



**LEARNING FACILITIES AND RESOURCES FACTORS CONTRIBUTING TO POOR PERFORMANCE IN
MATHEMATICS IN K.C.S.E IN SELECTED PUBLIC SECONDARY SCHOOLS IN KIAMBAA DIVISION OF CENTRAL
PROVINCE, KENYA**

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**LEARNING FACILITIES AND RESOURCES FACTORS CONTRIBUTING TO POOR PERFORMANCE IN MATHEMATICS
IN K.C.S.E IN SELECTED PUBLIC SECONDARY SCHOOLS IN KIAMBAA DIVISION OF CENTRAL PROVINCE, KENYA**

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ABSTRACT

Students' poor performance in national examination remains a major concern worldwide and Kenya in particular. Teachers, students, parents, curriculum developers and the public have tended to blame one another for the poor performance in Mathematics at secondary school level. In an attempt to respond to this problem, the Kenyan Mathematics scholars have carried out many studies in Mathematics education. Despite these studies, students' performance remained poor. This means that the main reason for this poor performance had not been established. This study aimed at determining learning facilities and resources as factors contributing to the poor performance in Mathematics by students in secondary schools in Kiambaa Division. The study employed a descriptive survey and focused on Form 3 students and their Mathematics teachers. Random stratified technique was used to select 6 public secondary schools from 40 public schools of Kiambaa Division. Form 3 students were selected randomly. Simple random sampling was used to select 20 students and 4 teachers from each school sampled. Data was collected with two instruments, Mathematics Teacher Questionnaire (MTQ) and Mathematics Student's Questionnaire (MSQ). A total of 16 teachers and 80 students filled the MSQ and MTQ respectively. The findings of this study would be of significance to the teachers, students, curriculum developers and college tutors in educational institutions with regard to improvement of Mathematics performance and education. The information provided would enable them to make important decisions on curriculum development and implementation, teacher training, proper administration, learning and teaching resources, change of attitude and motivation in learners that will help to improve performance in Mathematics. The study revealed that some schools did not have adequate teaching and learning resources. This was seen as a factor that contributed to poor performance of Mathematics. Based on the above findings, the study recommended that the government and the community should provide the necessary teaching and learning facilities to facilitate the teaching Of Mathematics. The researcher makes the following suggestions for further research: There was need to conduct a research to investigate on home background and its effect of student's performance. There was need to conduct a research to investigate how administrative factors contribute to poor performance.

Key Words: Learning facilities and resources, Poor Performance in Mathematics, Public Secondary Schools, Kenya National examination Council.

Background of the Study

In today's world, the fields of technological and professional education require a strong foundation consisting of sound background knowledge of Mathematics. As technology develops and reaches more and more into all those levels of industry and commerce, so more Mathematics will be needed at all these levels.

The utilitarian value of Mathematics as man develops his technology, in endeavours to master his environment needs a lot of emphasis than it had been made before. The application of Mathematics is obvious or unconsciously done. But there is no doubt that well qualified mathematicians are in great demand (Mwangi, 1983). In Kenya since independence, there has been a tremendous and a very remarkable trend towards the development of our educational system. There has been the need to relate science and technology to national goals for the overall economic development. This has no doubt become central to educational development. The Kenya Government also spends a large percentage of the annual budget on education (Wamahiu, 1977). Part of this money is channeled towards the improvement of Mathematics. However, the increased expenditure on education does not result to improved performance in Mathematics (Omar, 1996). For any improvement in science and technology to be realized, good performance in Mathematics is necessary as it forms the basis of some very important professional courses such as medicine, agriculture, engineering and many others. Eshiwani (1980) observes that Mathematics is the backbone of other subjects. Consequently, there is need to improve its performance as Kenya looks forward to become industrialized country by the year 2020. In addition, the government has continually reviewed the education system to ensure that it serves the needs of the learners. It has come up with the new educational system, the 8:4:4 which can be described as dynamic, and stresses on curriculum improvement with stress on science and technology (Kiswili 1995). In science and

technological advancement, Mathematics has been found to be of great use as well as serving other roles in the society. For example, Mathematics in school curriculum is important in various aspects. It equips students with skills that enable them to play an active role in society. It is very vital in the inculcating of coherent and logical reasoning as well as producing a unique expression of ideas in a universal language which facilitates scientific and technological manipulation and innovation. Mathematics thus equips the learners with competence in computation and also helps in developing attitudes of critical and analytical thinking together with equipping students with a proper vehicle of communication of thoughts and ideas through its symbolic expression (Thuo 1985). In support of this, Cockroft (1982) observes that it would be very difficult, perhaps impossible to live a normal life without making use of Mathematics of some kind. According to him, learners develop logical reasoning in problem solving situations that are encountered by the society in everyday situations through learning Mathematics. In addition, Kiswili (1995) observes that reasoning is mainly developed in the process of learning Mathematics and other subjects in the school curriculum. Similarly, Eshiwani (1981) observes that Mathematics is one subject which everyone whether at school or not knows about. It is a subject that deals with our day-to-day lives directly or indirectly. It is a subject that can be done (dealt with) in anyone's mother tongue, makes life easier for everybody because people use it as common media communication. It is also a subject unlike others, which everyone going to school must learn. It is a compulsory subject up to secondary level of education, and even at higher levels of learning, there is basic Mathematics in every course. In addition, Mathematics guides the study of many other subjects in science, technology, commerce, industry and engineering. It is a basic requirement for study for several subjects at the university, teacher training and in many employment sectors. Eshiwani (1981) also notes that Mathematics is perhaps the best organized of all disciplines. In

most cases, the material taught in various Mathematics systems is consistent. As a result, it permits one deal with the chaotic universe and makes it seem orderly. Consequently, owing to the importance attached to Mathematics, it is one-core and compulsory subjects in the 8:4:4 system of education. According to this system of education for a student to join the university including most of the tertiary institutions, he or she must have attained a grade C+ or above in Mathematics. This has resulted to a lot of emphasis in the learning of the subject being put in place; more time is allocated to it. It is also taught in the morning when the learner's minds are sober so that they can comprehend the concepts and principles of Mathematics. Of late also, post-secondary many institutions of learning are offering bridging courses in science subjects, such as biology, physics, chemistry and Mathematics. This is to enable those students willing to take science related courses and were not qualified to get an opportunity to further education in their areas of interest in sciences. In addition, the government through the Ministry of Education and the Japan International Cooperation Agency (JICA) have started the strengthening of Mathematics and secondary education project (SMASSE). SMASSE was initiated in 1998 with assistance from the Japanese Government to improve performance in science subjects and Mathematics. It is hoped that the SMASSE project will bring a remarkable change in attitudes and performance in Mathematics. However, despite the much efforts put in the improvement of the performance of the Mathematics, performance in Mathematics leaves a lot to be desired. The performance of the subject has been generally poor in this country. This has caused a lot of concern been expressed by parents, teachers and politicians. According to the Kenya National Examinations Council (KNEC, 2002) Mathematics analysis for Kenya Certificate of secondary Education (K.C.S.E.) indicates that 5.8% boys scored between grade A and B and 68.4% scored grade D and below that year. On the other hand, 2.4% of the girls scored grade A and below

while 23.4% of them scored below grade D. The overall performance of both girls and boys has been quite low over several years. Consequently, poor performance in Mathematics in K.C.S.E has resulted to blame by all education stakeholders of education blaming each other for example, teachers blame students for not taking their studies seriously. Similarly, teachers and students blame the school administrators for failing to provide the much-needed resources such as textbooks and classroom facilities among others. Such accusations reoccur year after year eventually: teachers have developed low morale and negative attitude towards teaching Mathematics. Likewise, parents are blamed for not working together with the schools in provision of learning resources, and funds for ensuring that schools run smoothly. Consequently, there is public outcry by the concerned parties that is, students, parents and educators about the mass failure in Mathematics subject in particular, requiring an urgent investigation (Eshiwani, 1993).

Statement of the problem

Secondary school students' poor performance in Mathematics in the K.C.S.E in Kenya has been an area of concern by students, parents, teachers, curriculum developers and the public in general. Mathematics is a compulsory subject for all Kenyan schools. It is the backbone of other science subjects and technology. However, the performance in Mathematics at the K.C.S.E has been steadily deteriorating over the last few years. This has been of great concern to all education stakeholders. The failure rate has increased, for example 63.3% of candidates in 2002 obtained a grade "E*" (which is a fail), this rose to 72-2% in 2001 and 75% in 2002 and it should not be surprising if it will be higher in the later years (KCSE analysis 2002)

Despite the national efforts made in developing a curriculum that is appropriate to the needs of this country, coupled with enormous teacher training effort, performance particularly in Mathematics has been relatively poor and appalling low all over

the country and in general, a decline has been observed in the subsequent years. Any remedial action to be taken requires the identification of the factors that contribute to poor performance in Mathematics. Although many people have done research in particular field of Mathematics performance here in Kenya, they have not been able to find out the real causes of poor performance in Mathematics in secondary level. The main concern of this study is to find answers to the question, how do learning facilities and resources available contribute to poor performance in Mathematics at K.C.S.E level in secondary schools in Kiambaa Division of Kiambu District, Central Province?"

Objective

The objective of this study was to find out how the learning facilities and resources available contribute to poor performance in Mathematics in the selected secondary schools in Kiambaa Division.

LITERATURE REVIEW

This chapter was devoted to reviewing literature relevant to this study.

Theoretical framework

Performance

Performance is a measurement of how much learning has taken place. It is the manifestation of learning. It can be observed and measured using various instruments such as written tests, quizzes and assessments. The learner's performance level is indicated through use of marks and grades. Mathematics being one of the compulsory subjects and examinable at the K.C.S.E its performance has to be evaluated. This is because it determines the degree course one has to undertake at the University as well as in most of the tertiary institutions. In secondary schools, Mathematics is assessed throughout the whole course. The evaluation of the subject is of two types. The first is the formative type which is internally based and continuous. Its main function is to give feedback to

learners and teachers. This is important for the improvement of future performance. The second type is the summative assessment which is given at the end of the term or end of the course in form of examinations such as K.C.S.E (Gay, 1981). The summative evaluation of Mathematics is done at the K.C.S.E level after completing four years in secondary school. The performance in examination in schools is referred to as academic achievement. The achievement of students' performance in Mathematics is usually measured at the K.C.S.E. However the result at the K.C.S.E level of Mathematics performance has been a major concern among teachers, students, parents and education stakeholders due to the poor performance. This is one of the reasons why this study is being conducted to find out what could be contributing to poor performance in Mathematics in public secondary schools in Kiambaa Division of Kiambu District.

Availability of textbooks and other resources

There is evidence of relationship between availability of books and achievement. Studies conducted in Ghana and Uganda Olateju (1988) indicates that textbooks availability is positively correlated with achievement. Eshiwani (1983) found that in both Primary and Secondary schools, the availability of textbooks had a positive relationship to achievement in Mathematics. If it would be possible every student must have a Mathematics textbook. Mutunga and Breakell (1992) notes that the textbooks determine the sequence, scope and pace of Mathematics programme. The schools should therefore provide adequate exercises for students necessary for mastery of concepts. In this respect, a textbook is an important guide for the teacher during his teaching. In view of the importance of textbooks to teachers and students, their availability is likely to be reflected in students' performance in Mathematics. Textbooks should therefore be provided at all costs to boost achievement in this important subject.

STUDY DESIGN AND THE METHODOLOGY

This chapter provided a description of the procedures that was followed in conducting the study. The selected study design was descriptive survey. The method which was involved in this study was non-experimental, as it deals with the relationships among non-manipulated variables. The study was conducted in public secondary schools within Kiambaa Division in Central Province of Kenya. The target population of this study consisted of all the public Secondary schools in Kiambaa Division. According to the Kiambu District Education Office, the Division had a total of 40 secondary schools both private and public. The study population was made up of 6 public secondary schools. Secondary school Mathematics teachers and form three students from these public schools took part in the study. The study was strictly carried out in public secondary schools in Kiambaa. Private schools were exempted in the study as they sometimes had a different curriculum as compared to that of public schools, as well as their class size may too be small or large. Owing to this reason only public schools were considered. The selection of the sample was carried out through random sampling techniques from a list of public schools in Kiambaa Division. Random sampling technique was used to select the sample of teachers. Form three Mathematics teachers were involved because they were the ones who were teaching them and knew their performance. A total of 40 boys and 40 girls were selected for the study. 16 teachers became the subjects of the study. Data for this study was collected using Mathematics Teachers' Questionnaires (MTQ) and Mathematics Students' Questionnaire (MSQ). The researcher conducted a pilot study as a pre-test of the questionnaire to determine whether there were ambiguities in any of the items. To test reliability, split half method was used. Preliminary visits to sample schools were made by the researcher after obtaining permission to carry out the research as well as introductory letters to the head teachers. This study generated both qualitative and quantitative

data. Because of its nature the data was analysed using descriptive techniques of data analysis.

DATA ANALYSIS, RESULTS AND DISCUSSION

This chapter focuses on the completion rate of the instruments, demographic information of the respondents, presentations, interpretation and discussions of findings. In this study, out of the 16 teachers sampled, all of them (100%) completed and returned the questionnaires. Out of 80 students sampled all of them (100%) filled and returned the questionnaires. Findings revealed that 8 (50%) were male while the same number 8 (50%) were female. This shows that the researcher had a balanced sampling as proposed in the sampling techniques. The teachers were asked to indicate the type of schools that they taught. Findings revealed that 8 (50%) were teaching in mixed schools. 4 (25%) taught in girls' school and the same number taught in girls' schools. This shows that all categories of school in terms of gender were well represented. The teachers were further asked to indicate the number of students in their classes. The findings are revealed that classes had different number of students. However, there were classes that had a considerable high number of students which exceeded 50 in a class. For example there was a class which had 65 students, 54 students and also 48 students. When teachers have many students it becomes difficult for them to teach effectively. The study also wanted to establish the teacher's professional qualification. Teachers were also asked to indicate the same. Their responses showed that majority 9 (56.3%) were Graduate Trained teachers 2 (12.5%) Mathematics teachers were Approved graduate teachers, 4 (25%) were Diploma holders and 1 (6.3%) held a Post Graduate Diploma in Education. This showed that all teachers were qualified to teach in secondary schools. The fact that majority were graduate trained teachers could be attributed to the fact that, for one to teach in a secondary school one usually must hold a Bachelor of Education Degree. The results therefore showed that majority were qualified to teach in secondary

schools. This implied that teacher's qualifications were not a factor leading to poor performance in Mathematics in school in Kiambaa Division. They indicated that they all taught Mathematics and another subject. They indicated that they had been trained in the subjects that they taught. This further implies that qualification of teachers was not a factor that led to poor performance since all of them had been trained. The Mathematics teachers were further asked to indicate the duration of time that they had been teaching Mathematics in their teaching profession. The findings showed that most of the teachers, 7 (43.8%) had been teaching the subject Mathematics for between 6 and 10 years, 6 (37.5%) had been teaching for between 1 and 5 years and the rest 5 (31.3%) had been teaching Mathematics for between 11 and 15 years. This showed that majority of teacher had a considerable long experience in teaching Mathematics. The experience acquired by the teachers was important in this study in that teachers were able to give information on the causes of poor performance in the subject. Findings revealed that some teachers had been teaching Mathematics for a considerable long time. Findings also revealed that 4 (25%) teachers said their teaching load was between 25 and 30 lessons a week, 5 (31.3%) said they had between 31 and 35 lessons per week while 7 (43.8%) said they had 36 lessons and above. When they were asked to comment about the teaching load, 4 (25%) said it was moderate to cope with. 5 (31.3%) said it was a bit hectic to deal with especially when the classes were too large. Seven (43.8%) said it was too heavy for them and this affected their performance. Most of the teachers 7 (53.8%) therefore felt that the teaching load was heavy. Teachers tackling many lessons are not able to perform their teaching effectively. This may be a great cause of poor performance in the subject.

Demographic information of students was based on students' responses on name and type of school and their gender. To find out their gender,

the respondents were asked to indicate whether they were male or female. Their responses showed that 40 (50%) were male and the same number 40 (50%) were female. This shows that the students sample was balanced in terms of gender. They were further asked to indicate the type of school that they were in.

The results showed that 40 (50%) students were from mixed schools, 20 (25%) were from boys school and the same number from girls school. This shows that the sampling of schools was balanced where that all the categories of school were well represented. This is important in that the researcher would get the views of students from different categories of schools.

Learning facilities and resources in schools

The researcher wanted to find out what learning facilities were found in the schools and how they contributed to poor performance in Mathematics. To establish the same, the respondents were asked to indicate whether the school had adequate classes where learning of Mathematics took place. In this item the 9 (56.3%) Mathematics teachers of said yes while 7 (43.8%) said no. Among the student respondents on the same item, 68 (85%) said yes while 12 (15%) said no. It could be concluded that most school had adequate classrooms where learning of Mathematics took place. Though majority of the respondents said that there were enough classrooms, one cannot ignore the 7 (43.8%) teachers who said that there were not enough classrooms for learning Mathematics. Lack of facilities such as classrooms could be a hindrance to proper teaching and learning of Mathematics which could eventually lead to poor performance in the subject. The teachers were also asked whether the school had well equipped libraries with relevant and appropriate teaching materials for Mathematics. Their responses were that majority 9 (56.3%) said that the schools offered library services with appropriate teaching materials for Mathematics, 7 (43.7%) said their schools did not offer library services. Those who said that their school had

offered library services were further asked to indicate whether they were equipped. 5 (55.6%) said the libraries were well equipped while 4 (44.4%) said they were not well equipped. Though most of the teachers said that the libraries were well equipped, a significant number of the respondents said there were no libraries or the ones available were not well equipped. Lack of library services and teaching materials can be a hindrance to proper learning of Mathematics. This could also lead to poor performance in the subject. Mathematics teachers were asked to indicate what materials they had in the library to help students learn Mathematics. Their responses showed that schools had the following materials in their libraries: newspapers, magazines, charts, textbooks, computers, revision books, past papers and reference books. However some said that their libraries had few materials which were necessary for teaching Mathematics.

The researcher also wanted to find out whether the school had enough text books. The students were asked the ratio of sharing textbooks by students. The responses revealed that majority of the students 53 (66.3%) shared a book between 2, 17 (21.3%) shared a book between 3, 8 (10%) shared a book between 5 and 2 (2.5%) did not share text books. This shows that most of the school had enough text books for the students. However, sharing of books has its own limitations in that students would not access text books whenever they want as it would happen if students did not share books. Sharing of books has its own limitations. For example when students are given some assignments the same day it would not be so easy to do the assignments since they would need the same book at the same time. This will eventually lead many to not completing the assignments given and so this will also lead to poor performance.

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The chapter summarizes the findings, gives conclusions and recommendations and suggests areas of further research.

Summary

The study revealed that there were a number of factors that contributed to poor performance of Mathematics in Kiambaa Division. It was also revealed that a number of schools did not have enough teaching and learning materials which was a factor leading to poor performance.

Implications of the findings

Findings from this research imply that poor performance in Mathematics in Kiambaa Division is a major concern. Availability of teaching learning materials and resources were some of the factors that contributed to poor performance.

Conclusions

The study intended to investigate the teaching learning materials and resources as factors contributing to poor performance of Mathematics in Kiambaa Division of Kiambu District. The study employed descriptive survey design. Sixteen teachers and 80 students were selected for the study. The findings revealed that some schools did not have the essential teaching and learning facilities such as books, classrooms libraries and other equipment necessary for teaching and learning of mathematics. Some classrooms were overcrowded and teachers had to handle many students which lowered their performance.

Recommendations

Based on the above findings the recommendation given was that the government and the community should provide the necessary teaching and learning facilities to facilitate the teaching of Mathematics.

Suggestions for further research

Taking the limitations and delimitations of the study, the researcher made the following suggestions for further research: There was need to conduct a research to investigate on home background and its effect on students' performance and also there is need to conduct a research to investigate if administrative factors contribute to poor performance.

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