

Mock Examination Scores as Predictors of Students' Performance in Senior Certificate Examinations in Mathematics and Physics in Akwa Ibom State, Nigeria.

Roseline Ekim Dick Ekim (Mrs)
Federal Government Girls College, Ikot Obio Itong, Mkpato Enin L.G.A.
P.M.B. 5003
Akwa Ibom State, Nigeria
roseline2014godwinhf@gmail.com

&
Orluwene, Goodness W. (Ph.D.)
Department of Educational Psychology, Guidance and Counselling
Faculty of Education
University of Port Harcourt
Port Harcourt
goodness.orluwene@uniport.edu.ng

Abstract

Mock examination is a school-based examination. The results of the examination inform students on their relative performance to an external examination like SSCE. Therefore, the study investigated mock examination scores in predicting students' SSCE performance in mathematics and physics. The study was carried out using 688 senior secondary 3 students in the three Federal Government Colleges in Akwa-Ibom State of Nigeria by purposive sampling method. Two research questions and two null hypotheses guided the conduct of the study. Data collected on students' mathematics and physics scores in mock and senior school certificate examinations (SSCE) were analysed using simple linear regression. The results revealed that students' mathematics scores in mock significantly predict their scores in mathematics SSCE while physics mock results had insignificant predictions for physics SSCE result. Based on the results it was recommended that mock examination could be used in predicting mathematics SSCE

Keywords: Mock examination scores, senior certificate examination, Akwa Ibom State

Introduction

Education is the bed rock of a nation's progress and sustenance. It is universally recognized as one of the most fundamental building blocks for human development and poverty reduction. It is the key to attaining the millennium development goals. According to Ogunkoya (1988) and Ogunsanya (2004), education has, become a vital and crucial tool needed for the formation of minds from childhood to adulthood in a designed environment called school where learning and acquisition of skills can take place for the total development of each

individual, society and the nation at large. To Ezekoli (1999), education is an essential tool for individual, social and technological development.

Most individuals and nations of the world view education in different ways. To some, it is for work while for some it is as a profession among others. As this will enable one to get white collar jobs and as it addresses the central problem that arises when work becomes separated from formal education, making it difficult for pupils to make the transitions from one environment to another. Nigeria in her educational policy (NPE) regard it as an “instrument for excellence” for effecting national development (Federal Republic of Nigeria (FRN), 2004).

In this light, there was need for the introduction of examinations in our educational system, although the concept of its existence is said to be as old as man. Examinations are used to identify and define those adjudged suitable to proceed to the next stages of education, Ojerinde (1994). According to Maduabum and Maduabum (1998), it is an indispensable instrument in educational enterprises. They further stated that examination serves as a tool for providing accountability of educational outcome and a basis for successive improvement of educational programmes. Asuru (2008) pointed out that the basic role of examination is to generate data for promotion, certification, selection, prediction, monitoring of standards, instructional/ motivational aids and research.

It is also seen as a yardstick for academic status upliftment, while some see it as an organized assessment technique which presents the individual with a series of questions or tasks geared toward ascertaining the individual’s acquired skills and knowledge content, and ability to utilize these knowledge and acquired skills effectively. On these roles, Oguche (1988) included that Nigeria among many other countries of the world that strongly believed in the use of examination as the most reliable instrument for measuring learning achievement at all levels of her education.

This calls for the improvement of examinations for a better result, since it helps to evaluate the level to which educational objectives would be achieved. This idea brought about the establishment of different examination bodies among which are West African Examinations council (WAEC) and National Examination Council (NECO) in 1952 and 1999 respectively, other than the original teacher- made test. However, the methods of examinations have been changing from one age to the other, probably as a conscious move to make the system of examination serve the needs of the age and society more effectively. This led the Federal Government of Nigeria to embrace the conduct of external examination for students in the last tier of their studies- JSS 3 and SSS 3 and certified them. Thus, West African senior secondary certificate examination (WASSCE/SSCE) in the senior school and certificate examination (JSCE) in the junior school was brought to existence in line with the new policy of education (6-3-3-4) system.

Despite the importance of examination, students' achievement in these examinations had been unfavourable in most cases. Considerable research efforts have been expanded in recent years on problems connected with poor achievement of learners at the ordinary level. Among these researchers are; Adepoju (2009), Kolawole (2003), Ayodele (2002), Adegbite (1999), Ubahakwe (1988), Obemeata (1985), This dwindling abilities called for an education summit to rectify the situation. It is this search for a solution that brought to the fore, the question of the relevance of mock examinations and post unified tertiary matriculation examinations (UTME) screening exercises for those that intend to study further in higher institutions.

Mock is a fake examination that doesn't count for a grade, but usually done for the purpose of studying in other to see how one would perform on the real examination. It gives one a better idea about what to study harder (Effiom, 2004). To Ale (2002), mock examinations are teacher made tests prepared by the school teachers and administered to students towards the

end of the second term when those classes are supposed to have covered their examinations syllabi. This is done based on the fact that, mock examinations promote success in further examinations and as such, it is regarded as reasonable and expedient.

However, some administrators, organizers and instructors see mock examination as diagnostic and prognostic in nature. This to them is because, it aims at revealing the academic competence, preparedness, strengths and weakness, orderly presentation of materials and ability to communicate effectively and intelligently (WAEC Annual Report, 1980). However, based on its relevance, mock examinations should be designed to have more relevance to Nigerian situation (Omolewa, 1981).

These examinations are not only confined to Nigeria, but also too many other countries in the world, whether developing or developed. This is as a result of the high turn-out failure rate in ordinary level certificate examinations (O'level). These have undesirable effects on the learners and their families. The failure, also generate a feeling of helplessness (Ayodele, 2002), and loss of self-esteem (Adepoju, 2009), as well as a level of frustration that is soul harrowing (Obemeata, 1985), sometimes a catalogue of failures could also culminate in a situation of self-procured demise (Majamsam & Bakare, 1994).

Hence, the study, "mock examination scores as a predictor of students' performance in senior certificate examinations" becomes necessary in Federal Government colleges in Akwa Ibom State. The emphasis placed on mock examinations in Federal Government colleges also provided the impetus or a driving force for the study of this nature. This study tries to establish the link between the grades of students in the mock and ordinary level certificate examination.

Despite the unique position of examination in our educational system, it was discovered that more than 32% of the students who enrolled for senior secondary certificate examinations (SSCE) in the last five years had failed grades (Federal ministry of education SSCE, 2009 results analysis). This failure generates much concern even at international level and in Nigeria

where there is a persistent poor performance of students in examinations despite the myriad policies and research efforts to enhance students' performance. In the course of these, some researchers have been having some conflicting findings on the predictive strength of science mock grades at predicting performance in senior secondary certificate examinations. Some argue that a good academic achievement in mock examinations would produce better senior secondary certificate examination performance, while others are of the opposite opinion. The problem of this study posed as research questions is; how significantly would science mock grades predict performance of students in senior secondary certificate examinations?

The purpose of this study was to; investigate the extent to which Mathematics and Physics mock scores could predict the performance of the students in the senior secondary certificate examination (Mathematics and Physics). To achieve these, the following research questions were stated.

- To what extent do students' mathematics mock scores predict their SSCE scores in Mathematics?
- To what extent do students' Physics mock scores predict their SSCE scores in Physics?

To further achieve the objectives of this study, the following null hypotheses were generated and tested at .05 level of significance.

- Students' mock scores in Mathematics do not significantly predict their SSCE scores in Mathematics.
- Students' mock scores in Physics do not significantly predict their SSCE scores in Physics.

Methodology

The research design adopted for this study is a correlational one by simple prediction design. It was carried out in the three Federal Government colleges in Akwa Ibom State. The population of the study consisted of six hundred and eighty eight (688) science students who

sat for Mathematics and Physics senior certificate examination in 2012/2013 school year and mock of the same year from the three (3) Federal Government colleges in Akwa Ibom State. The researchers used the entire population for the study. Thus, the sample size was six hundred and eighty eight (688) where 283, 210 and 195 students respectively were from Federal Government College, Ikot Ekpene, Ikot Ekpene L.G.A. Federal Government Girls' College, Ikot Obio Itong, Mkpata Enin L.G.A. and Federal Government Technical College, Uyo, Uyo L.G.A. by purposive sampling method?

These data were collected from the school statistics departments (vice principal academic office) of the colleges. The researcher made use of the mock scores and senior secondary certificate examination results for 2011/2012 academic year. These results were given in grades; A₁, B₂, B₃, C₄, C₅, C₆, D₇, E₈ and F₉ which were later changed to raw scores by calculating the mid-grade scores for each grade level in each of the examinations in the respective colleges (see Table 1).

Table 1

Conversion of letter Grades to Raw Scores

Students' grade	Scores interval	Calculation	Raw score
A ₁	75-100	$\frac{75 + 100}{2}$	88
B ₂	70-74	$\frac{70 + 74}{2}$	72
B ₃	65-69	$\frac{65 + 69}{2}$	67
C ₄	60-64	$\frac{60 + 64}{2}$	62
C ₅	55-59	$\frac{55 + 59}{2}$	57
C ₆	50-54	$\frac{50 + 54}{2}$	52
D ₇	45-49	$\frac{45 + 49}{2}$	47

E_8	40-44	$\frac{40 + 44}{2}$	42
F_9	0-39	$\frac{0 + 39}{2}$	20

The method of data analysis the researcher employed here was a simple linear regression which involved SSCE scores as dependent variable and mock scores as independent variable. While to test the significance of each of the hypotheses at .05 alpha level, the analysis of variance (ANOVA) and t-test associated with the simple linear regression were used.

Results

The result of the data analysis for research question 1 and its corresponding null hypothesis 1 were given in tables 2, 3, and 4

Table 2

Summary Model of Simple Regression of Students' Scores in Mathematics.

Variables	n	Mean	SD	R	R ²	Adjusted R ²	Standard error of estimate
SSCE scores	688	57.23	11.18	.383	.147	.146	10.329
Mock scores		52.30	7.59				

Table 2 shows the answer to the research question and its corresponding null hypothesis using simple linear regression. The table revealed that the mean score obtained in SSCE and mock in Mathematics are 57.23 and 52.30 respectively. A simple regression coefficient R of .383, R² of .147 and adjusted R² of .146 were obtained. This implies that mathematics mock examination scores can only predict about 14.7% of the variations in SSCE in mathematics. To determine the significance of the prediction of SSCE mathematics scores by mathematics mock scores, result of ANOVA table was used as shown in Table 3.

Table 3

Summary of ANOVA for Regression of SSCE Scores on Mock Scores (Mathematics)

Model	Squares	df	Mean square	F	Sig.
Regression	12692.602	1	12605.602	118.15	.000
Residual	73189.571	686			
Total	85795.173	687	106.690		

Table 3 reveals that, F-value 118.151 was significant at .05 level. This is because, the associated alpha level (.000) is less than the chosen 0.05 level of probability. Thus, the null hypothesis is rejected. This gives an implication that mathematics mock examination results predicts significantly SSCE mathematics results. To solidify this confirmation, the beta-value and associated t-value were also computed in Tables 4.

Table 4

Standardized and Unstandardized Coefficients

Model	Unstandardized coefficient		Standard coefficient		
	b-weight	Std. error	Beta	t	sig
Constant	27.696	2.742	.383	10.088	.000
Mock	.565	5052		10.870	.000

From Table 4, the beta value (the relative influence of performance in mathematics in SSCE Mathematics) is 0.383 and its associated t-value (10.87) was significant at .05 level. Thus, it means that mathematics mock scores is a good predictor of SSCE mathematics scores. The regression equation for SSCE mathematics was $y^1 = 27.696 + .565x$, where x is the raw score for each candidate in mathematics mock and y^1 is the predicted SSCE mathematics score.

In order to answer the research question two (2) and test its corresponding hypothesis, the data collected (Physics mock scores and SSCE Physics score) were subjected to simple linear regression. The results obtained are summarized and presented in Table 5.

Table 5

Summary Model of Simple Regression of Students Scores in SSCE Physics Scores on Mock Physics Score.

Score	n	Mean	SD	R	R ²	Adjusted R ²	Standard error of estimate
SSCE scores		61.66	8.71				
Mock scores	688	52.19	6.28	.057	.003	.002	8.70

Table 5 reflects that the mean scores are; 61.66 and 52.19 for SSCE and mock physics respectively. The simple linear regression yielded a coefficient of 0.057, R² of 0.003 and the adjusted R of 0.002. This tells us that only 0.3% of the variance can be explained by performance in Physics mock while about 99.7% of the variance Physics SSCE scores cannot be explained by Physics mock scores.

To determine the level of significance, of Physics mock scores as a predictor of students Physics performance in SSCE, ANOVA table was used. These results are presented in Table 6.

Table 6

Summary of ANOVA for Regression of SSCE Physics Scores on Physics Mock Scores.

Source of variance	Sun of squares	df	Mean	F	Sig
Regression	168.588	1	168.588		
Residual	51923.179	686		2.227	.136
Total	52091.767	687	75.690		

Table 6 reveals, the f-value is seen to be 2.227 which is significant at 0.136 level and greater than the chosen .05 probability level ($p > .05$). At this point, the null hypothesis is

accepted. That is, students' Physics mock scores did not significantly predict the SSCE Physics scores.

Further investigation was done on prediction of Physics mock in SSCE Physics through beta value and its associated t-values. The results are given below in Table 7.

Table 7

Beta-value and Associated t-Value for Prediction of SSCE Physics Scores Using Mock Physics Scores.

	Unstandardized coefficient		Standard coefficient		
	b-weight	Std. error	Beta	t	Sig
Constant	57.548	2.742	.057	20.725	.000
Physics Mock	.079	.053		1.492	.136

Table 7 reveals clearly that the Beta value was 0.057 and its associated t-value 1.492 which was significant at 0.136 which is greater than the chosen 0.05 probability level ($p > .05$). Therefore, the t-value obtained also indicate that Physics mock scores did not significantly predicted SSCE Physics scores. The regression equation for Physics is $y^1 = .079x - 57.548$, where x is the raw score for each candidate in Physics mock. While y^1 is the predicted SSCE Physics score.

Discussion

Prediction of SSCE mathematics score on mock mathematics score

The result of the study in table 2, yielded a simple linear regression coefficient R of .383 and R^2 of .147. The ANOVA computed in table 4 indicated that the f-value of 118.151 was significant at .05 level the associated p-value of .000 is less than the .05 probability level ($p < 0.05$) adopted for the study with this result, the null hypothesis was rejected. However, Yoloye (1983) in Okwilagwugwi (2004) had a contrary view in his findings and reported a low

correlation between UME (UTME) scores and students' future performance. This finding of the present study may be attributed to the fact that it was only mathematics that was involved in the dependent and independent variable. Again it could be that the content areas covered in both examinations did not differ much from each other.

Prediction of SSCE physics score on physics mock scores

The linear regression result analysis for Physics scores recorded a simple regression, R of 0.057 and R^2 of .003 (Table 5). From this result, the computed ANOVA in table 6 showed f -value 2.227 was not significant. This implies that, students' Physics mock scores do not significantly predict their Physics SSCE scores. The relative influence (Beta value) of 0.057 was not significant based on its t -value of 1.472 which the calculated p -value of 0.136 was greater than .05, the chosen probability level.

The percentage (%) of association ($R^2 \times 100$) was found to be 0.3% and the coefficient of alienation $\sqrt{1-r^2}$ which represent the degree of lack of association between the two variables was found to 0.984. The percentage of error of prediction ($1-r^2$) of the candidate's performance in SSCE Physics by their performance in Physics mock was given as 99.7%. This implies that, only 0.3% of variance in SSEC could be accounted for while 99.7% cannot be explained by mock examinations performance thus showing a low predicting strength.

Contrary to the low predicting strength of physics mock over SSCE physics score is the study of Adesoji (2008), who found out a high significant predictive strength between the results of students in mathematics with their physics results. These controversies in the findings may be due to the variance in the variable of study, location, and the examination conditions that students found themselves and so on.

The current finding is also in agreement with the work of Nzewunwa and Osaat (2006) who in their study UME (UTME) as a predictor to PUME (PUTME) students' scores in

Faculties of sciences, health sciences and Engineering in University of Port Harcourt revealed significant differences between UME (UTME) and PUME (PUTME) scores, they concluded that the UME (UTME) scores contributed very little to students' future performance. This implies that UME (UTME) scores did not predict students' academic performance (CGPA), while PUME (PUTME) scores predicted. However this poor prediction of mock physics scores could be attributed to inadequate internal psychometric properties of the physics mock questions. It could also be SSCE Physics was conducted under a controlled examination conditions, thus, minimized examination frauds among other reasons. Consequently, scores obtained from these examinations are true representative of students' performance.

Implications of the Study

This study reveals that mathematics mock scores is a significant predictor variable while Physics mock scores is not. The insignificant prediction of SSCE physics scores by mock physics score implies that;

- Physics mock scores could be inflated and this may not represent students; real performance. These inflated Physics mock results may lead to relaxation on the part of the candidates in their further study for the SSCE.
- Again that the test items in mock examinations do not possess adequate psychometric properties of a test when compared to that of SSCE.
- It could also be that mock examinations were not conducted under a controlled examination conditions giving room for examination irregularities such as examination malpractice.
- It may also imply that the students themselves do not prepare adequately for these examinations.

The significant prediction of mock examination scores on SSCE for mathematics implies that;

- Mock scores can be used by teachers, parents, counsellors, school administrators and students themselves to determine or predict the performance of the expected external examinations.
- It may also implies that the mock scores were truly significant.
- More so, may be both examinations, mock and SSCE were conducted properly by taking cognizance of examination ethics.

Conclusion

Based on the findings of the study, it was concluded that mock examinations could be good predictor of SSCE scores if given under good examination rules and conditions. Again, mock performance could be used to predict SSCE performance if the mock items undergo some levels of standardization. At the same time, physics mock scores could not predict the SSCE scores in physics. This could be as a result of some irregularities in the cause of mock examination preparations, which could be caused by the parents, teachers, government and the students themselves.

Recommendations

Based on the findings and implications of this study, the researchers made some recommendations as follows:

- Mock examinations especially in the Federal Government colleges should be properly supervised by the federal ministry of education and the examination bodies such as WAEC and NECO.
- Mock examinations should be allowed to undergo some proper standardization. This is to enable it have a perfect match with the SSCE for a better prediction.
- Time laps between mock examinations and SSCE should not be too long, may be, not more than three weeks for it to serve as test-wiseness.

- The government, principals, teachers, parents, students and every other organs of educational system such as examination bodies should join hand and comb out examination malpractice that has so much invaded into our educational system.

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