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Analysis of Students' Performance in Junior Secondary School Mathematics Examination in Bayelsa State of Nigeria

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ABSTRACT Mathematics is the bedrock of all science and technologically based subjects. The poor performance of students in mathematics tests has become a thing of great concern to all stakeholders such as: parents, teachers, and government. This paper therefore looked at the influence of sex, school location and school type on the academic achievement of secondary school students in mathematics. The paper found out that student performance in mathematics in junior secondary school Examination for 2006 was high, male students performed better than their female counterparts in the examination, students from the rural school performed better than students from urban schools in mathematics examination and also students from private schools performed better than those from public schools.

INTRODUCTION

Mathematics as a subject affects all aspects of human life at different degrees. The social, economics, political, geographical, scientific and technological aspects of man is centered on numbers. Disciplines where numbers are predominant and form integral part of mathematics include: statistics, accounts, arithmetic, engineering, etc. For example the earliest civilization of mankind came through mathematical manipulations.

The inter-relationship between mathematics, development and advancement of humans shows the importance of mathematics in life due to its numeral and symbolic nature, it is more related to the scientific and technological facets of man's world than to any other aspect as it occurs and re-occurs in the physical and natural sciences. The basic skills underlying all scientific and technological skills are the control of the tools of mathematics.

Mathematics is seen as the language used to describe the problems arising in most branches of science and technology. It is a subject that is related to other school subjects in areas like number and numeration, variation, graphs, fractions, logarithms and indices, algebraic processes, solution of equation and also in area and volume.

However, the performance of students in mathematics has been a great concern to the society. Awokoya (1975), Fafunwa (1980), both agreed in different researches that we live in a world where science and technology have become an integral part of the world culture, therefore for any nation to be relevant, it must not over look the importance of mathematics in her educational system.

Accordingly, the observed poor performance in mathematics has been a matter of serious concern to all well-meaning educators. Students' poor performance in mathematics over the years has been attributed to the fact that the subject is difficult. In the same view, student's performance in mathematics tests has been observed to vary from person to person and from school to school.

This study therefore sought to provide data on the performance of students in mathematics tests as it relates to sex (male or female), school location (urban or rural) and school type (private or public).

Literature Review

The students' achievement in the outcome of mathematics tests depends on how much interest

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the students have in the subject. Achievement processes have been viewed by the characteristics of students and their environments, utilization of teaching-learning models, instructional materials as well as the structural ability of the students. Human and social psychologists have viewed the term performance or achievement in varying ways. On the effect of attitude and consistent overt behavior, that can be manifested by an individual through a pattern of performance in a given task, Linn (1965), Anderson (1942), Akpan (1989) all agree that the lack of straight-line relationship between attitude and consistent action is not real. They concluded that if an individual is not influenced by fear or other external influences, the individual would always produce consistent action or behavior which will reflect his attitude towards the object of interest. This is to say that if an examinee has an unfavorable attitude towards a subject, then this will reflect in his performance on that subject. They confirmed that attitude predicts behavior. Thus, it can be inferred that the perceived difficulty of mathematics tests, by some examinees is as a result of their poor attitude towards the subject.

On the influence of sex on performance in mathematics tests, Mitchelmore (1971) acknowledges the superiority of males over females when he noted that in all tests, boys obtained higher scores than girls at 0.01 levels. Also Maccoby and Jacklin (1975), Fischer and Walker (1972), Grambs (1972), Comber Keeves (1973), Fin et al. (1979), Fennema and Sherman (1977) and Tyler (1961) in separate studies found out that boys clearly perform better than girls in mathematic tests. Maccoby (1966) referred to the differences as a direct effect of sex stereotyped interests. In another study it was revealed that "members of each sex are encouraged in and become interested in and proficient at, the kinds of tasks that are most relevant to the roles they currently or are expected to play in the future" (Lee and Stewart 1976 p. 449).

On school location and performance, Simmelkjaer (1979), Friedman (1962), Bell (1971), Kostman (1977) and Bell (1975), in their studies reported that educational institutions in the urban share common features of learning impediments such as reading retardation, high absenteeism, drug abuse, students vandalism, and apathy. These vices as well as overcrowding account for the causes of poor performance in the urban school as compared to schools in the rural areas. However, in contrast, Ogunlade (1973), Lawin (1973), Obot (1991) and Anwana (1979) all disagreed on this view. They maintained that schools in the urban are well staffed, and with good facilities. Hence these factors induce better performance in the urban than the rural areas.

On school type and performance, opinions and positions of many researchers have shifted with time. Thus, in the seventies and eighties, it was common to see headlines as 'Crisis Hits Private School' or "College in Crises" West (1982) reported that private schools were those days in financial trouble. However Washing Post (April 13, 1981) reported contrary to this view when it ran the story concluding that private schools are more integrated than public schools and that private schools produce better cognitive outcomes even as they control for student quality.

METHODOLOGY

The aim of this study was to find out the relationship existing between such variables as sex, school location, school type and performance in mathematics test. Therefore inferential survey design was considered appropriate because of its descriptive nature, as it involves the collection of data to accurately and objectively describe existing phenomena, which in this case was the 2006 J. S. S. C. E mathematics examination. The relevant data for this study were obtained from the junior secondary school examination test items in mathematics for the year 2006. The sample size of this study was 600 students randomly selected from the population of 12, 436 J. S. S. 3 students examination for 2006 in Bayelsa State. The state was stratified into three zones and four schools were randomly selected from each of the zones making a total of 12 schools.

Instrument

The J. S. S. C. E mathematics objective paper for 2006 formed the instrument used for data collection. The test was a one hour multiple choice of mathematics ability.

Data Analysis

The means and standard deviations from the total raw score for each were compared against

the critical t-value of 1.96. The statistical tools used were the t-test for one sample mean and independent t-tests.

RESULTS

To find out whether the level of performances of students in the JSS mathematic test was high or low, the mean and standard deviation from the observed students total raw score and the hypothetical score were found. These were 28.59 and 7.09 against 20.00 and 0.00 (t calculated = 29.68 > t critical = 1.96) as refuted in table 1.

To find out if the performance of students in JSS3 2006 mathematics test was influenced by sex, the mean and standard deviation for the males and females were 29.24 and 6.00 for males and 27.93 and 7.98 for females. (t cal = 2.27 > t critical = 1.98) as could be seen in table 2.

For location of school, the means and standard deviations were 25.36 and 7.43 for urban and 31.81 and 4.96 for rural (t cal = 12.51 > t critical = 1.96). This is shown in table 3.

Finally, for school type, the mean and standard deviation were 27.83 and 7.58 for public school and 30.11 and 5.69 for private school (t cal = 3.75 > t critical = 1.96). This is reflected in table 4.

Table 1: Result of t-test analysis of the difference between observed students' mean score and the hypothesized mean score.

Variable	*X*	*S. D*	*t-value*	*Df*
Observed students' Mean score	28.59	7.09	29.68*	598
Hypothesized score	20.00	0.00		

*Significant at .05 level (critical t = 1.96)

Table 2: Result of independent t-test analysis of the influence of sex on academic achievement of secondary school students.

Group	*N*	*X*	*SD*	*t-value*	*Df*
Males	300	29.24	6.00	2.27*	598
Females	300	27.93	7.98		

*Significant at .05 level (critical t = 1.96)

Table 3: Result of independent t-test analysis of the influence of location on academic achievement of secondary school students.

Group	*N*	*X*	*SD*	*t-value*	*Df*
Urban	300	25.36	7.43	12.51*	598
Rural	300	31.81	4.96		

*Significant at .05 level (critical t = 1.96)

Table 4: Result of independent t-test analysis of the influence of school's proprietorship on academic achievement of secondary school students.

Group	*N*	*X*	*SD*	*t-value*	*Df*
Public	400	27.83	7.58	3.75*	598
Private	200	30.11	5.69		

*Significant at .05 level (critical t = 1.96).

DISCUSSION

The finding of this study showed that students' performance in 2006 JSS Mathematics test was high. Comparing the hypothetical pass mark of 20.00 with the students' mean score of 28.59 this indicated that the students performed very well. This result is in agreement with Linn (1965), Anderson (1942) and Akpan (1989) who reported that if an examinee has a favourable attitude towards a particular subject, then this will reflect in his performance in that subject. This is to say that since mathematics has been made compulsory and a pre-requisite for admission into the senior secondary, hence the students have developed a favourable attitude towards the subject resulting in their high performance.

On whether performance is influenced by sex, the result showed that male students obtained higher mean score than the females with the calculated t-value significant. This result is in line with those of Fememe and Sherman (1977), Grambs (1972), Comber and Keeves (1973), Tyler (1961), Fin et al. (1979) and Maccoby and Jacklin (1975) who all observed that in nearly all cases reported, males outscored females in mathematics tests.

On whether the location of a school influences performance in mathematics tests, the result showed that students from rural schools against all odds performed higher than those from urban schools. Though this result is supported by those of Simmelkjaer (1979), Friedman (1962), Bell (1971) and Kostman (1977) who reported that urban schools shared common features of learning impediments such as reading retardations, high absenteeism, drug abuse, students vandalism, apathy and overcrowding which have manifested in their poor performance. However, the result is contrary to those of Ogunlade (1973), Lawin (1973) Obot (1991) and Anwana (1979) in which they found that students from urban schools performed better than those from rural schools. Their reasons were that urban schools

are better staffed, with better facilities, students are exposed to good study habits, are highly motivated to study with conducive leaning environment, hence these factors encourage the students from urban schools to perform better than those from rural schools.

On school type and performance, the result showed that students from private schools performed better than those from public schools. This result agrees with that reported by Washington Post (1981) that private schools have been found to be better than public as the private schools are more integrated than public schools and that private schools produce better cognitive outcomes just as they control for student quality.

CONCLUSION

The results of this study have raised a number of puzzling issues concerning our measurement efforts. First, that the performance of students in JSS mathematics test 2006 was found to be higher than the hypothetical mean score showed that there has been some level of improvements in the mastery of the subject. But comparing this result to what are obtained in the field showed a total contrast as student test scores (weekly test reports) are yet to hit such a high performance level.

Secondly, despite all the advantages the urban schools have over the rural schools, the result of this study has proved to be in favour of students from rural schools. It is hard to consider that supervisors of the 2006 JSSCE could violate the regulations and guidelines for group-administered test to the level that extraneous factors such as test sophistication and interpersonal effects could significantly influence the candidates' performance. It is believed that due to the proper and regular inspection by ministry officials, such could not be experienced in the urban schools. Little wonder why many opt to write the JSS 3, WASC and NECO Examinations in the rural schools. The fact here remains that these candidates return with fantastic results from the rural schools. The question arises as to what is the magic, if not that examination malpractices are allowed in the rural schools as against the urban schools? Hence, it is the opinion of these researchers that the Ministry of Education, WAEC and NECO should look inwards on the activities of these rural schools to avoid a total breakdown in our academic system.

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