

## **Comparative Analysis of 2021 and 2022 West Africa Examination Council (WAEC) and National Examination Council (NECO) Chemistry Multiple Choice Questions in Enugu State, Nigeria**

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**ABSTRACT:** *This study compared 2021 and 2022 WAEC and NECO Chemistry multiple choice question in Enugu State, Nigeria. The comparison covered the various levels of the cognitive domain of Bloom's Taxonomy of Educational Objectives. The population of the study was 220 West Africa Examination Council (WAEC) and National Examination Council (NECO) Senior School Certificate Examination (SSCE) objective test items for Chemistry. There was no need for sampling since the population was manageable. Percentage was used in answering the research questions while Chi-square was used in testing the hypotheses. The result showed that for both examining bodies, most of the questions were on knowledge. When the distribution of the questions across the various levels of the cognitive domain, set by WAEC and NECO were compared, significant relationship was discovered in 2021 questions, whereas in 2022 questions, no significant relationship was observed. The conclusion therefore is that, as far as the distribution of questions across the various levels of the cognitive domain is concerned, WAEC is more consistent than NECO. Based on the finding of this study, it was recommended that authorities of National Examination Council ensure that subsequent SSCE Chemistry questions are appropriately distributed across the various levels of the cognitive domain.*

**KEYWORDS:** *West Africa Examination Council, National Examination Council, Cognitive domain, Bloom's Taxonomy.*

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### **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 and Udoh, 2017). The West African Examination Council (WAEC) was established through the ordinance No40 of 1951 (Okoye and Nwafor, 2009) with the sole responsibility of determining the examinations required in the public interest in West Africa, which are conducting examinations and awarding certificates that are equivalent to

those of examining authorities in the United Kingdom. In Nigeria, the council was solely responsible for conducting examinations for Nigeria students who had completed their secondary school education and wish to sit for the West African schools certificate, Teachers Grade II Certificate, Royal Society of Arts (RSA), National Business Certificate or the National Technical Certificate Examination (Dibu-Ojerinde and Faleye, 2006).

From 1952 to 1962, West African Examination Council (WAEC) performed its duties well without much criticisms. Criticism started becoming louder in 1967 as a result of massive failure plus other variables, which made the country Nigeria to hold a national conference in 1969. The conference held in 1969 heralded the development of yet another curriculum different from the one Nigerians were used to prior to independence. This curriculum conference was a turning point in the curriculum development history of Nigeria, Chemistry inclusive. The outcome of this conference was what gave birth to a new curriculum which comprises some part of the pre-independent curriculum and some new aspects (like Modern Chemistry Curriculum) were introduced (Anibueze, 2015). Anibueze (2015) stated that the WAEC adopted the new curriculum in 1974 but the 1974 results were very poor.

However, from 1970s, some issues appeared to be getting too much for WAEC to handle such as timely release of results, massive failure, uncontrollable population explosions of candidates, overloading of works, cases of leakage of examination papers and increased rate of examination malpractice (Kolawole, 2007; Okoye and Nwafor, 2009). The massive leakage of question papers in 1977 was the climax which led the Federal Government of Nigeria to set up the Sogbetan Commission of inquiry to investigate the situation. It was as a result of these that made the Federal Government of Nigeria to establish National Technical Examination Board (NABTEB) for technical and business subject, National Teachers Institute (NTI) for teachers grade two certificate examination and National Examination Council (NECO) for senior secondary school certificate examination. These were established based on the Sogbetan Commission's recommendation to the Federal Government of Nigeria in April 1999. The Sogbetan Commission's recommendation also brought about the transformation of the National Board for the Educational Measurements (NBEM) that was established under decree no 69 of August 1993.

Among all these examination bodies set up by the Federal Government of Nigeria, National Examination Council (NECO) had the highest number of criticisms (Peters, 2012) while some scholars were in support of the establishment of NECO, others were against it. Famakinwa (2009) reveal that NECO was an attempt to bridge the educational gap between the different geographical sections of the country. National Examination Council (2003) revealed that its arrival was an opportunity for choice of examination body for candidates to patronise. Ahmed (2014) however argued that NECO had standard quality of question papers set and grades when compared to Broom's principles of evaluating students, which according to him, has made NECO to be more superior to WAEC. Anigbo (2018) revealed that 2017 NECO SSCE Mathematics questions were more normally distributed across the levels of the cognitive domain than WAEC.

Other scholars contradicted these assertion. Kolawole (2002) stated that NECO does not have the capacity to conduct reliable examinations that could command widespread national and international respect and acceptability. According to Obioma and Salau(2007), WAEC results have greater predictive power than the NECO results. Anigbo (2005) stated that NECO was inferior in terms of quality of question papers set and credibility of grades awarded to candidates. According to Peters (2012), the substandard nature of NECO made some Federal University from 2002 to have rejected NECO results. Ahmed (2014) stated that NECO questions from 2011 to 2014 were of higher standard than that of WAEC. Dibu-Ojerinde and Faleye (2005) stated that there was no difference between NECO and WAEC when they were compared. Hence, there is need to solve these controversies especially to determine the examination bodies ( WAEC and NECO) questions that is more standard. This is because most of the scholars criticisms are on the reliability and validity of senior secondary school certificate examination (SSCE) questions. Therefore, this study compared 2021 and 2022 WAEC and NECO SSCE chemistry multiple choice questions. The comparison covered the various levels of the cognitive domain of Bloom's Taxonomy of Educational Objectives – Knowledge, Comprehension, Application, Analysis, Synthesis and Evaluation.

### **Purpose of the study**

The main purpose of this study was the comparative analysis of 2021 West Africa Examination Council (WAEC) and 2022 National Examination Council (NECO) senior schools certificate examination (SSCE) in chemistry multiple choice questions in Enugu State, Nigeria. Specifically, the study sought to:

1. The level of the cognitive domain do 2021 WAEC and NECO senior schools certificate examination (SSCE) chemistry multiple choice questions cover.
2. The level of the cognitive domain do 2022 WAEC and NECO senior schools certificate examination (SSCE) chemistry multiple choice questions cover.

### **Research questions**

1. What level of the cognitive domain do 2021 WAEC and NECO SSCE chemistry multiple choice questions cover?
2. What level of the cognitive domain do 2022 WAEC and NECO SSCE chemistry multiple choice questions cover?

### **Research hypotheses**

1. There is no significant relationship between the examining bodies(WAEC and NECO) in the distribution of 2021 SSCE chemistry multiple choice questions across the various levels of the cognitive domain.
2. There is no significant relationship between the examining bodies(WAEC and NECO) in the distribution of 2022 SSCE chemistry multiple choice questions across the various levels of the cognitive domain.

## METHODOLOGY

The study was a comparative content analysis of evaluative research because it was aimed at comparing the extent to which 2021 and 2022 WAEC and NECO SSCE chemistry multiple choice questions were distributed across the expected levels of the cognitive domain. The Population of the study was 220 (120 test-item for NECO and 100 test-item for WAEC 2021 and 2022 combine) May/June objectives test item. There was no need for sampling since the population was manageable. The questions were administered to one Measurement and Evaluation expert, one chemistry lecturer in the Department of Science Education, Enugu State University of Science and Technology that are in the rank of senior lecturers and level sixteen Special Science School chemistry teachers. These experts were requested to classify each question according to the level of cognitive domain it belonged. All the experts had chemistry background since knowledge in the subject area was very important in the classification.

The 2021 and 2022 SSCE chemistry multiple choice questions had 120 test-items combine for NECO and 100 test items for WAEC. After the experts had indicated the levels, the researchers noted the levels assigned to each by the three experts. Any level assigned to a question by two experts were regarded as the level for that question, but in any case where the three experts assigned different levels to a particular item, the researchers took decision on what level it should belong. Such cases were very few. Having identified the levels assigned to various items, the researchers, for each examining body, took count to the number of questions that were asked at the various levels. In testing the hypotheses, the chi-square statistical techniques was used. This was appropriate because the information handled were frequencies. For the research questions, the percentage was used for analysis.

## RESULTS

### Research question 1

What levels of the cognitive domain do 2021 WAEC and NECO SSCE chemistry multiple choice questions cover?

**Table 1: Number and Percentage level of 2021 WAEC and NECO SSCE Chemistry Multiple Choice Questions at each level of the Cognitive Domain.**

Examination	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
<b>Total</b>						
WAEC 50	20(40%)	4(8%)	10(20%)	12(24%)	3(6%)	1(2%)
NECO 60	38(63%)	2(3%)	12(20%)	3(5%)	4(7%)	1(2%)

Table 1 showed the number and percentage level of 2021 WAEC and NECO SSCE chemistry multiple choice questions set at each level of the cognitive domain. From the Table 1, it was

discovered that questions covered all the levels of the cognitive domain. Majority of the items were centered on Knowledge with 40% and 63% questions respectively whereas the least number of items were centered on Evaluation with 1% questions for both examining bodies.

### Research question 2

What levels of the cognitive domain do 2022 WAEC and NECO SSCE chemistry multiple choice questions cover?

**Table 2: Number and Percentage level of 2022 WAEC and NECO SSCE Chemistry Multiple Choice Questions at each level of the Cognitive Domain.**

Examination	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation	Total
WAEC	25(50%)	4(8%)	11(22%)	6(12%)	2(4%)	2(4%)	50
NECO	33(55%)	3(5%)	16(26%)	4(7%)	4(7%)	0(0%)	60

Table 2 showed the number and percentage level of 2022 WAEC and NECO SSCE chemistry multiple choice questions set at each level of the cognitive domain. From the Table 2, it was discovered that the majority of the questions were centered on Knowledge with 50% and 55% followed by Application with 22% and 26% respectively whereas there was no question centered on Evaluation for NECO.

### Testing of Null Hypotheses

The following null hypotheses were tested at 0.05 levels of significance.

**HO<sub>1</sub>:** There is no significant relationship between the examining bodies (WAEC and NECO) in the distribution of 2021 SSCE chemistry multiple choice questions across the various levels of the cognitive domain.

**Table 3: Chi-square (X<sup>2</sup>) Analysis of determining if there was no significant relationship between the examining bodies (WAEC and NECO) in the distribution of 2021 SSCE chemistry multiple choice questions across the various levels of cognitive domain.**

Examination	K	C	Ap	An	S	E	T	alpha	df	Xcal.	Xcrit.	Decision	Body
WAEC	20(26.36)	4(2.73)	10(10)	12(6.82)	3(3.18)	1(0.91)	50	0.05	5	11.14	11.07	Rejected	
NECO	38(31.64)	2(3.27)	12(12)	3(8.18)	4(3.82)	1(1.09)	60						
Total	58	6	22	15	7	2	110						

Table 3 showed the Chi-square ( $X^2$ ) Analysis of determining if there was no significant relationship between the examining bodies (WAEC and NECO) in the distribution of 2021 SSCE chemistry multiple choice questions across the various levels of the cognitive domain. The Table 3 revealed that the null hypothesis was rejected because the calculated value  $X_{cal.}(11.14)$  was greater than the table value  $X_{crit.}(11.07)$ , which implies that there was a significant relationship between the examining bodies (WAEC and NECO) in the distribution of 2021 SSCE chemistry multiple choice questions across the various levels of the cognitive domain.

**HO<sub>2</sub>:** There is no significant relationship between the examining bodies (WAEC and NECO) in the distribution of 2022 SSCE chemistry multiple choice questions across the various levels of the cognitive domain.

**Table 4: Chi-square ( $X^2$ ) Analysis of determining if there was no significant relationship between the examining bodies (WAEC and NECO) in the distribution of 2022 SSCE chemistry multiple choice questions across the various levels of cognitive domain.**

Examination Body	K	C	Ap	An	S	E T	alpha	df	$X_{cal.}$	$X_{crit.}$
WAEC	25(26.36)	4(3.18)	11(12.27)	6(4.55)	2(2.73)	2(0.91)	50	0.05	54.37	11.07
NECO	33(31.64)	3(3.92)	16(14.73)	4(5.45)	4(3.27)	0(1.09)	60			
Total	58	7	27	10	6	2				

Table 4 showed the Chi-square ( $X^2$ ) Analysis of determining if there was no significant relationship between the examining bodies (WAEC and NECO) in the distribution of 2022 SSCE chemistry multiple choice questions across the various levels of the cognitive domain. The table revealed that the null hypothesis was accepted because the calculated value  $X_{cal.}(4.37)$  was less than the table value  $X_{crit.}(11.07)$ , which implies that there was no significant relationship between the examining bodies (WAEC and NECO) in the distribution of 2022 SSCE chemistry multiple choice questions across the various levels of the cognitive domain. 2021 WAEC and NECO SSCE chemistry multiple choice questions were distributed across the various levels of the cognitive domain. 2022 WAEC SSCE chemistry multiple choice questions are more normally distributed across the various levels of the cognitive domain than NECO. In both years, NECO set more number of chemistry multiple choice questions than WAEC. Most of the questions for each examining body were on knowledge.

## DISCUSSION OF FINDINGS

From the result, it was discovered that there was a significant relationship between the examining bodies (WAEC and NECO) in the distribution of 2021 SSCE chemistry multiple choice questions across the various levels of the cognitive domain. The findings is in agreement

with Dibu-Ojerinde and Faleye (2005) who state that there was no difference between NECO and WAEC when they were compared. The result is equally in line with the view of Okoye and Nwafor (2009) who states that as far as the distribution of questions across the levels of the cognitive domain, WAEC and NECO are similar.

The result also showed that 2022 WAEC SSCE Chemistry multiple choice questions are more normally distributed across the various levels of the cognitive domain than NECO. The result is in line with Anigbo (2018) assertion that NECO was inferior in terms of quality of question papers set. Kolawole (2007) stated that NECO does not have the capacity to conduct reliable examination that could command widespread national and international respect and acceptability. The result is against the view of Anigbo (2018) and Ahmed (2014) assertion that NECO had standard quality of question papers set when compared to Broom's principles of evaluating students, which according to them, has made NECO to be superior to WAEC.

The result also showed that NECO set more number of chemistry multiple choice questions than WAEC. NECO set overall 120 questions in the year 2021 and 2022 combined against WAEC 100 questions.

The result also revealed that most of the questions for each examining bodies (WAEC and NECO) were on knowledge. This is in line with Okoye and Nwafor (2009) findings, where knowledge is the predominant questions set by WAEC and NECO in their study.

## **CONCLUSION**

Based on the findings of this study, conclusion was drawn that WAEC Chemistry multiple choice questions consistently covered the various levels of the cognitive domain than NECO in the year 2021 and 2022.

## **Recommendation**

1. The authorities of National Examination Council should ensure that subsequent SSCE Chemistry questions are consistently distributed across the various levels of the cognitive domain.
2. Persons with 2022 WAEC and NECO certificate shouldn't be discriminated. This is because the 2022 WAEC Chemistry multiple choice questions are more valid and more normally distributed than NECO.
3. Students should continue to develop more interest in sitting for the WAEC examinations since WAEC questions were found to be more consistently standard than NECO.
4. Chemistry teachers and School authorities should continue to encourage the students to prepare adequately for WAEC examinations.
5. Parents should encourage their children to put more efforts in studying to reduce the high rate of failure in the two examinations.

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