

PSYCHOMETRIC PROPERTIES OF MAY/JUNE 2017 AND 2018 WAEC, NECO AND NABTEB PHYSICS MULTIPLE CHOICE TEST ITEMS

Prof. N. Agu

Department of Educational Foundations, Nnamdi Azikiwe University, Awka

Obidiebube, Audrey Nnenna *

Department of Educational Foundations, Nnamdi Azikiwe University, Awka

ABSTRACT

The purpose of the study was to compare the psychometric properties of May/June 2017 and 2018 WAEC, NECO and NABTEB physics multiple choice test items. Six research questions guided the study. The study adopted a descriptive survey research design. The population of this study comprised all the 5,748 SS 3 students who enrolled for 2018/2019 physics senior school certificate examination of WAEC, NECO and NABTEB in Anambra State. The multi-stage sampling and simple random sampling techniques were used to select 800 students. WAEC, NECO and NABTEB 2017 and 2018 May/June Physics multiple choice examination questions were used as instruments for data collection. The instruments were collected from the respective examination bodies' zonal offices, thus, proving to be valid and reliable. Percentage was used to analyze data to answer the research questions. The major findings of the study indicated among other that NECO had the highest percentage of acceptable difficulty index, followed by WAEC then NABTEB in 2017 while in 2018 WAEC had the highest percentage of difficulty index, followed by NABTEB then NECO. The findings also revealed that the percentage of acceptable discriminative indices of the three examining bodies, it is evident that WAEC had the highest acceptable discrimination index followed by NABTEB then NECO in 2017 while in 2018 WAEC had the highest percentage of acceptable discrimination index followed by NABTEB then NECO. Comparing the percentage of good distracter index among the three examination bodies, it is evident that NABTEB had the highest, followed by WAEC then NECO in 2017 while in 2018 WAEC had the highest, followed by NECO then NABTEB in 2018. It was therefore recommended among others that, Examination bodies such as WAEC, NECO and NABTEB should mount regular trainings/workshops/seminars and brief sessions for item writers, moderators, supervisors and examiners to update their knowledge in test construction.

Key Words: Psychometric, Test, Examination Bodies.

1. INTRODUCTION

Evaluation plays an important role in education process and development. It is crucial for teachers to make use of best evaluation practices in order to help the students to have better results in internal and external examinations. Evaluation is described as the systematic assessment of design, implementation or results of an initiative for the purpose of learning or decision making (Cheryl, Mary, Alvin, Erin & Cairine, 2014). Teachers carry out a routine evaluation of school learning to achieve objectives, but this is essentially internal. These internal evaluations go on by such names like teacher-made test, continuous assessments, school based

assessment and local test. For the conduct of external examinations however, according to section (5), sub-section 28d of the amended National Policy on Education that dwelt on certification, it was stated that Nigeria shall use public examination bodies for conducting national examinations in order to ensure uniform standards at this level (FRN, 2013).

Maintaining a high standard of education in any country requires specific quality assurance evaluation tools that are not only consistent, but truly able to confer qualitative status on an educational system and product. One of such tools is known as test. According to Ukwuije (2012), a test is an instrument which a teacher or examination body administers to testee in order to ascertain the quality of the educational system and its products who are learners. A test, according to Emaikwu (2012), is a tool utilized in measuring the extent to which learning has taken place, after a period of instruction, and inculcation by teachers, using a meticulously conjectured curriculum.

Tests could be taken as internal or external examinations (Ukwuije, 2012), the internal examination is that which is conducted within a school for its students, with the test constructed by the teachers of respective subjects and administered by them. Ukwuije went further to explain that, an external examination, on the other hand is a public examination conducted in the government's behalf by statutory examination bodies to cater for that the minimum requirement for partaking in the examination. In Nigeria, these external examinations include National Examination Council (NECO), West African Examination Council (WAEC) and National Business and Technical Examinations Board (NABTEB). The NECO, WAEC and NABTEB are the bodies authorized by the Nigerian constitution to conduct the Senior School Certificate (SSCE), General Certificate of Education (GCE) and other Examinations in Technical Colleges, and Senior Secondary Schools in Nigeria.

The categories used by WAEC, NECO and NABTEB for external assessment is of the multiple choice test, essay and practical variants. But in this study, multiple choice test is put into consideration. Multiple choice test is an examination modeled to induce a particular response, accurate or inaccurate. A true or false examination is one instance of an objective test (Pam, 2013). One example of objective test is the multiple choice test which contain items that are usually with four to five plausible answer options from which testees are expected to identify the correct answer. The multiple choice test is regarded as the most applicable, flexible and useful type of objective test item formats. Multiple choice test item formats are composed of three elements; a stem that presents the problem and which can take the form of an incomplete sentence or a question; the correct option or answer key; and several distracters, which are incorrect alternatives, but equally plausible for students who do not fully master the subjects to be tested (Bush, 2015). The quality of an item in a multiple choice test format is done by computing the test's difficulty indices, discrimination power and distracter indices.

Difficulty index of a test is the function of the skills required by the questions and the skills achieved by those attempting the test. The value obtained is known as the p-value. An item with a p-value greater than or equal to 0.90 or 90 percent means a very easy item. Boopathiraj and Chellamani (2013) asserted that the ideal difficulty index for a test item is 0.50 or 50

percent. However, a p-value of 0.30-0.70 is considered acceptable for an item and by extension, deemed suitable for administration.

Item discrimination or discrimination index is a measure of the proportion of testees passing each item in the upper and lower criterion groups. Discrimination Index ranges from -1 to +1; items with higher values are preferred. If the sample N is large ($N > 150$ say), discrimination index of 0.22 and above is recommended (Nworgu, 2003). The values for discrimination power range from 0.00 to 1.00; the higher the value (the closer it is to 1.00), the more an item is deemed to possess discrimination power. Item discrimination indices of 0.30 to 1.00 are acceptable, while indices of 0.29 to 0.00 indicate unacceptable item. Distracter index is also given consideration in the analysis of multiple choice item format.

Distracter index is a strong indicator of multiple choice test item quality. Distracters are incorrect options that are meant to distract the testee from the correct response, thereby giving him or her the opportunity to make use of his/her cognitive capacities. In similar vein, Abanobi (2013) has it that a distracter is expected to attract testees, meaning that they actually aim to establish content mastery among testees. The distracters are considered as not distracting or doing their presumed job if they are not selected at all by testees or only used by less than 5% of them (Tarrant, Ware & Mohammed, 2009). The takers of distracters (those who will select them as correct responses) are usually from the higher or lower percentile of intellectual capability among testees in a multiple choice item format. This test format therefore could range from varieties of subjects inclusive of physics.

Physics as a school subject is a requirement for the study of science related courses in institutions of higher learning. The role of Physics towards national development is highly significant in the school curriculum. Physics develops scientific literacy and help to build up necessary knowledge and skills required for lifelong learning in science and technology. According to Ruth (2012) students' lives are enriched with these knowledge, skills and attitudes to become scientifically capable members of society. The overreaching aim of physics is to enable students to carry out handy investigations, examine data, report evidence, and present conclusions (Oguguo & Lotobi, 2019). It is expected that the performance of students in physics conducted by WAEC, NECO and NABTEB shall be a true reflection of their achievement since they are parallel and equivalent to each other. Asikhia (2010) and Adeyemi (2008) concluded that there are observable disparities in the public perception of the results released by these examination bodies. Despite the fact that the certificate being awarded by these three examining bodies are said to be equivalent, yet, the public claim that there was a significant difference in the result released by them.

Ozumba (2008) made a comparative analysis of WAEC and NECO home Economics multiple choice test items for three years between 2004 and 2006, and concluded that NECO appeared cheaper than WAEC. She further explained that this was because NECO exam was taken shortly after WAEC. Consequently, students tend to correct their mistakes while writing NECO. Adewale and Bandele (2013) said that many people believed that WAEC examinations are the most difficult of examinations being conducted by these examination bodies, while NABTEB examinations are considered as being inferior to WAEC and NECO examinations.

Adewale and Bandele (2013) opined that NECO examination produces the most difficult test items than WAEC and NABTEB and that might have been one of the reasons for the recent mass failure in NECO. Okpala (2010) revealed that despite the importance of science subjects, observations have shown that science students are not doing well in science subjects particularly physics examination conducted by WAEC, NECO and NABTEB.

Kolawole (2007) researched on comparative analysis of psychometric properties of WAEC and NECO for senior secondary schools mathematics, and concluded that both have the same psychometric properties. While the above studies had findings favorable to NECO, some favorable to WAEC, some others had portrayed NECO as being inferior to WAEC, some had it that WAEC, NECO and NABTEB are equal and equivalent. According to Oweh (2014) who asserted that the increase in the poor performance of secondary school students in physics external examinations (WAEC, NECO & NABTEB) in the recent past in Nigeria created a public concern.

It has been observed by Adewale and Bandele (2013) that there is great disparity between the results of the candidates who sat for WAEC, NECO and NABTEB physics examinations. Looking at studies that have attempted to compare WAEC, NECO and NABTEB, it would be observed that there are disparities in their opinions. In the particular case of physics, some studies have been done on psychometric properties of mathematics, economics, biology, home economics and physics (essay test), but literature available to the researcher shows that there has not been any study done on comparison of psychometric properties of the three examination bodies on multiple choice test items in physics. Could it be possible that there are differences in the quality of the physics examination questions administered by these examination bodies? Could it be true that physics test items are difficult? Based on these doubts, there is need for a comparative analysis of psychometric properties of WAEC, NECO and NABTEB physics multiple choice test items in terms of their difficulty, discriminative and distracter indices.

The purpose of the study was to compare the psychometric properties of May/June 2017 and 2018 WAEC, NECO and NABTEB physics multiple choice test items. The study specifically focused on determining:

1. How are the difficulty indices of May/June 2017 WAEC, NECO and NABTEB physics multiple choice test items distributed?
2. How are the difficulty indices of May/June 2018 WAEC, NECO and NABTEB physics multiple choice test items distributed?
3. How are the discriminative indices of May/June 2017 WAEC, NECO and NABTEB physics multiple choice test items distributed?
4. How are the discriminative indices of May/June 2018 WAEC, NECO and NABTEB physics multiple choice test items distributed?
5. How are the distracter indices of May/June 2017 WAEC, NECO and NABTEB physics multiple choice test items distributed?
6. How are the distracter indices of May/June 2018 WAEC, NECO and NABTEB physics multiple choice test items distributed?

2. METHOD AND MATERIALS

This study employed a descriptive survey design. This study was carried out in Anambra State, Nigeria. The population of this study comprised all the 5, 748 SS 3 students who enrolled for 2018/2019 Physics Senior School Certificate Examination of WAEC, NECO and NABTEB in Anambra State. The sample size for the study consisted of 800 SS 3 students who offered Physics in the three external exams. Multi-stage sampling technique was used for the selection. WAEC, NECO and NABTEB 2017 and 2018 May/June Physics multiple choice examination questions were used as instruments for data collection. Distributions of difficulty indices, distributions of discriminative indices and distributions of distracter indices were used to answer the research questions. Chi-square goodness-of-fit test was used to testing the null hypotheses at 0.05 alpha level.

Research Question 1

How are the difficulty indices of May/June 2017 WAEC, NECO and NABTEB physics multiple choice test items distributed?

Table 4: Distribution of Difficulty Indices for WAEC, NECO and NATEB Physics Multiple-Choice Test Items for May/June 2017

S/N	Exam Type	Difficulty Indices										TOTAL
		0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	
1	WAEC	-	1	7	11	4	5	10	12	-	-	50
	%	-	2	14	22	8	10	20	24			100
2	NECO	1	-	2	12	14	7	9	5			50
	%	2		4	24	28	14	18	10			100
3	NABTEB	-	2	4	10	8	10	7	5	2	2	50
	%		4	8	20	16	20	14	10	4	4	100

Decision: 0.3 – 0.7 means acceptable difficulty indices

The analysis of difficulty indices for physics multiple-choice test items in 2017 revealed the following: For WAEC, 42 items representing 84% met the criteria for acceptable difficulty indices while 8 items representing 16% did not meet the criteria for acceptable indices. For NECO, 47 items representing 94% met the criteria for acceptable difficulty indices while 3 items representing 6% did not meet the criteria for acceptable difficulty indices. For NABTEB, 40 items representing 80% met the criteria for acceptable difficulty indices while 10 items representing 20% did not meet the criteria for acceptable difficulty indices. Comparatively, it is evident that NECO had the highest percentage of acceptable index, followed by WAEC then NABTEB in 2017.

Research Question 2

How are the difficulty indices of May/June 2018 WAEC, NECO and NABTEB physics multiple choice test items distributed?

Table 5: Distribution of Difficulty Indices for WAEC, NECO and NATEB Physics Multiple-Choice Test Items for May/June 2018

S/N	Exam Type	Difficulty Indices										TOTAL
		0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	
1	WAEC	-	1	4	8	9	11	12	5	-	-	50
	%		2	8	16	18	22	24	25	-	-	100
2	NECO	1	2	5	11	10	7	8	3	1	2	50
	%	1	4	10	22	20	14	16	6	2	4	100
3	NABTEB	1	1	4	6	11	10	6	7	3	1	50
	%	1	1	8	12	22	20	12	14	6	1	100

Decision: 0.3 – 0.7 means acceptable difficulty indices

The analysis of difficulty indices for physics multiple-choice test items in 2018 revealed the following: For WAEC, 45 items (90%) met the criteria for acceptable difficulty indices while 5 items (10%) did not meet the criteria for acceptable difficulty indices. For NECO, 39 items (78%) met the criteria for acceptable difficulty indices while 11 items (22%) did not meet the criteria for acceptable difficulty indices. For NABTEB, 40 items (80%) met the criteria for acceptable difficulty indices while 10 items (20%) did not meet the criteria for acceptable difficulty indices. Comparing the percentage of acceptable difficulty index, it is revealed that WAEC had the highest percentage of difficulty index, followed by NABTEB then NECO in 2018.

Research Question 3

How are the discriminative indices of May/June 2017 WAEC, NECO and NABTEB physics multiple choice test items distributed?

Table 6: Distribution of Discriminative Indices for WAEC, NECO and NATEB Physics Multiple-Choice Test Items for May/June 2017

S/N	ExamType	Discriminative Indices											TOTAL
		0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	Neg.	
1	WAEC	1	1	5	19	11	6	2	2	-	1	2	50
	%	2	2	10	38	22	12	4	4		2	4	100
2	NECO	-	5	15	9	4	5	2	1	-	-	9	50
	%	-	10	30	18	8	10	4	2			18	100
3	NABTEB	1	2	10	16	6	4	1	2	-	-	8	50
	%	2	4	20	32	12	8	2	4	-	-	16	100

Decision: 0.3 – 1.0 means acceptable discrimination indices

The analysis of discriminative indices for physics multiple-choice test items in 2017 revealed the following: For WAEC, 41 items (82%) met the criteria for acceptable discrimination indices while 9 items (18%) did not meet the criteria for acceptable discrimination indices. For NECO, 21 items (42%) met the criteria for acceptable discrimination indices while 29 items (58%) did

not meet the criteria for acceptable discrimination indices. For NABTEB, 29 items (58%) met the criteria for acceptable discrimination indices while 21 items (42%) did not meet the criteria for acceptable discrimination indices. Comparing the percentage of acceptable discriminative indices of the three examining bodies, it is evident that WAEC had the highest followed by NABTEB then NECO in 2017.

Research Question 4

How are the discriminative indices of May/June 2018 WAEC, NECO and NABTEB physics multiple choice test items distributed?

Table 7: Distribution of Discriminative Indices for WAEC, NECO and NATEB Physics Multiple-Choice Test Items for May/June 2018

S/N	Exam Type	Distributive Indices											TOTAL
		0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	Neg.	
1	WAEC	1	2	5	13	17	2	1	-	-	-	9	50
	%	2	4	10	26	34	4	2	-	-	-	18	100
2	NECO	1	6	9	14	8	1	2	3	-	-	6	50
	%	1	12	18	28	16	2	4	6			12	100
3	NABTEB	-	4	9	18	5	5	2	-	-	-	7	50
	%	-	8	18	32	10	10	4	-	-	-	14	100

Decision: 0.3 – 1.0 means acceptable discrimination indices

The analysis of discriminative indices for physics multiple-choice test items in 2018 revealed the following: For WAEC, 33 items (66%) met the criteria for acceptable discrimination indices while 17 items (34%) did not meet the criteria for acceptable discrimination indices. For NECO, 28 items (56%) met the criteria for acceptable discrimination indices while 22 items (44%) did not meet the criteria for acceptable discrimination indices. For NABTEB, 30 items (60%) met the criteria for acceptable discrimination indices while 20 items (40%) did not meet the criteria for acceptable discrimination indices. Comparatively, the results show that WAEC had the highest percentage of acceptable discrimination index followed by NABTEB then NECO in 2018.

Research Question 5

How are the distracter indices of May/June 2017 WAEC, NECO and NABTEB physics multiple choice test items distributed?

Table 8: Distribution of Distracter Indices for WAEC, NECO and NATEB Physics Multiple-Choice Test Items for May/June 2017

S/ N	Exam Type	Distracter Indices											TOTAL
		0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	Neg.	
1	WAEC	8	14	28	29	21	12	25	5	-	-	13	150
	%	5.3	7.8	18.7	19.3	14	8	16.7	3.3			8.7	100
2	NECO	23	101	40	16	18	6	6	8	3	2	17	240
	%	9.6	42.1	16.7	22	7.5	2.5	2.5	3.3	1.25	0.8	7.1	100
3	NABTEB	5	19	21	45	22	16	6	7	-	-	9	150
	%	3.3	12.7	14	30	14.7	10.7	4	2.7	-	-	6	100

Decision: positive index possessed good distracter index

Negative and zero indices non possession of good distracter index

The physics multiple-choice test for WAEC and NABTEB has 50 items with 4 response options, it means that there will be 150 (3 X 50) distracters each for WAEC and NABTEB. The multiple choice test for NECO has 60 items with 5 response options, it means that there will be 240 (4 X60) distracters. The acceptable criterion for a good distracter index is when the index is positive while negative and zero indices means that such distracter does not possess good distracter index. Therefore, good distracter index ranges from 0.1 – 0.9.

The analysis of distracter indices for physics multiple-choice test items in 2017 revealed the following; for WAEC, 129 distracters (86%) possessed good distracter indices while 21 distracters (14%) did not possess good distracter indices. For NECO, 200 distracters (83.3%) possessed good distracter indices while 40 distracters (16.7%) did not possess good distracter indices. For NABTEB, 136 distracters (90.7%) possessed good distracter indices while 14 distracters (9.3%) did not possess good distracter indices. Comparing the percentage of good distracter index among the three examination bodies, it is evident that NABTEB had the highest, followed by WAEC then NECO in 2017.

Research Question 6

How are the distracter indices of May/June 2018 WAEC, NECO and NABTEB physics multiple choice test items distributed?

Table 9: Distribution of Distracter Indices for WAEC, NECO and NATEB Physics Multiple-Choice Test Items for May/June 2018

S/N	Exam Type	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	Neg.	TOTAL
1	WAEC	16	32	39	22	13	8	-	-	-	-	20	150
	%	10.7	21.3	26	14.7	8.7	5.3					13.3	100
2	NECO	49	81	39	27	15	5	4	-	-	-	20	240
	%	20.4	33.8	16.3	11.3	6.3	2.1	1.7				8.3	100
3	NABTEB	27	36	29	15	15	6	-	-	-	-	22	150
	%	18	24	19.3	10	10	4	-	-	-	-	14.7	100

NOTE: positive index possessed good distracter index

Negative and zero indices non possession of good distracter index

The physics multiple-choice test for WAEC and NABTEB has 50 items with 4 response options, it means that there will be 150 (3 X 50) distracters each for WAEC and NABTEB. The multiple choice test for NECO has 60 items with 5 response options, it means that there will be 240 (4 X60) distracters. The acceptable criterion for a good distracter index is when the index is positive while negative and zero indices means that such distracter does not possess good distracter index. Therefore, good distracter index range from 0.1 – 0.9.

The analysis of distracter indices for physics multiple-choice test items in 2018 revealed the following; for WAEC, 114 distracters (76%) possessed good distracter indices while 36 distracters (24%) did not possess good distracter indices. For NECO, 171 distracters (71.25%) possessed good distracter indices while 69 distracters (28.75%) did not possess good distracter indices. For NABTEB, 101 distracters (67.3%) possessed good distracter indices while 49 distracters (32.7%) did not possess good distracter indices. Comparing the percentage of good distracter index among the three examination bodies, it is evident that WAEC had the highest, followed by NECO then NABTEB in 2018.

3. DISCUSSION OF FINDINGS

The result presented research question one revealed that the percentage of acceptable difficulty indices for WAEC, NECO and NABTEB physics multiple-choice test in 2017 was 84%, 94% and 80% respectively. This means that at least 80% of the items each in WAEC, NECO and NABTEB physics multiple-choice test in 2017 have acceptable difficulty indices. Comparatively, it is evident that NECO had the highest percentage of acceptable difficulty index, followed by WAEC then NABTEB in 2017. The result presented in research question two revealed that the percentage of acceptable difficulty indices for WAEC, NECO and NABTEB physics multiple-choice test in 2018 was 90%, 78% and 80% respectively. This means that at least 78% of the items each in WAEC, NECO and NABTEB physics multiple-choice test in 2018 have acceptable difficulty indices. Comparing the percentage of acceptable difficulty index, it is revealed that WAEC had the highest percentage of difficulty index, followed by NABTEB then NECO in 2018. The above findings support the findings of Ugodulunwa and Barko (2015) that some items possessed moderate difficulty levels and discriminated well between high and low achievers in business studies junior secondary certificate examination in Plateau State. Also, the findings support the findings of Nwosu (2011) on the comparative study of WAEC and NECO Economics multiple-choice questions from 2006 – 2010 in which not less than 36 items each from 2006 – 2010 of WAEC and NECO Economics multiple-choice test items have acceptable difficulty indices between 0.3 and 0.7.

The result in research question three revealed that the percentage of acceptable discriminative indices for WAEC, NECO and NABTEB physics multiple-choice test in 2017 was 82%, 42% and 58% respectively. This means that at least 42% of the items each in WAEC, NECO and NABTEB physics multiple-choice test in 2017 have acceptable discrimination index. Comparing the percentage of acceptable discriminative indices of the three examining bodies, it is evident that WAEC had the highest percentage of acceptable discrimination indices followed by NABTEB then NECO in 2017. The result in research question four explained that the percentage of acceptable discriminative indices for WAEC, NECO and NABTEB physics multiple-choice test in 2018 was 66%, 56% and 60% respectively. This means that at least 56% of the items each in WAEC, NECO and NABTEB physics multiple-choice test in 2018 have acceptable discrimination index. Comparing the percentage of acceptable discrimination indices among the three examining bodies, it is evident that WAEC had the highest, followed by NABTEB then NECO in 2018. Therefore, the above findings is in line with the findings of Olutola (2013) who reiterated that the discrimination indices, the 2008 WAEC Biology MCT had a discrimination power of 0.43, higher than that of NECO, which was found to be 0.39. The findings also agreed with the findings of Alanobi (2015) that who discovered that at least 46% of the items each in 2005, 2006, 2008, 2009 and 2011 NABTEB Economics multiple-choice tests possessed good and applicable discrimination indices.

The result in research question five revealed that the percentage of acceptable distracter indices for WAEC, NECO and NABTEB physics multiple-choice test in 2017 was 86%, 83.3% and 90.7% respectively. This means that at least 83.3% of the items each in WAEC, NECO and NABTEB physics multiple-choice test in 2017 possess good distracter index. Comparing the

percentage of good distracter index among the three examination bodies, it is evident that NABTEB had the highest, followed by WAEC then NECO in 2017. The result in research question six revealed that the percentage of acceptable distracter indices for WAEC, NECO and NABTEB physics multiple-choice test in 2018 was 76%, 71.3% and 67.3% respectively. This means that at least 67.3% of the items each in WAEC, NECO and NABTEB physics multiple-choice test in 2017 possess good distracter index. Comparing the percentage of good distracter index among the three examination bodies, it is evident that WAEC had the highest, followed by NECO then NABTEB in 2018. The above findings agree with the findings of Alanobi (2015) who revealed that greater than or equal to 90.7 percent of the items each in 2005, 2006, 2008, 2009 and 2011 NABTEB Economics multiple-choice tests had distracter indices that were acceptable. Finally, the item qualities of the NABTEB Economics multiple-choice test items were found to grow progressively from 2005 to 2011.

4. CONCLUSION

From the findings of the study, the conclusions was that WAEC, NECO and NABTEB Physics multiple-choice test items in 2017 and 2018 possess acceptable difficulty, discrimination and distracter indices and therefore should be accepted as standard questions for the senior secondary school certificate examination in Physics.

5. RECOMMENDATIONS

Based on the findings, the following recommendations were made:

1. Examination body such as NECO should mount regular trainings/workshops/seminars and brief sessions for item writers, moderators, supervisors and examiners to update their knowledge in test construction.
2. Anambra State's Education Resource Centre, which conducts the said examinations on behalf of the government, should drastically improve on test quality by engaging the services of psychometricians during test development to enhance their tests' psychometric properties.
3. State Ministry of Education in Nigeria should as well begin to inculcate the practice of item analysis and validation in their school system.

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