POOR PERFORMANCE IN MATHEMATICS AMONG SENIOR SECONDARY SCHOOL STUDENTS IN KADUNA STATE: WHAT’S TO BLAME?

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Abstract
This study was motivated by the need to find out factors responsible for the observed continued poor performance in public mathematics examinations in spite of efforts for its improvement. Data for this paper were obtained using a 10 item questionnaire administered on 141 randomly selected students and all mathematics teachers in GSS in Atyap Chiefdom. Respondents were instructed to indicate 1 for the factor making the greatest contribution to poor performance in mathematics and 10 making the weakest contribution. The statistical analysis showed that students consider teacher-related factors and resource materials for teaching very crucial in determining their performance in mathematics. Also there are observed differences in factors to which male and female students assign strong links with poor performance in mathematics. Similar studies to this were recommended in various social settings in order to have a clearer picture of the roles played by these factors in contributing to poor performance in mathematics nationwide.

Keywords: Mathematics, poor, performance, students

Introduction
Concerns for high rate of failure in public examination in Nigeria dates back to a number of decades. Ojaleye (2000) and Bojuwoye (2000) revealed that researchers have attempted to identify factors responsible for the high rates of failure among others, students’ negative attitude to the subject, lack of qualified teachers, inadequacy of teachers, lack of necessary learning skills, specialised language of the subject and unsuitable textbooks. In view of this, students were seen as the main focus of most research work. They became subjects of diagnoses aimed at discovering the “appropriate treatment of learning outcomes” (Ojaleye 2000:95). Mathematics is the cornerstone of development of any contemporary society, hence the concern for continued poor performance by students and increasing research to identify possible factors contributing to the nose diving in students’ performance.

Development of problem-solving strategies which mathematics teachers could use in teaching had long been initiated by mathematicians (Ojaleye 2000). More recently, the federal government working through the National Mathematics Centre (NMC), and other specialised institutions (Bessong and Obo 2005) and Associations such as the Science Teachers Association of Nigeria (STAN) and Mathematical Association of Nigeria (MAN), private organisations or companies and NGOs have been making a concerted effort to improve teaching and learning of mathematics. These efforts aim at improving performance of students in mathematics and meeting the aims and goals of the National Policy on Education for equipping individuals both mental and physical skills, abilities and competence needed for the technological development of the nation.

In Atyap Chiefdom of Zangon Kataf Local Government Area (LGA), in Kaduna State there has been an effort to improve teaching
and learning of mathematics through an educational endowment fund used for recruitment of part-time teachers, purchase of mathematics textbooks, improvement of school infrastructures and preparing students of Secondary School Certificate Examination (SSCE). A study in Zangon Kataf and Kaura LGAs in Kaduna State revealed that about 98.9 per cent of Senior Secondary School students had goal-setting ability which is important in determining student’s performance (Waji 2007). In spite of this and all the attempts by government and the private sector to improve performance in SSCE, the results have continued to be poor. For example, information from the WAEC results kept in the Zonal Education Office revealed that between the period 2004 and 2008, only 8.2 per cent of students passed WAEC mathematics at credit level in the Atyap Chiefdom. Studies in the US, New Zealand and Australia revealed contradictory results about gender difference in students’ performance in mathematics (see Grootenboer and Hemmings 2007). Although this has not been established among the students in Atyap Chiefdom, there is the need to examine factors responsible for the poor performance in mathematics by sex.

Factors affecting learning of mathematics have been identified to include reading skills, intellectual abilities such as “verbal, numerical, memory and computation abilities” (Ojaleye 2000:95), motivation and goal setting (Mallum and Haggai 2004; BabatunWaji 2007). Studies in different parts of the world and in Nigeria in particular, have also come up with other various and diverse factors responsible for the poor performance of students in mathematics. These include shortage of qualified and dedicated teachers, level of students’ preparedness to learn, inadequate teaching facilities, societal values, examination malpractice, gender differentials in performance in mathematics and lack of motivation of students by teachers (Bojuwuye 2000, Bessong and Obo 2005). Scientific research aims at providing scientific knowledge on a social problem which could be used for finding appropriate solutions acceptable to the social group concerned.

Therefore, this study of Senior Secondary School (SSS) students and mathematics teachers aims at identifying the factors considered affecting the performance in mathematics with the view to provide information needed by all the education stakeholders for developing strategies which could solve the problem of poor performance in mathematics in Atyap Chiefdom.

Methods and procedure

The population for this study was all SSS students and Mathematics teachers in Atyap Chiefdom. A sample of 20 per cent of students was randomly selected from SSS 1-3 students in each of the three government secondary Schools serving as WAEC examination centres in the chiefdom in 2009. A total of 141 students were selected in the three schools and all mathematics teachers of the nine (9) GSS in the chiefdom constituted the sample of teachers.

Instruments for data collection

The instrument used for this study was a 10 item questionnaire already developed and used by other researchers such as Bojuwuye (2000). The respondents were to rank the listed items or factors in order of their influence on students’ performance in mathematics. The instructional guide indicated 1 for the factor making the greatest contribution to poor performance in mathematics and 10 making the weakest contribution.

Data analysis

Descriptive statistics were employed for the analysis with average ranking used to determine the strength of the links between factors and poor performance in mathematics.

Results

Question 1: What are the factors, as ranked by students and teachers, which have the strongest link to students’ poor performance in mathematics?

Table 1 shows that shortage of qualified teachers has the strongest link to poor performance in mathematics followed by inadequate resource materials for teaching.
The third in strength as ranked by students and teachers are lack of motivation of students by teachers and mathematics anxiety respectively. Attitudes of teachers and students towards teaching and learning mathematics was ranked 4th while all others were ranked as having weaker links to poor performance in mathematics with school location having the weakest link.

**Question 2:** What role does students’ gender play in the ranking of items?

Disaggregating the data by sex of students reveals the same ranking by male students with that of all the students meaning that the view of female students are hidden or clouded by those of the male students. Both male and female students ranked shortage of qualified teachers as having the greatest link to poor performance in mathematics. However, poor teaching methods and attitudes of teachers and students towards teaching and learning mathematics ranked 5th and 4th respectively by male students were ranked 2nd and 3rd respectively by female students. In addition, inadequate resource materials for teaching and lack of motivation of students by teachers ranked 5th and 4th respectively by female students were ranked 2nd and 3rd respectively by the male students. However, the same ranking indicating weaker link to poor performance was given to items e-i by both male and female students.

<table>
<thead>
<tr>
<th>Factors</th>
<th>Students</th>
<th>Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Males</td>
</tr>
<tr>
<td></td>
<td>Mean Rank</td>
<td>Mean Rank</td>
</tr>
<tr>
<td>a. Shortage of qualified teachers</td>
<td>2.20 1</td>
<td>2.21 1</td>
</tr>
<tr>
<td>b. Inadequate resources materials for teaching.</td>
<td>4.60 2</td>
<td>4.36 2</td>
</tr>
<tr>
<td>c. Lack of motivation of students by teachers.</td>
<td>4.77 3</td>
<td>4.52 3</td>
</tr>
<tr>
<td>d. Attitudes of teachers and students towards teaching and learning of mathematics.</td>
<td>4.89 4</td>
<td>5.10 4</td>
</tr>
<tr>
<td>e. Examination malpractice.</td>
<td>5.75 7</td>
<td>5.68 7</td>
</tr>
<tr>
<td>f. Mathematics anxiety</td>
<td>5.50 6</td>
<td>5.48 6</td>
</tr>
<tr>
<td>g. Differences in sex of students’ performance</td>
<td>6.99 8</td>
<td>7.34 8</td>
</tr>
<tr>
<td>h. Large class-size</td>
<td>7.36 9</td>
<td>7.36 9</td>
</tr>
<tr>
<td>i. School location</td>
<td>7.91 10</td>
<td>7.58 10</td>
</tr>
<tr>
<td>j. Poor teaching methods</td>
<td>4.92 5</td>
<td>5.19 5</td>
</tr>
</tbody>
</table>
**Question 3:** Are the ranking patterns of students and teachers similar?

Teachers like students, ranked shortage of qualified teachers and inadequate resource materials for teaching as 1st and 2nd respectively. They both also gave attitudes of teachers and students towards teaching and learning mathematics and school location the same ranking of 4th and 10th respectively. Teachers and students differed in the ranking of all other factors. Mathematics anxiety and examination malpractice were ranked 3rd and 5th by the teachers while students ranked them 6th and 9th respectively. This means that while teachers accord mathematics anxiety and examination malpractice greater link to poor performance in mathematics by students, the students view them as having weaker link to their performing poorly in mathematics.

**Discussion**

Governments have taken the door steps of children but most of these schools are poorly staffed, equipped and maintained (Bojuwoye 2000). The findings indicate that shortage of qualified teachers is considered to be the greatest factor causing poor performance in mathematics among Senior Secondary School students in Atyap Chiefdom. This factor has been found to negatively and significantly affect students’ performance in mathematics in the United States of America (Torres 2003). As already pointed out by Bessong and Obo (2005), shortage of qualified teachers often leads to overloading of the few available ones thereby rendering them worthless and ineffective while their students’ performance grossly suffers.

The negative effect on students’ performance is further increased with the few teachers being unqualified to teach the subject. Lack of professional training, according to Bessong and Obo (2005), makes it difficult for teachers to comprehend their students’ psychology and potentials which should guide them in choosing effective methods and teaching aids. In contrast, in a national study, this factor was ranked 4th (Bojuwoye 2000) highlighting the importance of conducting small scale studies in different parts of the country to bring out likely differences in views regarding social phenomena.

Inadequate resource materials for teaching, ranked 2nd by both teachers and students, negatively impacts both teaching and learning and, subsequently, result in poor performance of students in examinations. This factor has also been ranked 2nd in a national survey of Senior Secondary School students (Bojuwoye 2000). The inadequacy of resource materials for teaching dampens the interest and enthusiasm of both teachers and students to teach and learn mathematics. Studies have shown that the motivation of the teachers through retraining and provision of necessary resource materials for teaching is critical to motivating students for better performance in mathematics (Martin 2002; Grootenboer and Hemmings 2007). Colleges of education have centres for resource material development and retraining of teachers in effective modern methods of teaching. This is a good step in the right direction, but effective use of these centres to equip teachers for more effective teaching is necessary for the impact of this effort to be felt.

Assigning attitudes of teachers and students towards teaching and learning mathematics the same rank (4th) indicates both teachers and male students agree while the female students differ by assigning it a greater link (3rd) to poor performance in mathematics. In addition, female students show disagreement with male students and teachers in assigning poor teaching methods a greater link to poor performance (2nd rank) rather than the weaker links of 5th and 8th ranks by students and teachers respectively. Teachers’ attitude to teaching has been described as pathetic or pitiful (Bessong and Obo 2007) and this negative attitude, particularly of male teachers, has been found to lower the performance of female students (Martin 2002). The attitude of students towards learning mathematics has also been found to have direct effect on their performance (Grootenboer and Hemmings 2007). Students who dislike maths have always linked their problem to the methods of teaching (Bature and Bature 2005). This may partly explain why female students, compared
to male students and teachers, accorded poor teaching method a stronger link to students’ poor performance in mathematics. These findings suggest female students in Atyap Chiefdom may have more negative attitudes towards mathematics than their male counterparts resulting from, possibly, their teachers’ attitudes and methods of teaching mathematics.

Mathematics anxiety, the “feeling of tension, apprehension or even dread that interferes with the ordinary manipulation of numbers and solving mathematical problems” (Ashcraft and Faust 1994 quoted by Sheffield and Hunt 2007:1) is given a stronger link to poor performance in mathematics by teachers than by the students. Students have been found to experience mathematics anxiety and a close relationship between mathematics anxiety and their performance in mathematics has been established (Sheffield and Hunt 2007). However, it is worth noting that it is the teachers rather than the students according a greater link of mathematics anxiety to students’ poor performance in the subject. Therefore, maths anxiety may not be as important a factor in determining poor performance in mathematics in all populations as generally believed. Teachers may give it a stronger link to their students’ poor performance to explain away their ineffectiveness in teaching the subject. However, another study with a bigger sample may be needed to confirm this finding.

The importance of mathematics for especially technological development and everyday economic activities cannot be overemphasised. Therefore, if government is not just paying lip service in talking about improving the standard of education generally, and particularly sciences including mathematics, it goes without saying that it must, without delay, embark on massive retraining of mathematics teachers in schools, train new ones and recruit more mathematics teachers. Similar studies on this topic should be encouraged in various social settings in order to gain a clearer picture nationwide of the roles these factors play in the observed poor performance in mathematics. This will enhance the development of strategies for improving students’ and teachers’ attitudes towards mathematics and subsequently, the development of the scientific manpower needed for the technological development Nigeria seeks to achieve.

Conclusion

Students consider factors to do with teachers and resource materials for teaching very crucial in determining their performance in mathematics. All these factors determine the effectiveness of teaching and learning which subsequently affect performance in examinations. Shortage of qualified teachers, inadequate resource materials for teaching, poor teaching methods, lack of motivation of students by teachers and attitudes of teachers and students towards teaching and learning mathematics greatly affect students’ performance. If the first three are taken care of by government and other stakeholders, the latter two may be solved and both teachers and students will be motivated to teach well and learn better thereby improving students’ performance in mathematics. Effort has to be stepped up to employ more mathematics teachers, produce enough resource materials and retrain all mathematics teaching staff.

Observed differences in factors male and female students in this study accord stronger links to poor performance in mathematics suggest the need for developing different strategies for the two genders in our attempts to improve students’ performance in mathematics. The Senior Secondary School students in Atyap Chiefdom do not consider mathematics anxiety as having a great link to poor performance in mathematics. Therefore, maths anxiety may not be as important a factor in determining poor performance in mathematics in all populations as generally believed. Teachers may give it a stronger link to their students’ poor performance to explain away their ineffectiveness in teaching the subject. However, another study with a bigger sample may be needed to confirm this finding.

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