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Abstract

Introduction: The Junior Secondary Certificate Examination (JSCE) is a summative examination taken by candidates at the end (the third year) of Junior Secondary Education in Nigeria. The Examination is in two versions – (a) the one being conducted by the States' Ministries of Education (MOE) and (b) the Federal version being conducted by the National Examinations Council (NECO). There was growing concern among stakeholders about the predictive validity of the State version of the JSCE for the Senior Secondary School Certificate Examination (SSCE). The study was undertaken to find out whether there is significant relationship between the overall performance of students in the JSCE and their performance in the Senior School Certificate Examination (SSCE).

Method: Schools in Osun State (of Nigeria) constituted the sample for the study. Promotion examination scores of the students in Senior Secondary School (SSS) 1 and SSS 2 as well as their SSCE in six major subjects were compared with corresponding JSCE scores using correlation analysis procedures.

Results: These showed that Osun State JSCE is a poor predictor of students' performance in the SSCE. However, JSCE English Language and Mathematics were found to have a greater capacity to predict performance in SSCE English Language and Mathematics than all the other subjects ($r = 0.32$, $p<0.05$ and $r = 0.22$ $p<0.05$ respectively).

Conclusion: Overall performance in JSCE across the six subjects investigated is a poor predictor of SSCE performance (except English Language and Mathematics). The trend could be due to the constraints facing the MOE which perform the role of an examination body.

Keywords: JSCE; SSCE; Predictive Validity and performance

Introduction

The National Policy of Education (NPE) in Nigeria recommends a two-tier secondary system; the Junior Secondary School (JSS) and the Senior Secondary School (SSS). The duration for each of the two levels is three years (Federal Republic of Nigeria [FRN], 1998 ed.).

The Junior Secondary Certificate Examination (JSCE) is a public examination (in Nigeria) conducted by each state of the federation through their respective MOE for final year students of the JSS at the end (i.e. the third year) of Junior Secondary schooling. While each state develops, administers, marks, and awards grades and certificates to all public schools under its jurisdiction, the National Examinations Council (NECO) is responsible for conducting the JSCE to all JSS III students of federal government colleges and other private secondary schools that elect to take the NECO-conducted examination.

The Senior Secondary Certificate Examination (SSCE), on the other hand, is a national examination for all Senior Secondary School 3 students in all secondary schools in the country. It is being conducted and administered by both the West African Examinations Council (WAEC) and NECO. The two examining agencies conduct parallel or equivalent SSCEs in the country. The SSCE was first conducted in 1958 by WAEC and its validity has been ascertained by many researchers (e.g. Ojerinde, 1986; WAEC, 1992). Indeed, the test development and administration processes by WAEC succinctly described by Salami (1990) and Chijioke (1990) respectively clearly show that the SSCE is patterned after the best tradition of development and administration of public examinations. The WAEC version of the SSCE will be used in this study for the purpose of comparison with the JSCE being conducted by the Ministry of Education in Osun State.

In all objectivity, the Evaluation Departments or Units in the State Ministries of Education, which shoulder the development and conduct of the JSCE, cannot claim the experience, technical know how, specialized focus, or the abundance of specialized staff and tremendous resources of WAEC and NECO. One may argue *a priori* that the standard of the JSCE will vary from state to state (in Nigeria) depending upon its human and material

resources, level of educational development, and the general state of its schools. The pioneer set of JSCE candidates wrote the examination in 1988.

Since the JSCE is meant to serve as the yardstick for admission into the Senior Secondary School, a student who is thereby admitted is assumed to possess the abilities and skills necessary to cope with the academic challenges of the SSS. However, it is common knowledge that performance in the SSCE has been low for quite a long time (see Omotoso, 1981; Faloye, 1987; WAEC, 1994; 1995), despite the fact that these same students obtained acceptable grades in the JSCE, and were consequently admitted to SSS I. This touches on the validity (Popham, 2002) of the JSCE as an adequate benchmark to judge students' capacity to cope effectively with SSS work. The purpose of this study, therefore, is twofold:

(1) To find out whether there is a significant relationship between the overall performance of students in the JSCE and their performance in the SSCE, including aggregate SSS1 and SSS2 results.

(2) To determine the nature and strength of the relationship between selected JSCE subjects and their corresponding equivalents in SSS1, SSS 2 and SSCE.

Method

The subjects for the study consisted of 505 students from six purposefully selected secondary schools in Osun State, Nigeria. These schools were the top three schools of science in the state plus three other public secondary schools. All students who took the 1993 JSCE were initially involved in the study. However, the final subjects were the students whose results were obtainable from the 1993 JSCE through SSS 1, SSS 2, and WAEC's SSCE (i.e. those who completed SSS, took the SSCE and who had intact academic records).

Examination scores of the students were obtained from school records in six JSCE subjects, namely: English Language, Mathematics, Integrated Science, Yoruba language, Social Studies, and Agricultural Science. For the purpose of comparison, the promotion examination results of students in SSS 1 and SSS 2, and their final SSCE results were also obtained in school subjects corresponding to the selected JSCE subjects; the only exceptions were Chemistry and Biology in the SSCE which were paired and matched with integrated science in the JSCE (Physics candidates were few in the three other public schools), and

Geography in the SSCE was matched with Social Studies in the JSCE (Economics, Government or History were not offered in any of the three schools of science at that time).

For the purpose of scoring, JSCE grades of A,C, P and F were awarded 3, 2, 1 and 0 points respectively, while SSS promotion grades and SSCE grades of Distinction, Credit, Pass, and Fail were treated likewise. Thus, aggregate scores were obtained for each student in all subjects that were amenable to Correlation analysis using Pearson r.

Results and Discussion

Table 1 presents correlations (Ott & Longnecker, 2001) between JSCE aggregate scores in each of the six schools and the corresponding aggregate scores of the students in SSS 1, SSS 2 and SSCE.

Table 1: Relationship between 1993 JSCE Results and Corresponding Scores of the Candidates in SS 1, SS 2, and SSCE

SCHOOLS	n	SSS 1	SSS2	SSCE
A	200	.20*	.19	.26*
B	100	.24*	.15	.32*
C	15	.28	.21	.31
D	90	.17	.36*	20
E	29	.28	.21	.19
F	71	.20	.35*	.44

The table shows that students from only two schools (A and B) had JSCE performances that were significantly related to their SSS 1 aggregate results (r = 0.20, p<0.05 for School A and r = 0.24 for School B); the other schools had positive but non-significant r's. On the other hand, only school D and F had students with significant correlations between their JSCE and their SSS 2 aggregate results (r = 0.36, P<0.05 for school D, and r = 0.35, P< 0.05 for school F). Concerning the correlation of JSCE scores with SSCE, three schools had significant correlation coefficients (r = 0.26, P<0.05 for school A; r = 0.32, P<0.05 for school B and r = 0.44, p<0.05 for school F). Correlations are generally low and tend to show little

predictive ability. For example, the coefficients of determination r^2 for the three schools are: 0.067, 0.0102, and 0.194 respectively. These show that the variances of SSCE performance that can be accounted for by JSCE performance are 6.7%, 1.02% and 19.4% respectively.

Table 2 presents the relationship between some JSCE subjects and their equivalents or approximations of the same at the SSCE.

Table 2: Correlation between Selected Subjects in the JSCE and Corresponding Subjects in SSS 1, SSS 2, and SSCE

JSCE	SSS 1	SSS 2	SSCE
English Language	Eng. Lang .333*	Eng. Lang .306*	Eng. Lang .319*
Mathematics	Math .303*	Math .287*	Math .219*
Integrated Science	Bio. & Chem. .218*	Bio. & Chem. .225*	Bio. & Chem. .116*
Agricultural science	Agric. Sc. .218*	Agric. Sc. .202*	Agric. Sc. .182*
Social studies	Geog. .168	Geog. .219*	Geog. .189
Yoruba Language	Yoruba Lang. .093	Yoruba Lang. .134	Yoruba Lang. .159

From the table, low but significant correlations between JSCE and SSS 1 English Language (r = 0.333), SSS 2 English (r = 0.306) and SSCE English (r = 0.319) were obtained (in each case, P<0.05). Similarly, correlations between JSCE mathematics and SSS 1 Maths (r = 0.303), SSS 2 Maths (r = 0.287) and SSCE Maths (r = 0.219) are all low but significant (P<0.05, n = 505). In other subjects, only the correlations between JSCE Integrated Science and both SSS 1 Biology/Chemistry (0.216) and SSS 2 Biology/Chemistry (r = 0.225) are significant (P<0.05). Similarly, the correlations between JSCE Agricultural Science (r = 0.218) and SSS 2 Agricultural Science (r = 202) and between JSCE Social Studies and SS 2 Geography (r = 0.219, P<0.05) are significant.

Table 3 presents a picture of the performance of students in the JSCE and the comparative performance of the same students in the same or similar subjects in the SSCE.

Table 3A: Contingency Tables of Comparative Performance in JSCE and SSCE

	JSCE English	SSCE ENGLISH LANGUAGE			
		A	C	P	F
A	91	18	60	13	-
C	255	10	105	99	41
P	145	-	9	60	76
F	14	2	2	1	9
	JSCE Int. Sc.	SSCE Biology and Chemistry			
		A	C	P	F
A	124	79	36	3	6
C	233	63	111	47	12
P	126	2	34	47	43
F	22	1	-	2	19
	JSCE Yoruba	SSCE Yoruba Language			
		A	C	P	F
A	72	60	12	-	-
C	307	182	46	18	61
P	116	41	32	32	11
F	10	2	-	-	8

From tables 3a and 3b, of the 91 students who obtained A grade in JSCE English, 18 of them obtained A grades in SSCE English, 60 obtained C grades, 13 obtained P grades and none obtained an F grade. 78 out of 91, or 85.7% of the students obtained Distinction in JSCE English. Furthermore, 93% of the students obtained P or F grades in SSCE English.

A similar trend can be observed in the performances in Mathematics and in Integrated Science. The case of Agricultural Science is less marked. In the latter, 12 out of 20 (or 60%) of those who failed Agricultural Science in the JSCE did not fail it in the SSCE. Also, even though 72 students obtained A grade in JSCE Agricultural Science, only 66% were able to obtain A in SSCE Agricultural Science. In contrast, up to 232 or 80.8% of the 287 students who obtained C grade in JSCE Agricultural Science were able to obtain C grade or better in SSCE Agricultural Science.

Table 3B: Contingency Tables of Comparative Peformance in JSCE and SSCE

	JSCE Math.	SSCE Math.			
		A	**C**	**P**	**F**
A	69	33	27	6	3
C	240	36	108	60	36
P	183	6	84	70	23
F	13	-	1	6	6
	JSCE Agric.	SSCE Agric. Sc.			
		A	C	P	F
A	72	48	14	1	8
C	287	85	147	42	13
P	126	8	39	40	39
F	20	4	4	4	8
	JSCE Social studies	SSCE Geography			
		A	C	P	F
A	64	42	21	1	-
C	296	113	140	22	21
P	123	8	38	41	36
F	22	3	2	7	10

The relationship between JSCE Social Studies and SSCE Geography appeared the lowest. For example, most (54.5%) of the 22 students who failed JSCE Social Studies were able to obtain A, C or P grades in SSCE Geography, and about 38% of students who obtained C grades in JSCE Social Studies secured A grades in SSCE Geography.

Table 4 presents a summary of the inter-subject performances.

	SSCE				
	JSCE	A	C	P	F
A	492	280 (56.9)	170 (34.6)	24 (4.9)	17 93.5)
C	1618	489 (30.2)	657 (40.6)	288 (17.8)	184(11.4)
P	819	65 (7.9)	236 (28.4)	290 (34.9)	228(27.8)
F	101	12 (11.9)	9 (8.9)	20 (19.8)	60(59.4)

From the table, 56.9% of the students who obtained A in JSCE also obtained A's in SSCE, 70.8% of students who obtained C's in JSCE also obtained C or better in the SSCE

and only 59.4% of students who obtained F grade in JSCE did likewise in the corresponding or equivalent SSCE subjects.

From the results, it may be deduced that:

1. 3 of the 6 schools investigated had relatively low but significant correlations between JSCE and SSCE results, two had significant correlations between JSCE and SSS 2 results.
2. Performance in JSCE English and Maths could be used to predict performance in English and Maths in SSS 1, SSS 2, and SSCE.
3. Overall performance in JSCE tends to have a low capacity to predict performance in SSCE.

It appears that the predictive capacity of the JSCE could be affected by the quality of the examination questions and the integrity of the procedure of its administration and scoring. At present, both of these seem questionable in most states as questions are often leaked, and more often than not, teachers in each school are also made to invigilate their own students! Likewise, the marking and awarding of grades tend to be abused; even the assignment of continuous assessment (CA) scores is often arbitrary and usually inflated (Ojerinde 1986; Adejumo & Afolabi, 1990). The practice of CA that provides part of the final score (FRN, 1992) for each of the subjects needs improvement. The National Institute for Educational Development (NIED) of Namibia (NIED) suggested ways of improving CA practice in schools which could be useful as well in the Nigerian context. It may therefore be better if the JSCE are prepared and conducted by a group of states, say, in a region such as the Southwest or Southeast. Continuous assessment scores of JSS students could be better and more effectively monitored to ensure accurate reporting. If nothing concrete is done to strengthen the JSCE, Senior Secondary Schools will not have a credible basis for admitting students into SSS 1 on account of their JSCE result.

According to results obtained in this study, not all JSCE subjects have adequate predictive strength. This negates the principle of testing (especially for public examinations) where all the items are expected to have been pre-tested and all the necessary psychometric strengths (of adequate predictive power, discrimination index and moderate difficulty level) ensured before they are administered on real candidates (Hopkins, 1998; Popham, 2002). The

concept of predictive validity has been described by many authors (e.g. Hopkins, 1998; Adewolu, 1999 and Popham, 2002). The concept is used to describe the capacity of a measuring instrument to forecast future performance in a related task (Graduate Management Admission Council [GMAC], 2005). A number of factors are found to potentially affect the predictive validity of test items. These include factors that are capable of affecting reliability (Badmus & Omoifo, 1998), since reliability is an essential (but not sufficient) factor in ensuring validity. Factors also include those relating to the test itself, i.e. the nature of the items, their psychometric properties of discrimination and distracter abilities as well as the homogeneity of the items. Although there is no local evidence to support the appropriateness of the length of the JSCE items of Osun State (Nigeria), which is basically multiple choice in nature, the results of the present study suggests that a good number of the items, especially in English Language and Mathematics, have good predictive strength. The low coefficients obtained for the other subjects suggest, however, that there are some defects in these subject items such as unsatisfactory and poor arrangement of alternatives, inappropriate wording of the item, stems as well as the use of difficult syntactic words that may be higher than the candidates' level of comprehension (Little, 1982; Oxenham, 1983; ERGESE, 1986; Kelly, 1991; Kellaghan & Greaney, 1991 and Somerset, 1996). Further investigation would still be needed on the quality of items of the JSCE being conducted by Osun State MOE in Nigeria.

Notwithstanding the foregoing, the MOE in Osun State have also tried to improve on the quality of items that were used in testing candidates for the JSCE. Authors' interaction with ministry officials have shown that staffers of the Curriculum Development and Evaluation Department of the Ministry have been attending seminars and workshops organised by WAEC and other related examining and professional bodies. This is aimed at improving their test development skills. The authors are of the view that the defects observable from the Osun State JSCE is not restricted to it alone. Studies on other public examinations in other parts of the world have revealed poor predictive validities. For example, Baron and Norman (1992) investigated the predictive validity of the SAT I. They concluded that the SAT I was "…by far the weakest predictor of College Grade Point Average". Therefore, the authors agree with the alternative as suggested by The National Center for Fair and Open Testing (Cambridge, MA; USA) that:

"…class rank, high school grades and rigor of classes taken are better tools for predicting College success than any standardized test". (p.3).

Conclusion

This study appears to reveal that:

1. Osun State JSCE is a poor predictor of students' performance in the SSCE
2. JSCE English Language and Mathematics have a greater capacity to predict performance in SSCE English Language and Mathematics than all the other subjects.

It may be useful to conduct a similar study using the JSCE's of states from each of the geo-political regions of the country.

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