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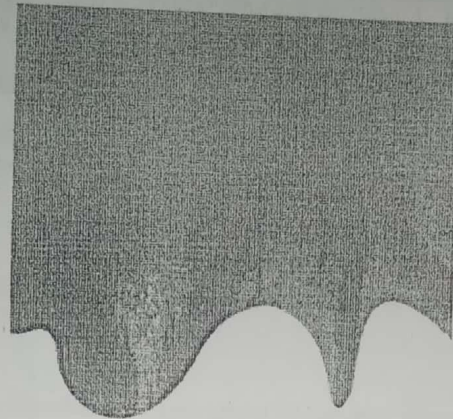
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Performance correlates of the understanding of english language and learning of mathematics in secondary schools in Osun State, Nigeria

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Abstract

The deteriorating performance of students in Mathematics in most certificate and selection examinations in the past few years spurred this research into investigating the level or extent of relationship that exists between English Language and Mathematics. Selected for this study were 100 boys and girls in the senior secondary III of Boripe Local Government Area of Osun State, Nigeria. The instruments used were researcher designed Mathematics Text (RDMT) and researcher designed English Language Test (RDET). The results of the study revealed that a significant general relationship between English language (the medium of instruction) and Mathematics even though there exist differences between students' performance in urban and rural schools. The study concludes by recommending equal distribution of qualified and experienced teachers to both urban and rural schools with special incentives for rural school teachers.

Keywords: Performance correlates, understanding English Language, learning mathematics, students' performance, school location

Introduction

The status and position which English language occupies in Nigeria today is a clear testimony of its being originally a foreign language of the

Nigeria's colonial overlords. The development of this language gradually grew over time to become all important language of education and lingua franca (Osakwe, 1999). Osakwe described English language as assuming irreplaceable roles in the country's educational system both as a subject in the schools' curriculum, and as a medium for teaching other school subjects. Similarly, Jegede (1990) contended that the life-wire of the country's educational system in English, and that students' ability to undertake higher education in any discipline depends largely on their achievement in English. This implies that students' lack of understanding or competence in English will affect their entire spheres of education, and inadvertently the political and socio-economic prospects of Nigeria, simply put no English, no education.

In a similar vein, the National Policy on Education (FRN 2004) emphasizes that it is only through English language that learners can gain mastery of the various subjects in the curriculum. Henry (2006) supporting the above assertion, posited that students' performance in all school subjects depend largely on the performance in English Language and the instructional mode employed by the teachers of English.

However, the concern arising from the interaction of language (English) with the teaching and learning of Mathematics' at the secondary school level has attracted a lot of attention and interest in the past few years. What actually triggered off the concern is the problems facing the teaching and learning of Mathematics in Osun State, Nigeria. Some of these problems include lack of understanding of some Mathematics concepts by the students, lack of commitment on the part of the teachers and the students' negative attitude towards Mathematics as a traditionally dreaded subject (Ogundele, 2010). In another development, one of such problems has to do with the idiosyncrasies of Mathematics identified by Sule (1991) traced to teachers' incompetence (15%), curriculum 15% while teachers' understanding (60%). Many of these problems were initially seen as relating only to cognitive differences, or being caused by environmental factor but of recent, the problems have been found to be largely language in nature (Osafehinti, 1987).

Statement of the problem

The teaching and learning of Mathematics is like the teaching and learning of any other subjects in a normal school setting which must be taught and learned through a conventional language medium. Studies have shown that a child learns best in his mother-tongue because it is the

medium in which he can best express himself (Shafuddin, 1984). In a similar vein, McCarthy (2006) posited that every individual is powerfully conditioned by his or her mother-tongue and as such he or she uses it as a basis of interpreting phenomena of any other language or concept (s) he or she learns later. Based on this, major impediment faced by the students in the teaching and learning of Mathematics is that most Mathematical terminologies do not find equivalent or places readily in most mother-tongue (as various ethnic groups do misinterpret few Mathematics concepts that are found due to the different ways of interpretation). This is due to the fact that there are as many local languages as the number of ethnic groups we have in Nigeria. This therefore implies that our children learn Mathematics via a foreign language medium that is English language in a multilingual environment, and with emphasis that students in urban areas are exposed to so many learning strategies with qualified teachers than students of rural areas, as such those in urban schools usually perform better than those in rural areas (Babatunde, 2009).

Lending credence to that, Ogundele (2010) contended that apart from the fact that Mathematics teaching and learning are done through the medium of English, the subject has its own language with terminologies, which are not universal to most first language of the world. He went ahead to give examples that words like 'function', 'field', 'abacus', 'geometry', 'trigonometry', 'kernels', among others which do not have equivalent words in most Nigerian languages, and if they exist at all, they mean different things in Mathematics. By implication this means that an average Nigerian student learning Mathematics is not only faced with problems of understanding concepts in Mathematics, he is also faced with the problem of learning symbols and terminologies which he or she has never come across before.

In support of the above, Ema (2001) opined that there are evidences that when Mathematics is taught in a second language (L2), as it is done in Nigeria, the child is confronted with words which are not used in his immediate environment, and so the learning of Mathematics becomes difficult because he would have associated Mathematics with the life around him, and also to familiarize himself with the rudiments of English such as the syntax, phonetics, phonology, semantics, among other things. At best, he/she succeeds in knowing a handful of the language which allows him or her to use for rote learning of some Mathematical concepts. This, no doubt, leads to the children's dislike for Mathematics, which will eventually lead to poor performance in most certificate and selection examinations. In another development, Bello

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(2004) posited that since poor performance in English by students could generally be traced to bad method of teaching, or negative attitudes on the part of the students, it is believed that students learn better when two or more sensory modalities are appealed to. It is therefore suggested that instructional materials like, radio, television, cassette recorders and physical oral drills in English language would be constantly used in teaching and learning processes.

Despite these shortcomings of the L2, studies have shown that language plays positive role in making students to understand geometry better.

Quilter and Murphy (1990) contended that there would be significantly better performance of learners in geometry text with less numbers. They affirm further that even when Mathematics students are intellectually bright, they still need good background knowledge of English. Similarly, Data (1984) found that students were found to perform better in identification of geometrical figures than in the knowledge of definition of terms and their explanations. Also better achievements were recorded where contents of a task were included in a text with less language and greater number of figures.

Purpose of the Study

The purpose of this study was to assess the extent to which the understanding of English language could affect the performance of students in Mathematics.

Research Hypotheses

The following hypotheses were derived for testing in this study:

H₀₁: There is no significant relationship between students' academic performance in Mathematics tests and their understanding of English language.

H₀₂: There is no significant difference between the urban and rural students' scores in Mathematics tests and their understanding of English language.

H₀₃: There is no significant difference between the male and female students' scores in Mathematics tests and their understanding of English language.

Methodology

This study is a descriptive correlational study as it sought to find out the relationship between students' academic performance in Mathematics and understanding of English language. The sample consisted of two hundred (200) senior secondary school three (SSIII) students drawn from ten (10) secondary schools in Osun State, Nigeria. They were selected through a stratified random sampling technique. All the schools used are all co-educational, hence selecting one hundred (100) boys and one hundred (100) girls.

Instrumentation

Two researcher-designed instruments were used in this study for the purpose of data collection. The instruments were (1). Researcher-Designed Mathematics Test (RDMT) and (2). Researcher-Designed English Test (RDET). These instruments were used as means of assessing the degree of relationship between the students' understanding of English and their performance in Mathematics. The tests were later taken to experts of Mathematics and English language for content validity. The instruments were administered with the assistance of some Mathematics and English language teachers of the schools of the samples.

A ten-item multiple Mathematics and English tests were constructed from the curricula of the ten (10) schools used for the study. The tests were pilot-tested in four (4) purposively selected secondary schools two (2) urban and two (2) rural). Twenty (20) randomly selected students in the SSIII, consisting of ten (10) boys and ten (10) girls from these four (4) schools participate in the pilot study. This set of students of the pilot study was adequate because they all met the condition needed for those who eventually participated in the main study. The test were pre-tested with the same group of students, and the Spearman Brown split half reliability technique for Researcher Designed Mathematics Tests (RDMT) and Researcher Designed English Test (RDET) resulted in 0.73 and 0.71 respectively; then the test re-test reliability after three (3) weeks using Pearson Product Moment Co-efficient gave 0.84 and 0.75 respectively. This made the researcher to adjudge the instruments suitable for the class level of the subjects.

The researcher, with the help of the teachers teaching Mathematics and English respectively administered the two tests to the respondents of each participating schools. The two tests were administered the same day on the same set of students with an interval of two hours between the tests.

The data collected were analyzed using Pearson 'r' correlational Co-efficient method for hypothesis one (H_{01}) while hypotheses two and three (H_{02} and H_{03}) were analyzed using Chi-square (X^2) statistic. The results of the analyses are as stated below:

Table 1 Summary of the Pearson analysis of students' performance in RDMT AND RDET

Variable	N	$\bar{X}$	SD	Df	Critical value	Calculated r value	Decision
RDMT	200	9.25	0.48	199	0.195	0.225	H_{01} Rejected
RDET	200	8.98	0.67				

Results in Table 1 above show that the calculated r-value of the students' performance in RDMT and RDET is 0.225 which is greater than the critical value of 0.195 at 0.05 alpha level of significant. This indicates positive but low relationship. As such, the null hypothesis which says that there is no significant relationship between performance in RDMT and RDET is rejected.

Table 2 Summary of Chi-Square (X^2) analysis of the difference between the urban and rural students' performance in RDMT and RDET

		RDMT		RDET					
Locale	Pass	Fail	Pass	Fail	N	Df	X^2	Critical value	Decision
Urban	64	38	64	36	200	198	23.26	7.81473	H_{02} Rejected
Rural	32	68	48	52	200				
Total	96	106	112	88	400				

Results in Table 2 above indicate that the obtained X^2 value of 23.26 was higher than the critical value of 7.81473 at 0.05 alpha level of significant, and so the null hypothesis that says that there is no significant difference between urban and rural students' performance in RDMT and RDET is

rejected and thus concluded that significant differences existed between the urban and rural students' performance in RDMT and RDET.

Table 3 Summary of Chi-square (X^2) analysis of the difference between the male and female students' performance in RDMT and RDET

Gender	RDMT		RDET		N	Df	X^2	Critical value	Decision
	Pass	Fail	Pass	Fail					
Male	55	45	58	42	200	198	0.6596	7.81473	Ho ² accepted
Female	59	41	62	38	200				
Total	114	86	120	86	400				

Results of Table 3 above indicate that there is no significant difference between male and female students' performance because the X^2 value of 0.6596 was lower than the critical value of 7.81473 at 0.05 alpha level of significant, so the null hypothesis which says that there is no significant difference exist between male and female students' performance in RDMT and RDET is accepted.

Discussion

Results of the data from this study revealed that a positive but low relationship existed between Mathematics and understanding of English language. This result confirmed the studies of Data (1984) and Quilter and Murphly (1990) who discovered that language understanding plays positive roles in making students to understand geometry better. Results in Hypothesis two (Ho₂) revealed that significant difference existed between the urban and rural students' performance in Mathematics and English.

The result further showed that students in urban schools performed better than their counterparts in the rural schools. This result is in agreement with Babatunde (2009) that students in urban areas are exposed to different learning strategies with qualified teachers, and so students in urban areas usually perform better than their counterparts in the rural areas because they (urban students) have more experience in

spoken English than those in the rural schools. Results in Table 3 indicated that there is no significant difference between male and female students' performance in Mathematics and English. This finding is in consonance with the findings of Bello (2004) that students (male and female) learn better when two or more sensory modalities are appealed to, and as such use of instructional materials such as radio, television, cassette recorders and physical oral drills in English language enhance performance of students (male and female) in the understanding of the language.

Conclusion

Based on the analysis of data and the results of the findings, it was concluded that there existed relationship between students' performance in Mathematics and English language. It was also further concluded that there existed significant difference between the urban and rural students' performance in Mathematics and English language. Similarly the study gives evidence that no significant difference existed between the performance of male and female students in Mathematics and English language.

Recommendation

Based on the analysis of the data collected and conclusion, the following recommendations are made:

There should be equal distribution of well qualified and experienced English Language and Mathematics teachers between urban and rural schools to reduce the differential understanding of worded questions in Mathematics. It is also recommended that incentives should be provided for teachers who are posted to the rural schools to encourage them to stay longer. It is also recommended that social amenities should be provided in the rural areas to make the students move at par with their counterparts in the urban schools.

It is also recommended that teachers of Mathematics should always come to the level of the students when they give worded questions to the students, because no doubt, simple English words will surely arouse the interest of the learners and help them to perform better.

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