FACTORS RESPONSIBLE FOR POOR PERFORMANCE OF STUDENTS IN MATHEMATICS IN NIGERIAN SECONDARY SCHOOLS

***Popoola, F. R.**
Olarewaju, R. R.
College of Agriculture and Animal Science
Ahmadu Bello University, Mado Road, Kaduna State, Nigeria
**E-mail: fellypopo@yahoo.com*

ABSTRACT

This study investigated the factors that are responsible for poor performance of students in mathematics. A random sample of 109 students from Best Start College Mango Kaduna was used. The research instrument was a reliable and validated 20 items likert type questionnaire which was administered on 109 secondary school students to obtain responses on the factors that are responsible for poor performance of students in mathematics. The responses were analyzed using t-test statistic. At 0.05 significant level and 38 degree of freedom , the calculated t-value was 0.469 and the t-critical was 2.021. Since t critical was significant the null hypothesis was retained. Thus, there was no significant difference among the respondents concerning the factors that are responsible for poor performance of students in mathematics in Nigerian secondary schools. One of the recommendations made was the need for efficient and effective teachers who are professionally and academically qualified to promote mathematics learning in schools.

Keywords: Performance, students, mathematics, secondary school

INTRODUCTION

The index for science, technology and mathematics education has been acclaimed widely to be a pointer of measuring the socio-economic and geopolitical development of any nation (Betiku, 2001a). Mathematics is one of the core subjects to be offered by all students up to tertiary levels of education among Science and Technology courses. It is one of the compulsory subjects. This compulsory nature of mathematics carries with it an assumption that all members of our society should have the knowledge of the subject. The competence of mathematics is a crucial and critical determinant of the post-secondary education and the options available to young people (Sells, 1978; Ojo, 1986).

However it is disappointing to note that the students' performance in mathematics at internal an external examination has remained considerably poor despite the relative importance of mathematics (Ale 1989). Many variables have been implicated as responsible for discouraging performance of students. These are Government related variables, examination body related variables, curriculum related variables, test related variables, textbook related variables, home related variables and student related variables. Amazigbo (2000) identified specific variables, such as

poor primary school background in mathematics, lack of incentives for test, lack of interest in the part of students, students not interested in hard work, incompetent teachers in the primary school, large classes, fear of the subject psychologically, etc.

Mathematics phobia has been an academic disease and its virus has not yet been fully detected so as to get its effective treatment in the class. However the symptoms of this disease are always observed on the faces of students when teaching and learning of mathematics take place in the classes. Bryl (1983) confirmed that poor performance in mathematics stemmed from anxiety and fear. This hatred for mathematics is usually distributed to all subjects that have direct links with mathematics (Mughol 1976; Okeke, 1982; Busari 1988). As a result of students' hatred for mathematics, some of them refuse to improve on interest in mathematics in the secondary level and this is carried over to tertiary institution. It has been observed that students form the habit of leaving the classroom either before or during the mathematics lesson under the pretense of easing themselves, students refuse to do assignment and this is one of the avenues whereby the teacher can know the students' problems, some do not make out time to practice the subject during the school or after the school hours.

Failure to understand mathematics in elementary school leads to inadequate comprehension of mathematics at secondary and tertiary level. Inadequate mastery of mathematical process and fundamental concepts and skills is probably the root cause of the difficulties encountered by individuals of all ages in anything mathematical. Therefore the purpose of this study is to examine selected variables and factors that contribute to poor performance in mathematics from the point of views of male and female students and suggest necessary remedies. Mathematics, despite its closeness to the physical environment has been seen as a subject whose connections with the physical world are relatively ignored hence ability to perceive mathematics from the physical world may be related to one's mathematical reasoning.

Searching into relationships between affective factors and mathematical reasoning supports the fact that affective domain has some impact in the learning of mathematics in general. Though there are conflicting findings on the relationship that may exist between affective and cognitive achievements (Simpson and Wazik, 1978, Lassa 1987, Inekwe 1996), affective domain remains a powerful dimension for learning which should not be neglected. Souper (1976) said that "emotion generates energy" and if education for learning is to be more than mere training of the intellect (the cognitive), then the importance of the acceptance of feelings and emotion in the classroom can be seen as being more therapeutic. Hence affective factors like motivation of attitude towardsand perception of mathematics from the physical environment are considered pertinent to this study. This is aimed at examining strategies that can remedy the dangerous situation of students who will be future leaders. Finding out factors that inhibit or enhance mathematics learning and understanding will erase fears, lack of confidence and independent thinking that are exhibited by students. Such research will yield information for guidance to the mathematics teachers on major areas of emphasis and in developing mathematics'

reasoning. Beyond this it can bring an awareness that may warrant change of emphasis and readjustments in the instructional methodologies and techniques in mathematics teaching for the mathematics teachers.

Educational systems can also derive various useful suggestions concerning curriculum development to shift and balance up in cognitive and affective emphasis in the teaching and learning and also learning of mathematics. Teachers are the most critical factor in the mathematics education. They are the spark and key man in the drive to progress in our educational system (Adesokan 200). Teachers are life wire of any mathematical education endeavour. The success of any school system largely depends on the attitude of the teachers. If teachers have no commitment to the teaching of mathematics and exhibit trauancy, their students are bound to copy them (korau, 2006). The teacher's personal attitude towards the subject and the students contribute much to generate in students positive or negative attitudes towards the subject. His commitment, concentration, consecration, concern for the students' welfare and success are attractions for the students. Some teachers lack the knowledge of ethics of the teaching profession. Some of them are harsh, sarcastic, unapproachable, antagonistic, rude to students and thunderous over any little students' mistake.

Some attack their students wishing them failure and some teachers spent the whole period jesting with the students instead of teaching. All these traits and tendencies reduce the teacher to the ordinary, bringing disregard to his integrity and the subject. Therefore the teachers' mood matters a lot. His negative disposition and poor interpersonal relationship with the students when learning mathematics can discourage, dispirit, dislodge and disperse them. A teacher who cannot generate enthusiasm for learning through personal involvement with the subject matter or communicate a sense of excitement and a contagious intellectual thrill will not encourage the students to learn. Effective teaching and learning of mathematics has a close relationship with the facilities available to the teacher. Availability of facilities such as conducive lecture rooms, laboratories/workshops/studios, libraries information and communication technology (ICT), administration blocks, hostel accommodation, clinic, sporting and recreational facilities, electricity, water and sanitation are essential for the preparation of teachers.

Many libraries in many schools are mere reading rooms as they lack current books and journals that are necessary for mathematical knowledge improvement. The world is fast becoming a global village. The teacher is therefore expected to be vastly knowledgeable mathematically if the pupils he/she has to teach would not make a laughing stock of her. (Tahir, 2006). Many learners come from home environment that are less likely to offer them the chances to assimilate the mathematics ideas that younger children from better homes receive. Such learners may not have enough teaching facilities in the home to encourage him to like mathematics. He may also suffer ill-health, insufficient sleep or insufficient nourishing food. This may not allow him to have mental energy or ability to concentrate so as to maintain a continuous level of accuracy in mathematics (Dubey, 1979). Such a child starts with a disadvantage. Therefore the achievement of such a learner and his emotional state are affected thus leading to backwardness in mathematics.

There is the need for parents to encourage the use of mathematics language during normal family activities. In Nigeria the pupils' home upbringing tends to affect their attitudes to authority. It is one of co-operation and passive submission. Children seen to have a natural tendency to explore, find out and collect objects. Too much restriction can have a lasting effect on the learner to the extent that he becomes afraid to experiment and explore in mathematics and later in life when encouraged to find out for him or make individual contribution he may be too inhibited to do so (Lawes, and Eddy 1967). Research by Banks (1971) showed that subjective measures of parental attitudes and aspirations are more important than the objective measures of material environment. Kahl (1961) has shown that parental attitudes were more important in predicting aspiration of pupils towards continuing their schooling and success in school than status. Parents should not expect too little or too much from their children. Too much pressure can lead to failure and dislike of mathematics. Critical remarks can encourage lukewarm attitude towards mathematics. They should therefore discuss the progress of their children with the teachers so as to assist the learners in their areas of difficulty.

Parents that are too pushful can cause academic maladjustment for learners. Boocock (1972) found that parental dominance tend to discourage the children in school learning. Some parents are very poor therefore they may not be able to afford the cost of some learning facilities and textbooks. However some parents over-pamper their children too much to the points of spoiling them completely (Korau, 2006). Since such parents shun their responsibility to train their children at home such children will develop nonchalant attitude to mathematics and other courses.

Korau (2006) observed that the schools population counts in thousands today against the hundreds of the previous years. Schools today are overcrowded in classrooms which make it impossible to talk of an ideal size of a classroom for effective teaching of mathematics. No effective teaching can take place under a chaotic situation where he cannot handle the large number of students effectively. Consciously quantity and quality cannot work together and this can affect the students' learning of mathematics and thus perform poorly. Korau (2006) gave the growth of candidates' population in WAEC school examination. In 1957 the population was 3,435 but by 1999 it rose up to 1.6 million.

Literature revealed that there are factors responsible for poor performance of students in school mathematics. This study is an attempt to contribute to these findings as it affects the students' best start College in particular and Nigeria in general. The purpose of this research study was to find out if there is any significant difference between male and female respondents concerning the factors that are responsible for poor performance in school mathematics.The following tentative answers were raised for the work.

HO_1: There is no significant difference in the responses of students concerning the poor performance of students in school mathematics.

HO_2: There is no significant difference of male and female respondents concerning the factors that contribute to poor performance of students in school mathematics.

METHODOLOGY

A random sample of 109 students out of the total population of 245 students from BestStart College, Mando Kaduna, comprising of 51 females responded to the questionnaire to determine their response towards the factors that are responsible for poor performance of students in school mathematics. This comprised of 30 students from Senior Secondary One, 50 students Senior Secondary Two and 29 students from Senior Secondary Three. This represents 44.4% of the College population. The simple random method used involved common 'draw' method whereby numbers 1 to 30 were written on slips of paper and other papers contain nothing for Senior Secondary One students. These slips were put inside a container. After thorough shuffling, they were drawn one by one until the number of students required in the class was obtained. The same technique was repeated for Senior Secondary Two and Senior Secondary Three students to select the number of students required for the study.

Respondents' questionnaire containing 20 items was designed to collect data. Each respondent responded to the same 20 questions by ticking the choices given. The choices were very true, true, fairly true and not true. Respondents were tick whether their poor performance in school mathematics are due to lack of qualified teachers, lack of incentive for teachers which prevent them from teaching effectively, some absent and incompetent teachers, lack of interest in mathematics on the part of students, overpopulation, poor background in mathematics, mathematics difficulty, the abstract nature of mathematics, lack of and outdated instructional materials, expensive mathematics text books, lack of encouragement from parents, other engagements in the home and uneducated parents who do not help students when they have difficulty to solve mathematics problems are some of the factors that are responsible for their poor performance in school mathematics.

Content validity was established by relating the content of each question to the literature while reliability coefficient of 0.8 was found to be internally consistent. “Experts in mathematics were given the test items to validate in order to meet the disposition of the population targeted in this study and give their recommendations. The choice of words and sentence structures of the questionnaire were corrected by the experts. These were fully affected in the final correction before administering. The test was administered to the respondents by the researcher. It involves ticking the correct letter among the choices given.

RESULTS AND DISCUSSION

From Table 1, the males' mean score was 0.97. They scored above the means in incompetent teachers, lack of understanding, many topics that cannot be understood, lack of teaching facilities, obsolete materials, library not well equipped, and expensive text books. They scored below the mean in lack of qualified teachers, lack of incentive for teachers, teachers' absenteeism, lack of interest, poor background, lack of concentration, mathematics difficulty, abstractness of mathematics, mathematical

language, financial problems to buy textbooks, lack of encouragement from parents, lack of help from parents and lack of time for practice.

The females' mean score was 0.87. They scored above the mean in lack of incentive for teachers, incompetent teachers, lack of understanding, many topics that cannot be understood, abstractness of mathematics, lack of teaching facilities, obsolete materials, and expensive textbooks. They scored below the means in lack of qualified teachers, teachers' absenteeism, lack of interest, lack of concentration, mathematics difficulty, mathematical language, library not well equipped, financial problem to buy textbooks, lack of encouragement from parents, lack of help from parents, and lack of time for practices. It is also observed that both male and female respondents were of similar opinion that there was lack of help from parent and lack of time practices.

On Table 2, chi-square test statistic was used to analyze the data to test null hypothesis which stated that there was no significant difference among the respondents concerning the students' poor performance in school mathematics. The relevant data collected were analyzed. Table 1 gives the summary of the computation at 0.05 significance level with the degree of freedom = 19, the calculated chi-square value was 2.01 and t critical was 10.12. Since the critical value was significant the hypothesis was retained. Therefore there was no significant difference in the responses of the respondents regarding the poor performance of students in school mathematics.

In Table 3, t-test statistic was used to analyze the data to test null hypothesis which stated that there was no significant difference among the male and female respondents concerning the factors that are responsible for poor performance of students in school mathematics. The relevant data collected were analyzed. Table 2 gives the summary of the computation at 0.05 significance level and with the degree of freedom = 107, the t-value was 0.469 and t critical was 1.980. Since t-critical was significant the hypothesis was retained. Therefore there was no significant difference in the responses of the male and female respondents regarding the factors that are responsible for poor performance of students in school mathematics.

In Table 2, chi-square test statistic was used for the analysis of the null hypothesis which stated that there was no significant difference among the male and female respondents concerning the students' poor performance in school mathematics. There were 20 curriculum items that were used to administer to the 109 respondents. At 0.5 significance leveland with the degree of freedom = 19, the critical value of 10.12 was significant, therefore the hypothesis was retained. Therefore there was no significant difference among respondents concerning the students' poor performance in school mathematics.However, Amazigbo (2000) identified poor primary school background in mathematics, lack of interest on the part of the students, lack of incentive for the teachers, incompetent teachers in primary schools, students not interested in hard work and psychological fear of the subject can be factors that are responsible for poor students performance in school mathematics therefore efforts should be made to remedy all these negative factors.

On Table 3, t-test statistic was used for the analysis of the null hypothesis which stated that there was no significant difference among the male and female respondents concerning the factors that ate responsible for poor performance of students in school mathematics. There were 20 items that were used to administer to the 109 respondents. The means of the responses per item of 51 males and 58 female respondents were calculated and used to calculate the t-value. At 0.5 significance level and with the degree of freedom = 107, the t-value of 1.980 was significant, therefore the hypothesis was retained. Therefore there was no significant difference among the male and female respondents concerning the factors that are responsible for poor performance of students in school mathematics.

The most critical factor in the mathematics education is the teacher which according to (Adesokan 2000) is the spark and key man in the drive to progress in our educational system. Korau (2006) also observed that the schools population counts in thousands today against the hundreds of the previous years. Schools today are overcrowded in classrooms which make it impossible to talk of an ideal size of a classroom for effective teaching of mathematics. No effective teaching can take place under a chaotic situation where a teacher cannot handle the large number of students effectively. Consciously or unconsciously quantity and quality cannot work together and this can affect the students' learning of mathematics and thus perform poorly.

Table 1: Summary of the Mean Score of data for testing the responses of male and female students concerning factors responsible the poor performance of students in school mathematics.

Variables	**Male**	**Female**
Lack of qualified teachers	0.61	0.62
Lack of incentive for teachers	0.90	1.10
Incompetent teacher	1.0	1.10
Teachers' absenteeism	0.63	0.48
Lack of interest	0.39	0.33
Lack of understanding	1.18	1.0
Poor background	0.88	0.95
Lack of concentration	0.71	0.52
Mathematics difficulty	0.69	0.71
Many topics that isn’t understood	1.16	1.36
Abstractness of mathematics	0.73	1.07
Mathematical language	0.57	0.38
Lack of teaching facilities	1.90	1.98
Obsolete materials	1.41	1.19
Library not well equipped	1.84	0.59
Expensive textbooks	1.75	1.36
Financial problem to buy textbooks	0.94	0.59
Lack of parental encouragement	0.57	0.55
Lack of help from parents	0.76	0.76
Lack of time for practice	0.67	0.67
Mean	0.97	0.87

Source: Survey, 2009

Table 2: Summary of the data for testing the responses of students concerning the factors that are responsible for poor performance of students in school mathematics

Factor	True	Not True	Total
1	58	10	68
2	103	20	123
3	97	17	114
4	48	12	60
5	26	10	36
6	101	18	119
7	92	14	106
8	53	14	67
9	58	18	76
10	111	29	140
11	86	18	104
12	38	11	49
13	198	11	209
14	120	17	137
15	87	14	101
16	140	24	164
17	61	20	81
18	37	7	44
19	22	15	37
20	55	13	68
	cal.	2.01	
	d.f	19	
	critical	10.12	

Table 3: Summary of the data for testing the responses of male and female respondents concerning the factors that are responsible for poor performance of students in school mathematics.

Variable	Number	X	SD	df	t-cal.	t-critical
Male	51	0.965	0.445	107	0.469	1.980
Female	58	0.866	0.410			

CONCLUSION AND RECOMMENDATIONS

Despite the relative importance of mathematics, it is very disappointing to note that the performance in the subject at both internal and external examinations has remained constantly poor (KoleOsho et al 1998) and the trend of students' performance has been on the decline (Salau 1995). Some of the variables that may be responsible for these may be curriculum related variables, examination body related variables, and students related variables, home related variables and instructional materials related variables.

Teachers are catalysts of the expected changes in society. This demands that they should be well trained, have recourse to retraining and updating of their mathematical knowledge through in-service training, workshops, seminars and conferences (Tahir, 2006). Efficient and effective teachers who are professionally

and academically qualified must be produced to promote mathematics learning in schools. Teachers must be highly motivated with adequate incentives and the issues of teachers' salaries and other fringe benefits should be addressed by the government. The low morale and status of Nigerian teachers have affected the quality of the intake and those already on the job. This has been attributed to poor incentives to improve performance, very poorly equipped working environments and non-availability of working materials, inadequate social recognition powerlessness and lack of control over working conditions.

The authorities should provide and retain qualified teachers and provide adequate teaching and learning facilities and equipments to schools. Teachers preparation programme should be student centered. They should show equal concern and treatment to students and have the knowledge of classroom interaction that serve to undermine students' self esteem, academic achievement and ultimately professional preparation so that they are adequately prepared to face the future with hope. Teachers should create an environment where students do not feel scared to ask questions. Nigerians should be made to be mathematically literate. Concretization should be meticulously applied in mathematics teaching at all levels (Primary to tertiary).

Affective and cognitive teaching strategies should be interwoven during mathematics teaching and learning since both have impact on mathematics reasoning. Mathematics laboratories should be established in the school system. Practical solutions to problems both simple and complex concepts should be assured. Both teachers and students should be involved in the design of teaching and learning materials. The Universal Basic Education (UBE) should incorporate laboratory for pre-primary to Junior Secondary levels so that they can have good foundation in mathematics before proceeding to tertiary institutions. These laboratories should be well developed in Teacher Education Institutions. Faculties of Education and Institutes of Education. Practical should also carry some credits in grading of students. The language in which mathematics texts are written must be simple an in all cases within the level of the ability of students in English language.

The use of questions in teaching and learning of mathematics is very vital and their importance cannot be emphasized. The value of asking and attempting to answer questions has been established by findings from research studies. An instructional environment that encourages asking of questions is known to have positive effect on comprehension (Costa et al 2000).A link was also reported to exist between question asking and improved problem-solving skills (Dori and Herscovitz 1999) and that question asking aids in developing independent learning skills (Marbach-Ad and Sokolove 2000). Questions are usually asked by teachers, students and also generated in textual materials.

Transfer of whatever is learnt in the classroom enables students to appreciate the relevance of mathematics in different spheres of human life. More opportunities for students to actively participate in the analysis of problems will improve confidence in solving mathematics problems.

Since not all students can afford to buy expensive textbooks, every school

should have an adequate and functional library, manned by at least one professional librarian. The contents of such a library should be supportive of the curriculum and reflective of our indigenous culture and home experiences and it should accommodate future development and desirable world-view.A high powered committee should be set up at various conferences and workshops concerning mathematics to look into salient points raised during workshops and conferences and come up with a blue-print for implementation. The various teaching methods that have been tested to be very effective should be made popular in the school system. Mathematics teachers need to be exposed to such methods which could be in form of conferences or workshops to update their knowledge of subject matter and teaching techniques.

There should be effective school psychological services which would lead to good teacher-pupils' relationship, effective classroom management and motivated teachers and pupils. This will eventually provide a conductive school climate for effective and learning process of mathematics.n The NERDC'S current review of the National curricula should be funded well by the Government and the final report should be speedily produced and be institutionalized.

REFERENCES

Adesokn, A.O. (2000). Teacher-effectiveness: A Tool for a functional Universal Basic Education UBE Programme in a Democratic Nigeria. Paper presented to the Conference on the Planning and Administration for a successful implementation of the UBE Programme in Nigeria. National Institute of Educational Planning and Administration (NIEPA) Ondo.

Ale, S.O. (1989). Combating Poor Achievement in Mathematics ABACUS. *The Journal of the Mathematics Association of Nigeria 19 (1)*

Amazigbo, J. C. (2000). Mathematics Phobia Diagnosis and Prescription National Mathematics Centre Annual Lecture, Abuja July.

Betiku, O. F. (2001a). Causes of Mass Failures in Mathematics Examination among Students a Commissioned Paper presented at Government Secondary School. Karu Abuja Science Day 1st March.

Banks, O. (1971). *Sociology of Education.* London, Batsford.

Busari, C. (1988). National Workshop on Review of Researches in Education by NRA in co-operation with CESAC, Lagos.

Bryl, P. G. (1983). A Descriptive Study of Mathematics Anxiety. Ph D. Thesis Indiana University Dissertation abstract international A3 (8); pp583.

Costal, J., Caldeira, H. Gallasstegui, J. R. and Otero, J. (2000). An analysis of question asking on scientific texts explaining natural phenomena. *Journal of Research in Science Teaching 37 (6) 602-615*

Boocock, S. S. (1972). *An Introduction to the Sociology of Learning.* Bouston: Hough Mifflin.

Dori, Y. J. and Herscovitz, O. (1999). Question-posing capability as an alternative evaluation method: Analysis of an environmental case study. *Journal of Research in Science 36,411-430pp*

Inekwe, O. I. (1996). Cognitive and Affective Factors that Affect Three Goemetric Reasoning Ability off Senior Secondary students in Kaduna State. PhD. Thesis, Pp.53

Kahl, J. (1961). *Common man boys.* In Hasley, A. Fllod, J. and Anderson, C.A. *Education, Economy and Society.* NewYork: Free Press of Glencoe.

Korau, Y. K. (2006). Educational Crises Facing Nigerian Secondary Schools and Possible Solutions being a paper presented at Faculty of Education National Conference 10th - 14th July, 2006

KoleOsho, A. Oyekanmi, S.O and Olabode, S. A. (1998). A study of the sex differences in achievement of field-dependent and field independent students in mathematics. *Journal of the Science Teachers Association of Nigeria 33 (122), 62-65*

Lassa, P. N. (1987). Assessing the cognitive outcomes of senior secondary school mathematics students. *Journal of Educational Studies Institute of Education, University of Jos volume 1, Pp. 8-18*

Lawes, J. S. and Eddy, C. T. (1967). *Understanding Children an Introduction to Psychology for African Teachers.* London: George Allen and Unwin Limited. Page 25

Marbach-Ad, G. and Sokolove, P. G. (2000). Can undergraduate Biology students learn to ask higher level questions? *Journal of Research in Science Teaching 37 (8)854-870*

Mughol, A. (1976). *A Study of the Concepts of Physics at the Secondary School Level.* Physics Education 466(16) 145-146

Ojo, J. O. (1986). Improving Mathematics Teaching in our Schools, ABACUS. *Journal Mathematics Association of Nigeria 17(1) 164-177.*

Okeke, R.A. (1982). Topic Difficulties in Secondary School Physics. Unpublished M.ED. Project University of Ibadan.

Salau, M.O. (1995). Analysis of students' enrolment and performance in mathematics senior secondary certificate. *Journal of Studies in Curriculum 5 and 6 (1 and 2) 8*

Sells, M. O. (1978). *Mathematics a Critical filter.* Science Teachers Association 45 (2) 28-29

Simpson, R. D. and Wazik, J. (1978). Correlation of Selected Affective Behaviours with Cognitive Performance in biology course of elementary teachers. *Journal of Research in Science Education. January 1978 Issue 1, 65*

Tahir, G. (2006). Teaching Education in the 21st Century and Beyond: Issues, Problems and Strategies for Improvement. Being a key note Address on the Occasion of the 2006 National Conference of the Faculty of Education, Ahmadu Bello University, Zaria.