

Assessment of Counselling Needs Related to Mathematics Performance among Secondary School Students in Maara District, Kenya

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Abstract

Dismal performance in mathematics by students has continued to curtail their admission into strategic professional courses both at midlevel colleges and universities. Therefore, this study sought to assess counselling needs related to mathematics performance among secondary school students in Maara district in Kenya. The study examined counselling needs regarding attitudes, study methods and test taking skills related to mathematics performance and determined whether statistically significant differences existed between psychological intervention requirements and mathematics counselling needs among the secondary school students. Descriptive survey research design was used for the study. The target population was 12,371 students from the 48 secondary schools in Maara district. Questionnaires were used to obtain the required data. The study findings indicated that secondary school students had mathematics counselling needs in relation to attitude, study methods and test taking skills for which psychological intervention was necessary.

Key Terms: Counselling, Mathematics, performance

1. Introduction

The major industrial and technological development in Kenya geared towards attainment of the vision 2030 relies heavily on strategic professional courses in the fields of engineering, information technology, architecture, medicine, education, among others (Adedeji, 2007). However, admission into professional courses both at midlevel colleges and universities in the country is based on students' mathematics achievement as a basic entry requirement (Manoah, Indoshi & Othuon, 2011). Unfortunately, the persistent dismal performance in mathematics by students at the Kenya Certificate of Secondary Education examinations may mean missed opportunities for the students, and a threat to achievement of the vision 2030 for the country (Olakutande & Nyauma, 2012). Attempts to improve performance in the subject have brought both the Japanese and Kenyan governments together in steering the development of a student centered and activity oriented learning environment through in service training for all mathematics teachers in the country (Makewa, Role & Biego, 2011).

In spite of this, there remains a gap in mathematics achievement evidenced by the enormous enrolment for bridging courses in the subject at universities as a prerequisite to admission into various courses at the institutions. Therefore, more avenues, of which school guidance and counselling is an option, need to be explored in an effort to realize optimal mathematics performance among secondary school students. To this end, knowledge about mathematics students' counselling needs may assist school counsellors in designing appropriate mathematics counselling programmes. Hence, the need to assess counselling needs related to mathematics performance among secondary school students in Maara District, Kenya.

2. Objectives of the Study

The objectives of the study were:

- i) To determine attitudes related to mathematics performance among secondary school students
- ii) To determine study methods related to mathematics performance among secondary school students
- iii) To determine test taking skills related to mathematics performance among secondary school students
- iv) To determine whether there is a statistically significant difference between psychological intervention requirements and mathematics counselling needs among secondary school students

3. Methodology

This study employed the descriptive survey research design. The study population was 12,371 Students from the 48 secondary schools in Maara District. Purposive sampling and simple random sampling techniques were used to obtain a convenient sample of 360 Form Three Students from 9 secondary schools in the District. Questionnaires containing 50 test items categorized under sections on demographic characteristics, attitudes towards mathematics, mathematics study methods, mathematics test taking skills, and psychological intervention requirements were used to obtain the required data. The data were collected during the month of September 2012 with approval from the National Council of Science and Technology. The obtained data were coded and entered into the computer for analysis using SPSS version 17.0. Means, percentages and chi square test statistic were used to analyze the data.

4. Results and Discussion

The following results were obtained:

4.1 Demographic Characteristics

The data analysis results indicated that 53.3% of student participants were female while 46.7% were male. Their age ranged between 16 years and 20 years with the majority comprising 48.9% being 17 years old. The students' mathematics performance at the primary level examinations was fair with the majority constituting 53.9% scoring above the average grade compared to only 10.4% at secondary level examinations. This implies that there exist factors limiting students' performance in mathematics at secondary school examinations and therefore, interventions may mean progress in mathematics achievement for the students. Incidentally, only 10% of the students attested to utilizing the school guidance and counselling services with regard to their performance in mathematics.

4.2 Attitude towards Mathematics

Information on table 1 shows respondents' views about their level of agreement with given negative statements on students' attitude towards mathematics. The responses were valued on a 5 level likert scale ranging from Strongly Disagree (SD), Disagree (D), Undecided (U), Agree (A) and Strongly Agree (SA). The information on Table 1 indicates that majority of the respondents either agreed or strongly agreed with the negative statements on students' attitude towards mathematics. This means that most secondary school students exhibited a negative attitude towards the subject exemplified by mathematics anxiety, dislike for the subject, perceptions that mathematics is difficult and low self concept about mathematics ability. Admittedly, most students' negative attitudes towards mathematics are propagated by negative mathematics experiences from home, school and the society (Akinsola, 2008). According to Manoah *et al.*, (2011), students' attitude towards mathematics has an influence on participation and success in the subject. Therefore, there is need for school counsellors to design programmes tailored towards treating the students' negative attitude towards mathematics in order to arbitrate the dismal performance in the subject.

4.3 Mathematics Study Methods

Information on table 2 represents respondents' opinion about their level of agreement with given negative statements on students' mathematics study methods. The levels of agreement ranged from Strongly Disagree (SD), Disagree (D), Undecided (U), Agree (A), and Strongly Agree (SA). As indicated on Table 2, it appears that majority of the respondents either agreed or strongly agreed with the negative statements on students' mathematics study methods. This means that most secondary school students used improper mathematics study methods regarding mastery of concepts and formulas, teacher consultation, note making skills, procrastination, problem solving techniques, and discussion groups. These findings support the views of Miheso, (2012) asserting that most secondary school students spent less time on mathematics study and activities. Besides, Wang, Du and Liu (2009) posit that students not only complain about mathematics but also fail to study hard, take initiative or show interest in the subject. Further, Obote (2011) sites a lack of motivation as the main barrier to participation in mathematics study and activities among secondary school students. Thus, low mathematics achievers have deficits in study skills which may require psychological intervention. Hence, counselling strategies and programmes that enhance participation in mathematics discussion groups, recall of mathematics formulas, application of concepts, mathematics note making, teacher consultation and problem solving techniques may mediate the students' improper mathematics study methods.

4.4 Mathematics Test Taking Skills

Information on Table 3 shows respondents' views about their level of agreement with given negative statements on students' mathematics test taking skills. The views were rated on a 5 level likert scale ranging from Strongly Disagree (SD), Disagree (D), Undecided (U), Agree (A) and Strongly Agree (SA). The data analysis results on Table 3 indicate that most respondents either agreed or strongly agreed with the negative statements on students' mathematics test taking skills. This implies that majority of the students hardly completed mathematics tests, panicked during the tests, misinterpreted test items, had difficulties applying concepts to test problems and were always ill prepared for mathematics tests. It is therefore not surprising that most students scored below the average grade in mathematics at secondary school examinations. In agreement with these results, Thompsons (2008) observes that students who utilized "low order thinking" which advocates for recall of information or application of concepts only in familiar contexts/situations scored below the average grade in mathematics examinations. Moreover, Ashcraft and Moore (2009) affirm that mathematics anxiety has a negative influence on performance especially when tests are done under timed and high stake conditions. Thus, more refined test taking skills among students may enhance performance in mathematics. Generally, the few student participants who disagreed or strongly disagreed with the negative statements on students' attitude, study methods and test taking skills with respect to mathematics education were most likely the high achievers in the subject.

4.5 Psychological Intervention Requirements

The data about respondents' opinions on items regarding the extent of mathematics students' psychological intervention requirement were analyzed using chi square test statistic at a significance level of .005. As indicated on Table 4, the obtained chi square test statistics were .000. Since the p-values were less than .005, the null hypothesis was rejected meaning that there was a statistically significant difference between psychological intervention requirements and mathematics counselling needs among secondary school students. To determine the trend of the chi square statistic results, the respondents' mean perceptions indicated on Table 5 were computed and found to range between 3.19 and 4.04. These means were calculated out of a possible minimum mean of 1 and a maximum mean of 5. Since the obtained means were all above the possible average mean of 3, it was concluded that there was need for psychological intervention regarding students' performance in mathematics. Therefore, students need guidance in self evaluation in order to identify and rectify defective attitudes, study methods and test taking skills that limit performance in mathematics (Wang *et al.*, 2009). In support, Olubusayo (2010) observes that students who procrastinate about mathematics study may require counselling on time management, organizational skills and competence building. Thus, secondary school students may benefit from mathematics counselling services in the effort towards improving performance in the subject.

4.6 Recommendations

- i) To improve attitude towards mathematics, the society and especially parents should be encouraged to speak positively about the subject instead of labeling it as difficult and a reserve for a few talented families or individuals. Besides, measures should be put in place to initiate and enhance a culture that values and encourages high mathematics achievement among students.
- ii) To enhance mathematics study methods, secondary school students should be encouraged to read mathematics text books and make their own notes. Moreover, parental support in terms of extra tuition and enhancement of a rich home mathematics environment is crucial. Besides, school administrators should equip the mathematics departments with adequate teaching and learning resources.
- iii) The desire for high mathematics achievement should deliberately be fostered through career counselling and subject facilitation. Further, school administrators should seek to empower school counsellors by allowing them to attend mathematics workshops and seminars.
- iv) To enhance utility of mathematics counselling services, mathematics teachers should appropriately refer students requiring psychological intervention regarding performance in the subject. Besides, school counsellors should design counselling strategies/programmes tailored towards mathematics students' demands.

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Tables

Table 1: Students' Opinions on Attitude Towards Mathematics

Statement	S D (%)	D (%)	U (%)	A (%)	S A (%)
I fear mathematics as a subject	10	8.3	0	28.3	53.3
Mathematics is difficult	15.6	13.1	.6	19.4	51.4
I can never perform well in mathematics	12.2	14.7	.3	28.6	44.2
The mathematics lessons are boring	15	6.9	1.7	26.7	49.7
I do not like mathematics	6.9	10.6	.6	34.7	47.2
I have lost interest in mathematics	18.3	11.4	.3	22.2	47.8
I do not need mathematics to succeed in life	40.8	23.3	8.3	20.8	6.7
I have a low ability in mathematics	8.6	13.3	0	23.9	54.2

Table2: Students' Opinions about Mathematics Study Methods

Statement	SD (%)	D (%)	U (%)	A (%)	SA (%)
Mathematics formulas are difficult to remember	8.1	14.7	.0	25	52.2
I often copy mathematics assignment from friends	13.9	13.3	.0	26.1	46.7
I do not like mathematics discussions	12.8	13.1	.0	28.1	46.1
I fear asking for help from the mathematics teacher	12.5	15.6	.0	29.4	42.5
I seldom practice mathematics problems	9.2	11.9	.0	31.4	47.5
I do not make my own mathematics notes	8.3	6.9	1.4	37.8	45.6
My effort in studying mathematics is always in vain	14.4	10.3	.0	33.3	41.9
I often wait until exam time to revise mathematics	10.8	8.6	.0	37.2	43.3

Table 3: Students' Opinions on Mathematics Test Taking Skills

Statements	SD (%)	D (%)	U (%)	A (%)	SA (%)
I hardly complete mathematics tests	4.2	11.9	1.1	39.7	43.1
I panic while taking mathematics tests	11.7	15	1.1	28.6	43.6
I misinterpret mathematics word problems	7.2	16.9	6.9	43.1	25.8
I have a problem applying mathematics concepts	9.7	10.3	11.4	43.9	24.7
I miss steps when answering mathematics tests	5	14.7	4.4	41.4	34.4
I waste time selecting mathematics optional test questions	3.6	6.7	0	35.6	54.2
I always feel ill prepared for mathematics tests	15.3	10.6	0	29.4	44.7
I often misread mathematics test instructions	13.1	13.6	0	24.2	49.2

Table 4: Counselling Help Requirements Chi Square Test

Statement	Chi Square	df	Asymp. Sig.
Family support with private tuition	243.750	4	.000
Making mathematics notes	264.472	4	.000
Persistent poor mathematics performance	209.528	4	.000
Mastery of mathematics concepts and formulas	213.556	4	.000
Developing interest in mathematics	144.167	4	.000
Concentration during mathematics lessons	53.306	4	.000
Coping with too many mathematics assignments	77.722	4	.000
Interpreting mathematics questions	186.722	4	.000
Clear presentation of mathematics test items	152.528	4	.000
Counselling help requirements	171.750	4	.000

Table 5: Students' Mean Perceptions

Statement	N	Mean	Std. Deviation	Min	Max
Family support with private tuition	360	4.00	1.193	1	5
Making mathematics notes	360	4.04	1.229	1	5
Persistent poor mathematics performance	360	3.88	1.347	1	5
Mastery of mathematics concepts and formulas	360	4.01	1.144	1	5
Developing interest in mathematics	360	3.62	1.419	1	5
Concentration during mathematics lessons	360	3.19	1.446	1	5
Coping with too many mathematics assignments	360	3.45	1.296	1	5
Interpreting mathematics questions	360	3.82	1.257	1	5
Clear presentation of mathematics test items	360	3.64	1.241	1	5