

**APPRAISAL OF RELIABILITY OF CRS MULTIPLE-CHOICE TEST
ITEMS ADMINISTERED BY ENUGU STATE MINISTRY OF
EDUCATION FOR BASIC EDUCATION CERTIFICATE
EXAMINATION (BECE)**

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Abstract

The study was designed to appraise the reliability of State Basic Education Certificate Examination Christian Religious Studies multiple-choice questions in Enugu State. Two research questions and one hypothesis was formulated for the study. Descriptive survey research design was adopted for the study. The population for the study consisted of Upper Basic 9 CRS students in all 291 secondary schools in Enugu State, who registered for BECE in 2015 and 2018. Three secondary schools were sampled from the three Local Government Areas that made up Enugu Education Zone. BECE question papers were administered to 300 students from the three schools drawn from the Enugu Education Zone. BECE question paper was the instrument used for data collection. Kuder-Richardson 20 (K-R 20) and simple linear regression were used to answer the research questions. The reliability coefficient of the CRS BECE multiple-choice test was tested for significance at an alpha level of 0.05 using simple regression procedure. Some of the major findings of the study indicated a low reliability of the test instrument to a great extent, and low stability of the test items.

Key Terms: Reliability, CRS Multiple-Choice Test Items and Basic Education Certificate Examination (BECE)

Introduction

The Basic Education Certificate Examination (BECE) is a mandatory examination for students in the ninth year of their basic education class and third year of the Junior Secondary School. It is the examination that aims at qualifying students for admission into senior secondary and vocational schools. BECE consists of multiple-choice, essay questions, and Continuous (Internal) Assessment marks provided by the schools. BECE is conducted by the Examination Development Centres (EDC) of every State Ministry of Education and the National Examination Council (NECO) for unity schools and allied institutions. State BECE which is the researcher's area of interest conducts the BECE for all public state secondary schools and approved private secondary schools in Nigeria. Enugu State Ministry of Education, like any other State Ministry of Education through the examination development centre is responsible for the development and construction of tests with regards to BECE.

A glance through the Enugu State BECE CRS results summary from 2010 to 2019 showed that the percentage of passes were on the high side. In 2010, the number of students that passed were 30680 (86.77%) out of 35355 that sat for the examination. In 2011, 33120 (96.45%) out of 34339 passed. In 2012, 24349 (83.93%) out of 29009 passed the examination. In 2013, 34400 (90.52) out of 38000 passed the examination. In 2014, 31112 (98.45%) out of 31600 passed. In 2015, 15654 (74.87%) out of 20907 passed the examination. In 2016, 19654 (85.77%) out of 22914 passed the examination (Enugu State Ministry of Education BECE Course Performance Sheet, 2010, 2011, 2012, 2013, 2014, 2015, 2016). It means that the mean percentage pass within the years under study is 88.11%. Nevertheless, a cursory look at students' achievement at Senior Secondary School Examination (SSCE) depicted low performance in Christian Religious Studies (WAEC Chief Examiner's Report 2018 and 2019).

Considering the discrepancy noted above, the reliability of the instruments for the test may be in doubt, hence the need for appraisal of the test standardization. Test standardization, therefore, is a process of providing a test with basic psychometric properties. One aspect of psychometric property that concerns this study is reliability. A test is reliable when it yields consistent results on repeated observations. Reliability is the degree of repeatability or consistency of empirical measurement (Anigbo, 2014). The reliability of a test could be expressed as a coefficient called the *coefficient of reliability*. It is generally obtained by correlating two sets of scores independently got by the test in the form of equivalent forms, test re-test or split-halves (Anigbo, 2014). Reliability can be estimated using three different methods. These methods include measure of stability (test-retest reliability), measure of equivalence (parallel/alternative reliability), and measures of internal consistency which involves split half and Kuder-Richardson estimates (Ebuoh, 2004). In this research work, the researcher will use Kuder-Richardson (K-R 20) to measure internal consistency and test-retest for measure of stability.

In reliability, we want to know the measure of consistency and measure of stability. Stability means administering items to have stable response in opinion test. Test-retest is

therefore used to know the measure of stability. Test-retest involves administering an evaluation instrument to the same group of test takers at two different times. The two set of scores obtained are then correlated to obtain an estimate of reliability coefficient (Anigbo, 2014). This study is interested in measuring the reliability of Christian Religious Studies multiple-choice questions of Enugu State BECE. Christian Religious Studies is one of the core subjects in both primary and junior secondary schools in Christian dominated states in Nigeria like Enugu State. It is one of the subjects through which students are assessed in BECE. CRS at the upper basic school level is meant to prepare learners for useful living through inculcation of Christian attitudes and values, and to prepare learners for higher education. It should be noted that every subject taught in basic and senior secondary school has its unique value and importance to the whole education process.

The uniqueness of Christian Religious Studies begins from its twofold function of synchronized development of the intellectual ability and moral character of the students. It also emphasizes the affective domain of education taxonomy - the domain which many seem to be silent about or sometimes even neglected (Ntama, Owulu and Monity, 2016). Since skills in affective domain describe the way people react emotionally and their ability to feel the pain and joy of others (Anigbo, 2014). Christian Religious Studies is a subject that helps to streamline the thought, character, moral and aspiration of the students. It also offers hope for the future, integrate, discipline, harmonious and progressive society (Ntama, Owulu and Monity, 2016).

The researcher is yet to come across researches carried out on the analysis of psychometric properties of BECE Christian Religious Studies (CRS) multiple choice questions. It becomes necessary that a study of the analysis of psychometric properties of State BECE CRS test items be conducted to ascertain the level of its reliability. From the inquiries made, items are gathered from different schools within Enugu State, generated by teachers in their subject areas. These items are then evaluated and administered by the Education Development Center (EDC). It has also been alleged that items are sometimes collected from some other sources apart from the ones generated by the teachers. This study therefore tries to examine the reliability of the BECE test items administered by the EDC.

Statement of the Problem

Recognizing the place of CRS in general attitude and character molding of students, it is important to know if the instrument used for test at BECE yields consistent result in terms of reliability and stability. It is laudable to note that research reports depicted that students' achievement in the subject is on the high side. In the course of this investigation, the researcher through a glance of Enugu State BECE CRS results summary from 2010 to 2019 discovered that the percentages of passes were on the high side. But a look at the WAEC Chief Examiner's Report of 2018 and 2019 showed that students' achievement in CRS is low. It leaves one to wonder what the reliability of the BECE test instruments could be. If the higher achievement at BECE level is real, it should translate to higher achievement at WAEC level.

Hence, one is left with option of doubt if the instrument at BECE level is truly reliable to have produced higher achievers. The problem is to find out if it is possible that the instrument at BECE level is truly valid and reliable to have produced high percentages of passes of candidates who took part in the examination.

Purpose of the Study

The purpose of the study is to appraise the reliability of CRS multiple-choice test items administered by Enugu State Ministry of Education for Basic Education Certificate Examination (BECE).

Specifically, the study was designed to determine:

1. the level of internal consistency of Enugu State Ministry of Education BECE CRS multiple-choice test items
2. the level of stability of Enugu State Ministry of Education BECE CRS multiple-choice test items

Research Question

The following research questions guided the study:

1. what is the internal consistency of CRS BECE multiple-choice items administered by the Enugu State Ministry of Education as measured with Kuder-Richardson 20 (K-R 20)?
2. What is the stability index of CRS multiple-choice items administered by the Enugu State Ministry of Education?

Hypotheses

The null hypothesis below was formulated to guide the study at 0.05 significant level:

Ho The reliability coefficient of the CRS BECE multiple-choice test will not be statistically significant.

Methodology

The research design for the study was a descriptive survey research design aimed at analyzing the psychometric properties of CRS multiple-choice test items administered by Enugu State Ministry of Education for Basic Education Certificate Examination (BECE). Descriptive research design, according to Idoko (2011) is concerned with the collection, collation, analysis, and interpretation of data the way they are or exist from relevant sources with appropriate tools and methods and afterward, using the result of the interpretation to describe existing situations, events, characters, and so on. The area of study was Enugu State. The State has six education zones namely: Agbani, Awgu, Enugu, Nsukka, Obollo-Afor and Udi education zones. There are many secondary schools in each of these education zones. The study was delimited to Enugu education zone which is made up of three Local Government Areas: Enugu East, Enugu North and Isi Uzo. In these three Local Government Areas, there

are 31 secondary schools managed by Enugu State Ministry of Education. The population of the study consisted of 55,244 Upper Basic 9 CRS students in all the 291 secondary schools in Enugu State. These were the students who registered for BECE in 2015 and 2018. The sample of the study consisted of BECE CRS multiple-choice items for 2 years. Simple Random sampling technique was used to draw the sample size out of the BECE CRS question papers from the year of establishment of the examination body. To obtain the years to be used, balloting by replacement was used to select the 2 years for the study. The schools were stratified into schools that sat for BECE. On the other hand, 3 schools were obtained through simple random sampling from the 31 State BECE schools from which 100 students were randomly selected from each of the schools. This yielded 300 students for the state BECE school population.

The instrument for data collection was BECE Christian Religious Studies multiple-choice question papers which had undergone standardization process before being administered to the examinees. The question paper contained 60 multiple-choice objective items with four options lettered A, B, C, and D for each item. There was one correct answer and three distracters. Validation of the question paper was not necessary because the instrument was already a standardized test for CRS BECE. Since the instrument was a BECE standardized question paper, there was no need to determine its initial reliability before commencing study. However, the level of internal consistency was measured using Kuder-Richardson formula 20 (K-R 20) after the administration of the test which is the essence of this study. The researcher administered the BECE CRS question paper to the sample with the help of two research assistants. The research assistants were assigned to two Local Government Areas while the researcher handled the third one. The answer scripts were scored. One mark was awarded for each correct answer and zero (0) for each wrong answer. Research question 1 was answered using K-R20 procedure while research question 2 was answered using the Pearson Product Moment correlation procedure. Hypothesis was tested using the t-test of significance of 'r' at an alpha level of 0.05.

Data Analysis, Results and Discussion

Research Question 1

What is the internal consistency of CRS BECE multiple-choice items administered by the Enugu State Ministry of Education as measured with Kuder-Richardson 20 (K-R 20)?

Table1: Summary of test of internal consistency of the CRS BECE multiple-choice items of the Enugu State Ministry of Education using KR-20 approach

Number of items	SDt	SDt²	∑Pq	K-R 20
60	9.42	88.74	14.4	0.85

The data presented in table 1 show the extent of internal consistency of CRS BECE multiple-choice items of the Enugu State Ministry of Education. As shown on Table1 the internal consistency index is 0.85. This indicates that the test has an appreciable level of internal consistency.

Research Question 2

What is the stability index of CRS multiple-choice items administered by the Enugu State Ministry of Education?

Table 2: stability index of CRS multiple-choice items of the Enugu State Ministry of Education

Computed r	r. Square	Adjusted r Square	Standard Error
0.06631	.00440	.00106	10.64514

The data presented in Table 2 show the extent of the stability of CRS BECE multiple-choice items of the Enugu State Ministry of Education. Correlations with two sets of scores were determined and an index of 0.06631 was obtained. This low stability index suggests that the CRS BECE multiple-choice items could have been influenced by some external variables.

Hypothesis

Reliability coefficient of the CRS BECE multiple-choice test will not be statistically significant.

Table 3: Test of significance of the stability of the CRS BECE multiple-choice test

Computed r	r. Square	Adjusted r Square	Standard Error	Beta	T	Sig. of t
0.06631	.00440	.00106	10.64514	.066305	1.147	0.2422

Table 3 above presents the analysis of the test of significance of the stability index of the CRS BECE multiple-choice items. As shown in the Table, the alpha level (0.05) is less than the significance of t (0.2422). Based on the decision rule the researcher upholds the null hypothesis and concludes that stability coefficient of the CRS BECE multiple-choice test is not statistically significant.

Discussion

The following constitute the summary of the major findings of the study:

1. The items of the CRS BECE multiple-choice items administered by the Enugu State Ministry of Education has high level of internal consistency
2. The items of the CRS BECE multiple-choice items administered by the Enugu State Ministry of Education has low stability index

CRS BECE multiple-choice items administered by the Enugu State Ministry of Education has high internal consistency

From the responses of the items administered to research subjects, it shows the BECE CRS multiple-choice items to a great extent established the reliability of the items. This is because internal consistency index of 0.85 depicts a very high level of internal consistency. This indicates that the test has an appreciable level of internal consistency. The findings agree with Anigbo (2014) who opined that test items are reliable when they produce the same result on repeated observations.

CRS BECE multiple-choice items administered by the Enugu State Ministry of Education has low stability index

The stability index of BECE CRS multiple-choice test items which were subjected to test retest approach could have been influenced by external factors and therefore did not yield good result. The findings agree with De Souza, Alexandre, Guirardello (2017) who said that in carrying out test retest the factors to be measured remains the same but random error can cause any change in the scores. The above finding was buttressed by hypothesis two which showed that the stability coefficient of the CRS BECE multiple-choice test was not statistically significant.

Based on the findings, the following recommendations were proffered:

1. To test the stability of items, Enugu State Ministry of Education through EDC can conduct pilot test or pretesting exercise to test the ability of the examinees before administering the test items.
2. The Enugu Ministry of Education through EDC should sometimes subject the test items to the test of internal consistency for a reliable result
3. Conferences, workshops, seminars and other in-service programmes should be regularly organized for test constructors.

Conclusion

The study centered on the appraisal of reliability of State Basic Education Certificate Examination Christian Religious Studies multiple-choice questions in Enugu State. Two research questions and one hypothesis was formulated for the study. Descriptive survey research design was adopted for the study. The population for the study consisted of Upper Basic 9 CRS students in all 291 secondary schools in Enugu State, who registered for BECE in 2015 and 2018. Three secondary schools were sampled from the three Local Government Areas that made up Enugu Education Zone. BECE question papers were administered to 300 students from the three schools drawn from the Enugu Education Zone. BECE question paper was the instrument used for data collection.

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