were male while 30 (69%) were females implying that there was a notable gender inequality in staffing at preschool level in Nyeri Central Sub-County. The finding was similar to studies by Andiemba and Kemboi (2013) and Otto (2014) where the number of female to male counterparts were in the ratio of 4:1. According to Otto (2014), most of the administrators prefer female teachers at preschool level due to the fact that they are not only expected to teach the young children but also to do other chores such as change of diapers and toilet training. Similarly, there were more female head teachers (60%) than male head teachers (40%) who participated in the study. However, the gender disparity was well within the government's basic gender mainstreaming minimum requirement of one third for each gender (Republic of Kenya, 2010).

The highest number of teachers (12) constituting 34.3% were in the age bracket of 31 to 40 years while over 40% were 30 years and below. Only four teachers were over 50 years. This was a clear indicator that ECDE centres in Nyeri Central Sub County were dominated by young to middle aged teachers. This implied that they were more likely to apply the modern child care techniques with ease. The finding was similar to Nyakundi (2014) who found that most of the preschools are taught by mostly young female teachers with very little or no experience. Further, most of the teachers (42.9 %) were certificate holders, 28.6 % diploma in ECDE holders and only 5.7 % were degree holders. However, eight teachers constituting 22.9 % had no professional training in ECDE. This implied that preschool teachers in Nyeri Central Sub County had disparate professional qualifications. However, since over 75 % of them had professional training, it was expected that they had the necessary pedagogical skills and were equally capable to implement the ECDE curriculum successfully. Over 90% of teachers had taught for at least one year in their current ECDE centre. This implied that their output in terms of learners' performance could be fairly ascertained in the current study. In addition, their

response in regard to adequacy of teaching and learning materials and the head teacher's support of teacher professional development was taken as the true account of what they had witnessed in their current school.

Adequacy of Teaching and Learning Materials and Academic Performance

The study's first objective was to examine the influence of adequacy of teaching and learning materials on the preschool learners' academic performance. To achieve this, a set of statements in form of a Likert scale were posed to the respondents to indicate the extent to which they agreed or disagreed with them. The questionnaire responses were coded such that strongly disagree (SD) was rated number 1 while strongly agree (SA) was rated number 5. The mean responses for preschool teachers were computed such that: a mean response of above 3.0 was considered as agree while a mean of below 3.0 was considered as disagree. Further, for easier interpretation the responses were collapsed into three columns of Agree (A), Undecided (U) and Disagree (D) as shown in Table 1. Table 1 shows the proportion of teacher respondents in various levels of agreement, the mean and standard deviation (SD).

Table 1: Teachers Response on Adequacy of Teaching and Learning Materials

Statement	D	U	A	Mean	SD
	%	%	%		
Most of my learners have the necessary basic items such as exercise books and writing items	57.2	20.0	22.9	2.4	1.1
Apart from the main text book, the school has other reference books for each subject	45.7	17.1	37.2	3.1	1.0
We have most of the recommended charts as per the syllabus	57.1	8.6	34.3	2.7	1.1
During psychomotor oriented lessons, most children can access materials such as plasticine and colours	62.9	8.6	28.6	2.5	0.8
I use audio visual teaching aids such a slide show of different animals	57.1	8.6	34.3	2.7	0.9
Mean of Means				2.7	1.0

N = 35

As evident from Table 1, most of the teachers (57.2%) refuted that most of the learners had the necessary basic items such as exercise books, pencils and other writing materials. Only 22.9% of teachers agreed while 20% were undecided. Similarly, most schools (57.1%) lacked the recommended charts as per the syllabus. Further, in most schools (62.9%), children could not access materials necessary in psychomotor oriented lessons such as plasticine and colours. In addition, 57.1% of teachers indicated that they did not use audio visual teaching aids. This implied that most of the preschools in Nyeri Central Sub County lacked some basic instructional materials that could lead to dismal academic performance. This finding was similar to Okongo, Ngao, Rop & Wesonga, (2015) study that found that there were inadequate learning resources at pre-school centres in Nyamira North Sub- County and which affected the implementation of inclusive education in pre-school centers. Likewise, Andiema and Kemboi (2013) decried of the acute inadequacy of materials and classroom space necessary for creative activities among Pokot Sub County ECDE centres.

Most of the interviewed head teachers attributed the inadequacy in essential materials to the parents' laxity in paying the recommended fee in the hope that the free education might be extended to preschool level. The head teachers' frustration was evident from their comments such as:

When I meet the preschool parents in our several meetings, they all seem eager to support our centre with all the essentials required, however, most assume the attitude of 'wait and see'...when I remind them, some claim that the national and county governments pledged support during the national elections and so we should make a follow up...(Head teacher 5).

It is therefore, important for the national and county governments to be clear on the support they intend to offer to the various public ECDE centres, so that the parents can take the full responsibility of their part without delay.

Preschool Teachers Attitude towards use of Teaching and Learning Materials

The second objective of the study was to establish the influence of teachers' attitude towards the use of teaching and learning materials on preschool learners' academic performance. In order to accomplish the objective, preschool teachers were subjected to some statements in regard to their feelings towards the use of instructional materials. Table 2 shows the analyzed data.

Table 2: Teachers Response on their attitude towards use of Teaching and Learning Materials

Statement	D %	U %	A %	Mean	SD
Children cannot learn to their best without use of teaching aids such as elaborate charts, realia and others	8.6	11.4	80.0	4.2	0.9
All children should practice at least one of the motor skills activities (such as modeling, drawing, colouring, tracing) everyday	8.6	22.9	68.6	3.8	0.9
ECDE teacher should refer to a minimum of three reference books for each subject for quality teaching	51.5	17.1	31.5	2.8	1.2
I always prepare all the charts I consider important but missing in the class	45.7	5.7	48.6	3.1	1.4
A preschool teacher should know how to improvise teaching and learning materials using locally available materials.	37.1	28.6	34.3	3.4	0.8
Mean of Means				3.5	1.0

N = 35

It was evident from Table 2 that majority of teachers (80%) affirmed that Children cannot learn to their best without use of teaching aids such as elaborate charts, realia and others. This implied that, teachers regarded teaching aids as important and necessary materials in curriculum implementation and enhancing academic performance. In the same vein, majority of teachers (68.6%), agreed that all children should practice at least one of the motor skills activities such as modeling, drawing, colouring and tracing on daily basis. This implied that, most teachers had a positive disposition on learners' frequent participation in motor skills. Cognate to the

study finding, Sinyei, Mwonga & Wanyama (2012) found that preschool teachers' support of learners' creative activities greatly influenced their academic performance. For instance, music and movement experiences in early childhood include activities such as playing instruments, chanting, singing, listening and dancing to music; all of which involve movement. These experiences not only enhance concepts in Music and movement but also in all the other ECE activity areas such as mathematics, language, creative activities, and social studies.

Only 31.5% of teachers agreed that they should refer to a minimum of three reference books for each subject for quality teaching. As noted by Melly (2017) most preschool teachers in public schools use only one text book per subject and thus depriving the learners the rich information which emanates from a combination of several reference books. The statement that 'I always prepare all the charts I consider important but missing in class' elicited varied reaction from teachers. While 48.6 affirmed, 45.7% disagreed and 5.7% were undecided. Makau (2016) had a similar finding where most of preschool teachers' in Isinya Sub County were found to be reluctant to prepare own charts and other teaching aids. Makau study attributed this failure to prepare teaching aids to teachers' attitude towards the use of teaching materials. Some teachers argued that there was no need to present some items using charts or other teaching aids since pupils encountered the same items at their surroundings and therefore simple explanation could do as well. In regard to improvisation of teaching and learning materials, teachers had also a varied response in that while 34.3% supported improvisation, 37.1% did not. The finding was contrary to Makokha (2017) who found that preschool teachers readily improvised the needed instructional materials for teaching science in Bunoma East Sub County. Ngure (2014) and Adegbiya (2012) studies reported that teachers who had many years of exposure to instructional materials and were equipped with skills to use them were more likely to use improvised materials.

Head teachers Support of Preschool Teacher Professional Development

The study's third objective was to examine the influence of head teacher support of preschool teacher professional development on academic performance of preschool learners. To achieve this, a set of statements in form of a Likert scale were posed to the respondents to indicate the extent to which they agreed or disagreed with them. Table 3 shows the analyzed data.

Table 3: Teachers Response on Head Teachers' Support towards Professional Development

Statement	D	U	A	Mean	SD
	%	%	%		
My head teacher sends me for bench marking in other good performing schools	71.4	2.9	25.7	2.2	1.0
My head teacher encourages the use of a resource person where necessary	42.9	14.3	42.8	3.1	1.3
My head teachers sponsors me for in service seminars and workshops	51.5	17.1	31.5	2.7	1.1
My head teacher has made me improve on time management	22.9	8.6	68.6	3.8	0.8
My head teacher has improved my pedagogical skills	42.9	5.7	51.4	3.2	1.3
Mean of Means				3.0	1.1

N = 35

As evident from Table 3, most of the teachers (71.4%) indicated that the head teachers do not send them for bench marking. Over half of the teachers (51.5%), indicated that their head teachers do not sponsor them for in service seminars and workshops. The small percentage of the teachers who indicated that they are sponsored for in service seminars was an issue of concern considering that professional development is a key indicator to teacher's potential towards solving problems Githae, Odundo and Mwangi (2015). In addition, Duflo et al., (2011) found that children assigned to teachers with effective professional development have better grades, high test scores, better self-esteem, and show higher aspiration and motivation towards school since curriculum interpretation is mediated by teacher's knowledge and practice in the classroom. Thus, it follows that, if a teacher fails to apply new ideas from professional development to class instruction then learner achievement is likely to be thwarted. A study by Voss et al., (2011), confirmed that professional development enhances teacher knowledge and skills, efficiency in class instruction which in turn translates into improved results and gains in learner achievement.

Teachers' response in regard to the statement that 'My head teacher encourages the use of a resource person where necessary' was varied where 42.9% disagreed, 14.3% were undecided while 42.8% affirmed. This implied that while some teachers and students benefitted from the experience and skills of other people, others did not. Most of the teachers were however, gave credit to their head teachers in that, they had an improvement on their time management and pedagogical skills.

Hypotheses Testing

In order to ascertain both the composite and relative influence of the three independent variables in this study on the dependent variable (the preschool learners academic performance), multiple regression analysis was conducted. Each of the three variables (Adequacy of teaching and learning materials, teacher's attitude towards use of teaching and learning materials, head teacher support of preschool teacher professional development) was hypothesized to be a predictor of dependent variable. However, the three hypotheses were stated in the null form and tested at 95% confidence level. Tables 4, 5 and 6 depict the summary of multiple regression analysis.

Table 4: Multiple Regression Model Summary

Model	R	R²	Adjusted R²	Standard error of the estimate
1	0.792	0.684	0.613	0.2602

Predictors: (constant), Adequacy of teaching and learning materials, teachers' attitude towards use of materials, head teacher support of professional development

Dependent variable: Preschool pupils' Academic Performance

In reference to Table 4, the multiple correlation coefficients R was 0.792 there was a strong positive correlation between the predicted and observed values of the preschool pupils' academic performance. The coefficient of determination R² which is the proportion of variance in the dependent variable that can be explained by the independent variables was found to be 0.684 implying that 68.4 % of variance in the preschool learners' academic performance was

explained by the level of the adequacy of teaching and learning materials, teachers attitude towards use of teaching materials and head teachers' support of professional development.

Table 5: Multiple Regression Model Significance (ANOVA)

	Model	Sum of Squares	df*	Mean Square	F	Sig.
1	Regression	17.824	3	5.941	21.370	0.012
	Residual	8.623	31	0.278		
	Total	26.447	34			

df*- degrees of freedom.

Table 5 shows the analysis of variance (ANOVA) output. The *F*-ratio in the ANOVA table tests whether the overall regression model is a good fit for the data. That is, the ANOVA shows whether the model, overall, results is a significantly good degree of prediction of the outcome variable. The table shows that the joint independent variables statistically significantly predict the dependent variable, $F(3, 31) = 21.370$, $p < 0.05$ and that other variables not included in this model may have accounted for the remaining variance. In other words, the regression model was a good fit for the data.

Table 6: Summary of Multiple Regression Model Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig. value
	Beta	Std. Error	Beta			
1 (Constant)	.342	0.204			3.82	0.081
Adequacy of teaching resources	.514	0.138	0.487		5.435	0.002
Teachers' attitude	.108	0.103	0.120		2.414	0.149
Head teachers' support	.454	0.129	0.367		4.241	0.008

Dependent variable: Preschool Pupils' Academic Performance

Table 6 reveals the relative contribution of the three independent variables to the dependent variable, expressed as beta weights. The positive value of the effects of adequacy of teaching and learning materials, teachers' attitude towards the teaching and learning materials and the head teachers' support of teachers' professional development implies that pupils' academic performance is actually determined by positive reinforcement of these three variables. The regression model capturing the hypothesized relationship was given as: $Y = \beta_0 + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \varepsilon$ and where y = preschool learners' academic performance, x_1 = adequacy of teaching and learning resources, x_2 = preschool teachers' attitude towards teaching and learning resources, x_3 = head teachers' support of teachers' professional development while ε is the error term. Assuming the error term ε to be zero and substituting the unstandardized coefficients β values, the estimated multiple regression equation becomes: $y = 0.342 + 0.514x_1 + 0.108x_2 + 0.454x_3$.

The β values indicate the individual contribution of each predictor to the model if the effects of all other predictors are held constant. In other words, the β values show the extent to which pupils' academic performance is influenced by each predictor. Thus, when the adequacy of teaching and learning resources increases positively by one unit, pupils' academic performance increases by 0.514 units ($\beta = 0.514$) while holding the other factors constant. Similarly, when

the teachers attitude increases positively by one unit, preschool children academic performance increases by 0.108 units ($\beta = 0.108$) and so on.

In order to test the study's three formulated hypotheses, the t statistic that tests whether a B value is significantly different from zero ($H_0: \beta = 0$) is considered (refer to Table 6).

HO₁: *Adequacy of teaching and learning materials has no significant influence on preschool learners' academic performance*

As shown in Table 6, the unstandardized beta value for the level of teachers involvement was significantly greater than zero ($\beta = 0.514$, $t = 5.435$, $p < 0.05$). Subsequently, the null hypothesis was rejected, hence, adequacy of teaching and learning materials had a significant influence on preschool children's academic performance in public primary schools in Nyeri Central Sub County. This implied that the EDCE centres which had invested in the necessary teaching and learning materials posted better academic results.

HO₂: *Teacher's attitude towards use of teaching and learning materials has no significant influence on preschool learners' academic performance*

In reference to Table 6, the unstandardized beta value for the school provision of OVC lunch programme was not significantly greater than zero ($\beta = 0.108$, $t = 2.414$, $p > 0.05$). Subsequently, the null hypothesis was retained, hence, teachers' attitude towards the teaching and learning materials had no significant influence on preschool pupils' academic performance in public primary schools in Nyeri Central Sub County. This implied that the teachers' attitude towards teaching materials was not a major factor in pupils' performance.

HO₃: *Head teacher support of preschool teacher professional development has no statistical significant influence on preschool learners' academic performance*

Table 6 shows that the unstandardized beta value for the level of head teachers' support of teachers' professional development was significantly greater than zero ($\beta = 0.454$, $t = 4.241$, $p < 0.05$). Subsequently, the null hypothesis was rejected, hence, the level of head teachers' support of teachers' professional development had a significant influence on pupils' academic performance in public primary schools in Nyeri Central Sub County. This implied that pupils in schools where head teachers' support to teachers' professional growth was high, performed better in their academic work.

VIII. Conclusion

Based on the study findings, the following conclusions were made:

1. Most of preschools in Nyeri Central Sub County were only providing the most basic teaching items- the main text book, exercise books, black boards, chalk. Other materials such as charts, outdoor play equipment, materials for creative activities, music, science, numeracy, and audio visual to enhance language were not provided. Very few teachers were keen to improvise or to use teacher made materials.
2. Most head teachers were not keen to secure adequate teaching and learning materials and also viewed preschool and the other school from class one as two distinct entities. In most cases their commitment was focused on the upper primary.
3. Most preschool teachers are positive towards the use of teaching and learning materials. However, they did not have enthusiasm and motivation to improvise some apparatus and materials that would miss in their schools.
4. Most preschool teachers were in need of continuous update of the new knowledge, techniques and teaching approaches based on researches done in the dynamic field of preschool

education. Head teachers were of little support to teachers in terms of sponsor or engaging assistant teachers to create time to the main teacher professional development.

IX. Recommendations

The study recommends that:

1. Taking into account that Early Childhood Education (ECE) is a fundamental right to every child and an indispensable element for learning at the subsequent levels as the child goes through the education system, the County government should have a vote head in its budgetary allocation each year to not only remunerate teachers but also to provide teaching and learning materials. Parents and other stake holders can then be mobilized to cater for any deficit in the budget.
2. With the support of the head teacher, preschool teachers should also be encouraged to improvise missing materials using locally available materials. All ECDE centres should fully streamlined with the nearest primary school and the head teacher assumes the full management.
3. In order to inculcate the positive attitude and also motivate the preschool teachers to use more learner centred techniques, they should be sponsored frequently to attend workshops and seminars. Bench marking with private and other better schools should also be scheduled as a termly event. By exposing the teachers to new challenging methods and strategies of teaching and interacting with different materials, they will acquire intrinsic motivation which is by far the hall mark of preschool teacher pedagogy.
4. Teachers' supervision by both external and internal supervisor is a part of professional development and which would not only motivate the teacher but enhance quality of learners' education. The government should effectively implement policy of quality assurance and standards (QAS) specifically for the pre-school sub-sector in Kenya.

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