Efficacy of Game Based Learning (GBL) Instructional Approach on Students' Task Persistence in Number Bases

Ukwueze, Timothy Chinedu (Ph.D), Chika C. Ugwuanyi (Ph.D) & Innocent O. Odo (Ph.D)

Department of Science Education, University of Nigeria, Nsukka.

DOI: https://dx.doi.org/10.47772/IJRISS.2024.8080237

Received: 31 July 2024; Accepted: 05 August 2024; Published: 15 September 2024

ABSTRACT

This study investigated the efficacy of Game Based Learning (GBL) instructional approach on Junior Secondary School three students' task persistence in number bases in public secondary schools in South East Nigeria. To achieve the purpose of the study, two research questions and three null hypotheses guided the study. The design of the study was quasi-experimental design; specifically, pre test-post test non-equivalent control group design. The population of the study comprised all the JSS3 students in the region. The sample of four (4) schools was drawn using multi-stage sampling procedures. Out of the four (4) schools sampled, two (2) were assigned to experimental groups and the other two (2) schools were assigned to control groups. Game Based Task Persistence Rating Scale (GBTPRS) containing of 20 items, was the instrument used for the study. The instrument was validated by three experts in Faculty of Education University of Nigeria, Nsukka. The instrument was trial tested on a sample of 30 JSS 3 students in private school and the reliability index of 0.83 was gotten using Cronbach's Alpha. Six (6) lesson plans which lasted for three weeks, three (3) for the experimental group and the other three (3) for the control group were used for the study. The data collected were analyzed using mean, and standard deviation to answer the research questions and Analysis of Covariance (ANCOVA) was used to test the null hypotheses at 0.05 level of significance. The results of the study revealed that Game Based Learning instructional approach was efficacious in improving the students' task persistence in number bases than conventional based learning instructional approach. Based on the findings, it was recommended that Mathematics teachers should use GBL instructional approach while teaching the subject.

Keywords: Conversion, Game Based Learning (GBL), Mathematics, Number bases, Task Persistence, Repeated Multiplication**,**

INTRODUCTION

All nations and Nigeria in particular aspire towards scientific and technological development. As such there is need to pay attention to students' academic progress in sciences and mathematics. Knowledge of sciences and mathematics are essential for advances in technology and solutions to some of the problems of future (Ukwueze, Nwagbo & Ugwuanyi, 2024). Hence, mathematics is said to be the gateway to science and technology.

Mathematics has been defined as the science of structure, order, and relation that has evolved from elemental practices of counting, measuring, and describing the shapes of objects. It is a mental activity which consists of carrying out, one after the other, mental constructions which are inductive and effective (Ukwueze, 2017). Mathematics is seen every-where, in everything we do. It is the starting point for everything in our daily lives (Ukwueze, 2024). Mathematics is the bedrock of scientific and technological advancement of any nation. Udom (2014) agrees that science and technology would not exist without

mathematical science. Every individual requires the knowledge of mathematics to function effectively and efficiently in today's world irrespective of individual's profession. This is why The subject, mathematics is regarded as an essential tool for scientific and technological development of any country (Okoye, 2021). The author asserted that mathematics is regarded as the key to success in the study of science and other related discipline. Mathematics permeates all fields of human endeavour and has found a place in science, architecture, engineering, industries, aeronautic space science, navigation, survey, and nuclear energy (Osuagwu, et al, cited in Ukwueze, 2017).

Despite the importance of mathematics, the achievement of students in the subject has been consistently below average especially in external examinations. The major cause of this is students low task persistence ability in the subject (Ukwueze, 2024). Poor achievement and low task persistence in mathematics in Nigeria secondary schools has assumed an alarming proportion and attracts the attention of researchers in the field (Agwagah, 2014). Ukwueze (2017) asserted that teaching and learning of mathematics in Nigeria is still in a deplorable state at all levels of Nigeria educational systems. This is because most Nigeria students are unable to retain the mathematical concepts learnt. They fail to produce them when needed. Moreover, the West African Examination Council (WAEC) Chief Examiners reports (2018- 2021), National Examination Council (NECO) Chief Examiners report, (2019-2023) also stated that the overall performance of candidates in mathematics was generally poor. This according to the report is as result of students not being able to handle the mathematics task giving to them in their question papers. As it is, Nigeria's quest for technological advancement and economic emancipation is being undermined by the continued poor mathematics achievement in WAEC and NECO examinations. More so, Agwagah (2014) stated specifically that conventional mathematics teaching is still the norm in the nations' schools and has continued to dominate the mathematics classroom. In using this approach, facts and ideas are given to the students and then explained. The teacher gives examples and comparisons to illustrate the main point of the lesson. With this approach, the feedback from students is not very obvious, students would not persist in their given task. As a result, students' achievements in mathematics at both internal and external examinations have been reportedly poor especially in number and numeration (Obioma, 2015; Galadima & Okogbenin, 2017).

The use of poor teaching approach, according to Obodo (2014), as a major factor contributing to the poor achievement and low task persistence in mathematics in general and number bases in particular is seen in the areas of unexplained formulae and erroneous definitions of some steps in number bases conversion. In this approach, the teacher presents question and ask the students to divide the denary number using the new base successively and record the remainders, the collection of the remainders from bottom, to top form the solution to the question. The students here lack understanding and knowledge of why concentrating on the remainders. Moreover, among the four basic operations in mathematics, addition, subtraction, multiplication and division, it is the division operation that students hate most (Ukwueze, 2017). In this approach, there always exist a gap between what the students ought to learn (knowledge on building blocks in bases and division skill) and how the teacher imparts it (methodology).

Number bases, therefore, are the ways of counting numbers in which certain numbers form a bundle or group. Number base is a topic in the theme of number and numeration in the JSS mathematics curriculum and the first theme in both primary and secondary mathematics curriculums.

The importance of number and numeration in junior secondary school has to fulfill two roles (Odili as cited in Ukwueze, 2017). These are viz: the inculcation of an appreciative understanding of our number system and an intelligent proficiency in its fundamental process; the socialization of number experiences in order to represent and solve problems in topics of mathematics like algebraic expression, geometry, trigonometry, and in daily life transactions, sound number and numeration knowledge is necessary. Number bases are used in many local market days, days of the week, and numerous counting (Odili as cited in Ukwueze, 2017).

Chief Examiners Reports of 2018, 2020 and 2021 reported general weakness in candidates' inability to

solve questions related to number and numeration and its associated word problems. In the country today, as noted by Odili, as cited in Ukwueze, (2017), most school leavers enter the world without being able to differentiate between number and numeral. Number stands for a concept or a quantity while numeral stands for sign or symbol that represents a number. For instance, a number/quantity two can be symbolically represented as 2 in Arabic and ii in Roman numeral.

This situation is caused by the fact that most mathematics teachers especially in the primary schools are not mathematics education specialists, and lack the teaching skills and approach to the teaching of number and numeration and its application to real life situations. To avert such situation, the use of mathematical games has been identified by Obodo (2014), Obioma (2015), Bala and Musa (2016) as a way of generating and promoting students task ability in mathematics classroom teaching and learning. The use of games in teaching have been documented to enhance students interest and in turns improved students' achievement in different concepts of mathematics. This is true, since students like games and perceive playing games as a means of easing of tension in the mathematics classroom (Ukwueze, 2017).

Game Based Learning (GBL) is defined as an enjoyable social activity with goals, rules, and educational objectives. Games, in general, serve the purpose of recreation and often generate excitement and spirit of competition. Games serve as recreation to both winners (as they strive to maintain their lead) and losers (as they strive to overcome their defeat) (Ukwueze, 2017). This study therefore, tried to employ game based learning approach specifically Number Bases Game (NBG) in teaching and learning of number bases.

NBG is an approach where the solution to conversion from denary to other bases lies on the arrangement or building number cards /objects in a given order of squared blocks while maintaining some rules and regulation of the game. The benefits of NBG approach could far outweighs the conventional approach to instruction which is often teacher centered (Ukwueze, 2017). The NBG instructional approach could allow students to reach levels of understanding and task mastery that would have been unattainable without it. The use of instructional games in mathematics teaching and learning create in students' permanent interest and skills needed in averting students' failure in both internal and external examination in mathematics (Ukwueze, 2017). The purpose of NBG is to give practices on conversion of denary number to binary number system, to give practices to the solution of conversion of number system from base ten to other bases, to arrange the card or the square objects in a way that matches the conversion. Materials needed in the game are: match box containing up to 100 square cards or square objects, set of fifty questions written on a foolscap sheet or typed on conversion from denary to other bases, the solutions to the fifty questions on a separate sheet, numbers 1-50 written on a separate card, a dye, bell, and watch. The procedure for the game:

Place the 50 set of questions and their solutions separately inside the box containing the objects, Place the 50 numbered cards face down on the table, he players toss the dye the player with the highest number when the dye is tossed will start the game, when two or more players get equal number, they will be subjected to another toss of dye until one gets the right, anti-clock wise direction from the position of the person that started the game will be followed for other turns, player proceeds to the cards faced down on the table and picks one, the facilitator will ask the player the question number written on the card from the sheet, the player will pick from the 100 square cards or objects and arrange them in a way that shows the result, the player continues if the solution is correct, otherwise he/she loses.

If a player gets the arrangement or building of the object correctly, he/she retains the card. He/she continues until he gets it wrong, and the card is returned for the next player to take a turn, once a card is touched the player will be given the question from where he continues otherwise the player loses his turn. The player with the most cards wins the game (Ukwueze, 2017). This can be utilized to enhance the task persistence ability in the students.

Task persistence is an individual's capability to exhibit resilience and spontaneity in the face of troubles,

obstacles and difficulties so as to achieve success. In respect to teaching and learning of mathematics, students should feel okay and on a normal solving mathematics problems, that is students' tendency in solving or practicing mathematics exercises without being forced (Ukwueze, Nwagbo & Ugwuanyi, 2024). According to Ndukwu (2017), task persistence means standing with a task despite its difficulty level. The task persistent skill of the learners depends on the approach that the Mathematics instructor uses in the classroom while teaching the subject. Mathematics teachers should emphasize on the need for students to persist in their given undertaken in order to progress both academically and in life endeavors (Ukwueze, 2024). The relationship between persistence and academic achievement have been repeatedly documented as positive correlates (Deater-Deckard, Petrill, Thompson, & DeThorne, 2015; Chatman, 2020; Mazumder, et al, 2020). None of these reports were in Nigeria and also, in number bases. Hence, there is need to investigate other teaching approach to see if it could boost students' task persistence which in turn boast the achievement in number bases.

Students' reaction when introduced to different instructional approaches such as GBL with a mathematical task may vary from individual to individual depending on the students' gender which may also indicate how they may persist in mathematics tasks and their extent of achievement in the subject (Ndukwu, 2017, Ukwueze, 2024). Gender refers to the social roles, behaviours, characteristics and attributes that a given society considers as normal or okay for men and women (Ukwueze, Nwagbo & Ugwuanyi, 2024). Based on various reports on gender differences in mathematics task persistence, the inconclusive scholarly reports, the use of GBL instructional approach could possess a high tendency of bridging the gap between male and female students' task persistence ability in number bases aspect. This study therefore, sought to investigate among JSS 3 students' the extent to which teaching and learning of number bases with GBL instructional approach would improve students' task persistence in number bases.

Research Questions

- The study was guided by the following research questions:
- What are the mean task persistence scores of students taught number bases using game based learning (GBL) instructional approach and those taught using conventional based learning (CBL) instructional approach?
- What is the influence of gender on the mean task persistence scores of students in number bases?

Hypotheses

The following null hypotheses guided the study and were tested at 0.05, level of significance.

H_{O1}: There is no significant difference in the mean task persistence scores of students taught number bases using game based learning (GBL) approach and those taught with conventional based learning (CBL) instructional approach.

H_{O2}: There is no significant influence of gender on the mean task persistence scores of students in number bases.

H_{O3}: There is no significant interaction effect of instructional approach and gender on the mean task persistence scores of students in number bases.

Methods;

The study adopted a quasi-experimental research design, specifically non-equivalent control group. The population of the study comprised of all the junior secondary school three (JSS3) students found in South East Nigeria. The study sampled one hundred and sixty, eight (168: M=72, F=96) JSS3 students found in

four (4) intact classes from four (4) different schools. Multistage sampling procedure was employed in the study. In the first stage, purposive sampling technique was used to select Enugu State from the region and also used to select Obollo-Afor Education Zone. In the second stage, schools in the zone were stratified based on the local government. In the third stage, proportionate stratified random sampling was used to sample two schools from Igbo-Eze North, one school each from Udenu and Igbo-Eze South LGAs. In the fourth stage, simple random sampling by balloting without replacement was used to draw one intact class from each of the school sampled. Simple random sampling by balloting was used to assign four classes to various groups; two classes to GBL and two classes to CBL (GBL group=81: Males=34, Females=47, CBL group=87, Males =38, Females=49).

The researchers adapted a 20-item Game Based Task Persistence Rating Scale (GBTPRS) from Ukwueze (2024) which was used for the study. The instrument contains two sections: Section A for demographic information and Section B for the item statements. It contains four, point response scale of Always (A) = 4, Sometimes (ST) = 3, Rarely (R) = 2, and Never (N) = 1, for the positively cued items. The negatively cued items were scored in a reverse order as follows: A = 1. ST = 2, R = 3, and N = 4. The total score of the instrument was 80 and the least score was 20.

The researcher developed two sets of lesson plan for this study. One set was used in teaching students in GBL group while the other one was used in teaching students in CBL group. Each set was written based on the following sub-topics in number bases thus: week one; conversion of binary number to denary, week two; conversion of denary to other bases, week three; conversion of other bases to denary.

The GBTPRS and the lesson plans were validated by three experts, one from Measurement and Evaluation Unit, one from Mathematics Education Unit and one from Educational Foundation Unit. The reliability of the GBTPRS was estimated by subjecting them to trial testing using 30 JSS3 students from private schools. The reliability coefficient index of 0.83 was determined using Cronbach's Alpha. The researcher trained four research assistants for this study who were their regular Mathematics teachers from the four sampled schools. The training lasted for three days using two validated lesson plans and the instructional guides developed for the study.

Data generated for the study were analyzed using SPSS version 20 in carrying out both descriptive and inferential statistics. The research questions were answered using the mean and standard deviation while Analysis of Covariance (ANCOVA) was employed in testing the null hypotheses at 0.05 significant levels

RESULTS

Table 1: Pre-task and post-task mean scores and standard deviations of students exposed to (GBL) and (CBL) approaches in number bases.

		Pre-task		**Post-task**		**Mean Gain**
Treatment	N	$\bar{x}$	SD	$\bar{x}$	SD	
GBL: Approach	81	26.54	8.79	72.64	6.27	46.1
CBL: Approach	87	28.29	9.34	55.84	10.25	27.55

Table 1 showed the mean task persistence scores of students that were taught number bases using game bases learning (GBL) approach and those taught using conventional based learning (CBL) approach. From the table, mean task persistence scores of 26.54 and 28.29 with the standard deviations of 8.79 and 9.34 were recorded for both experimental and control groups respectively at the pre-task. However, at the post-task, mean scores of 72.64 and 55.84 with standard deviations of 6.27 and 10.25 were recorded for both experimental and control groups respectively. Moreover, mean gain scores of 46.10 and 27.55 were

recorded for both experimental and control groups meaning that the students that were exposed to GBL approach (Experimental group) had higher post task scores than their counterparts in the CBL the control group.

Hypothesis One

Table 2: Analysis of Covariance (ANCOVA) of the effect of GBL and CBL instructional approaches on students' task persistence scores in number bases

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	12506.980[a]	4	3126.745	19.71	0.001	0.144
Intercept	71557.17	1	71557.17	576.17	0	0.84
Pretask	2986.056	1	2986.056	29.941	0	0.087
Treatment	12058.61	1	12058.61	147.95	0	0.004
Gender	6431.631	1	6431.631	72.053	0.088	0.008
Treatment * Gender	40.275	1	40.275	94.207	0.142	0.016
Error	764.716	162	41.745			
Total	563672	168				
Corrected Total	65615.81	166				

a. R Squared = .167 (Adjusted R Squared = .146)

Table 2 data showed that the probability associated with the calculated value of *F* (147.95; df=1,162) for the effect of GBL approach on students' task persistence in number bases is .000. Since the probability value of .000 is less than .05 level of significant (P < .05), the null hypothesis was rejected. Thus, there is a significant difference in the mean task persistence scores of students taught number bases using GBL approach and those taught number bases using CBL approach in favor of GBL group.

Table 3: Mean and standard deviation of pre-task and post-task mean scores of students exposed to (GBL) and those exposed to (CBL) approaches in number bases as a result of gender.

		Pre-task		Post-task		Mean Gain
Gender	**N**	$\bar{x}$	**SD**	$\bar{x}$	**SD**	
Male	34	46.56	8.94	65.77	4.82	19.21
Female	47	45.66	8.49	66.09	4.58	20.43

Table 3 data showed the difference in the mean task persistence scores of male and female students in number bases. The analysis showed that male students had a pre-task persistence mean score of 46.56 with standard deviation of 8.94 and a post-task persistence mean score of 65.77 with standard deviation of 4.82 while their female counterparts had pre-task persistence score of 45.66, with standard deviation of 8.49 and post-task persistence score of 66.09 with the standard deviation of 4.58 respectively. The mean gain score of 19.21 and 20.43 were got for male and female students respectively. This indicated that female students had a higher mean gain score than their male counterpart in number bases. The standard deviations of 4.82 and 4.58 for male and female students respectively, indicating a similar variation in their individual scores their group means.

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS |Volume VIII Issue VIII August 2024

Hypothesis Two

Table 2 data above revealed the calculated value of F (1, 162) = 72.053 with associated probability value of .088 (p> .05) with a very small effect size (partial eta squared =.008) for the influence of gender on students' task persistence score in number bases. Since the associated probability (.088) was greater than, 0.05 level of significance, the null hypothesis was not rejected. Thus, there is no significant influence of gender on the mean task persistence scores of students in number bases.

Hypothesis Three

Data on Table 2 above showed that the calculated value of F (1, 162) = 94.207 for the interaction effect of approach and gender on students' task persistence in number bases had an associated probability value of .142 (p>.05) with a small effect size (partial eta squared= .016). Since the associated probability (.142) was greater than .05, level of significance, the null hypothesis was not rejected implying that there was no significant interaction effect of instructional approach and gender on students' task persistence in number bases.

DISCUSSION OF FINDINGS

The result of this study indicated that the use of game based learning (GBL) instructional approach has a significant effect on the students' task persistence in number bases. The group (experimental) taught number bases using GBL instructional approach had higher task persistence score than the group (control) taught number bases with conventional based learning instructional approach. This result is in agreement with the earlier research findings on the efficacy of the use of various games in the teaching and learning of mathematics which were conducted by Musa and Bala (2016), Ezeoyiri (2016), Odo and UgwuAda (2017) and Ukwueze (2017), who confirmed that the use of games has positive effect on students' academic achievement and interest in mathematics.

The significant differences in task persistence scores of experimental group as compared with the control group indicates that the GBL instructional approach showed a promising implications for the potential of using the GBL in teaching number bases at secondary school level. This suggest that there is a need to provide more interactive and hands-on learning activities for number bases learning at the junior secondary school levels. When students participate actively in the process, their task persistence is usually more likely to be maintained. Game based learning provides an opportunity for students to learn number bases in a dynamic and engaging way.

This study is limited to Junior Secondary School (JSS3) students only. Inclusion of other junior students could have made this study robust. Also, this study investigated gender as the demographic variable, however inclusion of school location could have made the work impactful. Similarly, the use of GBL instructional approach to the teaching and learning of number bases is time consuming, single period in time table was not sufficient to apply all the steps involved. This study is among the few of its kind in South East Nigeria, that would go a long way in improving the students' academic achievement in Mathematics at junior secondary school level. More studies should be conducted to include school location and retention variables in other Mathematics contents.

CONCLUSION

On the basis of the findings of this study, the following conclusions have been drawn.

The group that was taught number bases using GBL instructional approach had higher task persistence score

than those taught with CBL instructional approach.

Gender had no significant influence on the students' task-persistence in number bases when taught using GBL instructional approach. There was no significant interaction effect of instructional approach and gender on students' task-persistence in number bases. It was concluded that GBL instructional approach was effective in bridging the gender difference in students' task-persistence in number bases of junior secondary school students three of South East Nigeria.

RECOMMENDATIONS

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

1. Mathematics teachers should embrace and employ the GBL instructional approach in the teaching and learning of Mathematics. Double period classes is recommended for this. This will help to correct the impression that some students have about mathematics.
2. Students should also embrace the innovative approach to learning such as practicing GBL instructional approach rules in order to facilitate their learning of mathematics.
3. Policy makers and other stakeholders in Mathematics education should organize workshops, in-service training, conferences and seminars for mathematics teachers where the guides on how to use GBL instructional approach to the learning of Mathematics would be presented.
4. The teachers training institutions like Universities and Colleges of education should include mathematics games and other activity-based teaching approach as strategies in mathematics method contents.

REFERENCES

1. Agwagah, U.N.V. (2014). Sustaining development in secondary school mathematics through constructivist Frame work; A model lesson plan. *Journal of n Mathematical Association of Nigeria 29 (1),*92-98
2. Bala, A & Musa, B (2016) Effect of the use of number base game on senior secondary school achievement in number bases. Abacus: *The Journal of Mathematical Association of Nigeria,* 31, pp 103-114.
3. Chatman Jr, T.E. (2020). Understanding the relationship between students' engagement and persistence among community college students. *D Dissertation* Liberty University, Lynchburg, Virginia Digital commons .liberty.edu
4. Deater-Deckard, K., Petrill, S. A., Thompson, L. A., & DeThorne, L. S. (2015). A Cross-Sectional behavioral genetic analysis of task persistence in the transition to middle childhood *Developmental Science,* 8 (3), F21–F26. doi:10.1111/j.1467-7687.2005.00407.
5. EzeOyiri, R.E. (2016). Effect of material and non-material reinforcement on junior primary school pupils' achievement and interest on number and numeration. *An unpublished M.Ed. Thesis, University of Nigeria, Nsukka.*
6. Galadima, I & Okogbenin, A. A. (2017). The effect of Mathematical Games on Academic Performance and Attitude of Senior Secondary Students towards Mathematics in selected Schools in Sokoto State. Abacus: *The journal of the mathematical Association of Nigeria*. 37(1), 30-37.
7. Mazumder, Q. H., Sultana, S., & Mazunder, F. (2020). Correlation between Classroom engagement and academic performance of Engineering students. *International Journal of Higher Education* 9, (3), 240-247, 2020.
8. National Examination Council (NECO) (2019-2023). *Chief Examiner's Report Nigeria SSCE, May/June examination.*
9. Ndukwu, E. C (2017). Effect of immediate feedback on Task persistence, Self-Efficacy and Mathematics achievement of low achieving senior secondary school student; *D thesis University of Nigeria Nsukka*

.

10. Obioma, G.O. (2015). Emerging issues in mathematics education in Nigeria with emphasis on strategies for effective teaching and learning of word problem and algebraic expression. *Journal of Issues on mathematics* 8(1),1-8.
11. Obodo, G.C (2014). Principles and practices of mathematics education in Nigeria. Enugu: Floxtonepress.
12. Odo, J.A. & Ugwuda, A.O. (2017). Effect of Mathematics Games on Students' Achievement and Interest in Mathematics. *Journal of Mathematical Association of Nigeria 12*, no; 3, pp 151-157.
13. Okoye, F. N. (2021). The Role Mathematics education in sustainable national security. *A seminar paper submitted in partial fulfillment of the course EDM 751.* Department of Science Education, University of Nigeria Nsukka.
14. Udom, S.U. (2014). Item responses dimensionality and some factors related to students' performances in mathematics. *Unpublished M.Ed Thesis, faculty of Education*, University of Calabar.
15. Ukwueze, T.C. (2017). Improving Students Achievement and Interest in Number Bases using Number Bases Game (NBG). *An unpublished M.Ed. Thesis, University of Nigeria, Nsukka.*
16. Ukwueze, T.C. (2024). Efficacy of Differentiated Based Learning Instructional Approach and Scaffolding Based Learning Instructional Approach on Senior Secondary Students' Task Persistence and Achievement in Mensuration. *An unpublished P.hD Thesis, University of Nigeria, Nsukka.*
17. Ukwueze, T.C. Nwagbo, C. R., & Ugwuanyi, C. C. (2024). Efficacy of Differentiated Based Learning Instructional Approach and Scaffolding Based Learning Instructional Approach on Senior Secondary Students' Task Persistence. *AJSTME*,10, (3). 337-343, March, 2024. https://www.ajstme.com.ng
18. West African Examination Council (2016- 2021). *Mathematics Chief Examiners' Report. Yaba*: Lagos.