FACTORS AFFECTING STUDENTS' INTEREST IN MATHEMATICS IN SECONDARY SCHOOLS IN ENUGU STATE

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Abstract

This study investigated factors affecting Senior Secondary School Students' Mathematics interest. The factors are student factor, teacher factor, government factor, infrastructural problem, instructional strategy, class size and mathematics anxiety. Two main instruments (FASMRI and MATHRET) constructed and face-validated were administered to 210 Senior Secondary School one (SSI) Students in the five selected public schools in Enugu and Obollo-Afor Education zones in Enugu State. The reliability coefficient for FASMRI is 0.83 and 0.89 for MATHRET using Split-Half and KR-20/21 procedures respectively. The data collected were analyzed using Pearson Product- moment correlation statistic and multiple regression analysis technique. Results showed that the seven factors were effective in predicting secondary school students' interest to learn mathematics. More so, teacher factor, student factor, instructional strategy, Mathematics anxiety and infrastructural problem correlate positively with the dependent measure, while class size and government factor correlate negatively with the dependent measure. Nevertheless, the seven factors have significant relative effects on mathematics interest. It is recommended that government should organize refresher course for mathematics teachers frequently from which teachers can be equipped with various in structural strategies with which they can use to teach students effectively to enhance their interest for mathematics learning.

Introduction

Mathematics is a science of magnitude and number that is very useful virtually in all subject areas. This is because all fields of studies are dependent on it for problem solving and prediction of outcomes. Competency in mathematics learning is vital to any individual and nation in domestic and business deals, scientific discoveries, technological breakthrough, problem-solving and decision making in different situations in life. Akinoso (2011) viewed mathematics as the basis for science and technology and the tool for achieving scientific and technological development. It may be in consideration of these and other vital usefulness of mathematics that Federal Government of

Nigeria made it a core and compulsory subject at all the levels of 6-3-3 system of education in Nigeria as contained in the National Policy on Education (F.M.E., 2004) which still remains the rallying point for all educational objectives in Nigeria.

Despite its great importance, it is the only subject that is most dreaded to learners among all subjects offered in schools (Ashcraft and Faust, 1994; and Akinoso, 2011). Students therefore tend to respond to it with less self confidence, negative feeling and anxiety. This situation is worsened by the compulsory nature of the subject at primary and post primary schools levels, leading to students' poor performance in the subject.

The incessant poor achievement in mathematics in Nigeria Primary and Post Primary Schools levels may be attributed to students' lack of interest in learning mathematics. Interest has to do with preparedness or mastery of a subject –matter background knowledge that can enable the learner to cope with further or next higher level of learning of the subject-matter or related learning task (Idigo, 2010). This suggests that mathematics interest test for senior secondary level has to do with mastering the prerequisite skills in junior secondary school (JSS) level mathematics that can enable the JSS three students cope with further learning of mathematics at the next higher level of mathematics teaching in senior secondary school one (SSI) level. And mathematics interest test can be developed and used as an indicator of success in any mathematics course (Idigo, E.C. 2010, Goolsby, 2013).

Many factors have been identified in literature as reasons associated with students' lack of interest in learning mathematics. These include Students' factor, teachers' factor, mathematics anxiety, class size, government factor, infrastructural problem, instructional strategy, among others (Okonkwo, 1998; Akinoso, 2011; and Goolsby, 2013).

Students' factor include lack of interest to learn mathematics caused partly by mathematics phobia and distractions from handsets they carry about even in the mathematics classrooms as perceived by the researcher while teaching them mathematics. These have lead probably to students' lack of reading culture especially mathematics textbooks.

Unodiaku (2012) attributed factors of academic achievement among secondary school students in mathematics to lack of interest. More so, the failure of students in mathematics achievement was also supported by some authors to be associated with lack of interest in studying the subject, (Obienyem, 1998; Okonkwo, 1998; Zuriel, 2004; Idigo; 2010 and Goolsby, 2013). Specifically, Goolsby (2013) attributed factors influencing students' mathematics interest to attitude towards success in mathematics, confidence in learning mathematics, perception of teacher attitude, mathematics anxiety, and Locus of control. According to Idigo (2012), factors associated with mathematics interest include, students' factor, teachers factor, mathematics anxiety, government, lack of infrastructural facilities, lack of instructional materials and problem of large class size.

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Mathematics anxiety is the feeling of tension, helplessness, mental disorganization and dread one when required to manipulate numbers and shapes and the solving of mathematics problems (Ashcraft and Faust, 1994). One of the most notable consequences of mathematics anxiety is poor mathematics achievement and competence (Ashcraft, 2002). Students who are infested with mathematics anxiety will lack interest to learn mathematics, and consequently may tend to achieve poverty in the subject.

Educational resources in the form of infrastructural resource materials are essential ingredients in any teaching/ learning situation. According to Fuller (1987) and Dembe, Moorad, and Afemikhe (2008) who all reported that school resources account for more of the variations in students achievement in school subjects such as mathematics. Furthermore, Dambe, et al (2008) reported that few effective studies undertaken in developing countries, those educational resources are very important input in achievement. The use of teaching resources particularly in mathematics will shift the psychological phobia, anxiety and abstraction associated with mathematics to real life situation and practically oriented. Many studies have considered each of these factors either singly or in combination of two, but this study examines the seven identified factors (teacher, student, mathematics anxiety, class size, government, instructional strategy and infrastructural problem) as correlates of students' interest to mathematics learning in senior secondary

school mathematics programme. It is therefore necessary to correlate some of the factors affecting students' interest to mathematics learning so as to know the extent of their relationships.

Statement of the Problem
Poor achievement in mathematics may be traceable to students' lack of interest in studying the subject. Seven factors (teacher, student, mathematics anxiety, class size, government, instructional strategy and infrastructural problem) have been identified as potentially affecting students' mathematics interest. To what extent do the independent variables either singly or when combined, relate to students' interest in mathematics? Therefore, the problem of this study is to correlate some factors affecting students' interest to mathematics learning among senior secondary school students.

Research Questions
The following research questions were posed to guide the study. Thus:-
1. To what extent do the scores in the variables individually predict students' interest in mathematics?
2. To what extent do the independent variables when combined, explain students' interest in mathematics?

Hypotheses
The following hypotheses were formulated to guide the study. They were tested at .05 level of significant.

H_{01}: Scores in the variables, individually, will not significantly predict students' interest in mathematics

H_{02}: Scores in the variables combined

assurance of the teacher's impulse as well as the determinant of his knowledge, attitude and instructional strategy. A qualified mathematics teacher can easily use different approaches/ methods, styles, illustrations, examples, and improvise materials in teaching students mathematics concepts, principles or ideas which his counterpart (unqualified mathematics teacher) cannot do. This suggests that student mathematics interest is dependent on qualification of the mathematics teacher. A qualified mathematics teacher can arouse students' interest in mathematics learning and ensure success in the learning of the subject through the use of appropriate instructional strategies in teaching the student. Teachers' effectiveness in any particular subject is an important determinant in that subject (Akinoso, 2011). Therefore, engaging qualified mathematics teachers who is equipped with various instructional strategies in teaching mathematics enhances students' interest to learn mathematics. This can be done through the teacher's application of his teaching styles, good trained mind and competencies which invariably eliminates anxiety in the students' learning of the subject. And qualified mathematics teacher uses varieties of mathematics games and improvise teaching materials to drive home mathematics concepts, ideas and principles competently.

Government factor as associated with students' mathematics interest is concerned with government provision of educational facilities and qualified teaching personnel for effective teaching of mathematics. Government can enhance students learning of school subjects (such as mathematics) by reducing the number of unqualified school teachers (mathematics) by 80 percent (NEEDS, 2007). Government is expected to provide schools with instructional materials such as Geo-boards and Heliographs in teaching plane geometry in secondary schools (Ozigbo, 1994) and computer aided instruction in teaching statistics and probability to students (Ozofor, 2001). Government intervention by providing educational facilities, instructional materials and conducive mathematics learning environment may correlate positively with students' mathematics interest. Therefore, government factor contributed greatly to students' mathematics interest.

The number of students in a mathematics class otherwise referred to as class size is a factor of interest to learn mathematics. According to Ifamuyiwa (2005), uncooperative attitude of the students and large class size contributes to students' poor performance in mathematics. More so, probably because of the negative effect of large class size that Caliber Associates (2005), reported that class size of not more than 18 students per teacher is required to produce the greatest benefits. Large class size therefore affects preparatory training such as students' interest to further learning of mathematics.According to Burns (1998), many students have fears and loathsome experiences about mathematics. Such negative experiences are caused by mathematics anxiety which knows no boundaries irrespective of age or gender.

Results

The results of the study were presented in line with the research questions and hypotheses.

Research Question One: The research question one was answered using Table1 below.

Table1: Relative influence of the Independent Variables
          on Students' Interest in Mathematics.

Variables	Standard	Std. Error	t-value	Prob. P<.05	Remark
Teacher factor	.014	.210	.175	.046	*S
Student factor	.029	.061	.513	.038	*S
Class size	-.016	.0418	-.820	.014	*S
Govt. factor	-.021	.121	-.321	.047	*S
Instructional strategy	.041	.097	.759	.025	*S
Maths anxiety	.013	.063	.101	.034	*S
Infrastr. problem	.015	.028	.051	.018	*S

    *S   =Significant at 0.05 probability level.

Table 1 shows the relative influence of mathematics interest test-scores on the independent variables. From the table the teacher factor has t-value of .175 and significant at .046. Thus, significant value (.046) is less than .05, (i.e. $046 \leq p \leq .05$). Therefore, t is significant at .05. Similar results hold for all the remaining six variables. Hence, the hypothesis is rejected meaning that scores in the variables will significantly predict students' mathematics interest.

Research Question Two: The research question two was answered using Tables 2 (a) and (b) below.

Table 2(a): Regression Analysis on Mathematics
          Interest Test Data.

Multiple R	.263
R Square (R^2)	.069
Adjusted R^2	.036
Standard error of estimate	6.026

Sources of Variation	df	Sum of squares (SS)	Mean square (MS)	F	Sig.	Remark
Regression	7	525.540	75.077	2.067	.049	S
Residual	195	7081.889	36.317			
Total	202	7607.429				

*S   =   significant

Table 2(b) shows that the seven independent variables had significant multiple correction on the students' mathematics interest when taken together (R= .263; R^2=.069). The result further showed that 3.6% of the variation in students' mathematics interest was accounted for by the independent variables. The F-value of 2.067 at P<0.05. The significant level was significant. However, the multiple correlations which is positive in the interest test is due to the seven factors taken together. Concerning the relative influence of the independent variables on students' mathematics interest, the correlation coefficients of the individual variables indicated significant results. This means that relationship exists between the independent variables and students' mathematics interest. With adjusted multiple regression coefficient R of .263, there is significant multiple relationship between teacher factor, student factor, class size, government factor, instructional strategy, mathematics anxiety, and infrastructural problem and students' mathematics interest. Hypothesis two was therefore rejected (P<.05). That means scores in the independent variables significantly predict students' mathematics interest.

Discussion

The value of mathematics interest of students as a pivot upon which science and technology rotates and achievement of millennium development goals cannot be overemphasized. The findings of this study showed that teacher factor, student factor, class size, government factor, instructional strategy, math anxiety and infrastructural problem are factors influencing students' mathematics interest. These factors were found to be significantly influencing the students' mathematics interest (p<.05). In other words, these independent variables were effective in predicting students' mathematics interest. More so the study showed that the seven independent variables had significant positive multiple correlation on students' mathematics interest when taken together (R=.263, R^2=.069). The observed F-ratio is significant at P<.05. This is an indication that the effectiveness of a combination of the independent variables in predicting students' mathematics interest, the magnitude of the relationships between students' interest to learn mathematics and a combination of independent variables is reflected in the values of coefficient of multiple regression R(.263) and multiple R squared (.069). Therefore, variability in students' mathematics interest is accounted

for by a linear combination of the seven independent variables. This finding is supported by earlier reports which confirmed that some factors of students' achievement include student factor, societal factor, language problems, instructional strategy adopted by the teacher and so on (Odeyemi, 1989; Usman and Nwoye, 2010; Okwu and Kurume, 2010; and Idigo, 2012). However, this finding contradicts earlier findings of Ola-Alani (2006) and Akinoso (2011) who all reported that class size, school age, teacher' factor, student factor a and infrastructional problem made significant contributions to the prediction of variation to achievement in mathematics. There is need for further enquiry to clarify this contradiction.

Table 2 indicates that correlation coefficients of variables, teacher factors, student factor, instructional strategy, math anxiety and infrastructural problem have positive relationship with students' mathematics interest while correlation coefficient of the remaining variables class size and government factor have negative relationship with students' mathematics interest. More so, the values of the standardized regression weight associated with these variables indicate that the variable instructional strategy is the most potent contribution with β=.041 followed by student factor with β =.029 and infrastructional problem with β=.015. However, the t-value does not associate with any of the independent variables.

The instructional strategy is the most potent variable that influence students'

mathematics interest based on the finding. This finding is in agreement with earlier reports of Usman and Nwoye (2010), Okwu and Kurume (2010) and Idigo (2012), who all reported that instructional strategy contributes significantly to students academic achievement in mathematics.

Conclusion

This research study reveals that mathematics interest in secondary school students depends on teachers, students, math anxiety, class size, government, instructional strategy used by the teacher, and availability of infrastructural facilities. The variables, teacher factor, student factor, instructional strategy, mathematics anxiety and infrastructural problem were positively related to students' interest to mathematics, while other variables, class size and government factor had negative relationship with students' interest to mathematics learning.

Recommendations

The result of this study has make it clear that most of the variables of the study were positively related to students' interest to mathematics learning.   Therefore, the following recommendations should be given priority attention.

1. Assessment of students for promotion from one level to another should be based on interest test against teacher made test or other tests.

2. Government should organize refresher courses for mathematics teachers regularly from which teachers can be equipped with various effective instructional strategies.

3. Government should provide schools

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