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Mathematics mock examination scores as predictor of junior secondary school students' academic achievement in BECE examination in Anambra State

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Abstract
Mock examinations are very helpful for students, as it help students to know how much they understand the concepts. The purpose of the study was to examine mathematics mock examination scores as predictor of junior secondary school students' academic achievement in BECE examination in Anambra State. Two research questions were answered and two hypotheses tested for the study. The correlation design was used in this study. The population for this study comprised all the 9,431 students who took BECE in 2021/2022 academic session in Anambra State. The sample for the study consisted of 500 students that were randomly sampled. Multi-stage sampling was used to obtain the sample for this study. Stratified sampling techniques were used to obtain four LGAs in Awka Education Zone. Then simple random sampling method was used to obtain five schools from each of the four LGAs giving a total of 20 schools. Then in each school, purposive sampling techniques were used to obtain 25 students, giving a total of 500 students. No instrument was developed for data collection as the existing academic records of the students in BECE and Mock on Mathematics were used. Simple linear regression was used to answer research questions as well as test the null hypotheses at 0.05 level of significance using SPSS software. Findings from the study revealed among others that there is a high positive relationship between junior secondary school students' mock examination scores and their BECE examination scores in Mathematics. It was recommended among others that mock examination preparation of students should be given more serious attention because of its predictive values on students' BECE scores.

Keywords: School students, mock examination, Anambra State, Awka Education Zone

Introduction

Examination is a test to show the knowledge and ability of a student. Examinations are used to identify and define those adjudged suitable to proceed to the next stages of education. As viewed by Merriam Webster (2021), an examination (exam or evaluation) or test is an educational assessment intended to measure a test-taker's knowledge, skill, aptitude, physical fitness, or classification in many other topics (e.g., beliefs). According to Maduabum (2018) [9], 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 and Longjohn (2018) [1] 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.

If there were no examinations, most students would have been less informed than they are today. Examinations compel students to read as much as they can, and as they do so, they absorb knowledge unconsciously. If examination is meant to prepare the students for life, there is the need for these students to prepare well for both internal (mock) and external examinations (Bosson-Amedenu, 2017) [2]. Mock examination is an examination, where the marks may or may not count, which serves chiefly as practice for future exams. As viewed by Collins Dictionary (2023) [4], mock examination is an examination taken as practice before an official examination in a school. Mock examination as a trial examination is formative, selective, predictive and diagnostic in nature. It is supposed to reveal how successful teacher's instructions have been mastered.

This mock examination being predictive in nature can be used for selection of students who will succeed in further academic endeavors. It also prepares the final year students (JSS3 and SS3) in readiness for the final examination (Ale in Bosson-Amedenu, 2017) [2]. Teachers rating (achievement and aptitude test scores) have been used to predict academic and occupational success. This is usually achieved by employing various instruments based on inferential statistics. Mock exam are very helpful for students, these exams help students to know how much they understand the concepts. Mock exams are for practicing, it gives an idea of how the real exam is going to be.

When students attempt such exam, they feel confident that now they know how the final exam is going to be, they learn how much time they have for every question, after getting the result of the mock exam, students can go through their mistakes, and improve them. Bosson-Amedenu, (2017) [2] continued that mock examinations are standardized tests prepared by ministry of education and administered to students prior to external examinations such as Basic Education Certificate Examination (BECE) usually when the syllabus for the said examination must have been covered. In support of the above assertion, Boke in Okonkwo and Agu (2022) [14] was of the view that mock exam was taken to mean a standardized exam that is jointly set, moderated, done, marked and analyzed at the district level by district exam panels. Mock examinations are administered to ascertain students' readiness for external examination such as Basic Education Certificate

Examination (BECE) and West African Examination Council (WAEC).

The national policy on education (FGN, 2013) defined basic education as that education that comprises 6 years of primary education and 3 years of junior secondary school education. The education is designed to run for 9 years, within these 9 years, the child is exposed to several subjects, the core subjects, the electives and the vocational or trade subjects. At the end of the 9-year education program, the students are assessed through the BECE. In April, 2011, the examination (BECE) replaced the formal, Junior Secondary Certificate Examination (JSCE). In Nigeria, BECE is administered by the state ministry of education in each state under the supervision of the National Examinations Council (NECO). NECO directly organizes examinations for Unity Schools, Armed Forces Secondary Schools and other Federal Government schools. Candidates in the third year of junior high schools approved by the Ghana Education Service are eligible for the examination, (Ojenride, 2011). The aim of this Basic Education Certificate Examination (BECE) is to inculcate relevant skills necessary for self-reliance, employment, or further studies in the senior secondary school.

As outlined by Esomonu and Onwuzuluike (2020) [5], the National Examination Council (NECO) and West African Examination Council through states' ministry of education conduct the BECE for all the federal government colleges (unity schools) and public secondary schools respectively including any other interested secondary schools. A candidate is expected to sit for minimum of ten subjects and a maximum of 14 subjects. A candidate is deemed to have passed the BECE, if he/she has six credit passes in six subjects including English language, one Nigerian Language and mathematics which is the bedrock of all sciences (Esomonu & Okoi, 2021) [13].

Mathematics is a science that studies numbers, shapes, objects and their properties which are needed as basic requirement for all sciences. Mathematics as discussed by Okoi and Esomonu (2021) [13] is a tool of basic sciences, such as physics, chemistry, biology, and even social sciences such as geography, economics, banking, and finance. The role of mathematics in physical and agricultural sciences, engineering, aircraft, computer, textile, industries, and weather forecasting are numerous. It is therefore very difficult to imagine a world without mathematics. Mathematics as a subject is relevant virtually in everyday activities of man. Both the educated and non-educated are faced with mathematics issues and manipulations as they run daily life activities. Supporting this view, Usman and Ojo (2014) [19] posited that the usefulness of mathematics extends to other fields of human endeavor such as politics, stock market, finance, and sports. This may be one of the reasons the managers of the Nigerian education system placed mathematics as one of the core subjects for students both in primary school (lower basic education), junior secondary (upper basic education) and the senior secondary education (post basic education). Credit pass in Mathematics is also one of the requirements for admission into many courses in Nigerian higher educational institutions.

Students who performed well in mock are expected to also perform well in BECE conducted by West African Examination Council (WAEC), National Examination Council (NECO) or National Business and Technical Examination Board (NABTEB) public examinations. A few studies have shown positive relationship between mock examination and BECE examinations. Madu and Ebere (2016) [8] investigated on the predictive validity of students' scores in mock senior school certificate examination on their scores in NECO external senior school certificate examination in 2010/2011 to 2013/2014 academic sessions in Umuohia Education Zone of Abia State. Oknu and Orum (2013) [12] conducted a study titled junior secondary school certificate examination (JSCE) results as predictors of students' performance in mathematics in senior secondary school certificate examination in Benue State. Ugwuola and Abonyi (2014) [18] carried out a study to determine the predictive validity of NECO junior secondary school certificate examination on student's performance in NECO senior certificate examination. Okoi and Esomonu (2020) [5] carried out a study on centralized secondary school examination, Basic Education Certificate Examination and mathematics test anxiety as predictors of students' achievement in Mathematics. In similar studies carried out by (Osadebe, 2010 [17], Orubu, 2013 [16], Onuka, Raji, & Onabamiro, 2010 [15], Chukwuma, 2010 [3], Karagöz & Rüzgar, 2020) [7] had similar findings. The studies reviewed thus far have shown that there are a lot of inconsistent findings on the relationship and prediction between students' mock examination scores and their BECE scores in mathematics. Most of such studies were limited to the nature and magnitude of such a relationship, using Pearson's product-moment correlation coefficient rather than regression analysis. Besides, most of them were carried out in a different exam bodies, subjects and location. These gaps in literature within the Nigerian context necessitated the current study. However, none of the afore-mentioned researchers, by way of empirical investigation, ascertained mathematics mock examination scores as predictor of junior secondary school students' academic achievement in BECE examination. This obvious gap necessitated the study on mathematics mock examination scores as predictor of junior secondary school students' academic achievement in BECE examination in Anambra State.

Research Questions

The following research questions guided the study

1. What is the relationship between mock examination scores and BECE examination scores in Mathematics?
2. How do students' mock examination scores predict their BECE examination scores in Mathematics?

Hypotheses

The following hypotheses were tested at 0.05 level of significance.

1. There is no significant relationship between students' mock examination scores and BECE examination scores in Mathematics.
2. The students' mock examination scores do not significantly predict their BECE examination scores in Mathematics.

Method

The correlation design was used in this study. This design is justified because it established the nature of relationship between the criterion variable (students' scores in BECE examination conducted by WAEC and NECO) and the predictor variable (students' scores in mock examination).

The population for this study comprised all the 9,431 students who took BECE in 2021/2022 academic session in Anambra State. The sample for the study consisted of 500 students that were randomly sampled. Multi-stage sampling was used to obtain the sample for this study. Stratified sampling techniques were used to obtain four LGAs in Awka Education Zone. Then simple random sampling method was used to obtain five schools from each of the four LGAs giving a total of 20 schools. Then in each school, purposive sampling techniques were used to obtain 25 students, giving a total of 500 students. No instrument was developed for data collection; the existing academic records of the students in BECE and Mock on Mathematics were used. The researcher collected the BECE scores in the Examination Development Center (EDC) of the ministry of education, Amawbia Anambra State, while the students' mock examination scores were collected from the respective Principals of the secondary schools sampled. Simple linear regression was used to answer research questions as well as test the null hypotheses at 0.05 level of significance using SPSS software.

Results and Discussion

Research Question 1: What is the relationship between mock examination scores and BECE examination scores in Mathematics?

Table 1: Relationship between Students' Mock Examination Scores and their BECE Examination Scores in Mathematics

Variables	N	Mock Examination	BECE Examination	Remark
Mock Examination	500	1	.763	High Positive Relationship
BECE Examination	500	.763	1	

Table 1 reveals that the correlation coefficient (r) between the junior secondary school students' mock examination scores and their BECE examination scores in Mathematics is 0.763. This shows that there is high positive relationship between junior secondary school students' mock examination scores and their BECE examination scores in Mathematics.

Research Question 2: How do students' mock examination scores predict their BECE examination scores in Mathematics?

Table 2: Regression Summary showing how Students' Mock Examination Scores Predict their BECE Examination Scores in Mathematics.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.917[a]	.841	.840	1.84522
a. Predictors: Scores in Mock Mathematics Examination Dependent variable: Scores in BECE Mathematics				

In Table 2, the predicted value of the students' BECE scores in Mathematics is 0.917. The coefficient of determination R-Square is 0.841. This shows that 84.1% of students' scores in BECE Mathematics can be predicted by their scores in mock examination.

Hypotheses

Hypothesis 1: There is no significant relationship between students' mock examination scores and BECE examination scores in Mathematics.

Table 3: Test of Significance of Relationship between Students' Mock Examination Scores and their BECE Examination Scores in Mathematics

Variables	N	Mock Examination	BECE Examination	Sig	Remark
Mock Examination	500	1	.763	0.00	Sig
BECE Examination	500	.763	1		

Table 3 shows Pearson's r of .763 for students' mock examination scores and BECE examination scores in Mathematics. The p-value is 0.00, testing at alpha level of 0.05. Here, the p-value (0.00) is less than the alpha level (0.05). Therefore, the null hypothesis is rejected. Consequently, there is significant relationship between students' mock examination scores and BECE examination scores in Mathematics.

Hypothesis 2: The students' mock examination scores do not significantly predict their BECE examination scores in Mathematics.

Table 4: Test of Significance of Regression Analysis and ANOVA between Students' Mock Examination Scores and their BECE Examination Scores in Mathematics

Model	R	R^2	Adjusted R^2		Std. Error of the Estimate
	.917[a]	.841	.840		1.84522
Model	Sum of squares	df	Mean Square	F	Sig
Regression	9240.347	1	9240.347	3591.181	.000
Residual	1026.653	499	2.573		
Total	10267.000[b]	500			

Table 4 showed that the amount of variation in students' BECE examination scores in mathematics due to their mock examination scores is significant, $F(1, 499) = 3591.181$, $p < .05$. The null hypothesis was rejected at $p < .05$. The Inference drawn was that the students' mock examination scores significantly predict their BECE examination scores in mathematics.

Discussion

Relationship between Students' Mock Examination Scores and their BECE Examination Scores in Mathematics

Table 1 reveals that the correlation coefficient (r) between the junior secondary school students' mock examination scores and their BECE examination scores in Mathematics is 0.763. This shows that there is high positive relationship between junior secondary school students' mock examination scores and their BECE examination scores in Mathematics. This finding is in agreement with the findings of Madu and Ebere (2016) [8] who found that students scores in mock senior school certificate examination has a correlation to their scores in NECO external senior school certificate examination. Also, the work is in consonant with the works of Karagöz & Rüzgar, (2020) who found out that there is a relationship between students' mock examination scores and their WAEC examination scores. The findings are in agreement with the findings of Chukwuma (2010) [3] who reported that there was a significant positive relationship between students' performance in BECE and SSCE in Igbo language subject. This finding shows that students who obtained acceptable scores in their mock examination in mathematics will as well obtain an acceptable score in BECE examination in mathematics. In other words, students whose mock examination scores in mathematics are poor will as well obtain poor scores in BECE examination in mathematics.

Regression Summary showing how Students' Mock Examination Scores Predict their BECE Examination Scores in Mathematics

In Table 2, the predicted value of the students' BECE scores in Mathematics is 0.917. The coefficient of determination R-Square is 0.841. This shows that 84.1% of students' scores in BECE Mathematics can be predicted by their scores in mock examination. The findings is in agreement with the findings of Madu and Ebere (2016) [8] where it was discovered that students' mock examination scores actually predicts their scores in WAEC examination in mathematics.

Significance of Relationship Analysis between Students' Mock Examination Scores and their BECE Examination Scores in Mathematics

Table 3 shows Pearson's r of .763 for students' mock examination scores and BECE examination scores in Mathematics. The p-value is 0.00, testing at alpha level of 0.05. Here, the p-value (0.00) is less than the alpha level (0.05). Therefore, the null hypothesis is rejected. Consequently, there is significant relationship between students' mock examination scores and BECE examination scores in Mathematics. In a similar study by Onuka, Raji and Onabamiro (2010) [15] 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 a similar vein, Orubu (2013) [16] found that students' grades in SSCE Mathematics were significantly predicted by their grades in BECE.

Significance of Regression Analysis between Students' Mock Examination Scores and their BECE Examination Scores in Mathematics

Table 4 showed that the amount of variation in students' BECE examination scores in mathematics due to their mock examination scores is significant, $F(1, 499) = 3591.181$, $p < .05$. The null hypothesis was rejected at $p < .05$. The inference drawn was that the students' mock examination scores significantly predict their BECE examination scores in mathematics. Osadebe (2010) [17] investigated the predictive validity of BECE scores in Mathematics and English for scores obtained at the SSCE in Delta State Nigeria, the results obtained showed positive and significant relationship between BECE and SSCE students' scores in Mathematics and English.

Conclusion

The study revealed that there is a significant relationship between students' mock examination scores and their BECE examination scores in mathematics. This might be attributed to the fact that mock examination questions are developed and standardized by the individual states' Ministry of Education on the basis of the syllabus developed for BECE. It is, therefore, necessary for the teachers, and other stakeholders to put all machinery on gear for proper teaching and learning in order to help candidates prepare for not only mock examinations, but also external examinations including BECE.

Recommendations

1. The government of Nigeria should strengthen Universal basic Education to improve achievement in senior secondary school since students' grades in mock examination predict their grades in BECE.
2. The study also recommends that mock examination preparation of students should be given more serious attention because of its predictive values on students' BECE scores.
3. Furthermore, the mock examination should be graded in stanine like SSCE to facilitate the relationship comparison of students' in the two examinations.

References

1. Asuru VA, Longjohn IT. UME scores as predictors of students' achievement in Post-James selection test in Rivers State College of Education. Trends Educ Stud (TRES),2018:3(1):115-120.
2. Bosson-Amedenu S. Predictive validity of mathematics mock examination results of senior and junior high school students' performance in WASSCE and BECE in Ghana. Asian Res J Math,2017:3(4):1-8.
3. Chukwu LO. Relationship among test anxiety, academic achievement and interest of senior secondary school students in geometry in Enugu State. Unpublished master's thesis, University of Nigeria, Nsukka, 2010.
4. Collins Dictionary. Mock examination. [Internet]. 2023 [cited 2024 Jan 4]. Available from: https://www.collinsdictionary.com/dictionary/english/mock-examination
5. Esomonu NPM, Onwuzuluike PO. Students' grades in Basic Education Certificate Examination as predictors of grades in West African Certificate Examination. Appl Sci Innov Res,2020:3(4):14-21.
6. Federal Republic of Nigeria. National policy on education. Lagos: NERDC Press, 2013.
7. Karagöz S, Rüzgar ME. The observations of student teachers in regard to professional qualifications of

advisor teachers during teaching practicum. Int J Educ Res Rev,2020:5(2):141-150.
8. Madu A, Ebere C. Predictive validity of mock senior school certificate examination on NECO senior secondary school certificate examination scores in agricultural science in Abia State. Int J Curr Res Acad Rev,2016:4(2):237-257.
9. Maduabum AC. Teaching-Learning Process in Public Primary Schools. Department of Educational Administration and Planning, University of Nairobi, Kenya, 2018.
10. Merriam Webster. Examination. [Internet]. 2021 [cited 2024 Jan 4]. Available from: https://www.merriamwebster.com/dictionary/examination
11. Ojerinde D. Examination malpractice-the NECO experience. A Faculty of Education Lecture Delivered at the Obafemi Awolowo University, Ile-Ife, 2011.
12. AI, Orum P. A comparative study of the predictive validities of students' performance at senior certificate States, Nigeria. Niger J Educ Res Eval,2013:14(3):181-190.
13. Okoi OA, Esomonu NM. Centralized secondary school examination, basic education certificate examination and mathematics test anxiety as predictors of students' achievement in mathematics. Int J Educ Res Rev,2021:6(3):235-239.
14. Okonkwo AB, Agu NN. Comparison of students' grades in mock examination and WASSCE in mathematics in Anambra State. South East J Res Sustainable Dev,2022:6(2):54-68.
15. Raji MAA, Onabamiro AT. The predictive power of junior secondary school achievement in Epe Local Government Area of Lagos state. [Internet]. 2010 [cited 2024 Jan 4]. Available from: http://ir.library.ui.edu.ng/handle/123456789/3009
16. Orubu MEN. UME and Post-UME scores as predictors of undergraduate academic performance in Delta State University. Nig J Educ Res Eval,2013:11(1):60-70.
17. Osadebe PU. Predictive validity of junior secondary certificate examination for senior secondary school. J Edu Res Dev,2010:2:183-189.
18. Ugwuola TO, Abonyi S. Predicting students' performance in senior secondary certificate examination from performance in junior secondary certificate examination in Ondo State, Nigeria. Humanity Soc Sci J,2016:3(1):26-36.
19. Usman KO, Ojo SG. Mathematics: A tool of national competitiveness and prestige. Abacus J Math Assoc Nigeria,2014:39(1):97-105.