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Comparative Analysis of WAEC and NECO Senior Secondary School Mathematics Examination

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Abstract

The main objective of this study was to compare the senior secondary school Mathematics examination questions set by the West African Examinations Council (WAEC) and the National Examinations Council (NECO) to ascertain how much the questions were distributed across the cognitive domain, the themes and topics in their syllabi. To this effect, the objective and essay question papers set by WAEC and NECO in Mathematics in 2008, 2009, 2010, 2011 and 2012 were obtained. A total of 917 Mathematics questions were set by the two examination bodies. The number of candidates that took both the Mathematics examinations conducted by WAEC and NECO in those years was 135, 712. A sample of 2000 was selected for the study using a purposive sampling technique. The questions were analysed in terms of how many of them fell under the various levels of the cognitive domain, the themes and topics in the syllabi of the examination bodies. Six research questions were stated were formulated and tested using the chi-square and t-test analyses at .05 level of significance. The results showed that for both examination bodies most of the questions came from application level, number and numeration theme and statistics topics. Based on academic performance on the candidates there was significant difference among the urban and rural candidates and likewise among the public and the private school candidates. The conclusion therefore is that, taking the distribution of questions across the level of the cognitive domain, the themes and the topics in the syllabi into consideration, WAEC and NECO were similar. It was recommended that the teachers should endeavour to teach to cover all the topics in the syllabi of the examination bodies so that the students would not found wanting when answering the examination questions.

Keywords: WAEC, NECO, Mathematic Syllabus, SSCE, Test Development.

1. Introduction

Public examination became necessary when the educational industry was overcrowded after the industrial revolution. It is now used as qualification examination to move students from one educational level to another (Udofia & Udoh, 2012). The essence of public examination is to provide uniform assessment to all candidate who were exposed to a given curriculum. They handle large scale testing programmes of candidates taking the examinations they registered at the same time. The councils use standard scores to report the performance of the candidates. In Nigeria public examinations are taken by candidates in the terminal classes for certification, namely: primary six, junior secondary and senior secondary schools. The aims of secondary school education in Nigeria, as stated in the National Policy on Education (FGN, 2004), are to prepare the individual child for (a) useful living in the society; and (b) for higher education. It is at the end of six years tenure in the secondary school that the senior secondary school certificate examinations are taken. The School certificate examinations, which determine the placement of Nigerian students in higher learning and/or employment, are of particular concerned (Ololube, 2008b).

Examination is a generic name for written exercises, oral questions, or practical tasks, set to test a candidate's knowledge and skill. It involves both quantitative and qualitative description of a pupil's behaviour, and the passing of value judgment concerning the desirability of that behaviour. According to Nworgu in Kpolovie (2002), examination agencies were set up to promote education, to co-ordinate educational programmes, and to control and monitor the quality of education in educational institutions, the essence of which is the organization of public examinations so as to provide uniform standards to all test takers, irrespective of the type or method of instruction they have received. Some of these examination bodies in Nigeria include the West African examinations Council (WAEC), the National Examination Council (NECO), the Joint Admission and

Matriculation Board (JAMB), and the National Business and Technical Examination Board (NABTEB). A closer look at the operations of these boards reveals that some of them perform similar functions. WAEC, NECO and NABTEB, for instance, all conduct secondary school graduate certification, although in the case of NABTEB, the examination is reserved for graduates of Nigerian Technical and Vocational Colleges.

The basic qualification for admission into any higher educational institution is the school certificate issued by the West African School Certificate Examinations Council (WAEC) and/or the National Examinations Council (NECO). The WAEC was established through Ordinance 40 of 1951 that charged the body with determining the examinations required in the public interest in West Africa. The body was empowered to conduct such examinations and award certificates equivalent to those of examining authorities in the United Kingdom. However as observed by Temitope (1999) WAEC is challenged by mass leakage of examination papers at times traceable to the officials of the council, unnecessary delay in releasing results, uncontrollable population explosion of the candidates and over load of work as a result of too many examinations conducted by the council. The level of exam malpractice was so high in 1977 that the situation was tagged “Expo 77”. This actually led the Federal Government to set up the Sogbtun Commission of inquiry to look into the problems of WAEC and the possibility of relieving the body of some of its burdens. The Sogbetun Commission’s recommendations led to establishment of the National Examinations Council (NECO). National Examinations Council (NECO), which was established in April, 1999, transformed from the National Board for Educational Measurement (NBEM) established by Decree 69 of 1993. The body was also charged with the responsibility of conducting the Senior School Certificate Examination (SSCE), the first of which was conducted by the body in May/June, 2000.

The establishment of NECO, which was seen by many as an attempt to reduce the burden of WAEC and mitigate the burden of testing large number of candidates, unfortunately led to concerns by some that creditability issues would inevitably arise (Afemikhe, 2002). With two examining bodies, WAEC and NECO, conducting parallel SSCEs, students admitted to write either version of the SSCE are assumed to possess similar academic strengths (those needed for undergraduate activities). In the recent past, however, some calls have been made for the cancellation of NECO for fear that the SSCE it administers is not as valid as that of the WAEC. Critics submit that a large portion (40%) of candidates final outcome in each of the subject areas at the NECO Senior School Certificate Examination is made up of school-based teacher assessment scores. However, this assertion, if true, may not necessarily be detrimental to the credibility of NECO certification as the National Policy on Education has been quoted by Nworgu (1992) as stating that educational assessment and evaluation is to be liberalised by basing such evaluation in whole or part on continuous assessment of the progress of the individual.

Having been given a similar mandate, to conduct the Senior School Certificate Examination it would seem unfair if the holders of either the WAEC or NECO certificate are discriminated against. However, in the not too distant past, some universities in Nigeria and abroad denied entrance to holders of NECO certificates based on speculations about their integrity. As a standardised test, the SSCE adheres to a uniform mode of test construction, administration, scoring and interpretation, and it should thus be expected that both WAEC and NECO test items pass through the same rigorous standardized procedures before they are administered to candidates. In this way, differences in achievement should be exclusively the result of chance factors like the individuality and academic dedication of candidates.

Most students consider Mathematics a difficult subject. Students perception of any task, especially at the beginning, affects the outcome more than anything else (Maxwell, Mergendoller and Bellisimo, 2005), hence students perform poorly in Mathematics tests and examinations. For the pervasiveness of Mathematics students develop unbridled ambition to pass Mathematics examinations at all costs through examination malpractices. Despite the challenges of this negative attitude of students and the obvious abstract nature of Mathematics, Ale and Adetula (2005) concluded in their stud, that the poor performances of students in WAEC/SSCE Mathematics over the past two decades are reflections of the poor state of Mathematics teaching & learning processes in schools. This supports the conclusion of an earlier study by Alio (2000) that the poor performance of students in Mathematics has to do with the use of non-standard techniques in teaching problem solving by Mathematics teachers. These teaching methods are mainly teacher-centred and textbook directed rather than learner-centred. They emphasise whole class lecturing, competition for grades, memorisation of facts, standard rules and procedures at the detriment of genuine understanding, neglecting students’ curiosity, motivation and goals in learning Mathematics (Akinsola, 2009). They are characterised by poor classroom organization, poorly coordinated students activities, and poor student-teacher or student-student rapport. These constitute factors that hinder students from deriving maximum benefit from classroom work (Igbokwe, 2000). The situation could be very serious in our kind of secondary school system where the curriculum is competitive, examination driven

and teachers traditionally aim at preparation for in-school and public examinations.

Okwilagwe and Nwazota (2010) carried an Analysis of National Examinations Council Junior School Certificate Examination Questions in two Core Subjects. The study was an analysis of content coverage of Junior School Certificate Examination Syllabi by National Examinations Council Papers in Two Core Subject. The extent to which item a on the test represent Bloom's Taxonomy of Educational Objectives (cognitive domain) was also analysed. The ex-post facto research design was adopted in the study. Examination syllabi for Social Studies and Integrated Science and question papers for a three year period were collected and analysed using descriptive statistics. Findings indicated that NECO JSCE Integrated Science and Social Studies questions cover between 50% and 60% of the examination syllabi. Most of the areas not adequately covered were very relevant to everyday life. Generally, Social Studies multiple choice items were easy but in 2001 and 2003 the essay items were difficult as 33% and 40% were at the application level respectively. Integrated Science multiple choice questions and essay questions for 2004 were difficult as they covered 30% and 46% application level respectively. In view of the findings, it was suggested that to meet the standard of NECO questions, the subject teachers should develop in students the skills and strategies for answering higher order questions to keep pace with the changing patterns of questions presentation.

Okoye and Nwafor (2009) carried out a study on A Comparison of SSCE Questions Set by the West African Examinations Council and the National Examinations Council, Nigeria. The purpose of this study was to compare the Senior School Certificate Examination (SSCE) essay questions set by the West African Examinations Council (WAEC) and the National Examinations Council (NECO) in terms of how much they were distributed across the various levels of the cognitive domain. To this effect, the essay question papers set by WAEC and NECO in Biology, Chemistry and Economics in 2004, 2005, 2006 and 2007 were obtained. These questions were analysed by three experts in Measurement and Evaluation in terms of how many of them fell under the various levels of the cognitive domain. The result showed that for both examining bodies, most of the questions were knowledge and comprehension questions. When the distributions of the questions across the various levels of the cognitive domain, set by WAEC and NECO were compared, no significant difference was obtained. The conclusion therefore is that, as far as the distribution of questions across the levels of the cognitive domain is concerned, WAEC and NECO are similar.

Kpolovie, Ololube & Ekwebelem (2011) conducted a comparative study on appraising the performance of secondary school students on the WAEC and NECO SSCE from 2004 to 2006. The study examined the performance of secondary school students on WAEC and NECO SSCEs from 2004 to 2006. The researchers, having reason to doubt the parallel nature of the examinations conducted by WACE and NECO, undertook a quantitative analysis of the performances of candidates in the SSCE in select subjects: Mathematics, English Language, Chemistry, Physics, Biology, Literature in English, Economics, Government, Agricultural Science, Food and Nutrition, and Geography, so as to establish their comparability. The research design was correlational. A sample of 1,233 participants was drawn from a population of 1,422, 140 examination candidates using a purposive sampling technique. The instruments used for data collection included the WAEC and NECO SSCE result Forms. Eleven hypotheses were tested with the Pearson correlation technique set at 0.05 alpha level. Findings indicated a statistically significant positive relationship between candidates' performance on WACE and NECO SSCEs in all the subjects.

Adegun (2005) conducted a comparative study on Administration of Senior School Certificate Examination by WAEC and NECO in Ekiti State, Nigeria. The study compared the administration of Secondary School Certification Examination (SSCE) by the West African Examinations Council (WAEC) and the National Examinations Council (NECO) as perceived by Principals, Vice Principals and Head of Department of Secondary Schools in Ekiti State, Nigeria. Research questions were raised on examination administration, standard of examination questions, marking and releasing a results. Simple random sampling technique was used to select 50 principals, 50 Vice Principals and 50 Heads of Department and these totalled 150 respondents. The researcher constructed and validated a questionnaire tagged School certificate Examination Administration Questionnaire (SCEAQ) for use. Frequency count, percentage and Chi-square were used for data analysis. The result of the study showed that WAEC was perceived to be better organized in terms of the administration of the examination. Its officials were perceived to be more efficient in terms of supervision during examinations while NECO examination was perceived to be easier for the students to pass. It was recommended that NECO should ensure improvement of the conduct and supervision of the school certificate examination so as to attain to expected standard.

Achor, Agogo and Orokpo (2011) carried out a comparative study on some Nigeria students performance in practical and theoretical chemistry Tests as predictors of their performance in MOCK-SSCE Chemistry

Examinations. The study adopted the ex-post facto design in which the results of some Nigeria students' practical knowledge of Chemistry and their tests of theoretical knowledge of Chemistry were used to predict their performance in MOCK-SSCE chemistry. The Senior School Certificate Examination (SSCE) is a terminal examination while the internal or State qualifying examination set after the pattern of SSCE is called MOCK-SSCE. Out of 33 schools in Ogbadibo LGA of Benue State Nigeria, only 15 schools met the requirements for selection as a science secondary school. Eight of these schools with a science student population of 128 were randomly selected and used as sample for this study. The instruments used for this study were the students' alternative to test of practical knowledge of Chemistry (STTKC) and the students tests of theoretical knowledge of chemistry (STTKC). These instruments developed by the researchers had reliabilities of 0.94 using Kuder Richardson (K R21) for SATKC and .89 for SATKC. Using multiple regression analysis the result shows that students performance in a test of theoretical knowledge in Chemistry does not significantly predict their performance in MOCK-SSCE Chemistry theory examination. SATPKC could not significantly predict MOCK-SSCE mean practical scores. The overall relationship between SATPKC, MOCK-SSCE practical and MOCK-SSCE theory was not significantly (F12, 127 = 1.644, p>. 05). STTKC could not significantly predict mean MOCK-SSCE practical examination scores similarity, the overall relationship between STTKC, MOCK-SSCE practical and MOCK-SSCE theory mean scores was not significant (F2 127= .177, p>.05). It was recommended that Principals of schools should ensure that science students carry out their lesson on practical weekly and at the same time relating it to theory as it will go a long way to enhance their performance during practical test. Similarly, school Principals and science teachers should ensure that theoretical aspect of Chemistry should be handled with all seriousness since it is as important as the practical aspect also.

Until recently, Item Response Theory was referred to as the item characteristics curve theory; it is now sometimes referred to as the modern test theory. Item response theory is a model that has its roots in the latent trait theory; it however appeared as a theory in its own right in the work of Lord, Birnbaum and Rasch in Umobong (2004). Item Response Theory (IRT) is the most significant, development in psychometrics. It explains what happens when an individual encounters a multiple choice test item. The model simply says that the outcome of such an encounter is governed by the product of the ability of the person and the easiness of the item and nothing more.

Bandele and Adewale (2013) carried out a research on Comparative Analysis of the Item Difficulty Levels of WAEC, NECO and NABTEB Mathematics Achievement Examinations. The study examined the item difficulty levels of WAEC, NECO and NABTEB Mathematics Achievement Examinations and compared same to ascertain the order of difficulty levels of mathematics achievement tests being constructed by these three examination bodies in Nigeria. Three homogenous groups of 200 students each were randomly selected from the Government technical Colleges and the Senior Schools that were randomly selected from Ondo, Ekiti and Osun States of the South West Geopolitical Zone of Nigeria. The instrument consisted of adopted WASSCE, NECO and NABTEB Mathematics Examinations. Four hypotheses were raised and tested at P = 0.05 and the results showed that there was no significant difference in the item difficulty levels of WAEC, NECO and NABTEB Mathematics Achievement Examinations. Hence, it was recommended that none of this examination should be seen as being lower in standard than the other and there should be no discrimination in the recognition of WAEC, NECO and NABTEB certificates. There is also need to look at some factors like gender, school location and school type as observe by Yusuf, and Adigun (2010), Uka (2006), and Oluwatayo (2012).

The study deals solely on comparative analysis of senior secondary Mathematics examinations by WAEC and NECO taking into consideration the subject content coverage based on the spread of the questions across the various levels of the cognitive domain, themes and topics in the syllabi of the examining bodies and also infer the student's academic achievement in Mathematics from the stated variables. The main purpose of this study was to carry out a comparative analysis of senior secondary school Mathematics examination conducted by West African Examinations Council (WAEC) and National Examinations Council (NECO).

1.1 Research Questions

1. How are the spread of items of senior school Mathematics examination questions from WAEC and NECO examination bodies across the cognitive domain?
2. What is the extent of content coverage of SSCE Mathematics questions from WAEC and NECO examination bodies?
3. What is the spread of senior secondary school Mathematics items set by WAEC and NECO based on the topics in their syllabi?

4. What is the difference on the performance of urban and rural students based on the distributions of Mathematics questions set by WAEC and NECO across the levels of cognitive domain, themes and topics in their syllabi?
5. What is the difference on the performance of public and private schools students based on the distributions of Mathematics questions set by WAEC and NECO across the levels of the cognitive domain, themes and topic in their syllabi?
6. What is the difference on the performance of male and female students based on the distributions of Mathematics questions set by WAEC and NECO across the levels of the cognitive domain, the themes and topic in their syllabi?

2. Research Methodology

2.1 Research Design

This study adopted ex-post facto design. Ex-post facto design was most suitable for this study because the main aim will be to observe the effects of what has already occurred.

2.2 Area of the Study

This study was carried out in Akwa Ibom State of Nigeria. Akwa Ibom is located in the coastal South-Southern part of the country, lying between latitudes 40o 321 and 5o 331 North, and longitudes 7o 251 and 8o 251 East. Currently Akwa Ibom State has 586 Secondary Schools comprising 241 public and 345 private Secondary Schools.

2.3 Population and Sampling

The objective and essay questions set by WAEC and NECO in Mathematics and 2000 simple randomly selected students out of all the Akwa Ibom State candidates who took both WAEC and NECO Senior School Certificate Examination (SSCE) from 2008 to 2012 of was 135,712 were used for the study.

2.4 Instrumentation

The objective and essay questions in Mathematics set by WAEC and NECO (2008 - 2012) were used to collect data in order to sort out questions belonging to each of the levels of the cognitive domain. Data were also collected from the Mathematics WAEC and NECO Syllabi which evolve from the senior secondary school curriculum. They reflect the aims and objectives of the syllabi. They also highlight the format/structure of the Mathematics Examinations. They show the topics, contents and remarks that indicate the scope of the questions to be used. The questions cover the following themes in the syllabus: (i)Number and Numeration (ii)Algebraic processes (iii)Mensuration (iv)Plane Geometry (v)Trigonometry (vi)Statistics and Probability. The WAEC and NECO Senior Secondary Certificate Examination Result Forms (WNSSCE-RF) were used to collect data on the grades of the candidates. In terms of scoring (measuring the relative performance of secondary school students) on the WAEC and NECO Mathematics SSCE, the highest grade in both examinations, A1, will be given the value 9, the second highest B2 will be given the value 8, B3 accorded 7, C4 accorded 6, C5 accorded 5, C6 accorded 4, D7 accorded 3, E8 accorded 2 and F9 accorded 1.

2.5 Research Procedure

The researcher collected the objective and essay question papers in Mathematics set by WAEC and NECO in the years 2008 to 2012. Each of the questions was classified according to the level of the cognitive domain it belonged. What guided the classification was the action verb used in posing the question. Where a question had sub-sections, each of them was treated as a separate item. After the researcher had indicated the levels, the researcher noted the levels assigned to each of the questions. Having identified the levels assigned to various questions, the researcher, for each examining body, took count of the number of questions that were asked at the various levels. The researcher made use of the two syllabi of the examining bodies to consciously classified questions according to the six themes in the syllabi and also classified each of the questions according to the topics in the syllabi. The researcher took count of the number of questions asked in the themes and topics of mathematics.

The researcher visited the selected schools, met with the appropriate school authority for the WAEC and NECO Senior Secondary Certificate Examination Result Forms to be released to him for collation. The researcher engaged research assistants who helped in sorting out the needed grades of the candidates. Conscious care was

taken so that grades of the candidates selected will be for only the candidates that sat mathematics examinations conducted by both examining bodies; this was done by placing the SSCE result forms of WAEC and NECO and meticulously going through the names of the candidates and also taking into consideration the period under investigation, that is, from 2008 to 2012. Grades in Mathematics for WAEC and NECO SSCE candidates in the sample were collated and tabulated.

3. Results

Table 1: Number and percentage of mathematics questions set at each level of the cognitive domain by WAEC and NECO

WAEC					
Cognitive Level	Year				
	2008	2009	2010	2011	2012
Knowledge	1(1.1)	3(3.2)	2(2.3)	7(8.2)	4(4.7)
Comprehension	12(13.2)	10(10.8)	9(10.2)	11(12.9)	11(12.8)
Application	65(71.4)	69(74.2)	68(77.3)	59(69.4)	60(69.7)
Analysis	7(7.7)	4(4.3)	4(4.5)	2(2.4)	3(3.5)
Synthesis	5(5.5)	6(6.4)	5(5.7)	6(7.1)	7(8.1)
Evaluation	1(1.1)	1.(1.1)	-	-	1(1.2)
Total	91	93	88	85	86
NECO					
Cognitive Level	Year				
	2008	2009	2010	2011	2012
Knowledge	4(4.4)	4(4.2)	1(1.0)	5(5.3)	4(4.4)
Comprehension	12(13.2)	14(14.7)	10(9.6)	16(17.0)	17(18.9)
Application	63(69.2)	63(66.3)	85(81.7)	69(73.4)	65(72.3)
Analysis	4(4.4)	3(3.2)	5(4.8)	1(1.1)	3(3.3)
Synthesis	7(7.7)	9(9.5)	3(2.9)	2(2.1)	1(1.1)
Evaluation	1(1.1)	2(2.1)	-	1(1.1)	-
Total	91	95	104	94	90

Note: Numbers in brackets are percentages.

Table 1 shows that in 2008 WAEC and NECO set ninety one items with most of the items measuring application and list measuring evaluation. This was the trend from 2009 to 2012

Table 2: Number and percentage of mathematics questions set at each theme of WAEC and NECO syllabi.

WAEC					
Content	Year				
	2008	2009	2010	2011	2012
Number & Numeration	22(24.2)	23(24.7)	20(22.7)	20(23.5)	18(20.9)
Algebraic Processes	17(18.7)	17(18.3)	16(18.2)	17(20.0)	18(20.9)
Mensuration	8(8.8)	11(11.8)	15(17.0)	16(18.8)	11(12.8)
Plane Geometry	25(27.4)	20(21.5)	16(18.2)	16(18.8)	18(20.9)
Trigonometry	8(8.8)	10(10.8)	7(8.0)	6(7.1)	12(14.0)
Statistics & Prob.	11(12.1)	12(12.9)	14(15.9)	10(11.8)	9(10.5)
Total	91	93	88	85	86
NECO					
Content	Year				
	2008	2009	2010	2011	2012
Number & Numeration	22(24.2)	23(24.2)	27(26.0)	26(27.7)	21(23.3)
Algebraic Processes	22(24.2)	23(24.2)	24(23.1)	20(21.3)	20(22.2)
Mensuration	12(13.2)	10(10.5)	13(12.5)	9(9.5)	14(15.7)
Plane Geometry	12(13.2)	17(18.0)	19(18.2)	12(12.8)	11(12.2)
Trigonometry	8(8.8)	6(6.3)	8(7.7)	11(11.7)	11(12.2)
Statistics & Prob.	15(16.4)	16(16.8)	13(12.5)	16(17.0)	13(14.4)
Total	91	95	104	94	90

Note: Numbers in brackets are percentages.

Table 2 shows the distributions of Mathematics questions across the themes in the syllabi of WAEC and NECO. WAEC in 2008 most items came from plane geometry, in 2009, 2010 and 2011 most items came from Numbers

and numerations while in 2012 the item were spread between Number and Numeration , Algebraic processes and Plane geometry. In NECO set most items in the said period were from Number and Numeration.

Table 3: Number and percentage of mathematics topics set by WAEC and NECO

WAEC					
Topic	Year				
	2008	2009	2010	2011	2012
Number bases	2(2.2)	1(1.1)	1(1.1)	1(1.2)	1(1.2)
Fractions, decimals & approx.	1(1.1)	-	1(1.1)	1(1.2)	1(1.2)
Indices	2(2.2)	3(3.2)	2(2.3)	2(2.4)	2(2.3)
Logarithms	2(2.2)	3(3.2)	-	2(2.4)	-
Sequence	3(3.3)	2(2.2)	2(2.3)	-	-
Sets	1(1.1)	3(3.3)	4(4.5)	4(4.6)	5(5.8)
Pos and neg. integers, rat. nos	1(1.1)	1(1.1)	1(1.1)	2(2.4)	1(1.2)
Surds	1(1.1)	2(2.2)	1(1.1)	1(1.2)	1(1.2)
Ratio, prop & rates	1(1.1)	6(6.4)	4(4.5)	3(3.4)	4(4.6)
Variation	2(2.2)	1(1.1)	1(1.1)	2(2.4)	1(1.2)
Percentages	6(6.6)	1(1.1)	3(3.5)	2(2.4)	2(2.3)
Algebraic expression	5(5.5)	1(1.1)	-	3(3.4)	1(1.2)
Simple optn on alg. Exp	1(1.1)	1(1.1)	1(1.1)	2(2.4)	4(4.6)
Solution of linear eqns	-	1(1.1)	3(3.5)	2(2.4)	2(2.3)
Change of subject	1(1.1)	-	1(1.1)	1(1.2)	1(1.2)
Quadratic equation	2(2.2)	2(2.2)	3(3.5)	2(2.4)	2(2.3)
Graphs of lin & eqn. function	-	5(5.3)	5(5.7)	5(5.9)	4(4.1)
Linear inequalities	4(4.4)	3(3.2)	2(2.3)	1(1.2)	3(3.5)
Algebraic fractions	4(4.4)	4(4.2)	1(1.1)	2(2.4)	2(2.3)
Lengths & perimeters	3(3.3)	9(9.7)	7(8.0)	10(11.8)	6(7.0)
Areas	3(3.3)	2(2.2)	7(8.0)	3(3.4)	5(5.8)
Volumes	2(2.2)	-	1(1.1)	3(3.4)	5(5.8)
Angles of a point / types of Ls	-	2(2.2)	2(2.3)	2(2.4)	1(1.2)
Angles & intercept on par. Line	2(2.2)	1(1.1)	2(2.3)	2(2.4)	1(1.2)
Triangles and other polygons	10(10.9)	5(5.3)	2(2.3)	2(2.4)	3(3.5)
Circles	8(8.8)	8(8.5)	5.(5.7)	2(2.4)	8(9.3)
Construction	3(3.3)	-	4(4.5)	4(4.6)	2(2.3)
Loci	2 (2.2)	1(1.1)	1(1.1)	1(1.2)	2(2.3)
Sine, cosine & target of an angle	7(7.7)	7(7.5)	2(2.3)	2(2.4)	7(8.1)
Angles of elevation & depression	1(1.1)	2(2.2)	1(1.1)	1(1.2)	4(4.6)
Bearings	-	1(1.1)	4(4.5)	3(3.4)	1(1.2)
Statistics	8(8.8)	9(9.7)	8(9.1)	8(9.4)	6(7.0)
Probability	3(3.3)	3(3.2)	6(6.8)	2(2.4)	3(3.5)
Total	91	93	88	85	86
NECO					
Topic	Year				
Number bases	1(1.1)	1(1.1)	2(1.9)	2(2.1)	1(1.2)
Fractions, decimals & approx.	1(1.1)	1(1.1)	2(1.9)	1(1.1)	1(1.2)
Indices	5(5.5)	3(3.1)	2(1.9)	3(3.2)	2(2.3)
Logarithms	4(4.4)	3(3.1)	1(1.0)	3(3.2)	-
Sequence	1(1.1)	4(4.2)	1(1.0)	3(3.2)	-
Sets	4(4.4)	2(2.1)	8(7.7)	5(5.3)	5(5.8)
Pos and neg. integers, rat. nos	1(1.1)	1(1.1)	1(1.0)	1(1.1)	1(1.2)
Surds	-	-	2(1.9)	-	1(1.2)
Ratio, prop & rates	2(2.2)	6(6.3)	6(5.8)	-	4(4.6)
Variation	3(3.3)	4(4.2)	1(1.0)	1(1.1)	4(4.6)
Percentages	3(3.3)	2(2.1)	2(1.9)	8(8.5)	1(1.2)

Algebraic expression	3(3.3)	3(3.1)	1(1.0)	2(2.1)	2(2.3)
Simple optn on alg. Exp	4(4.4)	3(3.1)	3(2.9)	5(5.3)	1(1.2)
Solution of linear eqns	2(2.2)	1(1.1)	2(1.9)	3(3.2)	1(1.2)
Change of subject	1(1.1)	1(1.1)	1(1.0)	1(1.1)	1(1.2)
Quadratic equation	1(1.1)	2(2.1)	5(4.8)	2(2.1)	2(2.3)
Graphs of lin & eqn. function	3(3.3)	5(5.3)	9(8.6)	2(2.1)	4(4.0)
Linear inequalities	3(3.3)	3(3.1)	1(1.0)	3(3.2)	3(3.5)
Algebraic fractions	2(2.2)	1(1.1)	1(1.0)	1(1.1)	2(2.3)
Lengths & perimeters	7(7.7)	6(6.3)	11(10.6)	3(3.2)	6(7.0)
Areas	3(3.3)	3(3.1)	2(1.9)	4(4.3)	5(5.8)
Volumes	2(2.2)	1(1.1)	-	2(2.1)	-
Angles of a point / types of Ls	1(1.1)	2(2.1)	- 2	(2.1)	-
Angles & intercept on par. Line	3(3.3)	3(3.1)	4(3.9)	1(1.1)	1(1.1)
Triangles and other polygons	2(2.2)	2(2.1)	4(3.9)	5(5.3)	6(6.7)
Circles	1(1.1)	4(4.2)	5(4.8)	4(4.3)	4(4.4)
Construction	4(4.4)	3(3.1)	3(2.9)	-	-
Loci	1(1.1)	3(3.1)	3(2.9)	-	-
Sine, cosine & target of an angle	4(4.4)	2(2.1)	3(2.9)	8(8.5)	4(4.4)
Angles of elevation & depression	2(2.2)	2(2.1)	2(1.9)	-	3(3.3)
Bearings	2(2.2)	2(2.1)	3(2.9)	3(3.2)	4(4.4)
Statistics	8(8.8)	9(9.6)	9(8.6)	11(11.6)	4(4.4)
Probability	7(7.7)	7(7.5)	4(3.9)	5(5.3)	9(10.0)
Total	91	95	104	94	90

Note: Numbers in brackets are percentages

Table 3 shows the spread of Mathematics items set by WAEC and NECO based on the topics in their syllabi. In 2008, out of the total numbers of items set by WAEC to cover thirty three topics in the syllabus, 29 in 2009,33 in 2010 and 2011 and 31 in in 2012. In 2008, out of ninety one items set by NECO 32 in 2008, 32 in 2009, 31 in 2010, 27 in 2011 and 31 in 2012. It was observed that both WAEC and NECO set the bulk of their questions from Statistics and Lengths and Perimeters.

Table 4: Numbers and percentage of passes in senior school mathematics examination by WAEC and NECO in urban and rural areas

WAEC						
Location	N	Year				
		2008	2009	2010	2011	2012
Urban	200	84(42)	91(45.5)	89(44.5)	101(50.5)	91(45.5)
Rural	200	27(13.5)	43(21.5)	56(28)	63(31.5)	39(19.5)
NECO						
Location	N	Year				
		2008	2009	2010	2011	2012
Urban	200	131(65.5)	126(63)	145(72.5)	129(64.5)	148(74)
Rural	200	91(45.5)	87(43.5)	101(50.5)	93(46.5)	104(52)

Note: Numbers in brackets are percentages

From Table 4 the WAEC results in urban recorded pass grades as follows: 42% in 2008, 45.5% in 2009, 44.5% in 2010, 50.5% in 2011 and 45.5% in 2012. While in rural area the percentage of candidates that recorded pass grades is as follows: 13.5% in 2008, 21.5% in 2009, 28% in 2010, 31.5% in 2011 and 19.5% in 2012. On the other hand NECO in the urban area recorded pass grades as follows: 65.5% in 2008, 63% in 2009, 72.5% in 2010, 64.5% in 2011 and 74% in 2012. While in rural area the percentage of candidates that recorded pass grades is as follows: 45.5% in 2008, 43.5% in 2009, 50.5% in 2010, 46.5% in 2011 and 52% in 2012.

Table 5: Numbers and percentage of passes in senior school mathematics examination by WAEC an NECO in public and private schools

WAEC						
School Type	N	Year				
		2008	2009	2010	2011	2012
Public	200	63(31.5)	51(25.5)	58(29)	92(46)	84(42)
Private	200	127(63.5)	134(67)	121(60.5)	146(73)	151(75.5)
NECO						
School Type	N	Year				
		2008	2009	2010	2011	2012
Public	200	83(41.5)	90(45)	75(37.5)	87(43.5)	89(44.5)
Private	200	156(78)	162(81)	158(79)	190(95)	188(94)

Note: Numbers in brackets are percentages.

Table 5 shows that WAEC in public schools recorded pass grades as follows: 31.5% in 2008, 25.5% in 2009, 29% in 2010, 46% in 2011 and 42% in 2012. While in private schools the percentage of candidates that recorded pass grades is as follows: 63.5% in 2008, 67% in 2009, 60.5% in 2010, 73% in 2011 and 75.5% in 2012. NECO in public schools recorded pass grades as follows: 41.5% in 2008, 45% in 2009, 37.5% in 2010, 43.5% in 2011 and 44.5% in 2012. While in private schools the percentage of candidates that recorded pass grades is as follows: 78% in 2008, 81% in 2009, 79% in 2010, 95% in 2011 and 94% in 2012.

Table 6: Number and percentage of passes in senior school mathematics examination by WAEC and NECO based on gender

WAEC						
Gender	N	Year				
		2008	2009	2010	2011	2012
Male	200	88(44)	97(48.5)	121(60.5)	101(50.5)	111(55.5)
Female	200	101(50.5)	96(48)	139(69.5)	104(52)	99(49.5)
NECO						
Gender	N	Year				
		2008	2009	2010	2011	2012
Male	200	126(63)	150(75)	117(58.5)	99(49.5)	101(50.5)
Female	200	131(65.5)	148(74)	121(60.5)	87(43.5)	100(50)

Note: Numbers in brackets are percentages.

From Table 6 for WAEC the percentage of male candidates that recorded pass grades is as follows: 44% in 2008, 48.5% in 2009, 60.5% in 2010, 50.5% in 2011 and 55.5% in 2012. While the percentage of female candidates that recorded pass grades is as follows: 50.5% in 2008, 48% in 2009, 69.5% in 2010, 52% in 2011 and 49.5% in 2012. For NECO the percentage of male candidates that recorded pass grades is as follows: 63% in 2008, 75% in 2009, 58.5% in 2010, 49.5% in 2011 and 50.5% in 2012. While the percentage of female candidates that recorded pass grades is as follows: 65.5% in 2008, 74% in 2009, 60.5% in 2010, 43.5% in 2011 and 50% in 2012.

4. Discussion of Major Findings

From the result, it was found that in each year NECO set more number of questions than WAEC apart from 2008 which each examination body set equal number of questions. Out of the total of 917 Mathematics questions set by the two examination bodies in 2008, 2009, 2010, 2011 and 2012, NECO set 474 Mathematics questions while WAEC set 443 Mathematics questions this could be attributed to the fact that NECO usually sets sixty multiple choice questions against fifty multiple choice questions set by WAEC. The result showed that for each examination body, the bulk of the questions set, came from the application level then followed by the comprehension level. The predominance of these levels of questions could be as a result of the fact that Mathematics questions are problem-solving types. It was observed that the least percentage of questions set by two examination bodies came from the evaluation level. WAEC did not have questions from the evaluation level in 2010 and 2011; likewise NECO set no question from the evaluation in 2010 and 2012. This result is similar to that obtained by Okoye and Nwafor (2009) when they analysed Biology, Chemistry and Economics questions set at the various levels of the cognitive domain by WAEC and NECO. In their research work which covered 2004, 2005, 2006 and 2007, in some years questions were not set at the evaluation level by the two examination

bodies.

The two examination bodies set Mathematics questions across the six themes in their syllabi throughout the five years of the study. In descending order, WAEC set hundred and three questions in Number and Numeration, ninety five questions in Plane Geometry, eighty five questions in Algebraic Processes, sixty one questions in Mensuration, fifty six questions in Statistics and Probability, and forty three questions in Trigonometry. Likewise NECO set hundred and nineteen questions in Number and Numeration, hundred and nine questions in Algebraic Processes, seventy three questions in Statistics and Probability, seventy one questions in Plane Geometry, fifty eight questions in Mensuration and forty four questions in Trigonometry.

The percentage of candidates that recorded pass grades in the Mathematics examination conducted by the two examination bodies showed that the urban candidates had the higher number of pass grades than their rural counterparts. This supports the finding of Kpolovie, Ololube, Ekwebelem (2011) and Achor, Agogo, and Orokpo (2011) who opined that the geographical location of schools has influence on the academic achievement of students. The above result also supports the earlier finding of Beeby in Owoeye and Yara (2011) who maintained that the socio-economic well-being of students' parents has a strong relationship with students' academic performance emphasising that the urban / rural location of schools appear to outweigh this factor in fixing the language performance of learner, whereas learning in an unconducive atmosphere cannot produce positive language performance.

The result showed that private school candidates recorded greater number of pass grades than their public school counterparts. This supports Afolabi (2001) who concluded in his findings that students who attended private school performed better in most subjects including Mathematics because of the use of relevant instructional material to aid their teaching-learning activities. This also agrees with Lackhed and Jimeniz in Adebayo (2009) who reported that private schools have more instructional materials, a larger stock of institutional resources such as laboratories, libraries and subject rooms. From the result the number of male candidates that recorded pass grades was almost the same as the number of female candidates that obtained pass grades. This is in consonance with the claim of Rogers in Eboh and Muoboghare (2004) that both sexes are equal in most abilities and Brush in Eboh and Muoboghare (2004) found that males and females performed equally in many tasks including science. Incidentally, Mathematics belongs to the sciences.

5. Conclusion

This study responded to fears of educators, researchers, students and parents regarding the comparability of WAEC and NECO in their examining functions. Specifically for the subject, Mathematics it therefore called for a need to compare these examination bodies in terms of various aspects. This study took up the aspects of comparing the two examination bodies in terms of how they distributed their questions across the various levels of the cognitive domain, the themes and topics in their syllabi. Finally, it is based on this, that the study has attempted to show that as far the distribution of questions across the various levels of the cognitive domain, the themes and topics in the syllabus is concerned; WAEC and NECO are comparable with respect to Mathematics.

6. Recommendations

1. The examination bodies should spread the Mathematics items evenly to cover the cognitive domain.
2. The WAEC and NECO need to spread the items to cut across all the themes and topics in their syllabi and make sure that the items are evenly distributed.
3. The examination bodies should construct more items at the higher levels of the cognitive domain which will help the candidates in critical reasoning when giving solutions to the mathematical problems.
4. The teachers should be aware of the frequent occurring topics set by WAEC and NECO to make help them prepare the candidates adequately for the examination.
5. The teachers should endeavour to teach to cover all the topics in the syllabi of the examination bodies so that the students would not found wanting when answering the examination questions.
6. Teachers should always develop the test blue print when constructing the Mathematics items for internal examination.
7. Students should not only rely on what the teachers teach but they must endeavour to look through the subject curriculum and syllabus for them to develop independent reading.

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