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INFLUENCE OF THREE MODES OF ORDERING TEST ITEMS ON SENIOR SECONDARY SCHOOL STUDENTS' ACADEMIC ACHIEVEMENT IN MATHEMATICS IN AWKA EDUCATION ZONE

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Abstract

The study investigated the influence of three modes of ordering test items on senior secondary school students' academic achievement in mathematics in Awka Education Zone. Four research questions guided the study and five null hypotheses were tested at 0.05 alpha level. The study adopted ex post-facto design. Population for the study comprised 5,057 senior secondary school three (SS3) students which comprised of 2259 males and 2798 females in all the public secondary schools in Awka Education zone of Anambra State, Nigeria. Multi-stage sampling procedure was used to select 380 SS3 students. The instrument for data collection for this study was General Mathematics Achievement Test (GMAT). The GMAT was validated by three experts, one in the Department of Science Education and another one in the Department of Educational Foundations (Measurement and Evaluation Unit), Nnamdi Azikiwe University, Awka. The third expert is from the Department of Mathematics, Nwafor Orizu College of Education Nsugbe. Kuder Richardson Formula 20 was used to obtain the reliability coefficient value of 0.79, 0.81 and 0.82 for least difficult to most difficult item, most difficult to least difficult items and items in randomized order respectively. The mean, standard deviation, Analysis of Variance and independent t-test were used for data analysis. The findings of the study showed that ordering

of test items from least difficult to most difficult items favours the students more than ordering of test items from most difficult and randomized order. It was recommended among others that the examination bodies should adopt the method of arranging the test items from simple to complex order of difficulty.

Introduction

The problem associated with mathematics evaluation and achievement is a major challenge for educators. General concern about mathematics achievement has been evident for many years. A central and persisting issue is how to provide instructional environments, conditions, methods, and solutions that achieve learning goals for students with different skills and ability levels. The current debate among scholars is how students could be successful in mathematics examinations. The discussion emphasizes mode of ordering items to produce individuals who can understand and apply fundamental mathematics concepts. Mathematics is a fundamental part of human thought and logic, and integral to attempt at understanding the world and ourselves. Hence, Kolawole and Oluwatayo (2005) define Mathematics as human invention, born out of human search to solve human problems. This implies that Mathematics is a creation of the human mind which is concerned with ideas, processing and reasoning. It plays a vital role in the study of science, technology and all other spheres of human endeavours. According to Akaeze and Okigbo(2021), the function and relevance of mathematics to education and the society makes it to be regarded as the bedrock of science and technological development. The importance of mathematics to nation building cannot be over emphasized as it continued to play significant role to the development of both the individual and the nations.

As a condition for admission into tertiary institution, a candidate seeking admission to study any course especially in the university is expected to have passed five(5) 'O' level subjects including Mathematics and English language at credit level in one sitting or six in two sittings in the West African Senior School Certificate Examination (WASSCE) and National Examination Council (NECO). A credit pass in Mathematics is compulsory for all science based courses generally and at least a pass in Mathematics for all courses in social science except Economics where

a credit is required (Unified Tertiary Matriculation Examination, 2020/2021). Despite the importance and usefulness of Mathematics to human existence and the enviable position it occupies in the field of disciplines, students' achievement in both internal and external examinations have continued to deteriorate year by year (Egbe, 2018).

Secondary School Students perform poorly in both internal and external examinations like WASSCE and NECO. In national results showing the summary of students' performance in Mathematics in WASSCE from 2009-2021, it is evident that students' performance is below expectations. A close look at the results revealed that candidates in Nigeria did not record up to 50% credit in Mathematics in any of the years suggesting low achievement in the subject. The WAEC Chief examiners 2020 reported that there was 1.06% improvement in the students' performance in 2020 compared to that of year 2019.This improvement is infinitesimal compared to what should be expected in a subject such as mathematics which is the bedrock of all sciences. The low achievement in mathematics at both qualifying examination (SSCE,UME) has resulted in many students not being able to proceed in educational careers of their choice. The achievement of some of the few students who eventually made it into tertiary institution is equally not encouraging.

It is worrisome to note too that the academic achievement of students in mathematics has continued to deteriorate year after year (Ebenebe, 2019). This shows that there is low academic achievement of students in mathematics over the years, and therefore called for an investigation to the factors responsible for the situation. Many variables have been identified by Suleiman and Hammed(2019), Emerson, Antonietta, Jonathan, Aahron, Sitay and Redjie (2020) as being responsible for students' low interest and poor achievement in Mathematics. Such variables include curriculum, examination bodies, teachers, students, environment and textbooks. From studies by those authors carried out to identify the various factors which cause the persistent poor achievement and possible way to combat it, the identified causes are usually classified as;intrinsic factors(psychological and physical factors inherent in the students including sex), Instructional factors (the strategy adopted by the teachers in the course of teaching, the structure, content, reliability, validity and mode of presentation and administration of the test instrument and environmental factors(Physical factors, condition and quality of the learning and examination).

This consistent poor performance by students in mathematics calls for serious national action to remedy the situation and to put mathematics on a sound footing to facilitate

the realization of a great and dynamic economy in Nigeria. Attempts to find solution to the incessant failure rates of students in mathematics have made researchers in mathematics education to consider a number of factors (Adebayo, 2018). In this vein, it appears that government, school administrators among other educational stakeholders have collectively improved school environment, enhanced teaching methods in mathematics, and provided qualified/competent mathematics teachers (Nwankwo, 2021).

Similarly, Wisdom (2018) posited that, a number of programmes have been embarked upon like introduction of new mathematics textbooks, different mathematics competitions, workshops and seminars. Despite the efforts of these educational stakeholders in improving academic achievement of students in mathematics, the issue of poor academic achievement in the subject still persists. It appears that less effort are directed at problems from examinations and testing order such as ordering of test items from most difficult to least difficult level, random order or ordering from least difficult to most difficult. The present researcher is motivated because ordering of test items and gender could have an impact on the achievement of students in mathematics in Awka Education Zone of Anambra State, Nigeria, since much effort have been made in improving the teaching and learning methods in mathematics classroom and poor performance of students in the subject persists.

Test consists of a set of questions to be answered or tasks to be performed (Adebola, 2018). Tests are used to assess the ability or trait in question. Psychological and Education tests are standardized procedure to measure quantitatively or qualitatively one or more aspect or trait by means of a sample of verbal or nonverbal behaviors (Nwankwo, 2018). Test is made up of several items and its procedure of administration is standardized to ensure maximum objectivity. The different types of test include: achievement test, intelligence tests, aptitude test and personality test among others (Vikas, 2016). Test items are usually administered with standard directions under uniform conditions to sample of examinees who are representative of the population for which the test is intended (Onu, 2018). This is not the case with most test items constructed by teachers for placement and internal examination in most cases. These could invariably lead to low achievement in Mathematics. A lot of teachers may construct very poor test instruments lacking in the major indices of validity, reliability and structure (Adebayo, 2018). Test item should be presented to the testee in such a way that they could solve it with relative ease. Hence, it appears that students may

perform better when test items are administered to them from least difficult to most difficult items.

Ordering of test item seeks to address the order in which test items should be presented to students. Ogunsanwo(2006) holding up to Guttman's finding stated that there are three modes or levels of ordering test items. The three modes according to Ogunsanwo are: from least difficult level (those which are below one's ability)to most difficult level(demanding higher ability),from most difficult level (demanding higher ability) to least difficult level (those below one's ability) and Randomization (in no particular order of difficulty) of test items. Ini, Bassey and Valentine (2019) shades more light on these three modes of ordering test items using a typical hypothetical Guttmann(1946)'s scale that shows a perfect sequencing of test items. The Guttmann scale test item scale as shown in Appendix B (page 56) indicates the item in which position are hierarchical. They are arranged in a systematic and logical order. When an examinee responds correctly to item 3 for example, it logically implies that the examinees respond correctly to items 1 and 2. Responses from examinees can be predicted from their cumulative score since Guttmann scale is deterministic. Guttmann response pattern is the most probable response pattern for a person when items are ordered from least difficult to most difficult. It is often observed however that examinees respond to item in a way that portray marked inconsistencies across the test items. The job of a Mathematics teacher is therefore not just to teach but also to be knowledgeable in test construction and administration.

The study on the influence of test item order on student achievement on multiple choice exams is not new. In fact, this line of inquiry has expanded to include testing expectation (Balch 2017). According to Wilson (2019), students who received the forward-sequential version (i.e., test items appear on the test in the same order as they were covered in the course) scored significantly higher than those who received the random-sequential version. A number of studies support the finding that students perform significantly better on a forward-sequential than a random-sequential version of a multiple choice exam (Balch 2017; Carlson and Ostrosky 2012; Stout and Wygal 2011). There could be a significant difference in students achievement based on test item order. However, it is clear that there are mixed results regarding students achievement and test item order for multiple choice exams in Mathematics as a subject irrespective of gender.

The order in which test items are presented could be influenced by gender of the testees. Gender is seen as either of the two sexes(male and female),especially when considered with reference to social and cultural difference rather than biological ones. Salikutluk and Heyne, (2017) showed that gender also contribute to variation in academic achievement. The studies have attempted to explain possible reasons to gender variation to performance in mathematics. Particularly attitudes, self- efficacy and achievement motivation towards mathematics are accountable factors which place boys in a favourable position over girls. Other studies on the other hand are of the view that gender does not have a significant effect on the performance of students(Khadijatu, 2017;Owan,2019).

The fear of Mathematics has been an academic disease with its attendant virus, which the society is yet to get its effective treatment. The symptoms of the disease are always observed on the faces of students when learning and writing mathematics examinations. This has always led to poor academic achievement. The poor academic achievement with its attendant problems has been a great thing of worry to all stakeholders, such as parents, teachers, educational psychologists, counsellors, government and the society at large. This is because mathematics is today, part of the basic requirements for entrance into tertiary institutions. This consistent poor performance by students in mathematics calls for serious national action to remedy the situation and to put mathematics on a sound footing to facilitate the realization of a great and dynamic economy in Nigeria.

To correct this abnormalcy, a number of programmes have been embarked upon like introduction of new mathematics textbooks, different mathematics competitions, workshops and seminars. The problems seem to continue because these interventions are outside the learner. It appears that less effort are directed at the ordering of test items. Research on the effect of the three mode of ordering test items on Senior Secondary Students' achievement in Mathematics would be another empirical dimension for documentation of significant roles of ordering test items which could improve the performance of the secondary school students in mathematics. It is on this note that this research will use the three mode of ordering test items to ascertain which of them affect male and female students' academic achievement in Mathematics in Awka Education zone of Anambra state.

Purpose of the Study

The purpose of this study was to determine the influence of the three modes of ordering test items on senior secondary school students' academic achievement in Mathematics in Awka Education Zone. Specifically, the study determined the:

1. Mean achievement scores of senior secondary school students examined with three different modes of ordering test items (from least difficulty level to most difficult level, most difficult to least difficult level and randomized order).
2. Mean achievement scores of male and female students examined with test items ordered from least difficulty level to most difficult level.
3. Mean achievement scores of male and female students examined with test items from most difficult to least difficult level.
4. Mean achievement scores of male and female students examined with test items in randomized order.
5. Interaction effect of test modes and gender on senior secondary school students' academic achievement in mathematics.

Research Questions

The following research questions guided the study:

1. What are the mean achievement scores of senior secondary school students examined with the three different modes of ordering test items in Awka Education Zone?
2. What are the mean achievement scores of male and female students examined with test items ordered from least difficult to most difficult in Awka Education Zone?
3. What are the mean achievement scores of male and female students examined with test items ordered from most difficult to least difficult levels?
4. What are the mean achievement scores of male and female students examined with test items in a randomized order?

Hypotheses

The following null hypotheses guided the study which were tested at 0.05 level of significance:

1. There is no significant difference in the mean achievement scores of secondary school students examined with three modes of ordering test items.

2. There is no significant difference between the mean achievement scores of male and female students examined with test items ordered from least difficult to most difficult
3. There is no significant difference between the mean achievement scores of male and female students examined with test items from most difficult level to least difficult level.
4. There is no significant difference between the mean achievement scores of male and female students examined with test items ordered in a randomized order.
5. There is no interaction effect of testing modes and gender on senior secondary school students' academic achievement in mathematics.

METHODS

The study adopted ex post-facto design research design. The population of the study was made up of 5,057 senior secondary school three (SS3) students which comprised of 2259 males and 2798 females in all the public secondary schools in Awka Education zone of Anambra State, Nigeria (PPSSC, 2023). They were selected because they are not external examination class. The sample size of the study was 380 SS3 students. Multi-stage sampling procedure was used in drawing the sample size of 380 SS3 students. First, purposive sampling method was used to select all the schools in Awka Education Zone with at least three arms of SS3 class. Using simple random sampling technique (Balloting), three schools comprising one single sex boy, one single sex girl and one co-educational schools were selected. The bases for stratification is to obtain threes(3's) from 3 strata according to school type in the study area. In stage three, any school with more than three arms of SS3, simple random sampling technique (balloting) was used to obtain only three classes. On the whole, three arms of SS3 students from each of the three schools were selected to obtain 9 classes. From that 3 schools, all the students found in each of the arms were used for the study. The instrument for data collection for this study was General Mathematics Achievement Test (GMAT) comprising of 50 standardized multiple choice objective questions taken from the 2022West African Senior Secondary Certificate Examination (WASSCE) past questions. The test items were rearranged by the researcher in three modes to help in the identification of the most effective mode of ordering test items in secondary school mathematics. The validation of the instrument was ascertained by giving the

questionnaire along side with the purpose of the study, and research questions, one expert in the Department of Science Education and another one in the Department of Educational Foundations (Measurement and Evaluation Unit),both from Nnamdi Azikiwe University, Awka and the other expert from the Department of Mathematics, Nwafor Orizu College of Education, Nsugbe. The reliability of the three versions of the instrument was determined using 30 SS3 students in three secondary schools in Aguata Local Government Area which is outside the study area. The scores were correlated using Kuder Richardson Formula 20 and the reliability coefficient values of 0.79, 0.81 and 0.82 for least difficult to most difficult, most difficult to least difficult and randomized order respectively was obtained. The researcher with the help of three research assistants from each school administered the test to the respondents. The research assistants were briefed on the purpose of the study before data collection. The answer script bearing the type of test answered was marked and scores was obtained and analyzed item by item and school by school. Data collected using General Mathematics Achievement Test (GMAT) was analyzed with respect to each of the research questions and research hypotheses. The mean and standard deviation were used to answer the research questions one to four. The computation was done using version 23 of Statistical Packages for Social Sciences (SPSS). The hypotheses one and five were tested using analysis of variance (ANOVA) while hypotheses two to four were tested using independent t-test. All the hypotheses were tested at 0.05 alpha level. Decision rule for the hypothesis is; reject any null hypothesis if the probability value (P-Value)is less than or equal to the significant value of 0.05 ($p<.05$), otherwise ($p>.05$) do not reject the null hypothesis.

Result

Research Question one:

What are the mean achievement scores of senior secondary school students examined with the three different modes of ordering test items?

Table 1: Mean Achievement Scores of Senior Secondary School Students Examined with the Three Different Modes of Ordering Test Items

S/N	Modes of Ordering Tests	Mean	Std. Deviation
1	Least to difficult	24.43	11.02
2	Most difficult to least difficult	21.15	10.35
3	Randomized	22.30	10.63

Table 1 revealed the mean achievement scores of students when they were tested using three different modes of ordering test items. Students in the least to most difficult test ordering format had the highest mean score followed by those tested with the randomized ordering format whereas students tested with the most difficult to the least difficult ordering format had the least mean score.

Research Question two: What are the mean achievement scores of male and female students examined with test items ordered from least difficult to most difficult?

Table 2: Mean Achievement Scores of Male and Female Senior Secondary School Students Examined with the Least to Difficult Ordering Test Items Format

S/N	Gender	No	Least to Difficult Ordering Test Items Format	
			Mean	Std. Deviation
1	Male	94	23.32	10.61
2	Female	86	25.65	11.38

Table 2 showed the mean achievement scores of male and female senior secondary school students examined with the least to difficult ordering test items format. Female students had higher mean score than male students.

Research Question three: What are the mean achievement scores of male and female students examined with test items ordered from most difficult to least difficult levels?

Table 3: Mean Achievement Scores of Male and Female Senior Secondary School Students Examined with the Most Difficult to Least Difficult Ordering Test Items Format

S/N	Gender	No	Most Difficult to Least Difficult Ordering Test Items Format	
			Mean	Std. Deviation
1	Male	94	20.66	10.42
2	Female	86	21.69	10.30

Table 3 showed the mean achievement scores of male and female senior secondary school students examined with the most difficult to least difficult ordering test items format. Female students had higher mean score than male students.

Research Question four: What are the mean achievement scores of male and female students examined with test items in a randomized order?

Table 4: Mean Achievement Scores of Male and Female Senior Secondary School Students Examined with the Randomized Ordering Test Items Format

S/N	Gender	No	Randomized Ordering Test Items Format	
			Mean	Std. Deviation
1	Male	94	21.44	10.56
2	Female	86	23.23	10.69

Table 4 showed the mean achievement scores of male and female senior secondary school students examined with the randomized ordering test items format. Female students had higher mean score than male students.

Hypotheses

1. There is no significant difference in the mean achievement scores of secondary school students examined with three modes of ordering test items.

Table 5: ANOVA on Students' Achievement Scores Examined with Three Modes of Ordering Test Items

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	999.893	2	499.946	4.395	.013
Within Groups	61088.544	537	113.759		
Total	62088.437	539			

2. There is no significant difference between the mean achievement scores of male and female students examined with test items ordered from least difficult to most difficult.

Table 6: t-test Analysis Mean Achievement Scores of Male and Female Students Examined with Test Items Ordered from Least Difficult to Most Difficult

Variable	No	Mean	SD	t-value	df	Sig. (2-tailed)	α-level	Remark
Male	94	23.32	10.61	-1.423	178	.157	0.05	Not significant
Female	86	25.65	11.38					

Table 6 shows that male students (M = 23.32, SD = 10.61) had a non-significant lower mean score on mathematics achievement in than female students (M = 25.65, SD = 11.38), $t(178) = -1.423$, $p > .05$. Hence, the hypothesis that there is no significant difference between the mean achievement scores of male and female students examined with test items ordered from least difficult to most difficult is not rejected.

3. There is no significant difference between the mean achievement scores of male and female students examined with test items from most difficult level to least difficult level.

Table 7: t-test Analysis Mean Achievement Scores of Male and Female Students Examined with Test Items Ordered from Most Difficult to Least Difficulty

Variable	No	Mean	SD	t-value	df	Sig. (2-tailed)	Remark
Male	94	20.66	10.42	-.664	178	.508	Not
Female	86	21.69	10.30				significant

Table 7 shows that male students (M = 20.66, SD = 10.42) had a non-significant lower mean score on mathematics achievement in than female students (M = 21.69, SD = 10.30), $t(178) = -664$, $p > .05$. Hence, the hypothesis that there is no significant difference between the mean achievement scores of male and female students examined with test items ordered from most difficult level to least difficult level.

4. There is no significant difference between the mean achievement scores of male and female students examined with test items ordered in a randomized order.

Table 8: t-test Analysis Mean Achievement Scores of Male and Female Students Examined with Test Items Ordered in a Randomized Order

Variable	No	Mean	SD	t-value	df	Sig. (2-tailed)	Remark
Male	94	21.44	10.56	-	178	.258	Not
Female	86	23.23	10.69	1.134			significant

Table 7 shows that male students (M = 21.44, SD = 10.56) had a non-significant lower mean score on mathematics achievement in than female students (M = 23.23, SD = 10.69), $t(178) = -1.134$, $p > .05$. Hence, the hypothesis that there is no significant

difference between the mean achievement scores of male and female students examined with test items ordered in a randomized order.

5. There is no interaction effect of testing modes and gender on senior secondary school students' academic achievement in mathematics.

Table 9

Tests of Between-Subjects Effects

Dependent Variable: score						
Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1436.381[a]	5	287.276	2.529	.028	.023
Intercept	276829.515	1	276829.515	2437.295	.000	.820
Gender	397.804	1	397.804	3.502	.062	.007
Categories	1014.796	2	507.398	4.467	.012	.016
gender * categories	38.685	2	19.343	.170	.843	.001
Error	60652.056	534	113.581			
Total	338532.000	540				
Corrected Total	62088.437	539				

a. R Squared = .023 (Adjusted R Squared = .014)



Discussion

The findings of the study showed that the mean achievement scores of students when they were tested using three different modes of ordering test items, performance in mathematics is best when test items are arranged in ascending order of difficulty(Least difficult to most difficult order). The findings of this study aligns with the findings from the studies by Ollennu and Etsey (2015) and Opara and Uwah (2017),who respectively indicated, that test items sequencing, order or arrangement have a significant effect on the performance of students in mathematics as well as other subject areas. The reason is that arrangement of test item from least difficult to most difficult order enables test-taker to reinforce after getting a previous item correctly, increasing their level of interest and motivation to score more. The similarity observed in the result of the present study and those related to it could be due to similarities in the areas of content scope or perhaps the varied approaches employed in these studies. The hypotheses tested revealed that item ordering has a significant effect on male and female students' academic performance in mathematics with those who answered the easy-to difficult arrangement performing significantly higher than those who answered difficult-to easy arrangement and randomized order. While those who answered difficult-to-easy arrangement performed the least in the mathematics achievement test. The findings of the study showed the mean achievement scores of male and female senior secondary school students examined with the least to difficult ordering test

items format. Female students had higher mean score than male students. Similarly the findings by Wilson (2019) supported that those female students' who received the forward-sequential version scored significantly higher than their male counterparts. Balch (2017), also agreed that female students performed better than their male counterparts on least to difficult ordering test items format.

The findings of the study showed that in the mean achievement scores of male and female senior secondary school students examined with the most difficult to least difficult order of difficulty, Female students had higher mean score than male students. To support these findings, Stout and Wygal (2011), supported that, there was a significant difference in students' achievement based on test item order of most difficult to least difficult levels with female students scoring higher. The findings by Wilson (2019) also agreed that there are good results regarding female students' achievement and test item order from most difficult to least difficult levels for multiple choice exams in Mathematics.

The findings of the study showed that in the mean achievement scores of male and female senior secondary school students examined with the randomized ordering test items format, Female students had higher mean score than male students. The finding of this study is in consonance with the findings from the studies by Ollennu and Etsey (2015), who posited that female students performed better than their male counterparts in test items ordered in a randomized manner. More so, Opara and Uwah (2017),supported that students academic achievement was below expectation in a randomized order of multiple choice questions.

The findings showed there is no interaction effect of testing modes and gender on senior secondary school students' academic achievement in mathematics. Ini, Etuk, and Valentine (2019) supported that test item arrangement has no significant interaction effect on students' academic performance of male and female students in mathematics with female students performing significantly higher than their male counterparts. Also the female students who answered difficult-to-easy arrangement performed the least in the mathematics achievement test. The result is not surprising since it is expected that going from the known to unknown will make the students be more interested in attempting other questions. This gives the students motivation and confidence after answering the first item correctly to continue, while those who took the difficult to easy format lose interest after exerting efforts and attempts having failed to answer the first few questions correctly.

Conclusion

Based on the finding of this study, it was concluded that ordering of test item plays a significant role in determining the academic performance of students in mathematics. When test items are arranged from simple to complex, students will score higher than in situations where the items are arranged from difficult to easy or when the random arrangement is in place. Students answering test items arranged from simple to complex can be motivated to put in more efforts having scored the first few items correctly. The same cannot be said of students who would have been bored after failing the first items under the difficult to easy or randomized test item arrangement.

Implications of the Study

The findings of the study has great implication on students, mathematics teachers, examination bodies, school authorities as well as curriculum planners. If students are not given examination questions based on least difficult to most difficult order, they will lose interest in mathematics as a subject and their potentials in mathematics will be jeopardized. Mathematics teachers are expected to set questions in ascending order of difficulty (easy to difficult) in public secondary schools in Nigeria, otherwise, the academic performance of secondary school students in mathematics will continue to deteriorate. If examination bodies fail to set mathematics questions from least difficult to most difficult level, Students academic achievement in mathematics will be below expectation. School authorities should monitor and supervise teachers' performance in classroom and also ensure they utilize mode of ordering test items from least difficult to most difficult level, if not, students' academic performance will be below expectation and they will not be opportune to engage in intense study. There is need for curriculum planners to integrate ordering of mathematic test item in ascending order of difficulty otherwise, they may find it difficult in consolidating teaching of test constructions to pre-service teachers. This will hamper their academic achievement particularly in mathematics. This means secondary school leavers in Nigeria will hardly fit into paid job or become self-employed, hence leading to higher rate of unemployment and poverty rise in Nigeria.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. For a better academic achievement in mathematics, the examination bodies WAEC, NECO and JAMB should adopt the method of arranging the test items from simple to complex order of difficulty.
2. Test items in mathematics examinations should be developed to cover the wide scope of course content or syllabus with focus on providing every learner an opportunity to perform well in the subject.
3. The randomization of mathematics test items during the examination should be totally abolished school authorities and examination bodies should rather focus their attention toward arranging items in ascending order of difficulty(easy to complex order).

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