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# Correlation between Class Size and Pupils' Acquisition of Early Mathematics Competencies: A Case of Kericho County, Kenya

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***Abstract***
Mathematics is one of the core subjects in the Basic Education Curriculum in Kenya. It means that all pupils are required to have a strong grounding in the subject which depends on the level of their early mathematics competencies. The purpose of the study was therefore to establish the level of pupils' acquisition of early mathematics competencies. The study was also to determine how class size was related to pupils' acquisition of early mathematics competencies. The study was guided by Social Development Theory by Lev Vygotsky. The study adopted a correlation research design and a mixed research method approach. The dependent variable was pupils' acquisition of early mathematics competencies while the independent variable was class size. The results from data analysis revealed that majority of the pupils had acquired early mathematics competencies and there was a difference in pupils' acquisition of early mathematics competencies between grade three pupils in public and those in private primary schools. The relationship between class size and pupils' acquisition of early mathematics competencies was significant at $p<0.05$ level of significance.
**Keywords:** Class Size; Pupils; Acquisition of Early Mathematics Competencies; Kericho County; Kenya
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## 1. Introduction

Early mathematics competencies influence pupils' later success in mathematics (Denton & West, 2002). Linda (2012) states that young children should possess adequate early mathematics competencies because it predicts later academic success in upper classes. Duncan and Magnuson (2011) report that early mathematics competencies affect later mathematics achievement and work performance in future. Salau (2000) remarked that there exists a connection between various science subjects and mathematics. However, even though it is clear that mathematics plays a very important role in the learners' future career and work performance, learners appear to perform poorly in the subject.

The term competence refers to a complex combination of knowledge, skills, values and attitudes which lead to effective, embodied human action in the world in a particular domain (Hoskins & Crick, 2010). Turner (2011) noted that these competencies can indeed be regarded as a set of individual characteristics or qualities that are possessed by learners and they include communication, mathematizing, representation, reasoning, devising strategies and using symbolic, formal and technical language and operations. According to Zhou, Peverly and Lin (2005) early mathematics competencies involve number operations, identification of geometric shapes, problem solving as well as logical reasoning. In addition, Kenya Institute of Curriculum Development (KICD, 2017) pointed out early mathematics competencies that learners in grade three should acquire including an understanding of number concepts, whole numbers, fractions and perform the four basic operations. They should also carry out measurement of length, mass, capacity, read time and identify money which were the focus of this study.

Pupils' early mathematics competencies is an issue of concern across the globe. According to United Nations Educational, Scientific and Cultural Organization (UNESCO, 2006) mathematics is a concern both in developing and developed countries. A report from the National Association for the Education of Young Children (NAEYC, 2010) noted that there has been a decline in pupils' mathematics competency in United States of America since 1970. Huntsman (2008) had found that in United Kingdom, fewer children per caregiver were associated with

 

higher process quality while higher ratios were associated with lower process quality. This is because the caregiver with fewer children provided more attention and interactions that were meaningful to children.

In Africa, research carried by Mullis, Martin, Gonzalez and Chrostowski (2003) on Trends in International Mathematics and Science Study (TIMSS) indicated that 68% and 90% of African boys and girls respectively failed to reach the low international benchmarks in mathematics. Research on learners' performance in mathematics pointed to the fact that poor implementation of mathematics curriculum greatly contributed to lack of adequate mathematics competencies (UNESCO, 2009). This was due to low quality of classroom organization and less resources that limited opportunities for pupils' to be hands-on. Furthermore, teachers had difficulties with teaching methodologies and lacked guidance on how to cater for individual differences to enhance pupils' mathematics abilities. In a study carried out in South African public schools by the Southern African Consortium for Monitoring Educational Quality (SACMEQ) on the conditions of schooling and quality of education, Moloi and Strauss (2005) found that learners performed poorly in mathematics in rural schools with inadequate resources. Similar results were reported by Odili and Asuru (2010) in a study conducted in Nigeria on primary school teachers' mastery of primary school mathematics content which revealed that low level of mastery of primary mathematics by primary school teachers was a big hindrance to the realization of the primary mathematics competencies. Arends, Winnaar and Mosimege (2017) who conducted a study on the teacher classroom practices and mathematics performance in South African schools also indicated that there was a positive association between teachers' choice of strategies and pupils' mathematical competencies. The above studies illustrate the gravity of the situation in Africa concerning pupils' mathematics competencies.

Regionally, (Uwezo, 2016) in Uganda noted that many children lacked early mathematics competencies which they were expected to have developed. It was also revealed that less than a third of learners enrolled in class three did not have the basic class two mathematics competencies. That is, in a class of ten only three pupils in class three in Uganda could solve a division problem of class two while only one recognized numbers between 11 and 99 in Kenya (Uwezo, 2015).

In Kenya studies reviewed indicated that the situation was not encouraging. Benson (2011) found that poor performance in mathematics was caused by factors such as; using approaches that were not learner-centered, learners' negative attitudes and lack of motivation. Makewa, Role, Too and Kiplagat (2012) stated that acquisition of mathematics competencies may not be guaranteed given the way of teaching. This resulted from the fact that many teachers in Kenya continued to use teacher-centered teaching approaches. Furthermore they lacked training and experience on the use of learner-centered teaching methods due to high teacher-pupil ratio and inadequate teaching and learning materials. A study by Magoma (2016) on determinants of standard one pupils' readiness to learn mathematics in primary schools in Kasarani sub-county, found that learners who had attended private pre-primary schools showed better numerical abilities than pupils who had attended public pre-primary schools. In Kericho County, Kandie, Begi and Kangethe (2014) in their study to establish the relationship between lower primary school teachers' mathematics self-efficacy and pupils' performance in mathematics, found that there was a significant relationship between lower primary school teachers' mathematics self-efficacy and pupils' performance in mathematics. The above studies made the researchers to investigate pupils' acquisition of early mathematics competencies which might explain why mathematics is poorly performed.

## 2. Statement of the Problem

Globally, mathematics is regarded as a very important subject because it is a building block for fields such as medicine, pharmacy, engineering, architecture and information technology among others. However, from the studies conducted globally, regionally and locally pupils' performance in mathematics has not been to the expectation of stakeholders. It was from the realization that performance of pupils in mathematics was poor that inspired the need to establish pupils' acquisition of early mathematics competencies and the factors behind it.

Studies which have attempted to research on the factors that explain pupils' unsatisfactory performance in mathematics chiefly focused on availability of resources, teacher motivation, teachers' self-efficacy, medium of instruction and not on pupils' acquisition of early mathematics competencies. Furthermore, the studies centered on upper primary and secondary schools. Therefore, there was need to conduct a study to establish pupils' acquisition of early mathematics competencies and the factors influencing it.

*3. Objectives of the Study*

a) To establish the level of grade three pupils' acquisition of early mathematics competencies in public and private primary schools.

 

b) To explore the relationship between class size and pupils' acquisition of early mathematics competencies.

## 4. Theoretical Framework

This study was guided by the Social Development Theory by Vygotsky (1978). Vygotsky in his Social Development Theory postulates that social interaction at various levels of development of learners plays a key role in cognitive development as it is explained by the concept of Zone of Proximal Development (ZPD). Vygotsky introduced the idea of ZPD that signifies the distance of gap between the actual and potential level, between what an individual child is able to do alone and what he/she can achieve through problem solving under an adult guidance or in collaboration with more experienced or capable peers. The ZPD includes a range of very complex tasks to be mastered independently by a child but can be realized with adult guidance or associations with knowledgeable peers. Vygotsky accentuated that teaching and learning are highly social activities, therefore, learners achieve their goals through interaction with teachers, peers and materials. He believed that pupils typically learn vicariously through one another. Vygotsky maintained that adults (teachers and parents) as well as peers promote children's cognitive development by assisting them with challenging tasks that will enhance mathematics competencies.

The concept of zone of proximal development lays emphasis on the construction of knowledge within a cooperative environment (Wells and Claxton, 2002) and it underlines that learning development is the result of interaction between the child and his/her environment (Vygotsky, 1978). A child can master knowledge, skills or strategies when they get guidance from an adult or peer either directly or indirectly (Westwood, 2004). Therefore, the relationship between peers and that of teacher-pupil as well as the environment will affect the acquisition of early mathematics competencies.

The theory was relevant to this study because it explains how an adult (teacher) and a capable peer could give guidance and assistance to pupils faced with challenging mathematical tasks.

## 5. Research Methodology

### 5.1 Research Design

Correlation design was used to guide the study. According to Vanderstoep and Johnson (2009), a correlation design involves a non-experimental study that measures the extent to which variables are related. This research design was appropriate since the researcher sought to describe the relationships that occurred between independent and dependent variables. It also suited the research problem in that questionnaires, observation schedules and mathematics competency checklists were used to gather data on the determinants of pupils' acquisition of early mathematics competencies

### 5.2 Variables

The dependent variable was pupils' acquisition of early mathematics competencies which was measured by using a checklist based on KICD Lower Primary School Curriculum Designs (2017). These competencies included counting, reading, writing, adding and subtracting numbers up to 1000. They also included multiplying and dividing 2-digit numbers, identifying Kenyan currency and fractions as part of a whole, estimating length, mass and capacity as well as reading time and making patterns. The independent variable was class size which was measured by indicating whether size of the class was appropriate or inappropriate using the number of pupils in class register in grade three.

### 5.3 Research Methodology

The method of research used in this study was mixed method approach. The method combines both quantitative and qualitative approaches. Questionnaires and mathematics competency checklists were used to collect quantitative data in which most of the inquiry was presented in numbers while observation schedules were used to collect qualitative data. The method was used so as to complement one set of results with another.

### 5.4 Location of the Study

This research was carried out in Kericho County which is located in Rift Valley region in Kenya. The county was selected because Uwezo (2010) revealed that only 34% of pupils in standard three could perform numeracy tasks.

 

5.5 Target Population

The population was pupils in grade three in Kericho County. Grade three was chosen because pupils at this level should have cumulatively acquired the requisite mathematical competencies before joining upper primary level. The target population was 4,140 grade three pupils enrolled in 81 public and 23 private primary schools in Kipkelion sub-county.

5.6 Sampling Techniques and Sample Size

Purposive sampling was used to select Kericho County and Kipkelion sub-county, while stratified random sampling was used to select public and private primary schools. The schools were selected from each stratum using simple random sampling. The sample of the study consisted of 20% of the schools that was 16 public and 5 private primary schools. The sampled schools had 579 pupils from public and 105 from private primary schools giving a total of 684 pupils who participated in the study.

5.7 Research Instruments

The researchers used questionnaires, observation schedules and mathematics competency checklists to collect data. The instruments were used to obtain data on background information of the pupils and schools and pupils' level of acquisition of early mathematics competencies. The research instruments were pre-tested in two schools, one public and the other private. Pilot study helped the researcher in detecting any anomalies, biasness or ambiguity in the instruments before carrying out the research. Content validity and test-retest methods were used to ensure the instruments were valid and reliable.

5.8 Data Collection and Analysis

Data was collected in three stages. During the first stage questionnaires were administered to teachers while during the second stage mathematics competency checklists were administered to pupils. The third stage involved the use of observation schedules. Data was analyzed using descriptive and inferential statistics. The descriptive statistics used included frequencies and percentages. Pearson's Product Moment Correlation and t-test were used to test research hypotheses and results presented using tables and text.

5.9 Logistical and Ethical Considerations

The researchers before going to schools to collect data had obtained all the relevant approvals from different authorities. They included introductory letter from Kenyatta University Graduate School, National Commission for Science, Technology and Innovation (NACOSTI), Kericho County Director of Education and County Commissioner and the management of schools. Consent of the respondents to participate in the study was also sought and assured that the information they provided will be kept confidential.

## 6.0 Results and Discussions

6.1 Pupils' Acquisition of Early Mathematics Competencies

The study sought to establish the level of grade three pupils' acquisition of early mathematics competencies in public and private primary schools. The objective was stated as:

**Objective 1:**

To establish the level of grade three pupils' acquisition of early mathematics competencies in public and private primary schools.

To achieve this objective, pupils' mathematics competencies were assessed using mathematics competency checklists. The checklists consisted of items on mathematics competencies that pupils were supposed to acquire by the end of the programme as outlined in KICD Curriculum Designs for Lower Primary Education (2017). The competencies included the ability to count, read and write numbers up to 1000. Other competencies were addition, subtraction, multiplication and division. They also included identification of simple fractions and Kenyan currency as well as estimation of length, mass and capacity. The pupils were also required to read time and make patterns of various shapes. To measure the pupils' mathematics competencies, a competency test was administered to the pupils and their abilities rated as [1] Below expectation, [2] Approaches expectation, [3] Meet expectation and [4] Exceed expectation. The results have been presented in Table 1 below.

 

***Table 1: Distribution of Pupils by Mathematics Competencies***

| | BE | | AE | | ME | | EE | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | F | % | F | % | F | % | F | % | F | % |
| Count Numbers Up To 1000 | 1 | 0.1 | 145 | 21.2 | 538 | 78.7 | 0 | 0.0 | 684 | 100 |
| Read Numbers Up To 1000 | 7 | 1.0 | 134 | 19.6 | 543 | 79.4 | 0 | 0.0 | 684 | 100 |
| Write Numbers Up To 1000 In Words | 11 | 1.6 | 223 | 32.6 | 450 | 65.8 | 0 | 0.0 | 684 | 100 |
| Subtract Up To 3-Digit Numbers From 3-Digit Numbers Without and With Borrowing. | 6 | 0.9 | 134 | 19.6 | 544 | 79.5 | 0 | 0.0 | 684 | 100 |
| Multiply Single Digit Numbers by Numbers 1-10 | 5 | 0.7 | 101 | 14.8 | 578 | 84.5 | 0 | 0.0 | 684 | 100 |
| Divide Up To 2 Digit Numbers by Single Digit Numbers Up To 25 | 6 | 0.9 | 111 | 16.2 | 567 | 82.9 | 0 | 0.0 | 684 | 100 |
| Identify ½, ¼, And 1/8 As Part of a Whole or Group | 0 | 0.0 | 79 | 11.5 | 605 | 88.5 | 0 | 0.0 | 684 | 100 |
| Estimate Length Up To 20 Meters | 30 | 4.4 | 232 | 33.9 | 422 | 61.7 | 0 | 0.0 | 684 | 100 |
| Estimate Mass Up To 5 Kilograms | 20 | 2.9 | 245 | 35.8 | 419 | 61.3 | 0 | 0.0 | 684 | 100 |
| Estimate Capacity Up To 5 Litres | 10 | 1.5 | 185 | 27.0 | 489 | 71.5 | 0 | 0.0 | 684 | 100 |
| Identify Kenyan Currency Up To 1000 | 0 | 0.0 | 33 | 4.8 | 651 | 95.2 | 0 | 0.0 | 684 | 100 |
| Read Time Using "Past" And "To" The Hour Using A Clock Face | 15 | 2.2 | 231 | 33.8 | 438 | 64.0 | 0 | 0.0 | 684 | 100 |
| Make Patterns Involving Squares, Rectangles, Triangles, Circles and Ovals. | 1 | 0.1 | 87 | 12.7 | 596 | 87.1 | 0 | 0.0 | 684 | 100 |

As shown in Table 1 majority of the pupils met expectations, while none of them exceeded the expectations. Close examination of the results also revealed that there were a significant number of pupils whose competencies were below or approaching expectations. The results imply that majority of the pupils' early mathematics competencies were adequate.

The researchers also sought to ascertain whether there was a difference in acquisition of early mathematics competencies between pupils in public and private primary schools. To do this, pupils' mathematics competencies were assessed by type of school and the results were as presented in Table 2.

***Table 2: Pupils' Mathematics Competencies by Type of School***

| | Type of School | N | Mean | Std. Deviation |
|---|---|---|---|---|
| Average Math Competence | Public | 579 | 2.7361 | .32269 |
| | Private | 105 | 2.9082 | .21513 |

Table 2 shows that the average means of mathematics competencies of pupils in both public and private primary schools were 2.7361 and 2.9082 respectively. The results imply that majority of pupils met the expectations.

To determine the difference in acquisition of early mathematics competencies between pupils in public and private primary schools, the following null hypothesis was generated and tested.
*$H_{01}$: There is no significant difference in acquisition of early mathematics competencies between grade three pupils in public and private primary schools.*

To establish whether there was a difference in acquisition of early mathematics competencies between grade three pupils in public and private primary schools, the researchers administered a t-test and the results have been

 

presented in Table 3.

***Table 3: Independent Samples Test***

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | F | Sig. | t | Df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference | |
| | | | | | | | | | Lower | Upper |
| Average Math Competence | Equal Variances Assumed | 41.740 | .000 | -5.254 | 682 | .000 | -.1720 | .0326 | -.2363 | -.1076 |
| | Equal Variances Not Assumed | | | -6.906 | 200.18 | .000 | -.1720 | .0249 | -.2212 | -.1229 |

The results in Table 3 show that the mean difference in early mathematics competencies between pupils in public and private primary schools was -.1720 with a p-value of .000. The results imply that the difference was highly significant, hence the null hypothesis was rejected and the alternate hypothesis which stated that there is a difference in acquisition of early mathematics competencies between grade three pupils in public and private primary schools was accepted. The findings therefore revealed that pupils in private primary schools were more competent in mathematics than their counterparts in public primary schools.

The results are consistent with those reported by Adeyemi (2014) in his comparative study of pupils' academic performance between private and public primary schools in Osun State in Nigeria. He found that pupils in private primary schools performed better than their counterparts in public primary schools. The current study findings also concur with those of Magoma (2016) who carried a study on the determinants of standard one pupils readiness to learn mathematics in primary schools in Kasarani sub-county, Kenya which had revealed that learners who had attended private pre-primary schools showed better numerical abilities than those who had attended public pre-primary schools.

Bonsu (2016) did a comparative analysis of academic performance of public and private junior high schools in the basic education certificate in Sekondi/Takoradi, Ghana. The results had indicated that there were no differences in academic performance amongst pupils in public and private schools' results which disagree with the findings of this study which showed that pupils in private primary schools had better mathematics competencies than those in public primary schools.

Rong'uno (2017) in his findings on the comparison of academic performance between public and private secondary schools in Wareng District, Kenya supports the outcome of this study which found that pupils in private primary schools showed better mathematics competencies than those from public primary schools. The researcher further stated that despite the government's heavy investment in public schools, there was no much that had been realized in performance. His findings therefore revealed that private schools out performed public schools' results which were similar to the findings of this study.

6.2 Class Size and Pupils' Acquisition of Early Mathematics Competencies

The researchers sought to explore whether there was a relationship between class size and pupils' acquisition of early mathematics competencies. The objective to be achieved was:

**Objective 2:**

To explore the relationship between class size and pupils' acquisition of early mathematics competencies.

To achieve this objective, the researchers used class registers to determine the number of pupils in grade three. The class size was categorized as being appropriate or inappropriate based on the number of pupils in class. The

 

appropriate class size was that of 40 pupils and below while the inappropriate class size was made up of pupils above 40. The results were as presented in Table 4.

***Table 4: Distribution of Pupils by Class Size***

| Class size | Frequency | Percent |
|---|---|---|
| Appropriate | 508 | 74.3 |
| Inappropriate | 176 | 25.7 |
| Total | 684 | 100.0 |

According to the results in Table 4, majority of pupils were in appropriate classes. The researcher also used observation schedule to achieve this objective. The researchers requested to attend mathematics lessons in grade three in order to observe and record the number of pupils in class. It was noted that most classes were made up of appropriate class sizes. However, the researcher observed that the few schools with inappropriate classes were faced with a lot of distractions because pupils were seen moving around in class with minimal individual attention from their teachers. Teachers were also having difficulties moving around in class because most spaces had been occupied by desks.

To find out whether there was a relationship between class size and pupils' acquisition of early mathematics competencies, mean scores in pupils' mathematics competencies in both appropriate and inappropriate class sizes were generated. The results were as presented in Table 5.

***Table 5: Pupils' Mathematics Competencies by Class Size***

| | Class Size | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| Average math competencies | Appropriate | 508 | 2.7774 | .28800 | .01278 |
| | Inappropriate | 176 | 2.7196 | .37904 | .02857 |

Table 5 shows that the average mean scores of pupils' mathematics competencies in both appropriate and inappropriate class sizes were 2.7774 and 2.7196 respectively. The results show that average mean score for pupils in appropriate size classes was higher than those in inappropriate class size.

The researchers were also to ascertain whether the relationship between class size and pupils' acquisition of early mathematics competencies was significant. This led to the formulation of the following null hypothesis.
*$H_{O2}$: There is no significant relationship between class size and pupils' acquisition of early mathematics competencies.*
To explore the significance of the relationship between class size and pupils' acquisition of early mathematics competencies, Pearson correlation coefficient was generated and the results have been presented in Table 6.

***Table 6: Correlation Between Class Size and Pupils' Acquisition of Early Mathematics Competencies***

| | | **Average math competence** | **Class Size** |
|---|---|---|---|
| Average math competence | Pearson Correlation | 1 | -.080* |
| | Sig. (2-tailed) | | .035 |
| | N | 684 | 684 |
| Class Size | Pearson Correlation | -.080* | 1 |
| | Sig. (2-tailed) | .035 | |
| | N | 684 | 684 |

*. Correlation is significant at the 0.05 level (2-tailed).

 

The results in Table 6 show that the correlation coefficient between class size and pupils' acquisition of early mathematics competencies was -.080, with a p-value of .035. The results imply that the correlation was significant, hence the null hypothesis was rejected and its alternate which stated that there is a relationship between class size and pupils' acquisition of early mathematics competencies was accepted.

The current study findings which disclosed that there was a significant correlation between class size and pupils' acquisition of mathematics competencies are consistent with those reported by Blatchford, Moriarty, Edmonds and Martin (2002) who carried out a study on relationships between class size and teaching. Their findings showed that there was better and individualized support for learners by their teachers in smaller classes. Learners therefore have better competence when they learn in smaller classes. Barnett, Schulman and Shore (2004) in their study on class size, what is the best fit, agreed with the findings of this study. They noted that smaller classes are better when handling young children because it allows for more individual attention and reduces the number of stressful interactions. This therefore saves time and effort devoted to class management. This argument was supported by Krueger (2000) in a study on how small classes help teachers do their best, which showed that small classes were associated with increased learner outcomes. The findings of Kariuki and Guantai (2005) in their analysis of SACMEQ data from 14 different African countries agree with the findings of this study that pupils in small size classes showed better competence as compared to their counterparts in large classes.

This research findings which revealed that there was a significant relationship between class size and pupils' acquisition of early mathematics competencies were also similar with those of Shin and Chung (2009) who undertook an analysis on how learners' achievement was being affected by class size. Their findings showed that competency is better in smaller classes and even effective in lower level classes than higher level classes. The current study findings are consistent with those reported by Situma (2010) in a study on primary school quality and performance in Kenya. His findings showed that among other factors such as feeding programmes, school infrastructure and sanitation, class size significantly affects and determines the competence of primary school learners. The study findings concur with those of Bruhwiler and Blatchford (2011) who in their studies on effects of class size and adaptive teaching competency on classroom processes and academic outcome noted that competence was subject to class size with regard to learning progress, knowledge acquisition and retention as well as class processes.

Yelkpieri, Namale, Esia-Donkoh and Ofosu-Dwamena (2012) in their findings on a research to establish the effects of large class sizes on effective teaching and learning in Ghana, showed that large class sizes affected performance of learners negatively. Their findings therefore agree with the findings of this study which indicated that pupils in appropriate class sizes showed better mathematics competencies than those in inappropriate class sizes. The findings of this study are also consistent with those reported by Linnel-Olsen (2019) who found that children learn more when classes were limited on size because they require larger spaces to engage in their appropriate class activities and cooperative play. Hence, there will be less distractions in class and teachers will give individualized support to their pupils.

The findings of current study revealed that class size influenced pupils' mathematics competencies, results which are contrary to those from a study done in Nigeria by Owoeye and Yara (2011) which disclosed that class size did not affect the achievement of learners in both urban and rural schools. Similarly, the findings disagree with those of Uhrain (2016) who carried out a research on effect of class size on student achievement in South Carolina which showed that other variables other than class size affected student achievement.

## 7. Conclusions

The first objective was to establish the level of grade three pupils' acquisition of early mathematics competencies in public and private primary schools. Findings had shown that the majority of pupils had met expectations in their acquisition of early mathematics competencies. It was therefore clear that pupils' early mathematics competencies were adequate.

In the second objective, the researcher was to explore the relationship between class size and pupils' acquisition of early mathematics competencies. Results showed that the relationship between class size and pupils' acquisition of early mathematics competencies was significant. It is evident therefore, that class size influenced pupils' acquisition of early mathematics competencies.

## 8. Recommendations for Key Stakeholders

Recommendations were made based on the study findings and conclusions. The recommendations are for the

 

following key stakeholders:

8.1 School Management

The results show that there was a relationship between class size and pupils' acquisition of early mathematics competencies. It is recommended therefore, that schools maintain appropriate class sizes to reduce challenges of interaction between learners and their teachers. This is because teachers ought to have high level of interaction with their learners in order to improve their mathematics competencies. School management should therefore construct more classrooms to have appropriate teacher-pupil ratio as required by the Competency Based Curriculum. This is because there were about 25.7% of pupils who were in inappropriate class sizes.

8.2 Parents

Parents play an important role as they have a shared responsibility with schools to provide an enabling environment that is conducive to learning. Hence, they should be ready to buy the required teaching materials to enable children handle activities that will promote their mathematics competencies. Parents should complement the government by building adequate classrooms in order to reduce the challenges of having large classes. This will enable schools to achieve the appropriate class sizes hence, teachers and learners will have high level of interaction which will improve their mathematics competencies.

8.3 Ministry of Education

Ministry of Education should maintain high standards of teaching and learning in primary schools by carrying out frequent inspections and supervision which may help in providing early intervention measures. The ministry should train teachers so as to acquire the necessary skills for handling the new curriculum. The ministry should also provide the necessary infrastructure which will minimize cases of over enrollment in primary schools. Adequate teaching and learning materials should be supplied to schools in good time by the ministry so as to enhance pupils' acquisition of early mathematics competencies.

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