
INTERNATIONAL JOURNAL OF SCIENCE ARTS AND COMMERCE

FACTORS AFFECTING MATHEMATICS ACADEMIC COUNSELLING SERVICES: THE SECONDARY SCHOOL COUNSELLORS' PERSPECTIVE

Monicah Buyatsi Oundo

Author's Affiliation Department of Education, Chuka University,
Chuka, Kenya.

Abstract

In response to persistent low mathematics achievement at Kenya Certificate of Secondary Education examinations despite provision of academic counselling services in schools, this study sought to investigate factors affecting mathematics academic counselling services among secondary school students in Maara District, Kenya. Opinions of heads of counselling departments who were purposively selected from 48 secondary schools in the district were collected using semi structured questionnaires, while data analysis involved extraction and discussion of main themes and excerpts. The finding indicated that secondary school students held tenaciously on the belief that mathematics was difficult and that they had low ability in the subject. Additionally, students were less consistent in studying mathematics and unwilling to consult peers and teachers when stranded. Lack of teaching/learning resources featured as a limitation to convenience in mathematics study and efficient completion of assignments. Therefore, it was recommended that measures be executed to provide personalized coaching, learning resources, syllabus revision and redesigning of mathematics text books.

Keywords: Mathematics, Counselling services, Achievement.

Introduction

In spite of mathematics achievement being fundamental for students' transition from secondary schools to colleges and universities, the subject's national mean score in the Kenya Certificate of Secondary Education examinations remains below the average grade. In retrospect, school counsellors and mathematics teachers have the responsibility of developing and motivating students' mathematic study orientation (Sani & Maruf, 2013) which is positively associated with achievement in the subject. In this case, the school counsellors assist students with career planning which entails aligning career interests with academic achievement and cluster subjects (Hughes & Karp, 2004) for which mathematics is core.

Therefore, career counselling emphasizes students' mathematics achievement which is a prerequisite for most professional courses at universities and colleges (Mbugua, Kibet, Muthaa & Nkonke, 2012)). Thus, careers of interest may evoke intrinsic motivation towards mathematics study because following a career path and attaining career goals could provide students with a strong purpose to study the subject. Besides, to influence optimal mathematics achievement among students, secondary school counsellors facilitate and advocate for a resourceful and conducive study environment. Particularly, the school counsellors deal with the psychological and social aspects of learning which constitute issues of attitude, study habits, motivation, self concept, test preparation, learning environment, discipline, social support and self efficacy among others (Eme, 2012). This is essential because research suggests that successful psychosocial academic intervention programmes are likely to result into improvement in students' achievement (Olubusayo, 2010). As such, continued low academic achievement after psychosocial intervention may mean challenges inherent in the counselling process, a prospect that prompted the investigation of factors affecting mathematics academic counselling services among secondary school students in Maara District in Kenya.

Objectives

The main objective of this study was to determine those factors affecting mathematics academic counselling services among secondary school students.

Methodology

The descriptive survey research design was employed for this study in which semi structured questionnaires were used to collect the necessary data. The sample size comprised of heads of counselling departments purposively selected from the 48 secondary schools in Maara District, Kenya. Permission for conducting the research was granted by the National Council of Science and Technology. Data analysis was done by use of thematic clusters and excerpts which were extracted, presented and discussed.

Results and Discussion

This section provides the data analysis results and discussions categorized under the sub headings: Demographic characteristics of the respondents and Factors that affect mathematics counselling services among secondary school students.

Demographic Characteristics

The data solicited on demographic characteristics of the participants were meant to determine the nature of the respondents with regard to gender, age and professional qualification. The heads of counselling departments who participated in this study constituted 10.417% male counsellors and 89.583% female counsellors. This gender bias was attributed to the mode of appointments to this position which was not standardized nor based on training and achievement. Therefore, female teachers were favoured because of the general belief that they are better at nurturing compared to their male counterparts. Further, majority of the

participants constituting 66.7% were aged between 40 years and 60 years which may signify broad guidance and counselling experience with students. However, regarding professional qualifications, only 16.667% of the heads of counselling departments had a certificate in guidance and counselling while the rest constituting 83.333% participants had no special training in guidance and counselling.

Factors Affecting Mathematics Counselling Services

This section presents themes and excerpts from data analysis results on factors that limit successful mathematics academic guidance and counselling services. These factors were based on the main themes derived from data analysis results and they included: attitude, procrastination, mathematics textbooks, and teaching/learning techniques.

Attitude

All the heads of counselling departments anonymously confirmed that majority of the secondary school students harboured negative feelings and beliefs about mathematics as a subject. Essentially, mathematics anxiety was reported as being prevalent among students including the high academic achievers who obtained less than the average grade in the subject. Further, psychological treatment of mathematics anxiety among students was reported as being hampered by negative mathematics talks from peers, parents, teachers and the society in general. This is clearly indicated in the following excerpt, “Anxiety inducing statements such as “No one from our family line has ever passed well in mathematics”, “Girls can never perform well in mathematics” or “One has to be abnormal to score more than 30% in mathematics” were continually passed on to clients by parents, siblings, neighbours and colleague students.” In addition, the anxiety appeared to be precipitated by an unfounded belief that the subject was difficult as indicated by a participant who noted, “Students exhibit anxious tendencies towards mathematics generally because they feel the subject is difficult and that they lack the intellectual ability to handle most concepts.” Supporting these findings, Asikhia (2010) purports that self efficacy which refers to how people judge their own ability to carry out and successfully accomplish a task, determines the choice of the course of action to be taken. Therefore, a student’s self efficacy in mathematics will determine whether they will study towards high achievement or not. Moreover, most heads of counselling departments felt that students’ viewing themselves as lacking in mathematics ability was a defense mechanism against any futile attempt towards improving achievement in the subject. Hence, it is not surprising that most school counsellors reported that students confessed of having given up in mathematics study and achievement. Consistent with these findings, Mbugua, Kibet, Muthaa and Nkonke (2012) assert that students fail in mathematics not because of a lack of arithmetic ability but due to negative attitude and laxity or resistance on the part of the learners. Nonetheless, neutralizing or reducing negative attitudes towards mathematics among students requires a concerted effort of teachers, parent, counsellors, society and the students themselves (Osen, 2007; Saritas & Akdemir, 2009). Thus, it may be challenging for school counsellors to treat attitudes towards mathematics when negative mathematics talks and discouraging experiences in class like persistent low achievement

prevail as posited by Githua (2013) that previous mathematics achievements influence attitude towards the subject.

Procrastination

Findings from this study suggested that procrastination in mathematics study was rife among secondary school students seemingly because the subject was deemed to be difficult. The heads of counselling departments asserted that many students hardly studied mathematics on a daily basis and commonly professed of not understanding what transpired during most mathematics classes. Accordingly, when students put off academic work for whatever reasons, then low achievement is inevitable (Akinsola, Adedeji & Adeyinka, 2007). Besides, students were reported as attesting to copying mathematics assignments from supposedly the few arithmetically talented colleagues for fear of punishment. This means that little time was allocated for mathematics study and conceptual development. In line with this argument, a participant stated, "Majority of the students disclosed that they preferred reading other subjects which seemed much easier to understand and remember at the expense of developing mathematical competence." Technically, it becomes very difficult to psychologically salvage mathematics procrastinators through guidance and counselling given that mathematics is a cumulative subject where mastery of prior concepts is necessary for the understanding of current content (SMSSE, 1998). This means that a student has to begin with simple concepts, on which more complex and advanced ideas can be expounded; an effort that may easily be frustrated by lengthy syllabus and the overall demanding academic work (Nakhanu, 2012). Shockingly, the results of this study also suggested that there existed a large proportion of students who actually wondered what was there to be studied in mathematics. Participants reported that many students talked of not studying mathematics at all aside from attending classes, completing assignments and taking the examinations. According to the heads of counselling departments, such students required thorough training in mathematics study methods and also a strong social support to avert procrastination or possibly instill an intrinsic motivation to learning of the subject. However, academic procrastination which has devastating effects on mathematics achievement and rated as very common among students (Asikhia, 2010), may not only hinder consistency in mathematics study but also implementation of outcomes of mathematics academic counselling sessions.

Mathematics Textbooks

Majority of the heads of counselling departments reported that students complained about inadequate mathematics textbooks; a finding that corresponds with the views of Gitaari, Nyaga, Muthaa, and Reche (2013) purporting that achievement in mathematics among secondary school students is influenced by student : textbook ratios. To put emphasis on inadequacy of mathematics text books, a participant wrote, "Students complain of inadequate mathematics textbooks. The books are also said to be small and thick in size which takes up much of the space in their school bags since having to carry 4 such books home every day for revision and reference purposes becomes cumbersome." This means that parents hardly bought school text books for use by students at home. In addition, this particular participant advised that book publishers could increase book sizes from size A5 to size A4 and possibly

combine form 1 and form 2 books into one book as well as form 3 and form 4 books into a single book. This was believed would ease portability, revision and reference hence, facilitating efficient personal study. Another participant stated, "Mathematics text books are viewed by students as lacking in comprehensive illustrations and detailed explanation of concepts. Students feel that reading and understanding of new mathematics concepts from such textbooks required more explanations from a teacher. This is commonly cited as the reason why most students fail to read ahead of the teacher." Consenting to this finding, Aldag (2007) insists that reading a head of the teacher motivates students' understanding of concepts and participation in discussion groups. Further, all the head of counselling departments noted that some students wondered why particular topics were included in the mathematics syllabus since such topics never seemed to make any sense to them at all. Apparently, most school books in Kenya do not overtly indicate topic objectives at the beginning of every chapter. Likewise, mathematics text books in Kenya do not explicitly emphasize the relevance of concepts to daily life experiences and though this is indirectly implied in exercise questions, most students are unable to capture the importance of the concept but instead see the questions as problems to be solved. Thus, justification of mathematics topics or concepts by relating them to real life situations is necessary if students are to appreciate and develop interest in learning the topics or concepts (SMASSE, 1998). Incidentally, with the introduction of calculators at secondary school level of education, students were reported as perceiving the use of mathematical tables as irrelevant and burdensome. Topics such as squares, square root, cubes, cube root, logarithms, reciprocals, trigonometric ratios among others were imagined to be easier and more interesting if the calculator was adopted fully without reference to the mathematical tables. This finding is supported by Masibo, (2013) who propose that the use of calculators in mathematics education serve to enhance motivation and interest in the subject among students. Hence, mathematics textbooks pose a real challenge to successful mathematics guidance and counselling services in secondary schools.

Teaching/Learning Techniques

The heads of counselling departments stated that students complained of mathematics teachers moving through lessons at a very fast pace. Further, students blamed mathematics teachers of regularly utilizing lecture method in teaching with little room for discussions and discovery methods. These findings may be attributed to the wide mathematics syllabus which is frequently not completed before students take the national examinations (Nakhanu, 2012). Still, Gitaari, Nyaga, Muthaa, and Reche (2013) maintain that inappropriate mathematics teaching methods curtail students' achievement in the subject and advocate for inculcation of student centred teaching strategies. Consistent with these findings, discussion and discovery methods have been hypothesized to yield optimal mathematics achievement among students and therefore, students should be allowed enough time and opportunities to discover different approaches to solving mathematical problems (Sani & Maruf, 2013). Contrary to students' sentiments, the heads of counselling departments noted that mathematics teachers complained of laxity among students during lessons and when carrying out mathematical activities. In addition, the mathematics syllabus was deemed to be wide and unfriendly to

students of average and below average ability in the subject. Further, the mathematics teachers were also reported as expressing frustration over students who were ignorant of simple mathematics concepts such as BODMAS, Logarithms, Pythagoras Theorem, operations with negative integers among others. Finally, the heads of counselling departments felt that persuading mathematics teachers to use discussion and discovery methods of teaching all the time would be difficult due to the wide content which must be covered within a stipulated time frame. Thus, the learner versus teaching technique conflict persists with students struggling to cope with the situation using strategies arrived at during guidance and counselling sessions.

Recommendations

The following recommendations were made based on the findings of this study:

- i. Parents and guardians should make an effort to provide personalized mathematics coaching, learning resources as well as emotional and moral support for students.
- ii. Schools should provide form one students with career books clearly indicating professional courses and relevant subject cluster requirements as well as the work settings for diverse careers. This will enable students to realize the importance of mathematics achievement since it is a basic entry requirement for most professional courses at colleges and universities.
- iii. Curriculum developers should rewrite the mathematics syllabus indicating every concept and sub concepts in order to make the examiner's expectations explicit to the students. Besides, to make mathematics relevant to real life situations, every concept in the syllabus should be accompanied by application areas in daily life experiences.
- iv. Since the mathematics syllabus is wide, the Ministry of Education should revise the syllabus in order to remove those concepts that require the use of mathematical tables since calculators clearly serve the same purpose. This will allow mathematics teachers more time for lesson preparation and to attend to individual students.
- v. Authors of mathematics textbooks should provide additional illustrations and video compact disks that make abstract concepts more visible to the learners. Further, the textbook authors should reflect especially in mathematics textbooks the topic objectives and their relevance to real life experiences.
- vi. Mathematics textbook publishers should consider increasing the textbook paper size and produce books that combine content of various levels in one volume. For example, a single book with form one to form four content should be availed for home use and school libraries. This will allow students and teachers to easily refer to earlier concepts requiring understanding of current content.
- vii. Companies that manufacture teaching aids should make smaller sizes of the resources such as solids, nets, dice, playing cards and solid skeletons which students can easily carry around and manipulate for better understanding of abstract concepts.

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