

Relationship Between Junior Secondary Certificate Integrated Science Examination Result and Academic Performance of Science Students in Senior Secondary Certificate Examination in Osun State, Nigeria

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Abstract:

This paper examined the relationship between junior secondary school certificate Integrated Science examination result and academic performance of Science students in senior secondary school certificate examination in Physics, Chemistry and Biology in Osun State, Nigeria. Three research hypotheses were generated to guide the study. Descriptive research design of ex-post facto type was adopted for this study. A Multistage stratified random samplings technique was used to select 300 SSS3 science students from the three senatorial district in Osun State, Nigeria. An inventory was used to collect data for this study. Data collected were analyzed using correlation analysis. Results show that the performance of students at JSCE Integrated Science and SSCE Physics, Chemistry and Biology were low. All the results revealed that there were significant relationships between the JSCE Integrated Science and SSCE Biology, Physics and Chemistry. It was recommended that, the Biology, Physics Chemistry components of the JSC Integrated Science curriculum needs to be reviewed in line with SSC syllabus. More science teachers need to be recruited for effective teaching of science subjects in schools and Government should organize more induction courses, seminars and workshops for teachers to expose them to new strategies in the teaching and

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learning of subjects.

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Introduction

The link between science, Technology and Mathematics has become obvious in the teaching of science in such a way that the concept and principles are presented so as to express the fundamental unity of scientific thought and avoid premature or undue stress in the distinction between the various scientific fields Astronomy, Biology, Physics, Chemistry and Geology. The essence of teaching Integrated Science at the Junior Secondary School (JSS) level of the Nigerian Secondary Education is to prepare students for the science subjects so that each of the major science subjects that is, Physics, Chemistry and Biology will not be totally new to the student at the Senior Secondary School (SSS) level.

Although, the junior secondary school certificate Integrated Science curriculum had earlier been faulted in some quarters. At a cursory examination, the new Integrated Science curriculum materials have some problems since inception. There had been insufficient and lack of preparation for the Integrated Science programme (Ncharam, 2000). For instance, both the Federal core curriculum and NTSP in use were not arial- trial- tested through pilot study prior to their adoption. Some areas of contextual materials might have been tailored without adequate data based on the target students' age, Socio-cultural backgrounds, cognitive abilities and level of understanding. Although Omosewo and Salami (2000) once showed that the Physics component of the JSS science curriculum was adequate. Egbeema and Bromide (1986) had found in their respective studies that the cognitive demands of the content of the Integrated Science text is incompatible with the cognitive abilities of the students for which they are meant. The reason attribute to this is that the content requires high level thinking.

In a related development Omodara and Makinwa in Omodara (2018) in another separate study were of the views that one of the problems contributed to the poor performance of students in science subjects most especially in Physics was that some of the teachers teaching Integrated Science did not teach the Physics component of the subject. In view of this/ the poor performance of student in science subject at the SSCE perhaps might be as a result of teaching Integrated Science at the JSS not teaching the vital components of the Physics, Chemistry and Biology aspects of the Integrated Science curriculum. Examination occupies a unique position as a measure of quality within the education system of any nation. In view of this, the National Policy on Education (NPE) in Nigeria recommends a two-tier secondary School: 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], (2012ed).

The Junior Secondary School Certificate Examination (JSCE) is a public examination in Nigeria conducted by each state of the federation through their respective Ministry of Education for final year students of the JSS at the end (that is, the third year) of Junior Secondary School. While each state develops, administers, marks, and awards grades and certificates to all public school under its jurisdiction, the National Examinations Council (NECO) is responsible for conducting the JSCE to all JSS 3 students of Federal Government Colleges and private secondary schools that elect to take the NECO-conducted examination (Faleye & Afolabi, 2006) and Olakunle(2019). The pattern of grading candidate's scores in the examinations was



such that the distinction grade was represented by “A”. The credit grade was representing by “C”. The ordinary pass grade was represented by “p” while the failure grade was represented by “F”(Faleye & Afolabi, 2006; Olakunle, 2019).

The Senior Secondary School 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 Examination Council (WAEC) and National Examination Council (NECO). The two examining agencies conducted parallel or equivalent Senior Secondary School Certificate Examination (SSCE) in the country. The WAEC has been confirmed by many researchers over the years to conduct a reliable and valid examination (e.g. Ojerinde, 1986, WAEC, 1992). The WAEC version of the SSCE was used in this study for the purpose of comparison with the JSCE being conducted by the Ondo State Ministry of Education. The pattern of grading candidates’ scores at SSCE was such that the distinction grades were represented by A1 to B3. The credit grades were represented by C4 to C6. The ordinary pass grades were represented by D7 and E8 while the failure grade was represented by F9 (WAEC, 2002).

Faleye and Afolabi (2006) once lamented that JSCE might not predict the SSCE results because the evaluation departments or units in the State Ministries of Education, which shoulder the development and the conduct of the JSCE, cannot claim the experience, technical know-how, specialized focus, or the abundance of specialized staff and tremendous resources of WAEC & NECO. In view of this, Faleye and Afolabi posited that the standard of the JSCE will also vary from state to state in Nigeria depending upon its format and material resources, level of educational development, and the general state of its schools.

The study of student’s performance in sciences subjects at the JSS and SSS levels has been the focus of attention of many researchers in recent time. Having realized the importance of science education to nations building, the poor performance of Nigerian students at SSCE in Science subjects showed clearly that Nigeria is not yet treading the path of development in Science and technological advancement. Predictive validity is the degree to which a predictor variable predicts another variable called a criterion. For predictive validity to be established between the predictor and the criterion measured, there must be a high degree of relationship between the score of the predictor and that of the criterion.

In Nigeria, researchers have had divergent findings on the predictive validity of some examinations (Alonge, 1998; Adeyemo; 2001; Adeyemi, 2008; Fakeye & Afolabi, 2006 Omolere, 2021). In other developing countries, the index of academic performance varies from one country to another. Othuon & Kishur (1994) founds that the Kenyan Certificate Primary Education scores has a moderate positive linear relationship with the certificate of secondary education grades. In some studies, performance in JSCE has been found to be significantly related to the performance in SSCE (Adeyemi 2008: Durotoluwa. 2000 and Adeyemo. 2001). However, some researchers have found no significant relationship between the performance in JSC examination and in SSC examination (Omonijo, 2001: Fakeye, 2005; Falade & Afisu, 2006).

The above inconsistent reports and findings leave one with doubt whether JSSCE Integrated Science may have reliable validity. It is therefore necessary in this study to examine the



relationship between the performance of students in JSCE Integrated Science and performance in SSCE Physics, Chemistry, and Biology.

Statement of the Problem

JSCE is an index used for admitting students into senior secondary school in Osun State. One would expect that a student admitted into senior secondary school must have been possessed the abilities and skills necessary to cope effectively with the academic challenges of the SS. In a more specific term, a student with good grades in JSCE Integrated Science is expected to obtain the same good grades in SSCE Physics, Chemistry and Biology. However, it is a common knowledge that performance in the science subjects at the SSCE level has been low for quite a long time despite the fact that these same students obtained acceptable grades in the Integrated Science at the JSCE, and were consequently admitted to science class in SSS1. This touches on the predictive strength of JSCE Integrated Science in SSCE Physics, Chemistry and Biology.

Purpose of the Study

The purpose of this study is to examine the relationship between the Junior Secondary certificate examination results in Integrated Science and the academic performance of science students in Senior Secondary Certificate Examination (SSCE) in Osun state. Specifically, this study is designed to examine:

1. The relationship between student's performance in SSCE Integrated Science and SSCE Biology results.
2. The relationship between students' performance in JSCE Integrated Science and SSCE Physics results.
3. the relationship between students' performance in JSCE Integrated Science and SSCE Chemistry.

Research Hypotheses

The following research hypotheses were generated

H₀₁: There is no significant relationship between students' performance in JSCE Integrated Science and SSCE Biology.

H₀₂: There is no significant relationship between students' performance in JSCE Integrated Science and SSCE Physics.

H₀₃: There is no significant relationship between students' performance in JSCE Integrated Science and SSCE Chemistry.

Methodology

Descriptive research design of ex-post facto type was adopted for this study. This design was considered appropriate for the study because the researcher did not manipulate any variable. The existing Integrated Science result for JSCE and Physics, Chemistry and Biology results for SSCE were used. The population for this study comprised of the 2021/2022 SSS3 students that were admitted into Senior Secondary Schools through 2018/2019 JSCE results.

The sample for the study comprised of 306 SSS3 science students selected through multi stage sampling techniques. The selected science Osun students were the students that wrote Integrated Science in JSCE, offered Physics, Chemistry and Biology at the Senior Secondary School level and wrote 2021/2022 WAEC SSCE. The geographical areas of Osun state were

stratified into three senatorial districts namely; Osun North, Osun Central and Osun South using stratified sampling technique. A simple random sampling technique was then used to select two local government areas from each of the senatorial districts. Two secondary schools from each of the selected local government area were then selected using purposive random sampling techniques. These schools were purposively selected because they are the top two oldest secondary schools from each of the selected local government areas and have been presenting students for WASSCE for over 25years. Therefore, they have well-equipped laboratories and libraries of Integrated Science, Physics, Chemistry and Biology.

An inventory titled “students JSCE and SSCE academic performance proforma” was used to collect relevant data for the study. Proforma consisted of items that captured information about the students. The items included students grades in Integrated Science for 2018/2019 JSCE as well as Students grades in Chemistry, Biology and Physics in the 2021/2022 SSCE. For the purpose of scoring JSCE grades of A, C.P and F were awarded 3, 2.1 and 0 points respectively, while SSCE grades of A,B.P and F were treated likewise. Data collected were analysed using correlation analysis. The entire null hypotheses postulated for the study were at tested at 0.05 level of significance.

Results

Research Hypotheses

H₀₁: There is no significant relationship between students’ performance in JSCE Integrated Science and SSCE Biology.

Table 1: Correlation of JSCE Integrated Science and SSCE Biology

Variable	N	\bar{x}	SD	df	r cal	r table
Performance in Integrated Science at JSCE	306	0.56	0.17	298	0.38	0.1946
Performance in Biology SSCE	306	0.53	0.23			

$P < 0.05$

From table 1 above, the r calculated of 0.38 was greater than the r table (0.1946). Therefore, the hypothesis which states that there is no significant relationship between JSCE Integrated Science and SSCE Biology is hereby rejected at 0.05 level of significance. It shows that there was a significant relationship between JSCE Integrated Science and SSCE Biology.

H₀₂: There is no significant relationship between students’ performance in JSCE Integrated Science and SSCE Physics.

Table 2 Correlation of JSCE Integrated Science and Physics.

Variable	N	\bar{x}	SD	df	r cal	r table
Performance in Integrated Science at JSCE	306	0.56	0.13	298	0.34	0.1946
Performance in Chemistry SSCE	306	0.53	0.15			

$P < 0.05$

From table 3 above, the value of r calculated of 0.34 was greater than the r table (0.1946). Therefore, the hypothesis which states that there is no significant relationship between JSCE Integrated Science and SSCE Physics was equally rejected at 0.05 level of significance. It

shows that there was a significant relationship between JSCE Integrated Science and SSCE Physics.

H₀₃: There is no significant relationship between students' performance in JSCE Integrated Science and SSCE Chemistry.

Table 3: Correlation of JSCE Integrated Science and SSCE Chemistry

Variable	N	\bar{x}	SD	df	r cal	r table
Performance in Integrated Science at JSCE	306	0.56	0.18	298	0.23	0.1946
Performance in Chemistry SSCE	306	0.51	0.23			

P<0.05

Table 3 above shows that r calculated of 0.23 was greater than the r table (0.1946). The hypothesis which states that there is no significant relationship between JSCE Integrated Science and SSCE Chemistry was rejected at 0.05 level of significance. It shows that there was a significant relationship between JSCE Integrated Science and SSCE Chemistry.

Discussion

Integrated Science as predictor of performance in science subjects in SSCE was examined in this study. There was significant but low relationship between JSCE Integrated Science and SSCE Biology, Physics and Chemistry. The low relationship may be due to the difference in nature and scope of the two examinations. While the JSCE Integrated Science is made up of two papers (i.e. Objectives and Theory); Physics, Chemistry and Biology are made up of three papers each (objectives, theory and practical).

Other likely factors responsible for the low predictive validity of JSCE Integrated Science are absence of any discernible standardization process for the examination and the time lag between JSCE Integrated Science and SSCE Science subjects. In other words, a period of three years after JSCE is a long time which may account for low predictive validity of SSCE Biology, Physics and Chemistry scores. Most of these reasons had earlier been raised by Faleye and Afolabi (2006), which claimed that, in all objectivity, the Evaluation departments or units in the State Ministry of Education, which shoulder the development and conduct of the JSCE cannot claim the experience, technical know how, specialized focus, or the abundance or specialized staff and tremendous resources of WAEC and NECO. This finding contradicts the earlier finding of Omonijo (2001) who posited that JSCE Integrated Science could not significantly predict the performance of students in SSCE Physics, Chemistry and Biology but support the findings of Adeyemi (2008).

The low relationship between JSCE Integrated Science and SSCE Biology, Physics and Chemistry may suggest that the Physics, Chemistry and Biology components of JSCE Integrated Science Curriculum may not be inadequate already ascertained that the Physics, Chemistry, Biology components of the JSCE Integrated Science Curriculum were adequate.

Conclusion

Based on the findings of this study, it was concluded that the relationship between the performance of students at JSCE Integrated Science and SSCE Physics, Chemistry and Biology were low.

Recommendations

Based on the findings of this study, the following recommendations are made for improvement

1. The Physics, Chemistry and Biology components of the JSC Integrated Science curriculum needs to be reviewed in line with SSC syllabus.
2. More science teachers need to be recruited for effective teaching of science subjects in schools.
3. Government should organize more induction courses, seminars and workshops for teachers to expose them to new strategies in the teaching and learning of subjects.

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