STUDENT FACTORS RELATED TO MATHEMATICS ACHIEVEMENT OF PUBLIC SECONDARY SCHOOL STUDENTS OF MASABA SOUTH SUB COUNTY, KENYA: A QUALITATIVE STUDY

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Abstract

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Performance in mathematics in Masaba Sub-County, Kenya has been poor for many years. In 2010 the mean score was 3.2282, while in 2011 it had a mean score of 3.9528 and in 2012 it had a mean of 4.0660 which is far below the maximum mean of 12.00.The purpose of this study was to assess student factors related to academic achievement in mathematics in Masaba South Sub County. The research objective of the study was to determine whether student factors have an effect on student academic achievement in mathematics. Students of Masaba South Sub County miss out in joining lucrative careers because of persistent poor performance in mathematics. The population was 40 schools in Masaba South Sub County. Saturated and stratified sampling techniques was used to select 6 secondary school principals in Masaba South Sub County, Kenya. Interview schedules were used to collect data. Qualitative data was analyzed using Thematic Analysis by coding and identifying themes per response. Validity of instruments was established through discussion with experts from Jaramogi Oginga Odinga University of Science and Technology school of education. The study might be useful to the ministry of education in improving the education system. The study found that poor performance in mathematics in Masaba South sub-county schools was due to poor attitude of students, students' lack of ambition, poor career choice, other students, lack of competitive spirit, and no desire to set targets, among others. The researcher recommended that schools should guide students on mathematics issues.

Keywords: student factors, academic achievement, mathematics

Introduction

Mathematics is part and parcel of our daily life; as such the provision of quality education and subsequent high performance is inevitable for the realization of millennium development goals and the vision 2030 (Ndemba, cited in Onderi, 2015). Despite the important role that mathematics plays in society, there has always been poor performance in the subject at national examinations.

According to Ranani (2014), performance in mathematics has been generally poor. Njoroge (2014) also decries the poor performance in mathematics despite the fact that it is one of the key subjects expected to turn Kenya into an industrialized country by the year 2030. The same trend has been noted in Masaba south sub county over the years as depicted in the KCSE results of 2010 with a mean score of 4.155, while in 2011 it had a mean score of 3.9528 and 2012 it had a mean score of 4.00660 showing some slight improvement though still below average (KNEC, 2014).The analyzed results are given in table 1.

Table 1
Mean Score in KCSE Mathematics between 2010 and 2012

Year	2010	2011	2012
Mean score	4.155	3.9528	4.0660

The table above gives the mean performance in mathematics between the years 2010 and 2012. Although the performance showed an upward trend the expected results were not good enough. Given the poor performance it was important to establish the influence of selected factors contributing to this. Of particular interest to the study will be the influence of student factors in academic achievement in mathematics in Masaba south sub county public secondary schools.

In Kenya, the major yard stick used to measure educational output is performance. This output, however is achieved after the various inputs into educational process undergo what is referred to as the educational production process. Poor performance in mathematics has been a major problem of concern to secondary education in Kenya in the last five decades. Teachers, schools, head teachers, class sizes and facilities among other variables have been blamed but little efforts have been made to establish the effect of student variables. This is what the study attempted to establish. The specific objective of the study was to determine whether student factors have an effect on student academic achievement in mathematics.

The expected findings of this study might assist educational stakeholders such as the Ministry of Education, Kenya Institute of Education, school administrators and parents to consider factors that influence performance in mathematics with a view to improving academic achievement in mathematics.

Role of Student Factors in Determining Academic Achievement in Mathematics

OECD (2013) found that four out of five students in OECD countries agree or strongly agree that they feel happy at school or that they feel like they belong at school. Students who are more perseverant and more open to problem solving perform at higher levels in mathematics. Students from poor backgrounds score lower in mathematics; they also have lower levels of engagement, drive, motivation and self-beliefs. Resilient students, who achieve at high levels, break this link. One way that a student's negative self-belief can manifest itself is in anxiety towards mathematics. Some 30% of students reported that they feel helpless when doing mathematics problems: 25% of boys and, 35% of girls. Mathematics anxiety is strongly associated with performance. In most countries and economies, the average girl underperforms in mathematics compared with the average boy; and among the highest-achieving students, the gender gap in favor of boys is even wider. However, PISA reveals that the gender gap, even among the highest-achieving students, is considerably narrower when comparing boys and girls with similar levels of drive, motivation and mathematics self-beliefs. In many countries, students' motivation, self-belief and dispositions towards learning mathematics are positively associated not only with how well they perform in mathematics, but also with how much better these students perform compared to other students in their school. Teacher-student relations are strongly associated with students' engagement with and at school. The above study was done in a rich country while the researcher did it at a poor country.

Methods

The study was carried out in secondary schools in Masaba South Sub County, Kisii County, Kenya. Masaba South sub county boarders Nyamache and Kisii central sub counties to the south, Trans Mara to the east, Bomet and Borabu to the north and Masaba north to the west. The district lies within longitude 330200 and 35020E and latitude 0020s and 00500s. The district has a mean annual rainfall of 1630mm (Republic of Kenya, 2009). Masaba South sub county has the following locations: Nyaribari Ikorongo; Nyaribari Masaba; Nyaribari Nyamagesa and Nyaribari Central. It was assumed that all public secondary schools offer the same mathematics curriculum.

Through qualitative research methods, the study identified student factors that influence academic achievement in mathematics. The study used saturated sampling technique to select 6 principals to be interviewed using an interview schedule. Kothari (2009) defines an interview schedule as an outline of questions that form a basis for and guide the interviewing process. The schedule provides a structure that aids in obtaining the necessary information efficiently and in business like atmosphere. The validity of the interview schedule was ascertained by the assistance of experts from the department of educational psychology, Jaramogi Oginga Odinga University of science and technology.

Before undertaking the actual study, an introduction letter from the school of post graduate studies of Jaramogi Oginga Odinga University of science and technology was sought and obtained. Permission to carry out the research in the schools within Masaba south sub county was obtained from National Council

of Science and Technology (NACOSTI).

The researcher assured the target respondents that their confidentiality was to be upheld at all stages of the study by keeping their identities anonymous while the data collection tools were being administered. Permission was requested and granted.

Qualitative Data Analysis

The researcher used a thematic analysis to pinpoint, examine and record patterns (or "themes") within data. Gibbs (2008) describes themes as patterns across data sets that are important to the description of a phenomenon and are associated to a specific research question. The themes become the categories for analysis and according to Gibbs (2008), a thematic analysis can be used in two different fields: literature critique and qualitative analysis of data and requires the determination of the frequency of appearance of a theme or a type of data. In this study, the researcher gathered data based on four main themes of school, family, student and guidance and counseling factors. Thematic Analysis of the four was performed through the process of coding in phases to create established and meaningful patterns. These phases consisted of familiarization with data, generating initial codes, searching for themes among codes, reviewing themes, defining and naming themes, and producing the final reports (Raburu, 2011) as presented in table 2.

Table 2

Coding

Transcripts	Themes/subthemes	Codes for themes/sub themes
There are both positive and negative impacts of teachers, teaching learning facilities, staffing of mathematics teachers, finance, performance index of mathematics in the school, other subject teachers attitudes towards mathematics, school policy on mathematics. Level of motivation, provision of teaching learning facilities, staffing of mathematics teachers, staffing levels, locality of the school, leadership and mobilization of resources... P1, P2---students can pass or fail depending on their availability , state and utilization…..P3	Effect of teachers on mathematics achievement Teaching facilities facilities School policy	TMA TLF SP
Posterity, continuous practice, learning facilities at home, tv, financial back up at home, parental encouragement…, basic needs, encouragement, exposure, level at which family provides teaching learning facilities, stability of the family..P4, P5...contributes to performance…P6	Family mathematics background Facilities at home	FMB FH
Role models, other students, efforts of the child, career choices of the students, lack of resources. Company, competition, excursions/exposures, setting of targets, age.P1, P2..can affect performance….P3	Other students, Competition from other students Career choice of student Setting target Ambition of the child Attitude	OS C CCS ST A
Shows students opportunities, helps students to have focus and direction, changes attitude from negative to positive, encourages students to work hard…giving direction and instruction, motivation, role models, encouraging teamwork, gives rooms for learners to express themselves…P4, P5…which is needed for them to do well…P6	Change attitude Chang attitude Motivation Guides students on career choices	CA GDF M GSCC

Having coded the transcripts, themes and sub themes were identified in the process of analysis and interpretation as was in Raburu (2011). The study used the six phases of thematic analysis.

Qualitative Findings

This section presents the results and discusions of the data colected from in-depth interview schedules witrh the headteachers from the sampled public secondary schools. The identified student factors influencing academic achievement in mathematics are as follows:

Other Students

The peers of the student have a crucial part to play as far as mathematics achievement his concerned. One principal remarked that:

> "*these students discourage each other that mathematics is hard. Others who are bright run to other schools which are known to do well in mathematics and hence our performace still remains low*" (Principal 2).

If a student chooses friends who love doing mathematics they will make him to work hard and vice versa. Other students will give him or her competition which will make him or her to work hard. They will also assist with asignments.this is in agreement with Shin (2008) which found that students can guide each other in solving problems with teachers guidance.

Competition

Competition within and without the school will make students do better. One principal remarked that:

> "*My students do not like competing with each other. They are already despaired.*"(P2)

This is because when students compete with each other they can do better. This is not in agreement with Shin, Jongho, Hyunjoom, and Yongnam (2009) which found that Singaporean students like competitions and they always excel.

Careeer Choice of Student

A career choice will make students to work hard. One principal remarked that:

> *"my students do not have careeers in mind and so do not work hard."*(P4)

Students who have no career in mind are unlikely to work hard. This is in agreement with Mbugua, Kibet, Muthaa, and Nkonke (2012) which found that who have chosen a career aearly are likely to succeed.

Setting Targets

A student who sets targets in his studies is likely to do well.one principal remarked that:

> *"my students do not set targets to achieve"* (P 6).

By setting goals students can work hard at attaining them.this is in agreement with Mbugua et al. (2012) which found that students with targets work hard at fulfiling them

Ambition of the Child

A student who is ambitious is likely to plan ahead and work hard in his or her studies. One principal remarked that:

> *"my students lack ambition in their studies"* (P 5).

Students who do not have ambitions are likely to fail.This agrees with Mutweleli (2014) which found that thewre was a significant relationship between self regulated learning and academic achievement.

Attitude

A positive attitude will make a student to do well. One principal remarked that:

> *"My students have a poor attitude to mathematics"*(P 3).

This is because a student who is negative to mathematics cannot attempt to do anything to improve.this is in agreement with Mbugua et al. (2012) which found that poor attitudes by both teachers and students can lead to poor performance in mathematics.

Conclusion

Student factors affect math performance. These factors include attitudes, self-motivation, self-regulated learning, and preparedness.

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