Predictive Validity of Junior School Certificate Examination on Students’ Performance in Senior School Certificate Examination in Mathematics

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Abstract
The study determined the difference in gender, and relationship between Junior Secondary Certificate Examination and National Examination Council - Senior Secondary Certificate Examination result in mathematics among secondary school students in Gombe state. Expo-facto research design was adopted for the study. The population of the study comprises of 21,487 (14,347 male and 7,140 female) secondary school students. A proportionate stratified random sampling was used to select 378 students drawn from six schools of three senatorial zones of the state. Results of Students who sat for 2012/2013 JSCE and 2014/2015 SSCE were used for data collection. Hypotheses were formulated and tested at α= 0.05 level of significance. The data was analyzed using t-test and Pearson product moment correlation. Findings from the study revealed that the difference in Junior Secondary Certificate Examination and Senior Secondary Certificate Examination mean scores was not significant \( t(376)=0.474, p> 0.05 \). This study concludes that a success in Junior Certificate Examination can lead to success in Senior School Certificate Examination if it is monitored well by the school management and teachers, because they all play a vital role for an effective teaching and learning. Experience teachers to handle the teaching of Junior Secondary school classes and teachers with experience on Senior Secondary Certificate Examination marking to be involved in teaching Senior Secondary classes was among the recommendation made from the study.

Keywords: Predictive validity, Gender, Mathematics.

Introduction
Predictive validity is used to indicate the degree of scores on the test and future outcomes that are closely related to the trait measured by the test. Junior Secondary Certificate examinations are an examination enrolled by a candidate in the 3rd year of their junior secondary education in Federal secondary schools, state secondary schools and Private secondary schools in the country. The Junior Secondary Certificate Examination (JSCE) is a very important tool in the Nigerian educational system in evaluating the academic achievement of a student at the end of his/her
third year in the junior secondary school. It is used to evaluate the academic achievement, or to some extent, the academic worth of a student at the end of his/her third year in the junior secondary. While NECO-SSCE it is, an examination written by the students at the end of their SS111 classes.

The Secondary education is an instrument for national development that fosters the worth and development of the individual for further education, general development of the society and equality of educational opportunities to all Nigerian children, irrespective of any real or imagined disabilities each according to his or her ability. The role of secondary education is to lay the foundation for further education and if a good foundation is laid at this level, there are likely to be fewer problems at subsequent levels (Federal Republic of Nigeria, 2013).

The National Policy on Education (NPE) by the Federal Government of Nigeria (FGN, 2013) adopted six-year duration for secondary education given in two stages of Junior Secondary School (JSS) and Senior Secondary School (SSS) respectively. Students are expected to spend three years each at the JSS and the SSS. These two levels of secondary school education have different external bodies conducting their examinations for certification at the end of each instructional period. The Junior Secondary Certificate Examination (JSCE) is conducted by each state of the Federation, including Federal Capital Territory (FCT) Abuja through their respective Ministries of Education for the final year students of public and private-owned junior secondary schools. These different Ministry develop, administer, mark and award grades and certificates to students under their jurisdiction. On the other hand, it is the responsibility of the National Examinations Council (NECO) to conduct the JSCE for all the Federal Government Colleges (Unity Schools) in the States including FCT Abuja and some interested private secondary schools, while the West African Examinations Council (WAEC) and NECO independently conduct the Senior Secondary Certificate Examination (SSCE) in Nigeria.

In view of the Nigerian Educational Research and Development Council (NERDC, 2008), what the students learn at the JSS level will lay the foundation for the students SSS education and it should be systematically connected to it. This continuity in the educational process is the essence of the educational system in Nigeria. It is therefore assumed that a student who is admitted into the Senior Secondary School Classes possesses the basic skills to cope with the challenges of schooling at that level. The above stated position however may not necessarily reflect what is happening at the secondary school level; for example, it has been observed that some students who were promoted to SSSI because they obtained acceptable grades at the JSCE later failed at the WAEC SSCE (Adeyemi, 2008), thus questioning the validity of the JSCE as a benchmark for predicting performance of students at the SSCE level. Oyedoji (1999) identified Mathematics as a specialized language in which knowledge of the physical world is recorded. Nurudeen (2007) viewed that Mathematics is an instrument to ease or facilitate the thinking capabilities of an individual in the learning of other subjects. Current government policy in Nigeria specifies at least a pass in mathematics at the JSCE level (lower level) as a prerequisite for admission into SS classes. In the stand of NERDC (2008), with a pass at the JSCE, one should be able to determine students that would likely do well at the SSCE. Adeyemi (2008) in predicting students' performance at the SSCE level from their performance at the JSCE in Ondo State Nigeria, revealed that JSCE scores were good predictors of scores obtained by students at the SSCE.
Ugwuda, and Abonyi, (2011) observed that the scores of students in JSCE in all the subjects under consideration had low but positive correlation with their corresponding scores in SSCE. Osadebe (2003) investigated the predictive validity of JSCE scores in Mathematics and English for scores obtained at the SSCE in Delta State Nigeria, the results obtained showed positive and significant relationship between JSCE and SSCE students' scores in Mathematics and English. In a similar study by Onuka, Raji and Onabamiro (2010) established that, there was a significant relationship between the overall performance in both examinations, as measured by scores obtained at the JSCE and SSCE, in Epe Local Government Area of Lagos State Nigeria. The results in a study conducted by Faleye and Afolabi (2005), for Osun State, however indicated generally contrasting evidence, that Osun State JSCE is a poor predictor of students' performance in the SSCE, except for their finding that JSCE English Language and Mathematics tend to have relatively greater capacity to predict performance in SSCE English language and Mathematics than the other subjects.

In this study, the subject in focus was Mathematics. Why because it has been observed by the National Examination Council (NECO) that students’ performance in Mathematics in NECO-SSCE is relatively poor despite students’ high grade/scores in their Junior School Certificate Examination (JSCE). This is pointed out by the NECO 2011 chief examiner reports that, out of the total number of 87,508 students that sat for Mathematics examination only 34% passed (Ebine, 2011). Specifically, in Gombe State about eighteen thousand (18,000) students registered for NECO 2011 but only seventeen (17) recorded significantly success in English and Mathematics examination (Punch, 2012). Specifically, the study determined to:

i. Find out the difference in gender between JSCE 2013 and NECO-SSCE 2015 result in mathematics among secondary school students in Gombe state.
ii. Relationship between secondary school students’ performance in JSCE 2013 and NECO-SSCE 2015 results in Mathematics in Gombe state.

Hypotheses
The following null hypotheses were formulated and tested at 0.05 level of significant.

H₀₁: There is no significance difference between JSCE and NECO-SSCE result in Mathematics across gender.
H₀₂: There is no significance relationship between JSCE and NECO-SSCE result in Mathematics for all students.

Methodology
An Expo-facto design was used in this study. The population of the study comprises of 21487, consisting of 14,347 males and 7,140 females. Purposive sampling techniques was used to sampled 26 public secondary school across the six senatorial districts in the state, because these are the only schools that run both JSS and SS classes and took JSSE and SSCE in mathematics in the year 2013 and 2015. Two schools were selected from each senatorial zone after which proportionate stratified random sampling was used to select results of 378 students. This is in accordance with the research advisors (2006) table for determining sample size. An adopted proforma was used for the data collection which was done directly from the school examination officer with the permission of the school principals. The data obtained was analysed using t-test and Pearson Product Moment Correlation (PPMC)
Results
The results of data analysis are presented below:

**Table 1:** \( H_01 \): There is no significance difference between JSCE 2013 and NECO-SSCE 2015 result in Mathematics across gender.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Gender</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>t – test</th>
<th>df</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>JSCE Maths.</td>
<td>Male</td>
<td>253</td>
<td>2.62</td>
<td>0.563</td>
<td>0.799</td>
<td>376</td>
<td>0.893</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>125</td>
<td>2.57</td>
<td>0.544</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SSCE Maths.</td>
<td>Male</td>
<td>253</td>
<td>1.74</td>
<td>0.458</td>
<td>0.474</td>
<td>376</td>
<td>0.379</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>125</td>
<td>1.72</td>
<td>0.468</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\( \alpha = 0.05, p > 0.05 \)

From the table 1 above, the result indicated that the JSCE mean for male = 2.62 and female = 2.57, SD = 0.563 and SSCE male = 1.74 and female = 1.72, with SD = 0.474 respectively. However, the difference of the mean scores of both JSCE and SSCE is not significant \( (t_{(376)} = 0.799, p > 0.05) \) and \( (t_{(376)} = 0.474, p > 0.05) \). In this case, the null hypothesis was accepted for both the examination therefore, equal variance assumed for all the groups.

**Table 2:** \( H_02 \): there is no significance relationship between JSCE and NECO-SSCE result in Mathematics for all students.

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>Std Deviation</th>
<th>r</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>JSCE Math.</td>
<td>378</td>
<td>2.60</td>
<td>0.556</td>
<td>0.307**</td>
<td>0.001</td>
</tr>
<tr>
<td>Pearson Correlations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SSCE Math.</td>
<td></td>
<td>1.73</td>
<td>0.461</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).**

The table 2 above shows Pearson correlation of JSCE and SSCE mathematics \( r = 0.307^{**} \) at \( p = 0.001 \). This indicated a perfect significant at \( p < 0.01 \). Therefore, null hypothesis was rejected. Meaning there is a relationship between JSCE and NECO-SSCE in mathematics result for all students.

**Discussion of Findings**
The finding of hypothesis one established that there is no significant relationship between the JSCE and NECO-SSCE scores in Mathematics across gender. This finding corresponds with the finding done by Faleyie and Afolabi (2005) on the Predictive validity of Osun State Junior Secondary certificate examinations with the population of 1220 and a sample of 505 using
proforma as an instrument for data collection, revealed that osun state JSCE was a poor predictor of students` performance in the SSCE. It`s also agreed with the finding revealed by Olupemi, (2014), On relationship between continuous assessment and junior school certificate examination mathematics scores in Ekiti state with the sample of 80 students and found out that there was no significant relationship between JSSCAS and JSS ST for male and female students where he suggested that teacher made test used for continuous assessment should be made to pass through the processes of standardization and validation. The hypothesis two revealed that there is significant relationship between JSCE and NECO-SSCE result in Mathematics for all the students. This finding was in accord with the findings by Adeyemi (2008), Osadebe (2003), Ugwada and Abonyi (2010), and Orubu (2013) whereby all of them showed significant relationship between JSCE and SSCE result.

Conclusion
The study concluded that there is no significant difference between students` performance in JSCE and NECO-SSCE in mathematics for male and female and there is relationship between JSCE and NECO-SSCE result in Mathematics for all students. This implies that a success in JSCE can lead to success in SSCE with a good monitoring by the school management and teachers have a lion share for the success.

Recommendations
Based on the findings of the study, the following recommendations were suggested:

1. Experience teachers to handle the teaching of JSS classes and teachers with experience on SSCE marking to be involved in teaching SSS3 classes.
2. Parents should show greater interest on the academic work / progress of their children or wards in order to assist them overcome observed learning difficulties in the core subjects. As well extra mural lessons should be organized for the children.

References
Olupemi, (2014). Relationship between continuous assessment and junior school certificate examination mathematics scores in Ekiti state. *International Journal of Liberal Arts and Social Science.* 2(6)54-64


