Full Length Research Paper

Junior Secondary School Certificate Examination Results as Predictors of Students' Performance in Mathematics at the Senior Secondary School Certificate Examinations in Benue State, Nigeria

[*1]O'kwu, E.I. and [2]Orum, C.C.

[1]Department of Curriculum and Teaching, Benue State University, Makurdi, Nigeria.
[2]Government Model Secondary School, Makurdi, Benue State, Nigeria.

Abstract

The main objective for this study was to establish the predictive value between junior secondary school certificate examination and the senior secondary certificate examination in mathematics. The study made use of 4698 students of Junior Secondary School graduates of 2000, 2001, 2002, 2003 and 2004 who are also the senior secondary school graduates of 2003, 2004, 2005, 2006 and 2007 respectively. The records of their final assessments were considered at each level of their secondary education. Correlation coefficients for the overall scores of the (JSCE) and the SSCE were found. All the correlation coefficients were found to be significant at 0.05 level of significance and hence the null hypothesis for the study was rejected at the 0.05 level of significance. It was concluded that some positive relationship exists between JSCE and SSCE which is the predictive value in question. The study recommended that serious attention should be paid to the students' preparation at the JSCE level to have greater positive effects on their performance at the SSCE level.

Keywords: Correlation, Mathematics Performance, JSCE, SSCE, Predictors.

INTRODUCTION

At any given stage of students' education, information is required about their capabilities and readiness for employment and for further studies in the next stage of education. This information is normally got from the assessment of students' academic performance in the various subjects studied as reflected in their examination results. This provides the opportunity for correct decision making, such as certification and placement of students, and for the prediction of their future performance at a higher level. In this research study, the researchers have the interest of ascertaining whether the junior secondary school certificate examination results would act as the predictors of students' performance at the senior secondary school certificate examinations, as far as mathematics is concerned.

The introduction of 6-3-3-4 system of education in Nigeria in 1982 came with the use of internal and external assessments of students which are combined for the certification and prediction of the future performance of students. The first stage of the 6-3-3-4 system stipulates the first three years of education of a child after the 6 year primary school education. This first three years of education of the child is known as the Junior Secondary School (JSS) level of education, while the last three years is the Senior Secondary School (SSS) level.

To attain the JSS certificate, continuous assessment and the final examination for the junior secondary school level are combined for the certification of the JSS level. The last three years, which is the Senior Secondary School level, is the end of the secondary education of the student. The senior secondary school certificate also is made up of the continuous assessment and the final examination of the student which conducted by either "National Examination Council" (NECO) or the West African Examination Council (WAEC).

*Corresponding Author E-mail: okwuemma@yahoo.com

A research by Klomegah (2007) to investigate the extent to which index scores of students' self-efficacy, self-set goals, assigned goals and ability could predict performances of university students and which was the best predictor of academic performance. The results of the study which was carried out in North Carolina, U.S.A., showed that self-efficacy had the strongest predictive power and high school GPA was a better predictor of students' academic performance than goal-efficacy model.

From another study on predicting senior secondary school certificate examination results from performance in the junior secondary school certificate examinations in Ondo State, Nigeria, Adeyemi (2006) found the junior secondary school certificate examination results as a good predictor of performance at the senior secondary certificate examinations.

Is there any way that the Junior Secondary School Certificate Examination (JSCE) will affect the performance of students at their senior secondary school level in mathematics? This is the question the researchers are trying to find an answer to.

Research Questions and Hypotheses

The following research questions were raised to address the problem of this study:-
i.   To what extent does the performance of students at the Junior Secondary School (JSS) correlate with their performance at the Senior Secondary School (SSS) level in mathematics?
ii. To what extent can Junior Secondary School overall performance be a predictor for the future performance of students at the senior secondary school level in mathematics?

To attain the objective of this study, the following null hypothesis was formulated.

Ho_1: There is no significant relationship between the overall performance of students at the JSS level (JSCE) and their overall performance at the SSS level (SSCE) in mathematics.

Design of the Study

The most suitable design for this type of study is the correlational design, where variables are correlated to establish the research measures. The design is suitable because the study is aimed at exploring the relationship between the variables, which are the junior secondary school certificate examination results and the performance at the senior secondary school certificate examination. The design was adopted because the study is aimed at seeking the predictive value of junior secondary school certificate result in the future

performance of students at the Senior Secondary School (SSS) level.

Two groups of graduates were used to explore all the research measures for the 2003, 2004, 2005, 2006 and 2007 samples respectively. These graduates were used previously for the final examination at the junior secondary school (JSCE) level. They were further categorized into the appropriate courses and placed in the senior secondary schools based on their performance at the JSS level. Also, at the end of the senior secondary level, they were subjected to final examination (SSCE).

Therefore, the variables that were used to explore this research measures include the final grades of the JSS graduates usually called the Junior Secondary Certificate Examination (JSCE) and those of the Senior Secondary Certificate Examination (SSCE).

Population and Sample

The entire Benue State was the area of coverage for this study. There are a total of three hundred and four schools (304) in Benue State as at April 2006 with both junior and senior secondary schools. Ten schools randomly selected from the three education zones in the state, constituted the sample for this study. In this respect, 800, 905, 979, 1004 and 1010 graduates of 2003, 2004, 2005, 2006 and 2007 respectively from the population of this study.

The entire population of the senior secondary school students for the whole state could not be considered due to the large number of subjects, which would involve massive data that might be difficult to handle. It is to this effect that ten schools were chosen from the three education zones in Benue State. Further, random sampling technique was employed to select the subjects for the study. This ensured that every subject had an equal chance of being selected. To employ this random sampling technique, the researchers used hat and draw method to select the schools and subjects for the study. With this technique, ten schools and 4,698 students were selected for the study.

The samples in each school comprised SS3 graduates who had their complete records of academic achievements from the junior secondary schools to senior secondary schools, including continuous assessment records and final results, such as JSCE and Senior Secondary Certificate Examination (SSCE). Students without any of these records were automatically dropped out of the sample.

Instrument

Official continuous assessment and examination documents from the state examination board, Makurdi,

and the West African Examination Council (WAEC), served as the source of data for this study. The Benue State Examination Board provided examination documents for junior secondary schools (SSS), and the West African Examination Council (WAEC) provided examination documents for senior secondary schools (SSS). The documents were that of junior secondary school certificate examination (JSCE) for the years 1999/2000, 2000/2001, 2001/2002, 2002/2003, 2003/2004 sessions and senior secondary school certificate examination (SSCE) for the years 2002/2003, 2003/2004, 2004/2005, 2005/2006 AND 2006/2007 sessions. All the continuous assessment and the final examinations scores which form the junior secondary school certificate (JSCE) and the senior secondary school certificate (SSCE) for the selected samples served as data for the investigation.

Data Collection and Analysis

The nature of the data prompted the type of data collection technique to be employed in this research work. Hence academic records of the graduates for the five years were collected. These academic records consist of the performance of students from junior secondary schools to senior secondary schools. The data were obtained from the schools records and they include records of mathematics overall assessment scores at the JSS level (JSCE), and the records of the overall assessment scores of students in mathematics at the senior secondary certificate examination (SSCE) results. The data were collected in respect of the variables earlier discussed for the period of schooling for each senior secondary school graduate from JSS1 to SS3.

The raw data collected for the study were continuous, giving marks of academic achievements. So they could be subjected to arithmetical and statistical operations. At the JSS level, scores for continuous assessment were weighted by teachers for the three years, giving the total core of 30%, while the examination score was 70%. The total of these scores have the overall score of 100% for the junior secondary school. At the senior secondary school (SSS) level, the continuous assessment scores were also for the three years of secondary school, which were expressed out of 100% for each year. In accordance with the implementation committee guidelines for the award of the senior secondary school certificate, 30% of the final grade came from the continuous assessment at the senior secondary school level weighted equally for the three years, that is 10:10:10 (Implementation Committee, Federal Ministry of Education, 1988).

As mentioned briefly in the design of this study, the overall assessment at the junior secondary school (JSCE) and the overall assessment at the senior secondary school (SSCE) were correlated. The most

suitable method of data analysis considered for this study is the product moment correlation coefficient (r).

The result of this led to the attainment of the objective of this study and hence provided the basis for testing the hypothesis.

RESULTS

To obtain the relationship between the variables at this level of the correlational design, the results are summarized in the table below.

From table 1, the r-values of 0.7, 0.7, 0.55, 0.36 and 0.69 respectively, for the 2003, 2004, 2005, 2006 and 2006 were found, and converted to t-values as shown. Also from the same table, the coefficients between JSCE and SSCE lie between 0.36 and 0.72, implying that positive correlation exists between the variables. Apart from that of 2006, the coefficients lie between 0.55 and 0.72, thus, they can both be used for group prediction. The same table shows that the correlation coefficients indicate that 52%, 24%, 25% and 48% of the variance are common to both JSCE and SSCE. The values 52%, 25%, 24% and 48% are the coefficients of determination between the two variables, showing the predictive values between them. The null hypothesis is therefore rejected. The conclusion is that there is a significant relationship between the overall performance of students at the JSS level and their overall performance at the SSS level.

DISCUSSION

So far, the above interpreted correlation coefficients show the extent to which JSCE and SSCE are related for the 2003, 2004, 2005, 2006 and 2007 respectively. The coefficient of 0.72, 0.69 and 0.55 are sufficient to make group predictions as stated by Borg and Gall (1983). The values indicate that students who scored high in the final JSCE also scored high in the SSCE and those who scored low in the JSCE also scored low in the SSCE. The correlation coefficients of 0.72, 0.69 and 0.55 indicate that 55%, 48% and 24% of the variance are common to both final FSCE and final SSCE which are also the predictive values of the variables concerned. The reason for obtaining high coefficients here may be that, students have continuous mathematics teachers for the three years of JSS education, and also in their SSS education. So there is a sort of consistency in the academic performance of students throughout the JSS and SSS education.

Generally, all the correlation coefficients for this study lie between 0 and 1, implying that all the coefficients are positive and all of them are found to be significant at 0.05 level of significance. These correlation coefficients lie within the range of what has already been found before by other researchers. For example, Okorho (1990)

Table 1. Correlation Coefficient between JSCE and SSCE Results and their respective student's 't' Equivalent from 203 to 2007

Year	Variables	DF	r	r^2	r^2%	t	Decision
2003	JSCE vs SSCE	800	0.72	0.52	52	3	significant
2004	JSCE vs SSCE	905	0.72	0.52	52	3	Significant
2005	JSCE vs SSCE	979	0.55	0.24	24	1.01	Significant
2006	JSCE vs SSCE	1004	0.36	0.22	25	1.86	Significant
2007	JSCE vs SSCE	1010	0.69	0.48	48	2.6	Significant

studied the relationship between internal and external assessment and obtained 0.32, 0.24 and 0.36 at the various levels of his correlational study design. Turton (1988) in his study on relationship between continuous assessment, Raven progressive matrices and achievement tests in integrated science at JSS1 level, obtained the correlation coefficients of 0.6, 0.77 and 0.77 at different levels of his correctional design. Particularly, he found 0.77 between continuous assessment and achievement test which is just about what has been obtained for the 2003 and 2004 samples for this study. Garba (1990) conducted a study on how entry grade relates to academic performance at the post secondary level, where the correlation coefficients of 0.34 and 0.47 were found. Hence from the result of this study, and also what has been found in researchers, it can be seen that the study has a significant predictive value at 0.05 level of significance.

SUMMARY

The general purpose of this study was to assess predictive value of the junior secondary school performance in relation to the senior secondary school mathematics achievement. To this extent the correlation coefficient between the variables wee obtained, using the Pearson Product Moment Correlation Coefficients. These correlation coefficients include 0.72, 0.72, 0.55, 0.36 and 0.69 between JSCE and SSCE respectively for the 2003, 2004, 2005 and 2006 and 2007 samples.

The correlation coefficients were used in obtaining the t-values to test the hypothesis. For the 2003, 2004, 2005, 2006 and 2007 samples, the t-values of 3, 3, 1.01, 1.86 and 2.6 respectively were obtained in relation to the hypothesis. All these were found to be significant at 0.05

level of significance. Therefore, the null hypothesis is rejected for all the five years.

The correlation coefficients obtained were used in obtaining the coefficients of determination, thus, obtaining the predictive values of the variables under investigation. The predictive values between JSCE and SSCE of 25%, 52%, 24%, 25% and 48% were obtained respectively for the 2003, 2004, 2005, 2006 and 2007 samples.

RECOMMENDATIONS

The study recommends that JSCE preparation of students should be given more serious attention because of the predictive values on students SSCE results.

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