NASARAWA STATE UNIVERSITY

KNOWLEDGE FOR DEVELOPMENT

JOURNAL OF SCIENCE, TECHNOLOGY AND EDUCATION (JSTE)

A PUBLICATION OF THE DEPARTMENT OF SCIENCE, TECHNOLOGY & MATHEMATICS EDUCATION (STME), NASARAWA STATE UNIVERSITY, KEFFI

VOLUME 9

ISSN: 2651-5539

JOURNAL OF SCIENCE, TECHNOLOGY AND EDUCATION (JSTE) VOL. 9. NO. 38

JSTE PUBLICATIONS, 2025 www.nsukjste.com/

ISSN: 2651-5539

EFFECT OF BLENDED LEARNING STRATEGY ON INTEREST AND ACHIEVEMENT IN LINEAR EQUATION AMONG BASIC EDUCATION STUDENTS IN KADUNA STATE, NIGERIA

[1]Isah, M., [2]Musa, D. C. and [3]Azige, G. D.

[1'2'3]Department of Science, Technology and Mathematics Education, Faculty of Education

Nasarawa State University, Keffi, Nigeria

Corresponding author: isahmike@gmail.com

Citation: Isah, M., Musa, D. C. & Azige, G. D. (2025). Effect of blended learning strategy on intere and achievement in linear equation among basic education students in Kaduna State, Nigeria. *Journ of Science, Technology, and Education (JSTE)*; www.nsukjste.com/ *9*(38), 534-549.

Abstract

This study determined the effect of blended learning strategy on achievement in linear equation among basic education students in Kaduna State. Quasi-Experimental Research Design was used for the study. The population comprised 99142 Basic eight (8) education students in Kaduna State. The sample of the study is 89 students from two intact classes of which 52 were male and 37 were female, which were made up of 42 students in the experimental group purposively selected and 47 students in the control group randomly picked for this study. Two (2) research questions and Two (2) null hypotheses guided the study. The Instrument for data collection is Linear Equation Achievement test (LEAT). The instruments were validated by three experts with average validity index of 0.80. Kudder-Richardson (K-R21) was used to estimate the reliability of LEAT with index of 0.94. Descriptive Statistics of Mean and Standard Deviation was used to answer the research questions, while inferential statistics of Analysis of Covariance (ANCOVA) was used to test the Null hypotheses at 0.05 level of significant. The result of the findings revealed that blended learning strategy enhances male and female students' understanding of linear equation. Mathematics teachers at all levels are urged to adopt blended learning strategy to promote students' achievement in Mathematics.

Keywords: Effect, Blended Learning Strategy, Interest, Achievement, Linear Equation, Basic education.

Introduction

Mathematics is a science of magnitude and number that is very useful, virtually in all subjects. It is generally seen as the language of most branches of science such as Chemistry, Biology and Computer Science

among others. The main objective of teaching mathematics is to produce persons who will be numerate, orderly, logical, accurate and precise in thought. It may be in consideration of these and others that, the Federal Government of Nigeria made mathematics a core and compulsory as contained in the national policy on education which remains the rallying point for all education objectives in Nigeria. According to Dauda and Bulus (2015), mathematics is full of technical terms which make it difficult to understand, if not explained in language that learners understand. When teaching without ensuring that learners understand the meaning of mathematical language, the learner loses communication and will result to dismal achievement in mathematics.

Mathematics as a subject is a master of other subjects. It contains all rudiments needed and builds solid grounds of reasoning for inference and discussion. Mathematics is described as the science of pattern and relationship which can be expressed in symbols (Ahmad & Aliyu, 2020). It is on this note that, mathematics becomes an important part of reforming our societal views and dispelling some common misconceptions about the subject. Mathematics is made up of a set of concept, facts, principles, and operations that are fundamentals to the existence of every individual (Hafiz & Hina, 2016). According to Ekwueme (2013), mathematics is a subject that is involved in every facet of life, through the existence of humans here on earth. Ekwueme also went further to describe mathematics as the study of measurement of relationship, and property of quantities and sets. In the author's opinion, mathematics is all about patterns and structures.

Mathematics has faced several challenges. Mathematics is considered as a fearful subject, since it involves plenty use of mathematical symbols and mathematical proofs (Badmus & Omosewo, 2018). Mathematics involves formulas for students to learn and apply. Students' lack of mathematics understanding among them had limited their views in the subject and further affected their achievement. Poor achievement in mathematics has affected other science subjects adversely. Despite the usefulness of mathematics, it is the most dreaded subject to students among all subjects offered in the school. Most of the students do not see the applicability of the subject to their daily lives and the world around them (Ifamuyiwa, 2019). Abdulhamid, Abubakar and Tola (2017) expressed that teaching mathematics requires application of effective methods that will bring active learning, but the absence of this will make the students not to participate actively in mathematics class. Mathematics has however been made a core subject both

at the basic and the secondary levels of education in Nigeria. Among the principal branches of mathematics are arithmetic, geometry, algebra, trigonometry, calculus and many more, but algebra is the main focus of this study and places emphasis on linear equation.

Linear equation forms an important part in both basic education and senior secondary school mathematics curricula. However, it is often perceived as being one of the most complex parts of the curriculum. The poor understanding of the students in this area has contributed to the low achievement in mathematics (Salami & Popoola, 2016), although attempt has been made to improve students' achievement and the quality of linear equation in schools

.Linear equation is a branch of mathematics that uses letters in place of numbers. Linear equation, as a gateway of mathematics, is one of the areas of mathematics in which students have major problems (Usman & Musa, 2019). Linear equations are equation of the first order. It has been noted by some researchers and scholars that, for any nation to achieve, such nation must invest in teaching and learning of mathematics. Linear equation can be directly or indirectly applied in all facets of human activities depending on the level of understanding to which the students have about principles and concepts of mathematics (Okpube and Anugwo, 2016). Because of the inter-relatedness of the entire branches of mathematics, the knowledge, students gain in linear equation, will boost their achievement in other areas of mathematics. The relevance of linear equation is not exhaustible. Linear equation is applied in every field including, natural science, social science, arts and humanities. Obi (2014) stated that in arts and humanity, Linear equations provide the baseline for better understanding of some universal concept and also observed that the area that has continued to generate interest among researchers and mathematics educators is the problem of instructional strategies.

The uninspiring teaching approach that a teacher applies could make the attainment of instructional objective illusive. Mathematics educators around the globe are searching for desirable teaching strategies that will engage students with task that could influence them to learn mathematics successfully (Usman & Musa 2015). The researcher focuses on Blended learning strategy if it might bring about the improved teaching and learning of linear equation as well as improving students' interest and achievement in linear equation among upper basic education students in Kagarko local government area in Kaduna, Nigeria.

Blended learning combines face-to-face and online learning that help in improving the classroom experience and extend learning

through the creative application of information and communication technology. According to Gynther (2005), the term 'Blend learning' was first used in American literature to describe a combination of Traditional teaching and technology-based teaching that used various forms of technology to support a wide range of pedagogical practices. If was discover earlier to be a teaching style uses traditional methods and technology to produce better students' learning outcomes. According to Wilson (2013), blended learning can be categorized into six models in provisions of their delivery; 1. The face-to-face model: It encourages teachers to use technology in the classroom in specific circumstances. 2. The rotation model: According to pre-scheduled meetings, students must rotate their learning environment from a conventional classroom to a lab. 3. The flex model: It is designed for students who have behavioural, academic, or social problems and includes full online learning under the supervision and guidance of a teacher. 4. Online lab model: This model requires students to go to an online lab to take certain classes, because of the school's constraints, such as not offering that course. 5. The self-blend model: It's a model that involves students choosing their own subjects to learn, and it meets the needs of high school students looking for extra courses to help them get into university or find work. 6. Online model: It's a model in which students with limited time connect with their tutor online and then come in for face-to-face classes or meetings on an individual basis. Among the types mention this research work will adapt Station Rotation model.

Blended learning is incredibly effective as they offer students the benefit of both virtual learning and traditional learning. Access to a digital learning platform also allows students to receive instant feedback on their work, thanks to automated assessments. Blended Learning, BL (also known as mixed or hybrid learning) was specifically chosen because it is a teaching style that combines the use of traditional educational methods with the application or use of technology to produce better students' learning outcomes. Studies have confirmed the value of technology intuition, as well as the advantages that institutions of learning stand to gain from the adoption of this kind of teaching style in their daily operations (Boe, 2018). According to Susan and Chris (2015), incorporating BL into the classroom motivates teachers to adapt their teaching approaches, and as a result, shifts learning towards a student-Centered model as against a Teacher-Centered model. Therefore, students' interest will be developed and they will participate actively in the learning process

According to Eze (2019), students' achievement is the result of an examination written by students which is often a reflection of learning. Students' achievement is the measure of students' ability to acquire certain knowledge and skills at the end of teaching and learning activities (Usman, 2020). Students' interest and achievement may be affected by gender. According to Barowski (2021), students' achievement refers to what students were able to learn in a determined period of time. Maikudi (2015) said that all is not well with teaching and learning of mathematics and linear equation in particular. Teachers should be able to develop innovative learning strategy that will make learning interesting and acceptable to enhance students' achievement.

Gender is the physical and behavioral difference that distinguishes individual human organism according to their function in the reproductive process. Genders affect learners' achievement. According to Alio and Kelvin (2019), there is a widespread notion that male students perform better in linear equation than female students. Ajai and Imoko (2015) discovered that female students out-performed their male counterpart in linear equation. The educational experience in schools is not expected to discriminate between male and female students and it is important to note that students have equal access to education. Blended learning Strategy makes use of YouTube as the online platform which might enhance achievement in the learning of linear equation.

Statement of the Problem

The students' achievement in mathematics has been poor over the years. This students' poor achievement could be blamed on such factors as poor instructional strategy. In spite of the role played by linear equation in the development of science, there is still persistent poor performance of students in the area. Despite the high position offered to mathematics in Nigerian education system, it is disheartening that strategies for teaching and learning this mathematics at upper basic levels are unlikely to be put to good use for effective learning of mathematics. The persistence of this poor achievement might be that mathematics teachers are not using impactful strategy that will bring about the desired outcome in the teaching and learning of linear equation which had led to fear and difficulty students experienced in learning mathematics. It is unfortunate that students scare themselves from learning linear equation because of the unknown variable regularly use in the topic. Students find it difficult to resolved and work on the variable. Some of the students get engulfed with phobia due to the numerous variables called unknown. Many students could not

solve simple linear equation. The notion that mathematics is for male has also discourage the female gender from putting the best in learning mathematics which invariably affect female achievement.

Therefore, a study towards adapting an alternative method of teaching is necessary in order to proffer solution to this problem. However, with the introduction of technology in education, blended learning strategy might present learning of mathematics in an appealing way, owing to various effects, allowing for meeting the various levels of students and designing activities that are appropriate to their actual levels. It is in view of this that the researcher decided to investigate what might be the effect of blended learning strategy on achievement in linear equation among basic education students in Kaduna state, Nigeria.

Purpose of the Study

The main purpose of this study was to determine the effect of blended learning strategy on achievement in linear equation among basic education student in Kaduna State, Nigeria. Specifically, the study was guided by the following;.

1. Determine the achievement of Students taught linear equation using blended learning strategy.
2. Find the achievement of male and female students taught linear equation using blended learning strategy

Research Questions

The following research questions were asked to serve as a guide for the research;

1. What are the mean achievement scores of students taught linear equation using blended learning strategy and those taught using Conventional method?
2. What are the mean achievement scores of male and female students taught linear equation using blended learning strategy?

Hypotheses

The following hypotheses were formulated and tested at 0.05 level of significance;

H_{o1}: There is no significant difference in the mean achievement scores of students taught linear equation using blended learning strategy and those taught using conventional method?

H_{o2}: There is no significant difference in the mean achievement scores of male and female students taught linear equation using blended learning strategy?

Methodology

The research design used for this study is quasi-experimental research design of pre-test, post-test of one experiment and one control group. According to Thomas (2020) quasi-experimental research design aims to establish a cause-and-effect relationship between an independent and dependent variable. The design is considered appropriate for this study since it involved intact classes. The experimental group was taught linear equation with blended learning strategy. The control group was taught linear equation using conventional teaching method. The population for this study was 99,142 upper basic II education students in Kagarko LGEA Kaduna state for 2024/2025 academic section (source: Kaduna State quality assurance department of KDSUBEB Kaduna) The sample for the study comprised 89 students from the two intact classes in Kagarko Local Government Authority, Kaduna state. Purposive sampling was employed in selecting experimental schools to ensure computer component to achieve the goal of the research. Control class was drawn from the remaining school using random sampling (lucky dip without replacement). The instrument is Linear Equation Achievement Test (LEAT) Linear equation achievement test. The LEAT instrument was used for the pre-test and post-test to obtain data on students' achievement in linear equation. The average validity index is 0.83 for LEAT. To determine the reliability of the LEAT, the items were trial tested using a small comparable group of 30 students' Basic 8 secondary Schools students which were not part of the sample respondents. Kuder-Richardson (K-R_{21}) formula method of estimating reliability was employed to compute the co-efficient of internal consistency of LEAT which was 0.90. The pre-test was conducted on all the respondents in experimental and control groups. The experimental group was taught using blended learning strategy. However, the control group was taught using conventional teaching methods. After the pre-test, the treatment commenced in the first week of the study with a well lesson plans for experimental group and control group. Normal schools' lessons times table was used to teach for the period of five 5 weeks. The experimental group was taught using Station Rotation Model where students were rotated to computer laboratory every evening for online video that contains preceding lesson in class because the school observes evening lesson. The control group was taught the same topic using conventional teaching method. LEAT was used to collect post-test scores. The post-test was administered to both the experimental and control groups at the end of the exercise, one hour was allowed for the test and scores was recorded.

The data collected from the administration of instrument was analyzed using the following statistical techniques. Descriptive statistics of means and standard deviation was used to answer the research question 1- 4. Analysis of covariance (ANCOVA) was used to test the null hypotheses, at 0.05 level of significance.

Results

The data were presented according to the research questions asked and hypotheses formulated for the study. The analysis of the data was done using statistical package for social science (SPSS Version 26)

Research Question One: What are the means achievement scores of students taught linear equation using blended learning strategy and those taught using Conventional method?

The mean achievement scores of students taught linear equation using blended learning strategy and those taught using Conventional method are presented in Table 1

Table 1: Mean Achievement Scores and Standard Deviation of Students Taught Linear Equation Using Blended Learning Strategy and those Taught Using Conventional Method

Methods	Type of Tests	N	Mean ($\bar{x}$)	Std.Dev. (σ)
Blended	Pre-test	42	29.36	8.32
	Post-test	42	70.07	7.41
Conventional	Pre-test	47	30.85	8.12
	Post-test	47	47.74	5.50

Table 1 shows that the pre-test and post-test mean scores and the standard deviation of Basis 8 students exposed to blended learning strategy are ($\bar{x}$ =29.36, σ=8.32) and ($\bar{x}$ =70.07, σ=7.41) respectively and the corresponding pre-test and post-test mean scores and the standard deviation of students in conventional class are ($\bar{x}$ =30.85, σ=8.12) and ($\bar{x}$ =47.74, σ=5.50)respectively.

Hypothesis One: There is no significant difference in the mean achievement scores of students taught linear equation using blended learning strategy and those taught using conventional method?

The result is as presented in Table 2

Table 2: Result of ANCOVA on Mean Achievement Scores of Students Taught Linear Equation Using Blended Learning Strategy and those Taught Using Conventional Method

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	11059.142a	2	5529.571	130.757	0.000	0.753
Intercept	20467.573	1	20467.573	483.995	0.000	0.849
Pretest	2.886	1	2.886	0.068	0.795	0.001
Method	**10996.328**	**1**	**10996.328**	**260.029**	**0.000**	**0.751**
Error	3636.835	86	42.289			
Total	316999.000	89				
Corrected Total	14695.978	88				

a. R Squared =0.753 (Adjusted R Squared = 0.747)

Table 2 shows an F-ratio of 260.029 with associated exact probability value of 0.000 which is less than α (alpha) value of 0.05 ($F=260.029$; $P = 0.000<\alpha = 0.05$). This indicates that there is significant difference in the mean achievement score of students taught linear equation using blended learning strategy and conventional methods. Since a significant different is observed, the null hypothesis was rejected. This implies that blended learning strategy produced a significant effect on post-test of students.

Research Question Two

What are the means achievement scores of male and female students taught linear equation using blended learning strategy?

The mean achievement scores of male and female students taught linear equation using blended learning strategy is presented in Table 3

Table 3: Mean and Standard deviation of Achievement Scores of Male and Female Students Taught Linear Equation Using Blended Learning Strategy

Methods	Type of Tests	N	Mean ($\bar{x}$)	Std.Dev. (σ)
Blended	Pre-test	18	28.61	7.57
	Post-test	18	70.22	6.99
Conventional	Pre-test	24	29.92	8.96
	Post-test	24	69.96	7.86

Table 3 shows that the pre-test and post-test mean score and the standard deviation of Basis 8 male students exposed to blended learning strategy are ($\bar{x}$ =28.61, σ =7.57) and ($\bar{x}$ =70.22, σ = 6.99)respectively and the corresponding pre-test and post-test mean scores and the standard deviation of female students are ($\bar{x}$ =29.92, σ=8.96) and ($\bar{x}$ =69.96, σ = 7.86)respectively.

Hypothesis Two: There is no significant difference in the mean achievement scores of male and female students taught linear equation using blended learning strategy? The result is as presented in Table 4

Table 4: Results of ANCOVA on Mean Achievement Scores of Male and Female Students Taught Linear Equation Using Blended Learning Strategy

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	65.226a	2	32.613	0.582	0.564	0.029
Intercept	16930.304	1	16930.304	302.111	0.000	0.886
Pre-test	64.510	1	64.510	1.151	0.290	0.029
Gender	**.045**	**1**	**0.045**	**0.001**	**0.978**	**0.000**
Error	2185.559	39	56.040			
Total	208471.000	42				
Corrected Total	2250.786	41				

a. R Squared = 0.029 (Adjusted R Squared = -0.021)

Table 4 shows an F-ratio of 0.001 with associated exact probability value of 0.978 which is greater than α (alpha) value of 0.05 (F=0.001; P =0.978 >α = 0.05). This indicates that there is no significant difference in the mean achievement score of male and female students taught linear equation using blended learning strategy. Since a significant different was not

observed, the null hypothesis was not rejected. This implies that blended learning strategy did not produce a significant effect on post-test scores of students Gender.

Discussion of Findings

This finding shows that there is significant difference in the mean achievement score of students taught linear equation using blended learning strategy and conventional methods. This implies that students expose to blended learning strategy understood linear equation than her counterparts in control group. The finding is in agreement with the finding of Martin, Roy, Eugene and Ngozi (2021), who found that the blended-learning approach enhanced learners' understanding and performance in mathematics. Ukeagba, Eugene and Martin (2020), who found that blended learning Instructional Approach enhances pupils' achievement in Mathematics in respect to Gender. Binta and Kabiru (2022), who found that students taught using blended learning strategy performed better than their counterparts with conventional method. These findings reported that students taught using blended learning strategy achieved better than those taught using conventional method.

Blended learning strategy enhances both male and female students' understanding in learning linear equation. The finding is in agreement with the finding of the following scholars; Attah and Ita (2017), the finding is in agreement with the finding of Horah Adeniji and Odeyemi (2018), who found that Blended Learning Instructional Package is devoid of gender bias. Attah and Ita (2017), who found that gender has no significantly influence on academic performance among senior secondary school students in Calabar metropolis. Felix and Mogege (2024), who found that no significant gender disparity in the mean achievement scores of learners, tutored mathematics utilizing blended learning. Pradipta, Rajaka and Prasanta (2022), whose find no significant difference in Gender achievement but in disagreement with the finding of Ajai and Imoke (2015) who reported that male students achieved better than female students when taught using blended learning strategy. The improved interest and achievement by the treatment group could be as a result of the understanding of multimedia theory of Richard Mayer in (1997). The theory emphasized exposing learner to watch audio and visual information for better understanding. Teachers should be aware that two sources of information help students learn more effectively, as they can process more information at the same time. This process will help them transfer the knowledge to long-term memory for an enhance achievement. At the end of the findings, it is discovered that blended

learning strategy enhances interest and achievement in linear equation.

Conclusion

The finding of this study indicated that blended learning strategy enhances male and female students' understanding of linear equation, this finding further establishes the role technology driven instructional strategy can play in students' achievement. The high achievement of students in the experimental group is connected to the manipulative activities and skills involved in utilizing blended learning strategy in mathematics. This study provides empirical evidence of the effectiveness of utilization of blended learning strategy on students' achievement in linear equation in Kaduna state.

Recommendations

Based on the results obtained, the following recommendations are made.

1. Mathematics teachers should adopt blended learning strategy as it enhances students' achievement.
2. Teacher should be encouraged to make use of blended learning strategy to enhance achievement
3. School administrators should periodically organize seminar and workshop for teacher on how to use blended learning strategy properly in teaching other mathematics concepts.
4. Mathematics teachers should no longer limit teaching to face to face but make use of online resources
5. Curriculum planners, policy makers and stakeholders in education should in-cooperate blended learning strategy into Nigerian school's curriculum for implementation.

References

Abakpa, B. O. &Igwe, D. O. (2013). Effect of mastery learning approach on senior secondary school students' achievement and interest in geometry in Makurdi, Benue State, Nigeria. Abacus: *Journal of the mathematical Association of Nigeria, (MAN),* 41(1), 227-235

Abdulhamid, M. G., Abubakar, M. & Tela, A. B. (2017). Cluster schools model of teachers professional development: role on pupils active participation in mathematics class in Gombe State. *Abacus: the journal of the mathematical Association of Nigeria*, 42(2), 143-148

Abubaka, Y. I. (2019).Effect of blended learning on students achievement in senior secondary geography in Niger state college of education, Nigeria. e-ISSN:2289-6589.

Agu, P. A., & Samuel, I. R. (2018). Effect of peer tutoring instructional strategy on achievement of Basic Science and Technology students with learning disabilities in Nasarawa State,

Nigeria. *East African Scholars Journal of Education, Humanities and Literature*, 1(2), 47–54. Retrieved from https://www.easpublisher.com/easjehl/

Ajai, J. T.&Imoko, I. I. (2015). Gender differences in mathematics achievement and retention scores: a case of problem-based learning method. *International Journal of Research in Education and Science (IJRES),* 1(1) 45-50

Alao, A., & Adeniyi, J. O. (2019). Leverage and liquidity management: Evidence from Nigerian consumer goods firms. *EuroEconomica*, 38(2), 19–32. Retrieved from https://www.zbw.eu/econis-archiv/handle/11159/4136

Ali, H. H., & Jameel, H. T. (2016). Causes of poor performance in mathematics from teachers, parents, and students' perspectives. *American Scientific Research Journal for Engineering, Technology, and Sciences*, 15(1), 122–136. Retrieved from https://asrjetsjournal.org/index.php/American_Scientific_Journal/article/view/1212

Ahmad, M. U., & Aliyu, A. Z. (2022). Innovative pedagogical strategies for teaching and learning of perceived difficulties in mathematics. *Brillo Journal, 3*(2), 102–112. https://doi.org/10.56773/bj.v3i2.54

Amadolo, M. M., Shikuku, B. N. & sss3wwwwwwwwwwwwwwwwwweebw22q1555555555Wasike, D. W. (2012). Investigation on factors that influence syllabus coverage in seniorsecondary school mathematicsin Kenya. *International Journal of Humanities and Social Science,* 2 (15), 51-59

Aminu, L. O. (2018). Effectofinquiry-based teaching strategy on junior secondary students' performance in mathematics inOdogbolu local government area of Ogun State. "*Journal of education advancement* 7(2), 1-11 ISSN 1115-3377

Attah, R. F. & Ita, P. M. (2017). Gender as predictor of academic achievement in english language among senior secondary school two students in Calabar Metropolis, Cross River State, *Global Journal of Educational Research*Vol. 16, 2017: 149-153. www.globaljournalseries.com; info@globaljournalseries.com

Badmus, O. T., &Omosewo E. O. (2018). Congruenceof physics and mathematics: a seasonal consonance between facts and logic. enhancing mathematics education in Nigeria, a Festschrift in HonourofProfessor Michael OlubusuyiFajemidagba.

Barowski, J. (2021).Academic Achievements overview, definition and research *https://study.com/learn/lesson/academic-ahievement-overview-factors.html*

Binta, M.&Kabiru, U. (2022). Impact of blended learning strategy in teaching student's teacher in NTI Centers Adamawa. *International Journal of Education, Library and Information Communication Technology 1(1) 1-8*

Dauda, B. &Bulus, A. K. (2015). Effect of language instruction on performance in mathematics concepts of junior secondary school students in Askira/Uba Local Government Area, Borno State, Nigeria. *The Journal of Mathematical Association ofNigeria,* 40 (1), 112-121

Ekwueme,C. O. (2013). Mathematics teaching and log in schools. Calabar Radiant Venture Nigeria LTD.

Eze, F. B. (2019). Effect of Constructivist Instructional Strategy on Students

Achievement in Secondary School Mathematics Curriculum in Rivers State, Nigeria. *Journal of Education, Society and Behavioural Science*, 34(10), 47–56. https://doi.org/10.9734/jesbs/2021/v34i1030362

Ganiyu, A. I. &Adetunji, A. O. (2021). Potency of blended strategies in students' performance in algebra at senior secondary schools. *International Journal of Innovative Research and Development* 10(3) 66-77

Gourish, C. M. & Palash, M. & Madhulika, M. (2018). Effect of blended Learning Strategy for Secondary School Science Students.International*Journal of Research and analytical Reviews* 6(1) 38181

Green, B. &. I. & Owo, W. J. (2021). Blended learning instruction strategy and junior secondary students academic achievement in basic science in Obalga, Rivers State. www.fnasjournals.com 3(1) 33-38.

Horah,S. O., Adeniji, J.&Odeyemi, A.O. (2018). Blended learning instructional strategy for enhancing students academic performance in physics practical in Port Harcourt Metropolis

Ifamuyiwa, S. A. (2019). The missing link: quality mathematics education for effective teaching and learning of mathematics, being a paper presented at the 4th annual state conference of the Mathematical Association of Nigeria (MAN) Ogun State.

Isah, M. (2013). Effect of improvised instructional Materials on students' achievement in geometry at the Upper Basic Education Level in Makurdi Metropolis, Benue State, Nigeria. *American Journal of Educational Research*, 2(7), 538–542. https://doi.org/10.12691/education-2-7-17

Khadija El Alaoui, Huda Mulhem, Amani K. Hamdan, Mohammad B. Abdul-Rahim, Maura A. E. Pilotti, &Ebtesam A. Tallouzi. (2018). Responses to the statements of the new general self-efficacy scale: The Case of the Arabic–English Bilingual Speaker. *Journal of Cross-Cultural Psychology*, 49(3), 413–428. https://doi.org/10.1177/0022022118757915

Kim, S. (2007). What is effective mathematics teaching? A study of teachers from Australia, Mainland China, Hong Kong SAR, and the United States. *ZDM – Mathematics Education, 39*(3), 265–270. https://doi.org/10.1007/s11858-007-0029-0

Maadi, M. A.(2021). Investigated the effect of using blended learning on instructional strategy on the degree of acquisition of geography skill for the eleventh level at the secondary stage in Kuwait. *Journal of Social Studies Education Research* 12(4) 93-120

Maikudi, J. (2015). Effects of guided discovery and problem-solving strategies on attitude and performance towards geometry among secondary school students in Kaduna state Nigeria. (Master's Dissertation) Amadu Bello University, Zaria

Martin, E. C. et al (2021).Usingblended learning strategy in mathematics to strengthen the teaching of geometric 2d shape and their properties to primary learner*http://respository.up.ac.a/handle/2263/86915*

Obi, C.N. (2014). Effect of origami on students' achievement, interest and

retention on geometry. (Unpublished Ph. D Thesis), University of Nigeria, Nsuka, Nigeria

Obodo, G. C. (2012). Effects of improvised teaching-learning materials on the academic performance of junior secondary school students in basic Science in Enugu State, Nigeria. *IOSR Journal of Research & Method in Education*, 3(5), 23–30. https://doi.org/10.9790/7388-0352127

Oluyemo, A. A. et al (2020).Gender difference in mathematics interest and achievement in junior secondary school students, Niger State, Nigeria. *International Journal of Research &Innovation in Social Science* 4 (10) 359.

Patrick Guidotti (2023) Advanced Mathematics: An invitation in preparation for graduate school De GruyterISBN-13: 978-3110780857

Salami,O. O. & Popoola, A. A. (2016). Effect of collaborative learning method on senior secondary school student's learning outcomes in mathematics. *the proceeding of Annual National Conference of the mathematical Association of Nigeria* (MAN), 229-241.

Sulaiman, H., Aminu, M. U., & Bashir, M. (2016). Moringa oleifera Lam. as a traditional medicine: A case study of Bauchi State University, Gadau Main Campus. *The International Journal of Science &Technoledge*, 4(2), 1–6.

Tara, S. N.(2016). Effect of blended learning strategy on achievement in biology and social and environment attitude of students at secondary level retrieved from (https://files.eric.edu.gov)

Taylor, P. (1999). *Practical foundations of mathematics* (Cambridge Studies in Advanced Mathematics No. 59). Cambridge University Press. https://doi.org/10.1112/S0024609300217372

Tong, D. H., & Ngan, L. K. (2022). Realistic mathematics education's effect on students' performance and attitudes: A case of ellipse topics learning. *European Journal of Educational Research, 11*(1), 403–421. https://doi.org/10.12973/eu-jer.11.1.403

Uko, L. U. (2012). *Mathematics as discourse*. *Bolema: Boletim de EducaçãoMatemática*, 43(3), 773–790. https://doi.org/10.1590/s0103-636x2012000300002

Umakalu, C. P. (2014).Teachers' Competencies in assessing students' affective outcome in secondary school mathematics(unpublished masters dissertation), University of Nigeria, Nsuka, Nigeria

Unamba, E. C., Eugene, M., & Martin, R. (2020). Using blended-learning strategy in mathematics to strengthen the teaching of geometric 2D shapes and their properties to primary 6 learners. *The Independent Journal of Teaching and Learning*, 16(2), 85–100. https://doi.org/10.19173/irrodl.v10i2.497

Usman, A. (2020). Mathematical proficiency of pre-service secondary school teachers in triangle trigonometry in Nigeria. *Asia Mathematika*, 4(1), 26–36.

Usman, M., & Musa, U. (2019). Assessment of level of awareness and extent of utilization of innovative instructional strategies for teaching science in secondary schools in Kebbi State, Nigeria. *ATBU Journal of Science, Technology and Education*, 7(2), 1–10.

Wilson, K. Mackintosh, K. Power, & S. Chan (2018). Effectiveness of self-compassion related therapies: a systematic review and meta-analysis Journal: *Mindfulness*

Yazici, E. & Ertevin, E. (2010). Gender difference of elementary prospective teachers in mathematics beliefs and mathematics teaching anxiety, *International Journal of Human and Social Science,* 31(3), 5-9