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RELATIONSHIP BETWEEN SCHOOL LEARNING ENVIRONMENT AND PUPILS' PERFORMANCE IN MATHEMATICS IN NAIROBI COUNTY, KENYA

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Abstract:
Mathematics for young children lays a foundation of basic concepts and skills on which future learning is built. However, despite the role it plays in an individual and society, in Kenya it has continued to be poorly performed by students in national examinations. The purpose of the study was to explore the relationship between school learning environment and pupils' performance in mathematics. Ecological model by Urie Bronfenbrenner was used to guide the study. The study used descriptive research design. Dependent variable was pupils' performance in mathematics; while independent variable was school learning environment. The target population was standard three pupils and teachers in Dandora Zone, in Nairobi County. Purposive and stratified random sampling techniques were employed to select the sample of the study. Questionnaire, achievement proforma and observation schedules were used to collect data. Quantitative and Qualitative methods were used to analyse data and results presented using tables and text.

Keywords: school learning environment; pupils; performance in mathematics

1. Introduction

Mathematics for young children lays a foundation of concepts and skills on which future learning and operations are built (NCTM, 2002). The main goal of mathematics early education is to prepare pupils to cultivate creative and critical viewpoint as they face encounters in their day-to-day lives (Mireemikwu, 2008). It provides an effective way of building intellectual discipline and encourages rational reasoning and mental rigour (Skemp, 2008). Schoenfield (2012) notes that mathematical knowledge plays an essential part in understanding the contents of other school subjects such as science and

social studies. National Council of Teachers of Mathematics (NCTM, 1992) adds that high quality mathematics learning is one that develops mathematical power for all students. Children should be provided with a variety of activities during the early years in order to help them learn basic concepts and have a firm basis in the subject (Ummeh, 2011). This is because educational skills and concepts are hierarchal and failure to acquire fundamental skills leads to failure in the achievement of advanced skills.

Mathematics is a pillar for many streams in education which serves as a gateway to future professions in variety of fields. In Kenya, it is a core subject in school curriculum for both primary and secondary schools. Mutunga and Breakell (1992) defined mathematics as a systematized body of knowledge where thoughts, principles and ideas involving numbers are built up logically. Regardless of the important role that mathematics plays in society, there has always been deprived performance in the subject at national examinations in Kenya (Aduda, 2003). The government of Kenya, in partnership with JICA (Japanese International Corporation Agency), introduced SMASSE (Strengthening Mathematics and Sciences in Secondary Education) project to improve students' performance in maths and sciences (Kenya National Examination Council, (KNEC, 2008).

Poor performance in mathematics has also been reported in lower primary school classes. A study by KNEC (2010) to monitor learner's achievement in literacy and numeracy had revealed that only 52% of standard three pupils were competent in solving mathematics problems. The report further revealed that home environment contributed to poor performance in mathematics. In addition, KNEC (1996) identified poor syllabus coverage and lack of mastery of basic concepts as the main reason for poor performance. A survey conducted by Uwezo (2010) had revealed that seven out of ten pupils in class three could do class two work. Uwezo findings further revealed that 60% of standard three pupils in public schools do not have the basic mathematical skills, while 34% of the pupils in standard three could not perform simple tasks that demonstrate numeracy and this may be attributed to school learning environment. There was therefore, need to explore the influence of school learning environment on pupils' performance in mathematics.

Learning environment plays an integral role in shaping the inherent potentialities. The world discussion on Education for All that took place in Thailand (2009) had reported that environmental experiences during the early years of development were crucial since they enhance or hinder realization of one's potential. When a school environment is conducive, learners become positive hence good performance. In addition, a report by UNICEF (2009) on child friendly school manual asserts that schools should provide child friendly environments that include; access to safe water, proper hygiene and sanitation facilities and school buildings free from hazards such as indoor air pollution.

Several factors have been reported to be influencing pupils' performance in mathematics. In Turkey, Tuncay and Omur (2009) had found that factors such as age, instructional methods, facilities and individual factors influenced learners' achievement in mathematics. In Africa, a study by Jekanyifa (2010) had found that students with

plenty of materials for teaching-learning in history scored better than those who had insufficient teaching-learning materials. Zacharia (2011) had found that secondary schools were poorly furnished with learning materials for maths.

In Kenya, Kenya National Examinations Council (KNEC, 2004) report had found that for many years, performance in mathematics has been declining. The factors such as overcrowding in primary schools, poor teaching methods and high incidences of teacher absenteeism hindered effective learning of mathematics (KNEC, 2010). Munda, Tanui and Kaberia, (2000) in Bungoma county Kenya had found that, infrastructure contributed positively to student's performance. The above studies shed light on causes of poor performance; however, their main focus was on higher classes. There was need therefore to conduct a study to focus on lower primary classes to explore the relationship of classroom learning environment on pupils' performance in mathematics.

2. Research Problem

School environment is an important aspect of learning because this is where learners spend most of their time. The school environment is also greatly responsible for influencing the well-being of children and educational outcome. Achievement in mathematics continues to be a major concern in Kenya and in many countries. Studies have revealed that majority of lower primary school pupils in Kenya do not possess basic mathematical skills. Concerted efforts have been made to curb the challenge such as reviewing of curriculum, introduction of programmes to strengthen Mathematics and Sciences in Secondary Education (SMASSE), in servicing of teachers and provision of adequate learning materials to improve mathematics achievement. In spite of this no significant improvement has been realised. There was need therefore to ascertain whether classroom learning environment plays a role in this trend.

Although several studies had pointed out some causes contributing to poor performance in mathematics, a lot of literature had focused on secondary classes. Lower primary classes should not be neglected as they play a critical role in laying a strong foundation for learning mathematics. Therefore, this study explored the relationship between school learning environment and standard three pupils' performance in mathematics in primary schools.

3. Research Objectives

The objectives of the study were:

1. To explore the relationship between availability of infrastructure and pupils performance in mathematics.
2. To find out the relationship between pupil-teacher ratio and pupils' performance in mathematics.
3. To determine the relationship between availability of teaching-learning materials and pupils' performance in mathematics.

4. Research Methodology

The study adopted descriptive research design. The dependent variable was pupils' performance in mathematics; while independent variable was school learning environment. The target population was standard three pupils and teachers in Dandora Zone, in Nairobi County. Location of the study and standard three pupils was done using purposive sampling, while stratified random sampling technique was used to choice schools and pupils involved in the study. The sample consisted of 19 primary schools, 4 public, 15 private and all the standard three teachers and pupils in the schools. Questionnaire, pupils achievement proforma and observation schedule were used to collect the required data. Quantitative and qualitative methods were used to analyse statistics. Descriptive statistics computed included frequencies, means and percentages. The inferential statistics used to test the null hypotheses was chi-square and results presented using tables and text.

5. Results and Discussions

5.1 Availability of Infrastructure and Pupils Performance in Mathematics

The first objective of the study was to investigate the relationship between availability of infrastructure and pupils performance in mathematics. To achieve the objective, the researcher used observation schedule, questionnaire and achievement proforma.

5.2 Pupils Achievement in Mathematics

To achieve the objective, pupils' performance in end of term exams was obtained and means scores calculated. The results for the 19 schools have been presented in Table 1.

Table1: Pupils Achievement in Mathematics

Schools	Mean Score in Mathematics
1	64.23
2	59.01
3	72
4	67.81
5	69
6	65.63
7	65.16
8	62.10
9	74
10	80.05
11	81.25
12	89.92
13	73.10
14	88.4
15	82.36
16	81
17	68.45
18	69.12
19	85.5

As it can be seen on Table 1 pupils' performance in mathematics was above average in most of the schools. Difference in performance in mathematics could be explained by difference in availability of physical facilities, pupil-teacher ratio and teaching-learning materials.

The available infrastructure in the primary schools was established using an observation schedule, questionnaire and the results are presented in Table 2.

Table 2: Availability Infrastructure

Facilities	**Schools**					
	Have standard facilities	**%**	**Have sub-standard facilities**	**%**	**No facilities**	**%**
Desks	8	42.1	11	57.9		
Classroom	6	31.6	12	63.1	1	5.3
Teachers chair and table	16	84.2			3	15.8
Library	5	26.3	1	5.3	13	68.4
Toilets	9	47.4	10	52.6		

As shown in Table 2 less than half (42.1%) of the schools had furniture which met the required standards, while in more than half (58%) of the schools the furniture did not meet the required standards. It was also observed that in most of the schools, pupil-teacher ratio was above the recommended ratio and desks were in poor condition as some were broken and unrepaired. Others were inappropriate for learners because they were either too high or too low than their reading level and this did not provide the physical comfort needed for concentration and learning of mathematics.

About classrooms, it was observed that a few classrooms 6(31 %) met required standards which included good ventilation, cemented floor, lockable strong doors, enough class size of 1:40, proper roofing and tidy class that is well arranged and litter was not scattered all over. Majority of the schools 12(63.1%) had poor conditions which included small classrooms. Many schools had an average of over 40 pupils per class and were too small in size leading to congestion and overcrowding in classroom because they were not built to specifications. This leads to inadequate space for movement in the classroom. Pupils were thus limited and this means their participation during mathematics activity and their interaction with teaching learning materials was minimal. Others had one large hall that had many portions hence pupils' concentration could easily be distracted because different classes were doing different activities.

In schools with poor conditions, classrooms had leaking roofs, some had no doors or windows while others had earth floors and the ones with cement had large patches where cement was worn out. They also had poor ventilation system which means that diseases would spread easily leading to absenteeism in schools and hence affecting performance in mathematics. Some of these schools were also located in noisy environments near business places which interfered with pupils learning mathematics. One of the schools did not have a classroom for standard three pupils and so pupils were forced to share a class with standard two pupils.

Regarding chairs and tables for teachers, majority of the schools (84.2%) had suitable chairs and tables while (15.8%) did not have enough chairs and tables and so teachers were forced to share desks with pupils while marking their work. On availability of library, majority (68.4%) of the schools did not have a library and so pupils were forced to do most of their reading from class or outside and could not easily access supplementary books for mathematics. In (26.3%) of the schools, libraries were available and meet the required standards and in (5.3%) they were available but not functional.

On availability of toilets for pupils, it was observed that majority (52.6%) of the schools did not meet the required standards as it was noted that both boys and girls had to share one toilet and slightly less than half (47.4%) had separate toilet for boys and girls. In some schools, there was only one toilet available and so pupils were forced to queue for a long time. This led to time wastage and affected pupils' performance in mathematics. In Kenya the Ministry of Education, Science and Technology (MOEST, 1999) recommends that toilets should be adequate and in good conditions. The ministry further recommends two toilets, one for boys and one for girls for 50 children. The above results imply that the available infrastructure did not meet the required standard for instruction and learning of mathematics.

To establish the relationship between availability of infrastructure and pupils' performance in mathematics, pupils' average scores in mathematics were calculated and presented alongside the availability of physical facilities. Table 3 shows the results.

Table 3: Availability of Infrastructure and Pupils Performance in Mathematics

Infrastructure	Condition	Frequency	%	Mean Score
Desks	Available and meets required standard	8	42.1	76.05
	Available and does not meet required standard	11	57.9	71.75
	Not available	0	0	0
Classroom	Available and meets required standard	6	31.6	77.80
	Available and does not meet required standard	12	63.1	72.10
	Not available	1	5.3	65.63
Teachers chair and table	Available and meets required standard	16	84.2	73.93
	Available and does not meet required standard	0	0	0
	Not available	3	15.8	71.6
Library	Available and meets required standard	5	26.3	73.13
	Available and does not meet required standard	1	5.3	82.36
	Not available	13	68.4	61.85
Toilet	Available and meets required standard	9	47.4	74.06
	Available and does not meet required standard	10	52.6	73.11
	Not available	0		0

Results in Table 3 show that schools that had infrastructure which meet the required standard had a high mean score compared to those which did not meet set standards. The more availability of physical facilities, the higher the performance of pupils scores in mathematics. However, on libraries, schools which had a library that did not meet the required condition scored higher marks than schools which had libraries with

required standards. This could be attributed to the fact that pupils do their reading from class under teachers' supervision and are given revision materials and most of the time they carry their books home. There was a slight difference in performance between schools with toilets that had required standards and those that did not have. The results imply that there was an association between availability of infrastructure and pupils' performance in mathematics that is, the more adequate infrastructure were, the higher the performance of pupils in mathematics.

Further analysis was done to find out whether the relationship between availability of infrastructure and pupils' performance in mathematics was significant. To test the result, the subsequent hypothesis was formulated and confirmed.

Ho1: There is no significant relationship between Availability of Infrastructure and Pupils performance in Mathematics.

A chi-square was used to decide the association between availability of infrastructure and pupils' performance in mathematics and the results are presented in Table 5 below.

Table 5: Relationship between Availability of Infrastructure and Pupils Performance in Mathematics

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	162.000[a]	3	0.0294
Likelihood Ratio	73.188	3	1.000
N of Valid Cases	19		

Table 5 shows that the relationship between availability of facilities and pupils performance in mathematics was ($0.0294<p< 0.05$). The results imply that the relationship between availability of infrastructure and pupils' performance in mathematics was significant. The null hypothesis was thus rejected. This means that availability of infrastructure influenced pupils' performance in mathematics.

The current study findings are in agreement with the study findings of SACMEQ (1999) which indicated that shortage of physical facilities, text books and other equipment affected students learning and their subsequent performance. Similar results were reported by Karimi (2013) who carried out a study on school centred aspects impelling students' performance in KCSE examinations in public day secondary schools. From the findings, it was revealed that a strong relationship exists between science laboratories, textbooks, classrooms and students performance in KCSE and indicated that performance was better in schools with facilities than those without. In addition, Adeboyeje (1994) and Ayodele (2004) had also found that the availability of sufficient school structures, classrooms, chairs, desks, research laboratory and other amenities were essential for the achievement of educational goals and objectives.

Whitbread (1999) found that children do well when their classes are prepared, have adequate space and favourable settings results which were similar to the findings of this study. Moyer (1995) also reports that school building design features and

component were found to influence pupils' learning and performance in schools. Ndani (2008) states that lack of sufficient amount of fresh air in a classroom means inadequate source of air in the body cells. Ill ventilated and congested rooms lead to rise of polluted air which frequently makes children sickening, fatigued and gloomy. This can suffocate the child and make him or her unable to carry out every day activities effectively. This also means that poor ventilation would affect performance in mathematics activity. Overcrowding may also lead to poor performance because there is no space for the children to carry out actual mathematical activities. From the above discussion it can be concluded that majority of the schools in Dandora had inadequate infrastructure to support children's good performance in mathematics.

5.3 Pupil-Teacher Ratio and Performance in Mathematics

The second objective was to find out the relationship between pupil-teacher ratio and pupils' performance in mathematics. Results on pupil-teacher ratio have been presented in Table 6.

Table 6: Pupil-Teacher Ratio

Schools	Ratio
1	1:75
2	1:25
3	1:12
4	1:47
5	1:21
6	1:16
7	1:60
8	1:41
9	1:94
10	1:21
11	1:22
12	1:50
13	1:68
14	1:15
15	1:24
16	1:44
17	1:35
18	1:29
19	1:50

Table 6 shows that majority of the schools 13 out of 19 had the recommended ratio of 1: 40 pupils per class while others did not meet the requirement. It was also observed that their rooms were very congested and teachers were handling over 40 pupils who translated to less individual attention. Overcrowded atmosphere does not provide good environment for teaching and learning mathematics as pupils find it difficult to write because they are squeezed and teachers cannot easily move around to assist needy pupils.

To establish the relationship between pupil-teacher ratio and their performance in mathematics, pupils' average scores in mathematics were calculated. Table 7 presents the results.

Table 7: Pupil-Teacher Ratio and Pupils' Performance in Mathematics

Ratio	Frequency	Percentage	Mean Score in Mathematics
Recommended ratio (40 below)	11	57.9	74.98
Not recommended ratio (above 40)	8	42.1	71.61

Outcomes in Table 7 show that there was a variance in pupils' performance in mathematics between schools with recommended ratio and those without. The schools that had 40 and below pupils in class, registered slightly higher mean (74.98) compared to schools which had above 40 pupils in class (71.61). The results imply that pupil-teacher ratio influenced pupils' performance in mathematics.

To understand the relationship between pupil-teacher ratio and pupils' performance in mathematics, the following hypothesis was formulated and tested.

H02: There is no significant relationship between pupil-teacher ratio and pupils' performance in mathematics.

Chi-square was used to determine whether the relationship between pupil-teacher ratio and pupils' performance in mathematics was significant. The results have been presented in Table 8 below.

Table 8: Relationship between Teacher-Pupil Ratio and Pupils Performance in Mathematics

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	17.000[a]	3	.386
Likelihood Ratio	12.315	3	.722
N of Valid Cases	19		

As shown in Table 8 the relationship between pupil-teacher ratio pupils performance in mathematics was not significant at (.386>p > 0.05). Thus, the null hypothesis was accepted. This could be because majority of the schools had the recommended ratio of 40 and below.

The current study findings are in agreement with those reported by Afolabi (2002) who found out that there was no significant relationship between class size and students' learning outcomes. These findings are however inconsistent to those reported by Majanga, Nasongo and Sylvia (2010) who investigated the effects of class size on interaction during mathematics discourse. Results had revealed that FPE policy created high pupil-teacher ratio, overcrowded classrooms and teacher shortage. Further, they reported that schools where pupil-teacher (PTR) was high; performance of pupils was very low compared to schools with low PTR. A study by Kaloki (2012) further revealed that PTR extensively influences performance of pupils in national exams and increase in PTR affected performance of pupils negatively. A similar study done by Njagi (2013)

had also revealed that large class size of 40 and above students, medium class (12-39) performed significantly better than small classes (<29>).

5.4 Availability of Teaching-Learning Materials and Pupils Performance in Mathematics

The third objective was to determine the relationship between availability of teaching learning materials and pupils' performance in mathematics. The study investigated the availability of teaching-learning materials using observation schedule and questionnaire and results are presented in Table 9.

Table 9: Availability and Standard of Teaching-Learning Materials

Materials	**Schools**					
	Schools with standard materials	**%**	**Schools with substandard materials**	**%**	**Schools without materials**	**%**
Textbook	9	47.4	10	52.6		
Charts	2	10.5	9	47.4	8	42.1
Chalkboard	7	36.8	11	57.9	1	5.3
Teachers guide	16	84.2	2	10.5	1	5.2
Syllabus	17	89.5			2	10.5
Pupils exercise book 2	11	57.9	8	42.1		

As it can be seen in Table 9 less than half of the schools (47.4%) had available textbooks that met the required standards, while more than half (52.6%) of the schools had available textbooks that did not meet the required standard which is 1:3. It was also observed that in most schools (52.69), students did not have a copy of their own textbooks and this resulted to sharing. Due to this shortage, at times teachers were forced to copy the work on the board for pupils. Government policy on pupil-textbook ratio instructs that lower primary and preschools should have a ratio of at most 1:3, while upper primary should have a ratio of at most 1:2 in all main subjects (Mutai, 2001). However, in some schools, textbooks were not available, while in others, the sharing ratio was very high and this affects pupils' performance in mathematics.

Teaching aids help in stimulating young children's physical, mental and emotional development. It was observed that 2(10.5%) of the schools had charts that were adequate for teaching mathematics, while 8(42.1%) did not have any chart for teaching mathematics. Teachers reported that due to high pupil-teacher ratio which translated to high workload, they did not get time to develop teaching-learning materials for teaching mathematics. Those schools with charts also were poorly displayed on the walls far beyond children's reach.

Chalkboard is still the most influential tool used in instruction and learning mathematics. Mathematic is taught by solving problems on chalkboard. More than half of the schools (57.9%) had chalkboards that did not meet the required standards, were faded and badly worn out so learners had difficulties seeing what was written on the board. Others were too small for the big class so pupils were forced to strain and also

the teacher could only write few mathematics on the board because of the small space then wait for learners to copy then clean the board to write the next item. In one school, one of the class three rooms did not have a blackboard and so they were forced to share with standard two pupils.

On availability of teachers' guide, majority (84.2%) of the schools had them and meet the required standards. This assisted the teacher in teaching appropriate content to pupils. Majority (89.5%) of the schools had syllabus, while (10.5%) did not have the syllabus. Pupils' exercise books were also available in more than half (57.9%) of the schools which made the pupils write their class work in one of the books and copy homework in the other book to go and do at home. Slightly less than half (42.1%) had only one exercise book for mathematics. It was observed that such pupils did not do their homework because most of the time their books were left in schools for the teacher to mark their class work. Others had unmarked books because they had only a book which was for both homework and class work. The results imply that most of the teaching-learning materials were available but did not meet the required standards hence this did not provide a conducive classroom learning environment for teaching and learning of mathematics.

A comparison on the relative performance in mathematics of pupils in schools where materials were available and those where they were not yielded the results presented in Table 10.

Table 10: Availability of Teaching Learning Materials and Pupils' Performance in Mathematics

Materials	Standard	Frequency	%	Mean Score
Textbook (1:3)	Available and meets required standard	9	47.4	76
	Available and does not meet required standard	10	52.6	72
	Not available	0	0	0
Charts	Available and meets required standard	2	10.5	70
	Available and does not meet required standard	9	47.4	73
	Not available	8	42.1	75.4
Chalkboard	Available and meets required standard	7	36.8	77
	Available and does not meet required standard	11	57.9	65
	Not available	1	5.3	66
Teachers guide	Available and meets required standard	16	84.2	70.2
	Available and does not meet required standard	2	10.5	66
	Not available	1	5.3	80
Syllabus	Available and meets required standard	17	89.5	74
	Available and does not meet required standard	0	0	
	Not available	2	10.5	73
Pupils exercise book 2	Available and meets required standard	11	57.9	75
	Available and does not meet required standard	8	42.1	72
	Not available	0	0	0

Table 10 shows that performance was high (76%) in schools that had available textbooks and met the required standard of 1:3 compared to those which did not meet the required standards. It is also clear that some schools did not have teaching-learning

materials and their performance was still high compared to those that had. This could be attributed to the fact that other locally available teaching materials were used for teaching mathematics and teachers were conducting tuition and this could have boosted their performance.

Majority (89.5%) of the schools had syllabus in their schools while only (10.5%) did not have any copy available and their performance was (73%). This is because teachers had other supplementary books for teaching mathematics. On availability of pupils exercise books, more than half (57.9%) of the schools had pupils with two exercise books one for class work and the other one for homework and their mean score of (75%) was higher compared to schools where pupils did not have both books**.** Results imply that availability of teaching-learning materials that met the required standards influenced pupils' performance in mathematics positively.

To establish the influence of teaching-learning materials on pupils' performance in mathematics, a Chi-square test was done and the results are presented in Table 11.

Table 11: Relationship between Availability of Teaching Learning Materials and Pupils Performance in Mathematics

Teaching-learning material	**Pearson chi-square**	
	Value	**sig.**
Textbooks	0.226	0.035
Charts	-0.206	0.397
Chalkboard	0.33	0.167
Teacher guide	0.036	0.883
Syllabus	0.028	0.908
Exercise book	0.186	0.035

Table 11 shows relationship between availability of teaching learning materials and pupil's performance in mathematics was only significant in textbooks and exercise books.

After the above analysis, the researchers also wanted to find out whether relationship between availability of teaching-learning materials and pupils performance in mathematics was significant. The following hypotheses was thus generated and tested.

H03: There is no significant relationship between availability of teaching-learning materials and pupils performance in mathematics

Chi-square test was used to test whether the relationship between availability of teaching-learning materials and pupils' performance in mathematics was significant. The results are presented in Table12.

Table 12: Relationship between Availability of Teaching-Learning Materials and Pupils Performance in Mathematics

Chi-Square Tests			
	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	162.000[a]	3	.294
Likelihood Ratio	75.822	3	1.000
N of Valid Cases	19		

Table 12 shows that the relationship between availability of teaching-learning materials and pupils performance in mathematics was not significant. The null hypothesis was therefore accepted. The results imply that teaching learning materials did not influence pupils' performance in mathematics. This can be attributed to the fact that most schools had available teaching-learning material but were not adequate.

These findings are inconsistent with those of Adeogun (2001) who revealed a very strong positive significant association between instructional resources and academic performance. Mutai (2006) who stated that learning is reinforced when there are enough reference materials such as textbooks, exercise books, teaching aids and class rooms. Another study done by Njagi (2013) revealed that adequate resources in secondary schools enable pupils to perform better and learn mathematics effectively.

6. Conclusion

Results from this study have shown that availability of adequate infrastructure influenced pupils' performance in mathematics. This is because schools with available and standard infrastructure performed better compared to those that did not have facilities or where they were inadequate. This means that one of the aspects that schools need to address if they are to improve pupils' performance in mathematics is that of physical facilities.

Pupil-teacher ratio did not influence pupils' performance in mathematics. It was clear from the study findings that most of the schools scored high even with high teacher-pupil ratio in class. Availability of teaching-learning materials also did not influence pupils' performance in mathematics. This was because majority of the schools had available teaching-learning materials which were not adequate for enhancing teaching-learning of mathematics.

7. Recommendations

To improve classroom learning environment and pupils' performance in mathematics, the following are the recommendations for different stakeholders.

A. Ministry of Education, Science and Technology

Results revealed that some teaching-learning materials and infrastructure were available in most of the schools but not adequate. Firstly, the ministry should increase provision of infrastructure and adequate teaching- learning materials in schools. This

can be done by ensuring that they give more financial support to schools. Secondly, the ministry should enforce the provisions and guidelines on the standard minimum requirements for infrastructure before a primary school is allowed to operate. This is because results revealed that most of the infrastructure in schools did not meet the required standards. Thirdly, The Ministry of Education Science and Technology should enforce the Rule on staffing quality and the pupils-teacher ratios in both public and private schools. The number of pupils per class should not be more than 40. Results had shown that some schools had a high pupil-teacher ratio which led to overcrowding and congestion. This would ensure that the teachers effectively and efficiently handle the pupils as well as increase individual attention. Lastly, the Ministry Of Education Science and Technology should conduct regular audit and inspections in primary schools to ensure conformity to standard guidelines.

B. Teachers

Findings indicated that most of the schools did not have adequate teaching-learning materials for teaching mathematics. Teachers should develop variety of teaching-learning materials which are relevant for teaching mathematics. This is because materials make learning more interesting and enhance acquisition of concepts. They should also be sensitized on importance of classroom learning environment and how it influences pupils' performance in mathematics.

C. Head Teachers

To improve mathematics in schools, it is recommended that schools should have a conducive learning environment that comprises of adequate physical facilities, teaching learning materials and recommended pupil-teacher ratio. They should provide environments to enhance pupils' performance in mathematics.

D. School Management

Availability of infrastructure was significantly associated with pupils' performance in mathematics. There is need therefore for school managers to ensure that facilities like classrooms are built to specifications. This is because most of the schools had small classrooms. They should also ensure that pupil-teacher ratio is 1:40 by admitting enough number of pupils per class and recruit more staff.

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