



Original Article

## Relationship between Teachers' Demographic Characteristics and Levels of Utilization of Instructional Materials in Pre-Primary Schools in Kenya

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Research indicates that children who obtain quality pre-primary education have a head start in life. It is also evident that early exposure and good use of instructional materials (IM) prepare children to be well adjusted later in life. Children are also well equipped with problem-solving skills that are important in Early Childhood Development and Education (ECDE). Instructional materials are core to effective teaching and learning in the formative years. The purpose of this research was to establish whether there was a significant relationship between teachers' demographic characteristics and levels of utilization of instructional materials in pre-primary schools in Kenya. The study adopted the Cognitive Theory of Multimedia Learning Framework (CTML) and Ecological Systems Theory by Urie Bronfenbrenner. Besides, the study applied a cross-sectional survey research design. A random sample of 168 teachers comprising of 76.2% females and 23.8% males participated in the study. The Chi-Square test results indicated that gender ( $\chi^2= 1.335$ ; d.f. =1;  $p= 0.030$ ), level of education ( $\chi^2=8.165$ ; d.f. =5;  $p=0.024$ ) and professional training status ( $\chi^2= 13.620$ ; d.f. =5;  $p= 0.020$ ) had a statistically significant linear relationship with the level of utilization of instructional materials. These results implied that female teachers were more likely to use instructional materials than their male counterparts and teachers who were more educated and highly trained were more likely to use instructional materials than their less trained counterparts. However, age, marital status, and duration of teaching experience had no statistically significant relationship with the utilization of instructional materials in pre-primary schools. It was concluded that professional training of pre-primary school teachers is critical for effective teaching and learning at the

foundational level. It was recommended that teachers should promote the utilization of instructional materials in their classrooms for interactive and experiential learning of pupils.

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## INTRODUCTION

Research indicates that children who obtain quality pre-primary education have a head start in life (Kelley & Camilli, 2007). It is also evident that early exposure and good use of instructional materials (IM) prepare children to be well adjusted later in life. Children are also well equipped with problem-solving skills that are important in Early Childhood Development and Education (ECDE). Instructional materials are core to effective teaching and learning in the formative years. There have been indications of gaps with regard to the adequacy and relevance of the instructional materials used in pre-primary schools' teaching practices (Kenya Institute for Curriculum Development, 2017). The prime objective of the Cognitive Theory of Multimedia Learning Framework (Mayer, 2005) is enabling users to learn as the instructions work through priming the necessary cognitive processes into the learner's memory. This theory postulates that children are usually motivated by handling instructional materials as they are able to relate to what is being taught. Omayio (2013) observed that instructional materials ought to stimulate the child's natural

curiosity, thus enabling the desire to explore the world, which in turn provides children with opportunities to broaden their knowledge.

There is inadequate information on the effect of teachers' demographic characteristics on the utilization of instructional materials, thereby justifying the need for such a study in pre-primary schools in Kenya. Therefore, the purpose of the study was to establish the relationship between teachers' demographic characteristics and utilization of instructional materials in pre-primary schools in Nyeri County, Kenya. The objectives of the study were: to establish the pre-primary school teachers' demographic characteristics; to determine the levels of utilization of instructional materials in pre-primary schools; to establish whether there was a statistically significant relationship between teachers' demographic characteristics and utilization of instructional materials in pre-primary schools. The null hypothesis stated that there is no statistically significant relationship between teachers' demographic characteristics and utilization of instructional materials in pre-primary schools

### Characteristics of Pre-Primary School Teachers

In this study, the critical indicators of teachers' characteristics were gender, educational level, professional teacher training, and teaching experience in pre-primary schools. A study carried out in the United Kingdom on the impact of teacher education level on child outcomes in centre-based early childhood education found significantly better child outcomes in programs with higher numbers of teachers with bachelor's degrees than their counterparts without an undergraduate degree (Kelley & Camilli, 2007). Research shows that early childhood teachers need to understand and support the requirements of quality service delivery in order to implement quality teaching in early childhood education.

Early et al., (2006) conducted a study in the United Kingdom on early childhood professionals which showed that about one-third of early childhood teachers had some experience with four-year-old children while only a fifth had experience working with five-year-old. This indicated that the majority of teachers did not have adequate experience in ECDE. The impact of teacher preparation and professional training on child educational outcomes has been examined with varying results. In the UK, knowledge, and skills of staff, rather than particular training characteristics such as educational attainment, has been identified as having the most impact on student outcomes

In China, since the mid-1990s, the government set the minimum educational qualification requirement for early childhood teachers at a certificate in ECDE (Wong & Rao, 2015). A study on ECDE teacher qualification found that only a quarter of the teachers had acquired the minimum qualification of a certificate in ECE, and only one out of ten of the kindergarten principals had attained a university degree in ECE. The qualifications of ECD educators were significantly behind that of nearby regions like Shanghai and Taiwan, where ECD teachers were required to attain at least a college-level education. Similar research done in Kenya indicated that a majority of ECD teachers accounting for 94.5% had the professional training qualification required for teaching in early

childhood centres (Achola, Gudo & Odongo, 2016).

### Utilization of Instructional Materials in Pre-primary Schools

Great educators like Comenius, Pestalozzi, Montessori, and Dewey stressed the importance of resources in teaching and learning. Comenius, for example, emphasized the importance of education through the use of real things. Foster et al. (2016) observed that through the use of media, the learner acquires and strengthens the skills of reading, observing, listening, and communicating ideas.

In Ethiopia, Afework and Asfaw (2014) researched the availability of school facilities and their impacts on the quality of education. The research was carried out in 24 primary schools in the Eastern Hararge zone and 12 primary schools in Harari regional state, Ethiopia. Research result showed that the availability of school facilities and instructional materials were unavailable, less in quantity and quality that created a great challenge on teaching and learning activities. This, in turn, had a negative impact on the improvement of the quality of education. Inadequate instructional resources contribute to the low usage of instructional materials by teachers.

Instructional materials are resources used to make learning easy, enjoyable, practical, and meaningful to the learner (Maddahian & Bird, 2004). Lack of confidence in teachers hinders the use of instructional resources in teaching. Chepkonga (2017) did a study on the influence of learning facilities on the provision of quality education in public early childhood development education centres in West Pokot County, Kenya. She concluded that without learning facilities in the school, effective learning could not take place. Abaya (2017) examined the influence of instructional materials on pre-school children's learning achievement in number work in Matungu division, Kakamega County, Kenya. The results showed that teachers' reliance on commercially acquired materials not only constrained learning programmes but also made learning more expensive and superficial instead of practical.

Research by Omayio (2013) on instructional strategies and utilization of learning resources in

teaching mathematics indicated that lack of learning resources led to low creativity among learners because they were not actively involved in the class. Lack of learning resources also led teachers to use the lecture method, thereby putting pupils at a disadvantage because what was learned was quickly forgotten. The researcher found that there was a lack of enough resource materials for teaching mathematics. Lack of adequate learning resources hindered the use of instructional materials in teaching and learning of number work in pre-schools in Migori County, Kenya.

According to research by Bolick et al. (2003), there was a positive relationship between effective teaching and the use of instructional materials. This implied that for effective teaching and learning to take place, the utilization of instructional materials was necessary. However, Waithaka (2005) reported that teachers lagged in the use of instructional materials during teaching and learning and gave little or no time for learners to interact with instructional materials in early childhood institutions. According to the submission of Ema and Ajayi (2006), learning materials cannot create change except where the teacher makes use of them skillfully, thus allowing the learners to benefit from the experience of handling the materials. This implies that the effective use of instructional materials depends largely on the teacher's knowledge of how to use them and the interaction with learners.

### **Theoretical Framework**

The theoretical framework for the study followed two theories, the Cognitive Theory of Multimedia Learning (Mayer, 2005) and the Ecological Systems Theory (Bronfenbrenner, 1979). These theories describe the learning process from both the environmental perspective as well as the interaction with learning materials. According to the Ecological Systems Theory, the development process of a child happens in different settings and every setting has a significant influence on the child's development. Teachers are thus part of the environment that the child's development process takes place. The child is taken to the school where the teacher can impart skills in the form of knowledge. This implies that the teachers, on their part, ought to be the positive role models to these

children in order to make the school setting a favourable environment.

### **METHODOLOGY**

The study applied a cross-sectional survey research design since data was gathered at one point in time. This design was appropriate for the study since the researchers wanted to establish the relationship between teachers' characteristics and the levels of utilization of instructional materials in the pre-primary schools. A stratified sampling technique was used to select four sub-counties out of eight sub-counties in Nyeri County, which formed the sampling frame. The four participating sub-counties had a total of 270 pre-primary school teachers from which a simple random sample of 168 (62.2%) of pre-primary school teachers was selected to participate in the study. A pre-test was conducted among 10 teachers who were not included in the main study. The split-half reliability method was used to compute the reliability of the test items. A coefficient of 0.716 was obtained, indicating that the internal consistency of the items met the recommended threshold of 0.70 (Mugenda & Mugenda, 2003).

The independent variables constituted teachers' demographic characteristics such as age, gender, marital status, education level, professional training, and work experience. The dependent variable was the levels of utilization of instructional materials in the pre-primary schools. For the purpose of establishing the levels of utilization of instructional materials, scores of responses to eight items along a 5-point Likert scale were calculated. The items assessed the extent to which teachers utilized instructional materials across ECDE activity areas. The responses on the Likert scale were coded as: "1= None at all", "2= Little Extent", "3= Moderate Extent," "4= Large Extent" and "5= Very Large Extent". The minimum and maximum possible scores a respondent could attain for the 15 items were 8 and 40, respectively. Using this analysis, respondents who attained a range of fewer than 20 points were classified as low users of IM; those who attained 21-30 points were classified as moderate users of IM, and respondents who attained 31-40 points were classified as high users of IM.

Research approvals were obtained from the relevant research institutions, including Kenyatta University and the National Centre for Science, Technology, and Innovation. Informed written consent was obtained from the study participants prior to the administration of questionnaires. Data were collected by the use of self-administered questionnaires. Data were analysed using the Statistical Package for the Social Sciences version 24. Descriptive statistics, such as frequencies were used to summarize the results. Chi-square statistic was used to test the relationship between teachers'

characteristics and utilization of instructional materials in pre-primary schools.

## RESULTS

### Teachers' Demographic Characteristics

The frequency distribution of teachers' demographic characteristics, namely gender, age, marital status, level of education, professional training status, and teaching experience are presented in *Tables 1 to 3*, while levels of utilization of instructional materials are presented in *Table 4*.

**Table 1: Distribution of gender and age of the respondents**

Variables		Frequency (N)	Percent (%)
Gender	Female	125	76.2
	Male	39	23.8
	<b>Total</b>	<b>164</b>	<b>100.0</b>
Respondents' Age	Below 20	1	0.7
	21-30 Years	40	24.2
	31-40 Years	65	39.6
	41-50 Years	32	19.5
	Above 50 Years	26	16.1
	<b>Total</b>	<b>164</b>	<b>100.0</b>

The findings of the respondents' gender distribution, as shown in *Table 1* indicated that 76.2% were female and 23.8% were male. According to the study findings presented in *Table 1*, about three-quarters (76.2%) of the respondents were female, while 23.8% were male. This implies that more female teachers tended to teach at pre-primary school level than male teachers. According to Kiboro (2018), the majority of teachers in lower primary were of the female gender. Ngeru (2015) observed that females dominated teaching positions in Nairobi County as they comprised the majority of the head-teachers as well as the majority of the teachers. Mwaniki (2015) also established that females comprised the majority of teachers in pre-primary schools in Embu County.

According to the findings shown in *Table 1*, the age distribution of the PPS teachers indicated that, out of the total 149 respondents, only one teacher (0.7%) was aged below 20 years with 36 teachers (24.2%) aged between 21 and 30 years while 59 teachers (39.6%) were aged between 31 and 40

years and 29 teachers (19.5%) falling within the 41-50 age bracket while the rest 24 teachers (16.1%) aged above 50 years. The majority of the teachers accounting for over 70% were aged above 30 years, implying that the majority of them were quite mature. Ngeru (2015) observed that many teachers were aged above 30 years, mainly because most of the teachers got into the teaching positions after having waited for some time after completing their academic training. According to Mwaniki (2015), youthful teachers comprised of the minority portion of the teachers in pre-primary schools and thus had more years to teach in pre-schools before gaining enough experience to use the instructional materials. Kiboro (2018) observed that the majority of the teachers were relatively mature as a considerable portion of the sampled teachers were aged above 30 years. This implied that they were able to provide sufficient information on how the demographic characteristics influenced the utilization of instructional materials.

**Table 2: Distribution of marital Status and educational level of respondents**

Variable		Frequency	Percent(%)
Marital Status	Single	29	17.6
	Married	116	70.9
	Separated	10	6.1
	Divorced	6	3.6
	Widow/Widower	3	1.8
	<b>Total</b>	<b>164</b>	<b>100.0</b>
Level of Education	Primary Completed	2	1.2
	Partial Secondary	4	2.4
	Secondary Completed	6	3.7
	College/Diploma	101	61.6
	University Degree	51	31.1%
	<b>Total</b>	<b>164</b>	<b>100.0</b>

The findings of the marital status of the 165 sampled teachers as shown in *Table 2* indicated that 29 teachers (17.6%) were single; 117 teachers (70.9%) were married; 6.1% were separated; 3.6% were divorced; while only three teachers (1.8%) were widowed. These results concur with the findings of the Kenya Demographic and Health survey conducted by the Kenya National Bureau of Statistics-Kenya and ICF International (2015), which showed that the majority of Kenyans were married at the time of the survey. Six in ten women and 5 in 10 men aged 18-49 years were married, in terms of age at first marriage, women were married at a median age of 20.2 years while men married about 5 years later, at a median age of 25.3 years.

The respondents' highest level of education was distributed as shown in *Table 2* where 51 teachers (31.1%) out of the total sample had attained a University degree while 101 teachers (61.6%) had attained a college diploma certification. 6 teachers (3.7%) had completed secondary school education

with 4 teachers (2.4%) having partially completed secondary school education. Only 2 teachers (1.2%) had primary school level as their highest level of education.

The findings in *Table 2* are similar to a study by Ngeru (2015), which observed that the majority of the pre-school teachers were at least O-level certificate holders, which was the minimum entry requirement for enrolling in the teaching profession. This implied that almost all the teachers were equipped with the necessary educational training and, therefore, well prepared to utilize the instructional materials in their schools. Makokha (2017) noted that the majority of the pre-school teachers in Bungoma County, Kenya, had at least an ECDE certificate. The huge number of the ECDE certificate holders was attributed to the fact that the entry grade for enrolling for ECDE training was quite low at Grade D-Minus, implying that a lot of those with such low grades were able to get into the profession by gaining the ECDE training.

**Table 3: Distribution of professional training status and Teaching Experience of respondents**

Variable		Frequency	Percent (%)
Professional Training Status	Untrained	11	7.0
	Certificate in ECE	30	18.6
	Diploma in ECE	77	46.2
	Degree in ECE	42	25.6
	Primary Teacher Certificate (P1)	4	2.6
	<b>Total</b>	<b>164</b>	<b>100.0</b>

Variable		Frequency	Percent (%)
Teaching Experience	Below 5 Years	47	28.6
	6-10 Years	70	42.2
	11-15 Years	23	14.3
	above 15 Years	24	14.9
	<b>Total</b>	<b>164</b>	<b>100.0</b>

Results in *Table 3* indicated that that most of the teachers had attained a college diploma in ECE (46.2%) or a University degree (25.6%), and a certificate in ECE accounting for 18.6%, while only a minority having attained primary teacher certificate (P1) at 2.6% and 7.1% were untrained teachers. According to Makokha (2017), the higher levels of teachers with ECDE certificates was ascribed to the fact that there was a lower entry grade of Kenya certificate of Secondary Education (KCSE) Mean Grade requirements of Grade D-(Minus) or higher, for training at ECD certificate level. The high enrolment of trained teachers in the county was attributed to the fact that the county government had employed trained teachers in all public pre-primary schools, with each pre-school having been given at least three teachers. There was a small portion of P1 teachers accounting for 3.45% that was attributed to the fact that P1 teachers lacked skills in dealing with young children and could only have been employed for having accumulated experience in the years they taught in pre-primary schools.

The findings shown in *Table 3* indicate that 47 teachers (28.6%) had less than 5 years of working experience, 70 teachers (42.2%) had between 6 and 10 years of work experience, 23 teachers (14.3%) had between 11 and 15 years of work experience while 24 teachers had above 15 years of teaching experience. These results imply that the majority of the teachers had a teaching experience of more than 5 years. According to Achola et al. (2016), this implied that they had sufficient teaching experience and thus could share information as to how they perceived the implication of instructional materials on ECDE learning. In Bungoma County, Kenya, it was observed that the majority of the teachers, almost 70%, had acquired an experience of more than five years in the service. They, therefore, had enough exposure and teaching experience in ECDE and were therefore reliable in providing

information relating to instructional material in ECDE. According to Makokha (2017), the long teaching experience was attributed to the fact that the majority of the teachers were already teaching in various schools before the county government employed them after basic education was devolved to the counties.

#### Levels of Utilization of Instructional Materials

The major task of this study was to establish the extent to which pre-primary school teachers' used instructional materials across eight ECDE activity areas. For the purpose of establishing the extent to which teachers used instructional materials across ECDE activity areas, scores of responses to eight ECDE activity areas along a 5-point Likert scale were computed. The items assessed the extent to which teachers utilized instructional materials across ECDE activity areas. The findings of the levels of utilization of instructional materials across ECDE activity areas are presented in *Table 4*.

**Table 4: Levels of Utilization of Instructional Materials**

Levels of the utilization of IM	Frequency	Percent (%)
Low	1	0.6
Moderate	87	53.1
High	76	46.3
<b>Total</b>	<b>164</b>	<b>100.0</b>

According to *Table 4*, the research determined that one respondent (0.6%) was a low user of IM, 86 (53.1%) were moderate users, and 75 (46.3%) were high users of instructional materials in ECDE activity areas. These findings agreed with those of Makokha (2017) where the level of utilization of improvised instructional materials was observed to be at 25.8% for the low users, 29.3% for the average users, and 44.8% for the high users. According to Makokha (2017), the high level of utilization of

improvised instructional materials was due to the fact that the teachers had a vast experience, which was supplemented by the availability of the locally available resources within the school environment. These findings were supported by those of Abaya (2017), where the level of utilization of instructional materials was inadequate, the learners had difficulties assimilating number work concepts.

### Hypothesis Test Results

The null hypothesis noted that there is no statistically significant relationship between teachers' demographic characteristics and utilization of instructional materials in pre-primary schools. Chi-Square tests were conducted to establish whether there was a significant relationship between teachers' demographic characteristics and utilization of instructional materials. The outcome of the Chi-Square test results is presented in *Table 5*.

**Table 5: Chi-Square results for teachers' demographics and utilization of instructional materials**

Teachers' Demographics	Chi-Square Value ( $\chi^2$ )	Degrees of freedom (d.f.)	Significance (p-value)
Age	8.345	5	0.378
Gender	1.335	1	0.030*
Marital status	21.153	5	0.057
Level of education	8.165	5	0.024*
Professional training	13.620	5	0.020*
Teaching experience	8.933	5	0.220

\* *Significant at  $p < 0.05$*

The Chi-Square test results indicated that three demographic variables had a statistically significant relationship with utilization of instructional materials namely gender ( $\chi^2 = 1.335$ ;  $p = 0.030$ ), level of education ( $\chi^2 = 8.165$ ;  $p = 0.024$ ) and professional training status ( $\chi^2 = 13.620$ ;  $p = 0.020$ ) had a statistically significant relationship with the level of utilization of instructional materials. These results implied that female teachers were more likely to use instructional materials than their male counterparts and that teachers who were higher levels of education and those who had acquired professional training as teachers were more likely to use instructional materials than their less educated and untrained counterparts. However, age, marital status, and duration of teaching experience had no statistically significant relationship with the utilization of instructional materials in pre-primary schools.

## DISCUSSION

### Gender of Pre-primary School Teachers

This study established that gender had a statistically significant relationship with the utilization of

instructional materials. These findings concurred with several studies done in other countries such as in Sweden, where Hedline and Aberg (2013) observed that pre-schools were dominated by female teachers. A study done among Swedish student-teachers found that the pre-school teacher-trainees were predominantly female. The researchers concluded that there was a need to recruit more male pre-school teacher trainees in order to bridge the gap. Similar observations were made in Kenya by Mwaniki (2015), where the majority of the pre-school teachers in Embu County were females, and there was a high correlation between gender and use of instructional materials in the teaching of number work in pre-schools. The same trend was observed in Kisumu County, where female teachers dominated the teaching profession in ECDE. Ngeru (2015) found that there was a significant relationship between female gender and the use of instructional materials. This trend would have been influenced by the fact that the majority of pre-primary school teachers were female.

### Teachers' Level of Education

The level of education of the respondents had a significant relationship with the level of utilization



of instructional materials. The researchers found that teachers' levels of education were highly correlated with the use of instructional materials. This finding is supported by research conducted in Kenya by Ngeru (2015), who observed that even though the minimum requirement for ECDE teachers was a Primary Teachers' Certificate (P1-level), most of the teachers had upgraded their academic status to diploma and bachelors' degree levels. This means that the ECDE teachers in that region were highly qualified. An exploration of teachers' qualifications conducted in Bungoma County by Makokha (2017) also indicated that all the teachers sampled had the relevant qualifications for ECDE teaching with the highest proportion having ECDE certificates and diplomas. All these studies showed that teachers' level of educational qualification was positively correlated with the use of instructional materials.

### **Teachers' Professional Training Status**

The teachers' professional training status of the respondents had a significant relationship with the level of utilization of instructional material in Pre-Primary Schools. This study established that trained teachers with a college diploma in early childhood development and education were more likely to use instructional materials than untrained teachers. The findings concurred with those of the previous exploration of the pre-school teachers' professional training qualifications that found that the majority of the respondents in the Central zone in Kisumu county had achieved at least a college diploma in ECDE. These findings showed a great improvement in the quality of teaching as compared to previous years, where most of the pre-school teachers were untrained (Achola et al., 2016). This trend was evident on a larger scale in Nairobi County, where all the teachers sampled had attained a college diploma or a bachelors' degree (Mwaniki, 2015). The results from a study by Ngure (2014) on the utilization of instructional media for quality training in pre-primary school teacher training colleges in Nairobi County, Kenya, revealed that a variety of instructional media were available but minimally utilized in training pre-primary teacher trainees. The contribution of the availability of instructional media, trainers' attitude towards instructional media, and motivation to the utilization of instructional media was correlated to

the level of use of instructional materials. The study recommended that the Ministry of Education should ensure implementation of the curriculum, which includes effective use of instructional media in teaching in pre-primary schools in Kenya.

### **CONCLUSIONS AND RECOMMENDATIONS**

This study has shown that teachers' characteristics such as gender, level of education, and professional training status of pre-primary school teachers had a statistically significant relationship with the level of utilization of instructional materials. These results implied that female teachers were more likely to use instructional materials than their male counterparts. Teachers who had higher levels of education and also those who were more highly trained as early childhood educators were more likely to use instructional materials in their classrooms than their counterparts who had lower levels of education and those who were untrained teachers. Based on the findings of this study, it is recommended that one of the requirements of recruitment and appointment of pre-primary school teachers should be professional training in early childhood education in order to improve the standards of instructional practice at the foundational level. In order to enhance the utilization of the instructional materials, there is a need to promote the development of instructional materials in pre-primary school teacher training colleges. There is also a need to develop in-service teacher training programmes for pre-primary school teachers in order to enhance the utilization of instructional materials in teaching and learning in early childhood education. There is a need to encourage gender equity in the training and recruitment of male teachers in early childhood education.

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### **AUTHORS' CONTRIBUTIONS**

This manuscript is based on doctoral dissertation research conducted by the first author in partial fulfilment of a PhD degree under the supervision of

the second and third authors. Both supervisors guided the entire research process and contributed their scholarly inputs to the writing of the research report and approved the final manuscript.

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