

ENGLISH LANGUAGE AND MATHEMATICS MOCK EXAMINATION RESULTS AS PREDICTORS OF PERFORMANCE IN SENIOR SCHOOL CERTIFICATE EXAMINATION CHEMISTRY IN IBADAN, OYO STATE, NIGERIA

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Abstract

This study investigated whether the performance of students in SSCE Chemistry could be predicted from their grades in English Language and Mathematics Mock examination results. Four research null hypotheses were generated to guide the study. The study employed descriptive research of ex-post-facto design. Five Secondary Schools were purposively selected from Ibadan, Oyo state, Nigeria. A total of 225 2020/2021SSS3Chemistry students that sat for English Language and Mathematics SSS3mock examination in 2020/2021 academic session were involved in the selected public secondary schools. Data collected were analysed using Pearson product moment correlation. The four null hypotheses were tested at 0.05 level of significance. Results of the analysis indicated that performance of students in Mathematics could be used to predict results of SSCE Chemistry; it was however found that results in English Language had low predictive values for performance in Chemistry. Based on the findings of the study, it was therefore recommended among others that credit pass in English Language should not be made mandatory for students seeking admission for science.

Keywords: Performance, Mock examination, Predictive, Ex-post facto, Correlation

Introduction

Examinations in Nigeria school dated back to the advent of formal education. The 1987 Education ordinance made provision for public examinations in schools. The National Policy on Education stipulated that all senior secondary schools should gear their programmes to meet the requirements of senior school certificate examinations. Examinations occupy a unique position as a measure of quality within the educational system. They are either internal or public. Internal examinations are the examinations that are set by teachers within the system like mock examinations; public examinations on the other hand, are the examinations that are conducted by recognized examining bodies. As such, the examinations such as the junior secondary school certificate examinations, senior secondary school two (SSS 2) unified examinations conducted by the state ministry of education and senior secondary school certificate examinations are regarded as external examinations. The senior secondary school mock examinations are pre-requisite examinations for the Senior School Certificate Examinations.

The mock examinations are conducted to SSS3 students after the students might have completed the secondary school curriculum before they write their senior school certificate examination. These students are expected to have possessed the abilities to cope effectively with the academic challenges. A student that performs brilliantly in the English Language and Mathematics mock examinations will give a sight to both institution and the parents that the students will have the ability to cope and also perform brilliantly in the senior school certificate examination in Chemistry.

However, despite the unique position of examination in the educational system, there have been conflicting reports on the predictive validity of secondary school mock examination for students' performance in SSCE Researchers in English Language (such as Adewale (2002), Ayodele and Iwalola

(2017) and Gabriel, (2020) have shown that the performances of students in the English Language are fast deteriorating, in a corresponding manner to their level of achievement in formal education. Some researchers such as Asaoye (2003), Adesoji (1999), Salewa (2000) and Omoniyi (2022) have also asserted that abilities in English Language do influence knowledge of students in other subjects in curriculum. Some educational researchers such as Akinlade (2008) and Donald (2011) have even advocated for the cancellation of the mock examination on the ground that its predictive value is in doubt. Physical science like Chemistry cannot do without Mathematics. Many of the expression used in these subjects are borrowed from Mathematics. According to Ale (1981) and James (2012), a lot of evidence shows a strong association between Mathematics and development of science and technology. Adesoji (1999) is of the opinion that the bedrock of the Physical sciences such as Chemistry and Physics is Mathematics.

It could be observed from the above reports that English Language and Mathematics do influence knowledge of students in other subjects in the curriculum. The focus of this paper is to find out whether ability of students in Chemistry could be predicted from their knowledge of English Language and Mathematics.

Theoretical Framework

Predictive validity is the degree to which variation in a predictor variable forecasts variation in another variable (criterion variable) (Olomolaye, 2004). This was also the view of Kerlinger (1973) when he declares that when one predicts success or failure of students from academic aptitude measures, one is concerned with predictive validity due to the empirical validity and criterion related validity. However, explicitly or implicitly it has a basis on theory. The two factor theory of trait organization based on statistical analysis test scores was developed by Spearman (1927). He based his theory on tests given to students in different school subjects. He found that correlation in every two subjects was always positive. This is because something is common to the performance in all subjects (Sidhu, 2005). Spearman named it as general factor or g factor. This theory maintained that all intellectual activities share a single common factor called the general factor or g factor. In addition, the theory postulated numerous specific activity. Positive correlation between any two functions or variables was attributed to the 'g' factor. The more highly the functions or variables were saturated with 'g' the higher would be the correlation between them. The presence of specifics, on the other hand, tended to lower the correlation between functions. Although two types of factors, general and specific are posited by this theory, it is only the single factor g that account for correlation.

Justification for the Adoption of the Theoretical Framework

The correlation model of two-factor theory involves the correlation between two variables, the independent (English Language and Mathematics mock examination results) and dependent (performance of students in SSCE Chemistry). The theory is based on tests given to students in different school subjects and the scores in every two subjects were correlated. This theory furnishes the only basis for prediction of individual's performance from one situation to the other. Likewise, this study involves the correlation between the examination grades of every two selected subjects. It also involves the prediction of individual's in subsequent academic performance from one subject to the other. Following the common relationship between the theory and this study, the correlation model of two-factor theory was adopted.

Statement of the Problem

Mock examination is an index used in senior secondary school three (SSS3) to prepare students for senior school certificate examinations (SSCE). The examination is done after the completion of the secondary school syllabus and before SSCE. A student with good grades in English Language and

mathematics Mock examination is expected to obtain good grades in SSCE Chemistry. However, it is a common knowledge that performance in Chemistry as a Science subjects at SSCE level has been low for quite a long time despite the fact that these same students obtained acceptable grades in English Language and Mathematics at Mock examination. Nwadike (2019) report on quality assurance in public secondary schools: issues and concerns gave the breakdown to those who scored credit in chemistry in the May/June (2015-2019) West African Senior School Certificate. Examination (WASSCE) as 48.05% in 2019, 53.28% in 2018, 44.54% in 2017, 42.67% in 2016 and 43.48% in 2015, while those who failed were given as 25.42% in 2019, 26.71% in 2018, 34.12% in 2017, 39.28% in 2016 and 36.67% in 2015. There is need to have a clear picture of how English Language and Mathematics mock examinations are related to SSCE Chemistry. This touches on the predictive validity of English Language and Mathematics Mock on academic performance of students in SSCE Chemistry.

Purpose of the Study

The study was designed to investigate the effectiveness of the performance of students in English Language and Mathematics mock examination results in predicting the performance of the same students in the senior school certificate examination (SSCE) in Chemistry. The study was specifically designed to determine.

the relationship between students' performance in English Language mock examination and WAEC SSCE Chemistry.

the relationship between students' performance in Mathematics mock examination and WAEC SSCE Chemistry.

the relationship between students' performance in English Language mock examination and NECO SSCE Chemistry.

the relationship between students' performance in Mathematics mock examination and NECO SSCE Chemistry.

Research Hypotheses

The following null-hypotheses were generated

Ho1: There is no significant relationship between students' performance in English language mock examination and WAEC SSCE Chemistry

Ho2: There is no significant relationship between students' performance in Mathematics mock examination and WAEC SSCE Chemistry.

H03: There is no significant relationship between students' performance in English Language mock examination and NECO SSCE Chemistry.

H04: There is no significant relationship between student's performance in Mathematics mock examination and NECO SSCE Chemistry.

Delimitation of the Study

The study was delimited to the relationship between students' performance in English Language and Mathematics mock examination scores and their performance at the WAEC / NECO SSCE Chemistry. The study was delimited to public secondary schools in Ibadan, Oyo State. It made use of 2020/2021 academic session SSS3 Chemistry students that sat for English Language and Mathematics mock examination and WAEC / NECO SSCE Chemistry. It was delimited to Chemistry as a science subject in secondary schools.

Methodology

The research design employed in the study was ex-post-facto design, as the researcher did not have direct control on the independent variables, since their manifestation had already occurred.

The study population comprised of all 2020/2021 SSS3 students that sat for both English language and

Mathematics mock examination and SSCE Chemistry in Ibadan, Oyo State, Nigeria. The sample for this study was 255 Chemistry students from public secondary schools that sat for 2020/2021 SSS3 mock examination in English Language and Mathematics and also sat for 2020/2021 WAEC and NECO SSCE Chemistry. Five schools were involved in the study. Five secondary schools were selected using purposive sampling technique. These schools were the top five oldest public schools, with laboratories and libraries that have been presenting students for WASSCE for over 25 years. All 2020/2021 SSS3 Chemistry students sat for English Language and Mathematics mock examination and the same student that sat for 2020/2021 WAEC and NECO SSCE Chemistry were involved in the selected five public secondary schools.

An inventory titled “students SSS3 mock examination and SSCE academic performance proforma” was used to collect relevant data for the study. The Proforma consisted of items that captured information about the students. The items included students’ scores in English Language and Mathematics for 2020/2021 SSS3 mock examination as well as students’ score in Chemistry in the 2020/2021 WAEC and NECO SSCE. The scores for SSS3 mock examination in English Language and Mathematics as well as scores for WAEC and NECO SSCE in Chemistry were collected in grades. The pattern of grading students in SSS3 mock examination and WAEC / NECO SSCE are such that the distinction grade is represented by B3 to A1 (65-100). The credit grade is represented by C6-C4 (50-64). The ordinary pass grade is represented by E8-D7 (40-49) and the failure grade is represented by F9 (0-39) (Fakeye, 2005). For the purpose of scoring, therefore, SSS3 mock examination and SSCE grade of (B3-A1), (C6-C4), (E8-D7) and F9 were awarded 3, 2, 1 and 0 respectively.

The collection of data for the study was made by the researcher who went around the selected schools to collect the final senior school certificate in Chemistry in the 2020/2021 academic session and their SSS3 mock examination results in English Language and Mathematics. Data collected were analyzed using Pearson produce moment correlation analysis.

Results

H01: There is no significant relationship between students’ performance in English Language mock examination and SSCE Chemistry.

In testing this hypothesis, data on the grades obtained by students in English Language in 2020/2021 SSS3 mock examination and 2021/2021 WAEC and NECO SSCE Chemistry were collected from the principals of the sampled schools. The hypothesis was tested using Pearson Product Moment Correlation analysis. The findings are shown in Table 1

Table 1: Performance in English Language SSS3 Mock Examination and WAEC SSCE Chemistry

Variable	N	Mean	SD	Df	r cal	r tab
Performance in English language at mock examination	255	0.45	0.13	253	0.06	0.1946
Performance in WAEC SSCE Chemistry	255	0.34	0.06			

In table 1, the calculated r (0.06) was less than the table value (0.1946). Hence, the null hypothesis was not rejected. This shows that there was no significant relationship between students’ performance in English Language mock examination and WAEC SSCE Chemistry.

H02: There is no significant relationship between students’ performance in Mathematics mock examination and WAEC SSCE Chemistry.

Testing this hypothesis, data on the grade obtained by students in Mathematics

mockexaminationsin2020/2021 session and 2020/2021 WAECSSCE Chemistry were collected from the principals of the sampled schools. The hypothesis was tested using Pearson Product Moment Correlation analysis. The findings are shown in table 2.

Table 2: Performance in Mathematics SSS3 Mock Examination and SSCE Chemistry

Variable	N	Mean	SD	df	r cal	r tab
Performance in English language at mock examination	255	0.59	0.22	253	0.64	0.1946
Performance in WAECSSCE Chemistry	255	0.54	0.18			

$P < 0.05$

In table 2, the calculated r (0.64) was greater than the table value (0.1964). Hence, the null hypothesis was rejected. This indicates a significant relationship between students' performance in Mathematics SS2 unified examinations and SSCE Chemistry

H03: There is no significant relationship between students' performance in English Language mock examination and NECO SSCE Chemistry.

Testing this hypothesis, data on the grade obtained by student in English Language Mock examination in 2020/2021 session and 2020/2021 NECO SSCE Chemistry were collected from the principals of the sampled schools. The hypothesis was tested using Pearson product moment correlation analysis. The findings are show in table 3.

Table 3: Performance in English Language Mock Examination and NECOSSCE Chemistry.

Variable	N	Mean	SD	df	r cal	r tab
Performance in English language and mock examination	255	0.41	0.18	253	0.08	0.1946
Performance in NECO SSCE Chemistry	255	0.32	0.09			

In table 3, the calculated value, $r = 0.08$ was less than the table value, $r = 0.1946$. Therefore, the null-hypothesis was not rejected. This shows that there was no significant relationship between students' performance in English Language mock examination and NECO SSCE Chemistry.

H04: There is no significant relationship between students' performance in Mathematics mock examination and NECO SSCE Chemistry.

In testing the hypothesis data on the grades obtained by students in Mathematics 2020/2021 SSS3 mock examination and 2020/2021 NECO SSCE Chemistry were collected from the principals of the sampled schools. The finding are shows in table4

Table 4: Performance in Mathematics Mock Examination and NECO SSCE Chemistry

Variable	N	Mean	SD	Df	r cal	r tab
Performance in English language at mock examination	255	0.54	0.19	253	0.58	0.1946
Performance in NECO SSCE Chemistry	255	0.51	0.17			

$P < 0.05$

In table 4, the calculated value, $r = 0.58$ was greater than the table value, $r = 0.1946$. Therefore, the

null-hypothesis was rejected. This indicates a significant relationship between students' performance in Mathematics mock examination and NECO SSCE Chemistry.

Discussion

Hypothesis one / hypothesis three revealed no significant relationship between students' performance in English Language mock examination and WAEC/NECO SSCE Chemistry. This was in consonance with the findings of Adewale (2002) Ayodele and Iwalola (2017) and Gabriel (2020) who have shown that performances of students in English Language are fast deteriorating in a corresponding manner to their level of achievement in formal education. Results in English Language were found to be irrelevant as far as predicting students' results in Chemistry is concerned. The findings have challenged the undue emphasis we lay on English language for opting for courses in area of science students to get a credit pass in English Language at the SSCE before they are admitted for science and related courses in higher institutions of learning.

Hypothesis two / hypothesis four showed significant relationship between students' performance in Mathematics mock examination and WAEC /NECO SSCE Chemistry. This was in agreement with the findings of Ale (1991) and James (2012) who showed a strong association between Mathematics and development of Science and Technology and Adesoji (1999) who was of the opinion that the bedrock of Physical Science like Chemistry is Mathematics. The findings of this study indicated that results of students in Mathematics could be used to predict their results in Chemistry. It is a well-known fact that Mathematics is very useful for understanding of Physical Science such as Chemistry. It should be realized that scientific facts and principle do not require the knowledge of laws governing grammar before one could understand them. Mathematics is an essential ingredient for Chemistry.

Conclusion

The findings of this study revealed no statistical significant relationship between the students' performance in English Language mock examinations and SSCE Chemistry but revealed significant relationship between the students' performance in Mathematics mock examination and SSCE Chemistry. This implies that results in English Language were found to be irrelevant as far as predicting students' results in Chemistry is concerned while results of students in Mathematics could be used to predict their result in Chemistry.

Recommendations

Based on the findings, the following recommendations were made

It should not be mandatory for science students to get a credit pass in English language at SSCE before they are admitted for science and related courses in higher institutions of learning.

Teachers on Mathematics should be more encouraged by the government concerning the teaching of the subject by sponsoring them for workshops and seminars.

Government should let the Mathematics teachers and students aware of the importance of Mathematics to science and consequently for technological development of the nation.

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