

Factors Contributing To Students' Poor Performance in Mathematics at Kenya Certificate of Secondary Education in Kenya: A Case of Baringo County, Kenya

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Abstract

Performance in Mathematics by students has persistently been poor. This study sought to investigate the factors contributing to the poor performance and to establish the strategies that can be adopted to improve performance in Mathematics by students in secondary schools in Baringo County in Kenya. The study to determine the school based factors that affect students' performance in Mathematics in secondary schools, socio-cultural factors that affect them and their personal factors that affect performance in Mathematics, and established the strategies that can be adopted to improve performance in Mathematics. Descriptive survey research design was adopted for the study. The target population was 1876 respondents which comprised of Form Three secondary school students in Koibatek District, 132 Mathematics teachers and 9 head teachers. The data for the research was collected by use of three questionnaires; student, teachers and head teachers questionnaires. Factors contributing to poor performance include under staffing, inadequate teaching/ learning materials, lack of motivation and poor attitudes by both teachers and students, retrogressive practices. Improving on these factors and sensitization of the local community to discard practices which prohibit student's effective participation in learning mathematics could improve performance in Mathematics. It is anticipated that the findings of this study will give curriculum developers new insights into emerging issues on performance and influence the Ministry of Education on policy formulation. Students are also expected to benefit from the findings; because improved mathematics performance will give them opportunities to pursue science related courses in higher institutions of learning and middle level colleges.

Key Terms: Factors, Mathematics, Performance, Poor

1. Introduction

Long before the coming of Arabs and Europeans to Africa, the African people had developed their own systems of education; although the systems varied from one community to the other, their goals were often strikingly similar (Sifuna & Otiende, 1980). At independence in 1963 education was viewed as the means to eradicating poverty, ignorance and disease from Kenya. Mathematics is seen by society as the foundation of scientific and technological knowledge that is vital in social- economic development of the nation. Because of this Mathematics is a compulsory subject at both primary and secondary levels in Kenya. Mathematics is also used as a basic entry requirement into any of the prestigious courses such as medicine, architecture and engineering among other degree programmes. Despite the important role that Mathematics plays in society, there has always been poor performance in the subject at national examinations (Aduda, 2003), this is demonstrated on Table 1 in Kenya Certificate of Secondary Education (KCSE).

Table 1: KCSE Performance in Mathematics

Year	1991	2000	2001	2002	2003	2004	2005	2006	2007	2008
Mean Score	12.23	16.61	18.72	13.23	18.25	16.24	17.62	12.24	16.26	18.73

Performance in Mathematics as reflected by the KCSE results has remained poor over the years. Hence, the need to investigate factors contributing to poor performance in Mathematics at KCSE examinations by students in Koibatek District so that poor performance in mathematics can be reversed. The student factors, social cultural factors and school based factors were investigated as independent variables, and achievement in Mathematics as the dependent variable. The conceptual framework, Figure 1 shows the relationship of these variables.

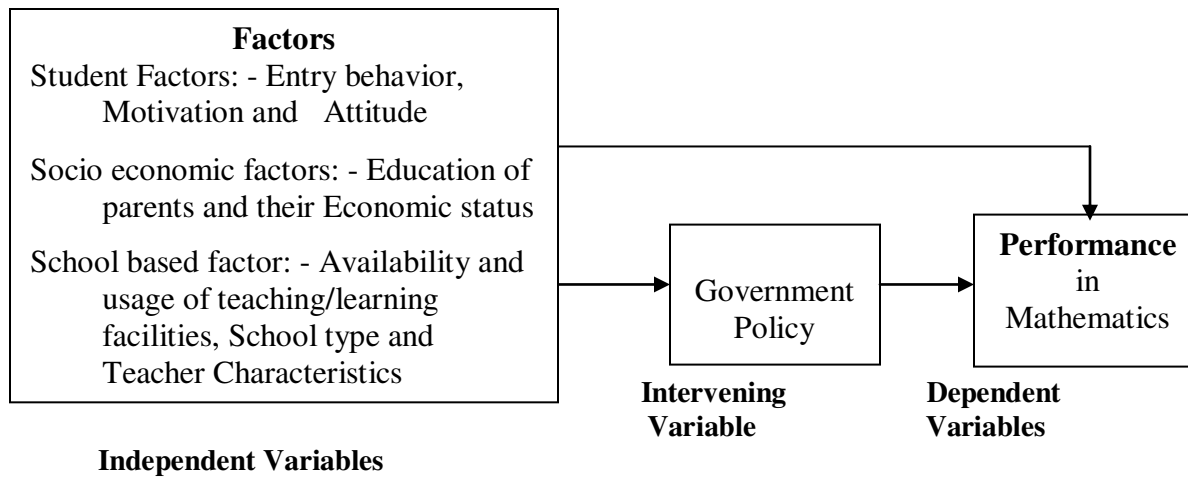


Figure 1: Factors Contributing to Poor Performance in Mathematics

2. Objectives of the Study

Objectives of the study were to;

- i) Determine the school based factors that affect student performance in Mathematics in secondary schools
- ii) Establish socio-cultural factors that affect student performance in Mathematics in secondary schools
- iii) Establish student personal factors that affect student performance in Mathematics in secondary schools
- iv) Establish strategies that can be adopted to improve performance in Mathematics by students in secondary schools

3. Methodology

The population of this study was of 1718 Form three students in 26 secondary schools, 132 Mathematics teachers and 26 Head teacher (DEO Koibatek, 2011). The student questionnaire comprised sections on demographic data with items such as gender, age, secondary school entry marks, socio-economic and cultural, school based factors with items such as method of teaching by teachers, availability of teaching / learning materials, academic qualification, and teaching experience of mathematics teachers and motivation. Mathematics teacher’s and head teacher’s questionnaires had sections on demographic data items such as gender, age, academic qualification, and teaching experience. Socio-economic and cultural, and school based factors with items such as method of teaching, availability of teaching/learning materials, workload and motivation and finally strategies to be adopted to improve achievement in Mathematics. Descriptive statistics were used to analyze the obtained data.

4. Results and Discussion

The following results were obtained;

a) Demographic Characteristics of the Respondents

Data on Table 2 indicates gender of the participants in the study where males were the majority in all categories.

Table 2: Gender of Participants

Respondents	Male (%)	Female (%)
Students	66.0	34.0
Mathematics teachers	72.2	28.8
Head teachers	77.8	22.2

b) Performance at Kenya Certificate of Primary Education

Kenya Certificate of Primary Education (KCPE) is the entrance examination to secondary schools in the country. Data obtained indicate that student had between 200 and 400 points out of a maximum of 500. This shows that their entrance mark to secondary schools cannot be the cause of poor performance at Kenya Certificate of Secondary Education (KCSE).

c) Age of Students

Information obtained indicate that most of students (74.1%) were between 17 and 19 years of age, 23.8% were between 14 and 16 years, 1.9% were over 20 years and only 0.3% were below 13 years.

These results are normal since the Kenya system of education is that pupils join standard one at age six, primary education is eight years and secondary four years.

d) Mathematics Teachers Demographic Characteristics

The following information was obtained about mathematics teachers;

- i) The mathematics teachers who participated in the study were 27.8% female and 72.2% males. Thus there are more male teachers in secondary schools than female teachers. The same pattern was with students. More girls need to be encouraged to take mathematics so as to have more female mathematics teachers.
- ii) Information obtained shows almost all teachers (94%) are professionally trained with Bachelor of Education degrees. Therefore, their output is expected to be good. Secondary school students appear to learn more Mathematics from teachers with degrees or significant coursework in Mathematics (Wayne & Young, 2000).
- iii) Ages of mathematics teachers; between 21 to 30 years of age (16.7%), between 31 and 40 years (66.7%) and over 40 years of age (16.7%). These shows mathematics teachers are fairly young and are expected to be energetic in teaching the subject

e) School Based Factors that Contribute to Poor Performance in Mathematics

The data was collected and analyzed,

i) Methods of Teaching Mathematics

Data obtained indicate that 5.6% of the teachers use lecture method, 3.4% use project, 64.2% use discussions, discovery method is used by 6.5% while 27% of the teachers use the question/ Answer method. According to (Costello, 1991) lecture method is ineffective in that it turns the learners into passive participants in the learning process. However despite the disadvantage, lecture method is useful in covering large content (SMASSE, 2007). Discussions, project and discovery methods creates an enabling environment for the learners and ensures that individual differences are taken care of.

ii) Teaching/Learning Materials for Mathematics

Information obtained on availability of teaching/learning materials for mathematics in secondary schools indicate that text books are leading with 94.1%, followed by mathematics geometrical sets (28.4%) and colored chalk (25.3%). Whereas, charts and mathematics models take 10.5% and 6.2% respectively.. According to Psacharopolous and Woodhall (1985) textbooks are a major input for performance in examinations. This view is shared by Chepchieng (1995) who observes that availability of and quality of textbooks in a secondary school is strongly related to achievement among children from lower income families especially those in rural boarding schools. that physical facilities contribute positively to students academic performance (Munda, Tanui & Kaberia, 2000). Also 43.5% of all students indicated that schools lacked physical facilities and the ones existing were poorly used. According to Munda, Tanui and Kaberia, (2000) physical facilities contribute positively to students academic performance.

iii) Effectiveness of Mathematics Teachers in Teaching

Student's opinion on the effectiveness of their Mathematics teachers in teaching the subject shows that 63.3%% indicated that they are highly effective, 27.5% indicated that they are average and 1.9% indicated that they are not effective.

iv) Teachers' Attitude towards Mathematics

Data obtained after analyzing teachers' responses on items soliciting their attitude towards mathematics indicate that they have a positive attitude towards the subject. The overall mean perception of Mathematics by the Mathematics teachers was 4.18 out of maximum possible score of 5.00. This implies that Mathematics teachers have a positive attitude towards Mathematics (4.18>2.50).

v) Mathematics Teachers' Workload

Data obtained shows that 27.8% of Mathematics teachers teach below 15 lessons per week, 66.7% teach between 16 to 30 lessons, while 27.8% teach more than 30 lessons in a week. According to the Ministry of Education (2008) a teacher in a secondary school is supposed to teach at most 30 lessons in a week. This indicates that 27.8% of mathematics teachers are overloaded. This percentage is high and may contribute to poor performance in mathematics.

vi) Mathematics Remedial Lessons

Information obtained shows that 55.6% indicate that remedial lessons are required in order to have mathematics syllabus completed.

This means that the mathematics syllabus is overloaded, teachers do not plan well or learners are slow in learning mathematics.

f) Socio economic Factors affecting Performance in Mathematics at KCSE

The following information was obtained on social economic factors affecting secondary school students performance in Mathematics at KCSE;

i) Students' Parents/Guardians Education background.

Results indicated that most parents/guardians (66.3%) do not have education beyond secondary school education, 27.5% have college education and only 6.2% have university education. thus they may not be good role models for their children in academic matters. Desarrollo (2007) indicated that the extent to which parents or other family members are actively engaged in a student's education had appositive influence on the student's achievement

ii) Source of Income for Students' Parents/Guardians

Student's parents/Guardians sources of income are farming (39.9%), salary (38%), Business (16.8%) and casual labour (5.3%). However, it was clearly indicated that the income is not consisted; therefore students whose parents rely on them are likely to get inadequate learning resources, and other essential requirements. Performance from such student will always be poor. According to Conger et al 1992, 1993, 1999 low parental socio-economic status is associated with diminished resources hence contributing to lower academic achievement.

iii) Cultural Factors

Mathematics teacher's responses on socio-economic factors contributing to poor performance in Mathematics cited circumcision (11.1%), beliefs (50%), early marriage (5.6%) and family income (61.1%). Also, cultural constraints negatively impacts on achievement level among students. Children who come from insecure environments caused by socio-cultural practices such as cattle rustling, early marriages and female genital mutilation (FGM) show emotional problems at school. They lack concentration in class and confidence in whatever task they are given to do (Durojaiye, 1976).

g) Students Personal Factors Contributing to Poor Performance in Mathematics at KCSE

Students' personal factors contributing to poor performance in Mathematics at KCSE were found to be gender, economic factors and attitude towards mathematics. Students' attitude towards mathematics was measured using likert scale and the results obtained indicated that they have a positive attitude towards mathematics. Mwamwenda (1995) argued that the achievement of students in a subject is determined by their attitudes rather than inability to study. Haimowitz (1989) indicated the cause of most failures in schools might not be due to insufficient or inadequate instruction but by active resistance by the learners. This argument suggests that favourable attitudes towards Mathematics should be developed for achievement in the subject to improve.

h) Strategies to Improve Achievement in Mathematics

The strategies suggested by the students on how to improve achievement in mathematics were grouped into five areas, which comprised of staffing, teaching and learning materials, curriculum, motivation and attitudes, and fees and levies. Data on Figure 2 give a summary of the strategies suggested by the students.

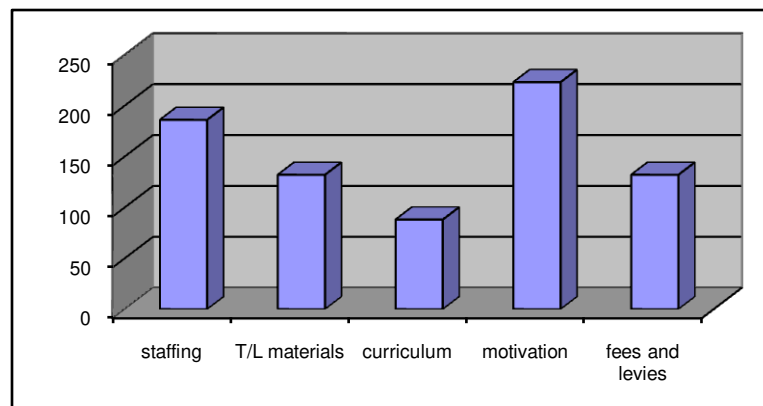


Figure 5: Strategies to Improve Achievement in Mathematics

The same strategies were identified by head teachers and mathematics as shown on Table 3. All head teachers (100%) suggest improvement mathematics curriculum may improve achievement in the subject.

Table 3: Head teachers and Mathematics Teachers Strategies

Strategies	Maths Teachers (%)	Head teachers (%)
Staffing	77.8	88.9
Teaching/Learning resources	50.0	55.6
Curriculum	27.8	100.0
Motivation	44.4	55.6
Fees and levies	77.8	88.9

i) Recommendations

From the findings of the study the following recommendations were made:

- To mitigate on the inadequacy of teaching/learning materials and equipments the government needs to enhance their provisions to schools. It should extend loan facilities and bursaries to secondary school students from poor families.
- The government and other stakeholders such as Non Governmental Organizations need to sensitize the local community to discard beliefs and practices such as FGM and *moranism* that prohibit effective participation which result to poor performance in mathematics.
- The Ministry of Education and schools managements should motivate teachers especially after the release of examination results. This includes recommendation for promotion, subsidizing of house rents
- The Ministry of Education should review the curriculum to make it relevant and flexible to the diverse needs of different regions and background of the students.

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