

PREDICTIVE VALIDITY OF BASIC EDUCATION CERTIFICATE EXAMINATION ON STUDENTS' ACADEMIC ACHIEVEMENT IN SENIOR SCHOOL CERTIFICATE EXAMINATION IN IBADAN, NIGERIA.

Moses Oluwafemi OGUNDOKUN, Ph.D

and

Justina Tubokun OYEDOKUN,

Department of Guidance and Counselling
University of Ibadan, Ibadan

Abstract

The Basic Education Certificate Examination (BECE) is a stepping stone for admission into the Senior Secondary School. Students that transited from Junior Secondary School to Senior Secondary School are expected to have the ability, enablement and the necessary skills needed to cope with all the academic challenges of Senior Secondary Certificate Examination (SSCE). However, the reverse is the case as students' performance in the SSCE has been very low despite that same students obtained good grades in the Basic Education Certificate Examination (BECE). This study examined the predictive validity of Basic Education Certificate Examination on students' academic achievement in Senior School Certificate Examination. This study adopted a descriptive survey research design of the ex-post facto type. Students' achievement records of 200 candidates for 2016 Senior School Certificate Examination (SSCE) results and their Basic Education Certificate Examination (BECE) results in 2013 were used for the study. Five research questions were tested and analysed, using frequency counts, percentages, Pearson's Product Moment Correlation and Multiple Regression analysis tested at the 0.05 level of significance. The findings revealed that the performance of students in BECE in all the subjects under consideration had low but positive correlation with the performance in SSCE. Also, findings revealed that there was a significant correlation between BECE English Language and Mathematics and SSCE English Language and Mathematics. Based on the findings, it was recommended that Government should intensify more effort at ensuring better teaching and learning strategies in schools through effective supervision and monitoring of schools.

Keywords: *Predictive validity, Basic Education Certificate Examination, Academic achievement, Senior School Certificate Examination*

Introduction

Academic achievement occupies a very important place in education as well as in learning process; this is not only a pointer to the effectiveness or otherwise of schools but a major determinant of the future of students and the nation. It is considered as a key criterion to judging one's total potentialities and capacities (Nuthana and Yenagi, 2009)

which are frequently measured by the examination results. It has become a phenomenon of interest to all stakeholders. This accounts for the reason why scholars have been working hard to untangle factors that militate against good academic performance (Aremu and Soka, 2003). Academic achievement of learners has attracted attention of scholars, parents,

policy-makers and planners. Adeyemo (2001) opined that the major goal of the school is to work towards attainment of academic excellence by students. This implies that the school may have other peripheral objectives but emphasis is always placed on the achievement of sound scholarship. Besides, virtually everybody concerned with education places premium on academic achievement; excellent academic achievement of children is often the expectation of parents (Osiki, 2001).

Academic achievement is the outcome of an education, the extent to which students and teachers have achieved their educational goal. It is the level of attainment of a given standard of excellence. It is the degree of success attained at the end of academic endeavours (Iwundu, 1995). Academic achievement is the level of performance that is exhibited by the individual, on a task, trade, profession or learning (Aremu, 2004; Adegoke, 2006). Thus, academic achievement could be seen as the level of proficiency and knowledge demonstrated by an individual after learning has occurred. It is commonly measured through examinations or continuous assessments but there is no general agreement on how it is best evaluated or which aspects are most important - procedural or declarative knowledge. The most common indicator of achievement, generally, refers to a student's performance in the school subjects such as English language, Mathematics, Biology, Chemistry, Economics, Government, History and the like, as measured by achievement tests. These include nationwide examinations, Basic Education Certificate Examination (BECE), Senior School Certificate Examination (SSCE), National Examination Council (NECO) and so on.

The Basic Education Certificate Examination (BECE) is a public examination

taken by students at the end of their Junior Secondary Schools. On the other hand, Senior School Certificate Examination is an examination for all students in the Senior Secondary School III in all Secondary Schools in Nigeria. The Junior Secondary Examination is conducted by National Examination Council (NECO) while the Senior School Certificate Examination is being conducted by West African Examination Council (WAEC) and National Examination Council (NECO). The WAEC version of the Senior School Certificate Examination is used for this study, since it follows the rules and regulations guiding the development and administration of public examination and the validity test ascertained by many researchers (Chijioke, 1990; Ojerinde, 2004).

Establishing the predictive validity of Junior Secondary Certificate Examination on student's performance in Senior Secondary Certificate Examination would go a long way in fulfilling one important uses of evaluation; which is for placement and for certification. The fact remains that the modes of selecting candidates for admission and certification in various programmes require constant examination. This is to ensure the credibility of each criterion. Obinne and Amali (2014) explain that test is one of the devices of evaluation in schools and testing concerns specific performance of a student in terms of given objectives. Testing is a fundamental part of teaching and learning process used, not only for ranking students at the end of teaching-learning process, but to guide teaching aid in the development of curriculum, as well as in assessment of learning difficulties and level of mastery among students.

Predictive validity is the degree of correlation between the scores on a test and some other measures that a test is designed

to predict (Afolabi, 2012). McDaniel (1994) points out that predictive validity is established when test scores are shown to predict criterion of data collected at a later time. This is obtained by correlating the predictor variable and the criterion variable. The scores obtained by students from their internal examinations, for example, continuous assessment and mock examination, entry or qualifying examination results respectively could be used to predict their future performance (Adeyemi, 2008). It is worth noting that a number of scholars have conducted predictive validity studies on educational issues (Faleye & Afolabi, 2005; Obioma and Salau, 2007; Adeyemi, 2008; Omirin & Ale, 2008). Predictive examination provides pre-requisite information to teachers, students, parents and all the educational stakeholders.

The Basic Education Certificate Examination is a stepping stone for admission into the Senior Secondary School. Students that transited from Junior Secondary School to Senior Secondary School are expected to have the ability, enablement and the necessary skills needed to cope with all the academic challenges of Senior Secondary Schools. However, the reverse is the case as students' performance in the Senior Secondary School Examination has been very low. For instance, in the 2014 and 2015 WASSCE, the percentage of candidates that obtained credit pass in five subjects and above, including English Language and Mathematics was 31.28 per cent and 38.68 per cent respectively (Adenipekun, 2016), though, same students obtained good grades in the Basic Education Certificate Examination (BECE) when admitted into the Senior Secondary School (Faleye, 1987; Faleye and Afolabi, 2005). Therefore, this study sought to investigate the predictive validity of Basic Education

Certificate Examination (BECE) on students' achievement in Senior School Certificate Examination (SSCE).

Research questions

The study seeks to answer the following questions:

- 1 What is the level of students' performance in major subjects in May/June 2016 Senior School Certificate Examination (SSCE) and 2013 Basic Education Certificate Examination (BECE)?
2. What is the predictive validity of BECE subjects on SSCE subjects?
3. Are there relationships in students' performance in BECE and SSCE Examinations in the core Science and Arts subjects (Mathematics and English Language)?
4. What are the joint effect of performance in BECE and SSCE in the core Science and Arts subjects (Mathematics and English Language)?
5. What is the relative effect of performance in BECE and SSCE in the core Science and Art subjects (Mathematics and English Language)?

Methodology

The design for the study is a descriptive survey research design which utilised an *ex-post facto* type. The target population for the study comprised the students' achievement records in Basic Education Certificate Examination, 2013 and their 2016 Senior Secondary Certificate Examination results in Oyo State. A total number of 200 candidates were used for this study. From the list of eleven local governments in Ibadan, 2 local governments were randomly selected by the use of random table number. From the list of secondary schools in each of the local government, five public secondary schools were selected from each local government,

using the table of random numbers. From each school, 20 candidates (10 males, 10 females) were randomly selected by the use of random table number. In all, eight subjects were considered from the SSCE results, classified into three sub-categories: core subjects (English-Language, Mathematics and Civic Education); Science subjects (Physics, Chemistry and Biology) and Arts and Social Science subjects (Economic and Government). The grades of the score were coded as: A1=4; B2-B3 =3; C4 –C6 =2; D7-E8=1; F9=0.

Eight subjects were also considered from their Basic Education Certificate. They were Mathematics, English Language, Physical and Health Education (PHE), Basic Science, Basic Technology, Social Studies, Civic Education and Business Studies. Students' grades were coded as follows: 3-Distinction,

Results

The results obtained in the analysis of data collected are presented in Tables below.

Table 1: Level of Performance in WASSCE in May/June 2016

Subjects	No of Enrolment	No and % of Passes at Grades 1 to 6	No and % of Passes at Grades 7 – 8	No and % at Grades 9
Mathematics	78776	29938 (38.00)	21732(27.59)	26339(33.44)
English Lang.	78821	30926 (39.23)	23637 (29.98)	23576 (29.91)
Yoruba Language	70795	19811(27.98)	28760(40.62)	21771(30.75)
Chemistry	29784	17258(57.94)	6217(20.87)	5619(18.86)
Physics	29775	12528(42.07)	8088(27.16)	8941(50.02)
Biology	38174	15919(41.70)	10418(27.29)	11462(30.02)
Economics	53317	14235(26.69)	11927(22.36)	26778(50.22)
Financial Acct.	22517	10116(44.92)	5607(24.90)	6665(29.59)
Government	31686	12425(39.21)	7029(22.18)	12030(37.96)
Lit. in Eng.	24870	3155(12.68)	4574(18.39)	17001(68.35)
Civic Education	78477	29916(38.12)	23334(29.73)	24791(31.59)
Commerce	22385	9389(41.94)	3679(16.43)	9121(40.74)

2-Credit, 1-Pass and 0- Fail. From the list of all the schools, two schools were randomly selected in Oyo state. From each school, one hundred students were randomly selected.

Procedure

The researchers made use of secondary data. The names of the candidates in their SSCE result in 2016 were used to trace their achievement in their BECE performances of 2013. Names of two hundred candidates who sat for WASSCE and BECE and matched one another were used for the study.

Data Analysis

Data were analysed, using frequency count, percentage, Pearson's Product Moment Correlation and Multiple Regression Analysis (Multivariate Regression). The research questions were tested at the 0.05 level of significance

Table 1 shows the level of performance in West African Senior School Certificate Examination (WASSCE) subjects conducted in year 2016. The percentage of examined students that had credit and above (A1-C6) in Mathematics was 29938(38%); 21732(27.58%) had Pass grade (D7/E8) and 26339(33.43%) failed Mathematics. With regards to the performance of the examined students in English Language, 30926(39.23%) had (A1-C6) in English Language, 23637(29.98%) had Pass grade (D7/E8) and 23576(29.91%) failed English

Language. Out of the total enrolment of 29784 for Chemistry, 17258(57.94%) made (A1-C6); 6217(20.87%) made Pass (D7 or E8) and 5619(18.86%) failed. In Biology, 15919(41.70%) made (A1-C6); 5607(24.90%) had pass grade (D7/E8) and 11462(30.02%) failed. Literature-in-English recorded the highest percentage of failure. Out of the 24870 that sat for the examination, 17001(68.35%) failed; 4574(18.39) had Pass grade (D7/E8) and just 3155(12.68%) had (A1-C6).

Table 2: The level of Performance in BECE 2013

Subjects	No of Enrolment	No and % of Passes at Distinction level	No and % of Passes at Credit Level	No and % of Passes at Pass Level	No and % of failure
Mathematics	96641	10392(10.75)	62854(65.04)	23259(24.07)	1360(0.14)
English Lang.	96652	4455(4.06)	74524(77.11)	17625(18.24)	48(0.05)
Yoruba Lang.	96183	3578(3.72)	64764(67.33)	26440(27.49)	1401(1.46)
Social Studies	95419	18283(19.16)	65773(68.93)	10962(11.49)	401(0.42)
Civic Education	94136	19413(20.62)	63230(67.17)	11057(11.75)	436(0.46)
Basic Science	96421	11348(11.77)	65541(67.98)	18407(20.22)	31(0.03)
Home Economics	60481	11906(19.16)	39689(65.62)	8561(14.15)	325(0.54)
Agricultural Sci.	93460	11704(12.52)	65772(70.37)	15972(17.10)	12(0.01)
Business Studies	93328	17842(19.12)	69465(74.43)	5874(6.29)	147(0.16)
CRS	45514	13771(30.26)	28938(63.58)	2705(5.94)	100(0.22)
IRS	171	137 (80.58)	14 (8.23)	1 (0.07)	19 (11.12)

Table 2 shows the level of performance in BECE examination conducted in year 2013. The percentages of students that had Distinction (A) in Mathematics were 10392(10.75%); 62854(65.04%) had Credit (C) and 23259(24.07%) had Pass (P). In English Language, only 4.06% had

Distinction; 77.11% had Credit; while 18.24% had Pass, however, 48(0.05%) failed. In Civic Education, 19413(20.62%) had Distinction grade; 63230(67.17%) had Credit; 11057(11.75%) had Pass grade. The same trend of performance was recorded for Basic Science. Out of the total enrolment of

(96421) that sat for the examination, 11348(11.77%) had Distinction grade, 65541(67.98%) had Credit grade, 18407(20.22%) had Pass grade. In

Agriculture science, 11704(12.52%) had Distinction, 65772(70.37%) had Credit grade while 15972(17.10) had Pass grade.

Table 3: Descriptive statistics and correlations among the performance in General subjects

Variables	N	Mean	Std. Dev.	1	2	3	4
BECE English	200	2.63	.675	1.000			
BECE Mathematics	200	2.53	.641	0.432**	1.000		
SSCE English	200	2.27	.859	0.326**	0.291**	1.000	
SSCE Mathematics	200	2.35	.713	0.329**	0.367**	.588	1.000

**. Correlation is significant at the 0.05 level (2-tailed).

As shown in the table 3, students' performance in BECE (English) significantly correlated with SSCE (English Lang.) ($r = .326$; $p < .05$); there was also significant relationship between performance in BECE (English Lang) and performance in SSCE Mathematics ($r = .329$; $p < .05$). Furthermore, students' performance in BECE (Mathematics) significantly correlated with SSCE English Language ($r = .291$; $p < .05$); and SSCE Mathematics ($r = .367$; $p < .05$).

Table 4: Multivariate Regression Analysis on Prediction of Students' Performance in SSCE General Subjects

Variables	N	Df	Std. Error	R ²	F	P	Remark
SSCE English Language	200	3	.804	0.13	15.233	0.000	Sig.
SSCE Mathematics	200	3	.653	0.17	20.276	0.000	Sig.

Table 4 above shows that the two independent variables, SSCE Subjects (Mathematics and English Language), when pulled together, have significant effect on the students' achievement in SSCE Mathematics and English Language. The both R² were obtained as 0.13 and 0.17. The analysis of variance performed on the multiple regressions yielded an F-ratio value of 15.23

and 20.28 were found to be significant at 0.05. This shows that the performance in Mathematics and English Language (Independent variables) combined together to account for 13% and 17% of the variance in students' achievement in SSCE English Language and Mathematics (SSCE) Subjects.

Table 5: Relative Prediction of BECE on Students' Performance in SSCE General Subjects

Variables		Coef.	Std. Err.	T	P>t	[95% Conf.	Interval]
SSCE English Language	BECE English	.313	.094	3.35	0.001	.128	.498
	BECE Mathematics	.247	.098	2.51	0.013	.053	.441
	Constant	.815	.270	3.02	0.003	.282	1.347
SSCE Mathematics	BECE English	.222	.076	2.91	0.004	.072	.371
	BECE Mathematics	.308	.080	3.85	0.000	.150	.465
	Constant	.984	.219	4.48	0.000	.551	1.416

Table 5 shows how each of the independent variables (BECE) made significant contribution to the prediction of students' achievement in SSCE. In relation to magnitude of prediction, performance in BECE achievement in English Language did contribute significantly to the achievement in SSCE English of students, (Beta= .313; t= 3.35; p<0.05). Achievement in BECE Mathematics did predict SSCE English

Language achievement as well (Beta= .247; t= 2.51; p<0.05). Also, performance in BECE achievement in Mathematics made the most contribution to the achievement in SSCE Mathematics of students, (Beta= .308; t= 3.85; p<0.05); then, Achievement in BECE English Language did predict SSCE Mathematics achievement (Beta= .222; t= 2.91; p<0.05)

Table 6: Multivariate Regression Analysis on Students' Performance in Science Subjects

Observation	N	Df	Std. Error	R ²	F	P	Remark
Biology	75	4	.740	0.11	3.057	0.034	Sig
Chemistry	75	4	.610	0.24	7.385	0.002	Sig
Physics	75	4	.192	0.09	2.269	0.088	NS

The table 6 shows that the three independent variables (BECE Subjects: Basic Science, PHE. and Basic Tech.), when pulled together, have significant effect on the students' achievement in SSCE Biology and Chemistry. Both R² were obtained as 0.11 and 0.24. The analysis of variance performed on the multiple regressions yielded an F-ratio value of 3.057149 and 7.385703 were found to be significant at 0.05. This shows

that the performance in Basic Science, Physical and Health Education and Basic Tech. (Independent variables) combined together to account for 11% and 24% of the variance in students' achievement in SSCE Biology and Chemistry subjects. The analysis of variance performed on Physics yielded an F-ratio value of 2.27 and was not significant at 0.05.

Table 7: Multivariate Regression Analysis on Students' Performance in Science subjects

Variables	Observation	Coef.	Std. Err.	T	P>t	[95% Conf.Interval]	
Biology	Basic Science	.049	.169	0.29	0.772	-.288	.386
	PHE	.223	.074	3.01	0.004	.075	.370
	Basic Technology	-.114	.199	-0.57	0.567	-.511	.283
	Constant	1.89	.661	2.86	0.006	.574	3.210
Chemistry	Basic Science	.62	.140	4.42	0.000	.340	.898
	PHE	-.03	.061	-0.47	0.638	-.151	.093
	Basic Technology	-.33	.165	-1.97	0.053	-.653	.004
	Constant	1.22	.547	2.24	0.028	.133	2.315

The table 7 above shows how each of the independent variables (BECE) made significant contribution to the prediction of students' achievement in SSCE. In relation to magnitude of prediction, performance in BECE achievement in PHE only contributed significantly to the achievement in SSCE

Biology, (Beta= .223; t= 3.01; p<0.05) among science related BECE subjects. Moreover, achievement in BECE Basic Science independently predict SSCE Chemistry (Beta= 0. 62; t= 4.42; p<0.05) among science related BECE subjects.

Table 8: Descriptive statistics and correlations among the performances in Arts/Social Science subjects

	Mean	Std. Dev.	Economics	Government
Mean			1.33	1.45
Std. Dev.			.53	.64
Social Studies	2.3590	.48176	.477**	-.056
Civic Education	2.5470	.83558	.281**	.190*
Business Studies	2.0769	.58947	-.028	.021

Table 8 contains descriptive statistics and correlations among the performance in Arts/ Social Science subjects. Students' performance in BECE (Social Studies) significantly correlated with SSCE performance in (Economics (r =. 477;

p<.05). There was also significant relationship between performance in BECE (Civic Education) and performance in SSCE Economics (r=.281; p<.05); Government (r=.190; p<.05).

Table 9: Descriptive statistics and correlations among the performances in Arts/Social Science subjects

Variables	Obs.	Df	RMSE	R ²	F	P	Remark
Economics	117	4	.4498691	0.29	15.03888	0.0000	Sig
Government	117	4	.637992	0.02	.8161734	0.4875	NS

The table 9 above shows that the three independent variables (BECE Subjects: Social Studies, Civic Education and Business Studies), when pulled together have significant effect on the students' achievement in SSCE Economics yielded an F-ratio value of 15.04 and was significant at 0.05. The R² were obtained as 0.29. This shows that the performance in Social Studies, Civic Education and Business

Studies (Independent variables) combined together to account for 29% of the variance in students' achievement in SSCE Economics. The analysis of variance performed on the effects of Social Studies, Civic Education and Business Studies on Government yielded an F-ratio value of .8161 and was not significant at 0.05. This means the three BECE subjects combined do not exert prediction on Government.

Table 10: Multivariate Regression Analysis on Students' Performance in Social Science subjects

	Variables	Coef.	Std.Err	T	P>t	95% Conf.	Interval
Economics	Social Studies	.609	.0971977	6.27	0.0000	.4172854	.8024179
	Civic Education	.112	.0517563	2.17	0.032	.009735	.2148121
	Business Studies	.211	.08293	2.54	0.012	.046741	.3753394
	Constant	-.9871464	.3990594	-2.47	0.015	-1.777755	-.1965378

The table 10 above shows how each of the independent variables (BECE) made significant contribution to the prediction of students' achievement in SSCE. In relation to magnitude of prediction, performance in BECE achievement in Social Studies contributed significantly to the achievement in SSCE Economics, (Beta= .609; t= 6.27; p<0.05) then Business Studies, (Beta= .211; t= 2.54; p<0.05), then Civic Education, Beta=.112 ; t= 2.17; p<0.05)

Discussion

The results show that the percentages of students that had credit and above are not up to 50%. One important deduction from the table is percentage of failure recorded in major subjects, especially, Mathematics and English Language. The level of performance in Mathematics is adjudged unacceptable. Finding of the study is in line with that of Anaduaka and Okafor (2013) who examined students' performance in Mathematics. This indicates that the level of performance in

Mathematics is not acceptable. The findings of this study corroborate that findings of Egede, (2014) which lamented the decline in performance of students, that in 2005, only 27.5% of students who sat for the West African Senior School Certificate Examination obtained five credit passes and above including in Mathematics and English Language, while in 2008, it was 13.7%%. The performance of students in SSCE examination has become a matter of concern for stakeholders.

The result shows that the percentage of students that had credit and above is more than 50%. Going by the trend, the BECE performance is fairly good. The findings of this study concur with that of Maliki, Ngban and Ibu, (2009) who found out that students' performance in Mathematics in Basic Education Certificate Examination for 2006 was high. One significant reason for performance in BECE is its difficulty index. The difficulty level of Junior Secondary School Education is relatively compared to SSCE examination.

There was a significant relationship between BECE general subjects - Mathematics and English Language and SSCE subjects (Mathematics and English). The finding corroborates O'kwu & Orum, (2013) who found that BECE performance in Mathematics and English Language predicts academic achievement in SSCE examination. Furthermore, the study supports the study of Omirin and Ale, (2008) which revealed that mock examination in English and Mathematics scores helped significantly in predicting the success of academic performance of students in WASSCE.

The finding supports the previous finding of Faleye and Afolabi (2005), which reported that overall performance of BECE examination is a poor predictor of SSCE

examination. Kolawole and Ala (2014) found that BECE had low but negative contributions to performance in SSCE. The possible explanation for this is that there is no serious attention given to students at their BECE level and this invariably affects students' performance at the SSCE level.

The result shows that there is significant relationship and prediction between Integrated Science and Biology and between Basic Science and Chemistry. However, no significant correlation (or prediction) was found for Basic Science and Biology; Basic Science and Physics; Physical and Health Education (PHE) and Chemistry; PHE and Physics. Basic Technology did not correlate (or predict) any SSCE science subjects. The study is in consonance with Adeyemi, (2008) that found significant relationship between the students' performance in BECE science subjects and students' performance in SSCE science subjects. However, the study was incongruent with Faleye and Afolabi, (2005) who found no relationship between BECE Science subjects and SSCE science subject. The possible justification for the inconsistency in the relationship between SSCE science subjects and BECE science subjects lies with the curriculum content itself. It can be claimed that performance in BECE science is not a strong preparatory ground for what is to be faced in senior secondary school level.

The study found significant relationship between BECE subjects and SSCE subject such as Social Studies/Economics, Civil Education, Economic and Civil Education and Government. However, there was no relationship between Social Study and Government, Business and Economics; and Business Studies/Government. This study corroborates Faleye and Afolabi, (2005) who found significant relationship between Social Studies and Geography. Hence, BECE

subjects' prediction on students' capability in SSCE subjects is limited.

In conclusion, the result of this study shows that the performance of students in BECE in all the subjects considered had low but positive correlation with their corresponding performance in SSCE results.

Implication of the Findings for Educational Practice

This study examined the predictive validity of Basic Education Certificate Examination on students' performance in Senior School Certificate Examination in Oyo state, Nigeria. However, the result of the study provides practical implication for the psychologists, students, teachers, government and bodies conducting both examinations - West African Examination Council and National Examination Council. Poor academic performances of students require the understanding of their limitations and on such basis embark on significant activities that would help them to improve. Also, students need to re-evaluate their academic achievement during their secondary education programme.

Recommendation

In a bid to improve academic performance, students should imbibe effective study habit to help their retention abilities.

The educational system in the state needs to be revamped and made to be result oriented. In doing this, the teaching and learning processes in all schools need to be re-examined with the aim of improving the quality of performance of students in public examinations.

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