VOL. 13 NO. 8,
AUGUST, 2026
E-ISSN 3026-8893
P-ISSN 3027-1061

African Scholar Publications & Research International
www.africanscholarpub.com

Journal of Education Research and Library Practice (JERLP)

Impact of Youtube Enhanced Instruction on Academic Performance in Algebra among Senior Secondary School Students in Zaria Education Zone, Kaduna State, Nigeria

***Mariya Jibrin, Muazu; **Salamatu Asabe Muhammad; & ***Safiya Shuaibu**

*Department of Mathematics, Faculty of Science Education, Federal University of Education, Zaria. muazumariya76@gmail.com **Department of Mathematics, Faculty of Science Education, Federal University of Education, Zaria. asabesalamatu2@gmail.com ***Department of Mathematics, Faculty of Science Education, Federal University of Education, Zaria. shuaibusafiya152@gmail.com

DOI: https://doi.org/10.70382/ajerlp.v13i8.0100

Abstract

This study investigated the Impact of YouTube enhanced Instruction on students' performance in algebra among Senior Secondary School Students, In Zaria Education Zone, Kaduna State, Nigeria. The research design for this study was quasi-experimental involving pretest, posttest and control group. The population of the study was 7,097 SS2 Senior secondary school students which comprised of 4,015 Males and 3,082 females from 30 public Senior Secondary Schools in Zaria Education Zone. A sample of 124 students from two randomly selected out of 20 co-Education 30 public Senior Secondary schools was used for the study. The study involve two groups experimental and control. The experimental group was taught Algebra through Youtube while the Control Group was exposed to the same concept using Conventional Method. The instrument used for data collection; Algebra Performance Test (APT). The instruments was also validated by the experts in the Department of Science Education, Ahmadu Bello University, Zaria. The reliability coefficients of 0.89 and 0.65 was estimated using Pearson Product Moment Correlation (PPMC) and Cronbach's Alpha statistics respectively. Four research questions and four null hypotheses were established to guide this study. Research questions were answered using Mean, Standard Deviation, statistics while the null hypotheses were tested using Independent Sample t-test at 0.05 level of significance. The major findings revealed a significant difference between the mean scores of experimental and control groups in their performance, all in favor of the experimental group. The results also show that male and female students in the experimental group do not significantly differ in their performance. Based on the findings, the researchers concluded that teaching Algebra via YouTube is gender friendly among Senior Secondary School Students. It is therefore

recommended that Secondary School Mathematics teachers should frequently employ YouTube in teaching difficult and abstract branch in Mathematics like Algebra.

Keywords: Youtube, Performance, Algebra, Students

Introduction

Mathematics is a subject taught at primary, secondary and tertiary level of education in Nigeria which is found to be useful in most field of life (Salman, at el. 2012). Mathematics according to Abakporo (2005) is the queen and substances of science and technology. The formal education of any country especially Nigeria is primarily responsible for providing scientific and Mathematics attitudes, fundamental skills, and ways of thinking as well as developing value in science particularly Mathematics. Korau . (2009), viewed Mathematics as the pivot on which any true science can rest and no science can succeed without going through mathematical demonstration. To highlights the intricate link of Mathematics to science and technology, Adetula and Ale (2010) opined that without the knowledge of Mathematics there is no science and without science there is no technology and without technology there were no modern society. Therefore, it serves as the only core or compulsory subject across the globe, because there is no nation of the world where Mathematics is not being taught but the language of instruction may differ due to the official language of each nation (Salman, Ayinla, Adeniyi, Ogundele, & Ameen, 2012).

Kurumeh, Jimin and Mohammed, (2012**)** described Mathematics as an essential tool for advancement of science and technology. No nation can develop scientifically and technologically if it neglects Mathematics because it is a subject that enables a learner to have adequate understanding and interpretation of concepts in science and technology. The National Policy on Education of the Federal Republic of Nigeria (2013) stated that all students regardless of discipline, gender or ability must study and pass it at credit level especially at secondary school level. To achieve the desired goal of teaching Mathematics, Nigeria as a developing country needs scientific innovation in teaching and learning process and as such requires mathematician that would enable the early and proper realization of these goals. In Nigeria in spite the enormous role that Mathematics stands for, Researchers such as Naroth (2010) and Esan (2015) evidences revealed poor academic performance of students in Mathematics is attributed to lack of teaching materials, Mathematics phobia, teaching method, poor teaching facilities that include equipment and instructional materials for effective teaching. In view of this, researchers include Gambari, Shittu, Daramola and Jimoh (2016), Osokoya (2007), Gakuru (2013), recommended various methods that are applicable in teaching Mathematics which include the use of Youtube.

YouTube is a useful tool that helps to stimulate student's perception, increases their learning simultaneously, it also allows repetitive viewing, the learner can view until the concept taught is well understood (Hallinan,2000). Television and video tape influence learners, stimulate learning and enrich the class with material not likely to be available in real classroom setting (Ofili, 2003). Instructional video does not only state a fact on oral speech, it also shows that fact, illustrates it and within a few moments puts it in a large context of knowledge related to the fact. These various kinds of elaboration via sound tracts and pictures increase the memory of the students' basic statement or information. It has been found that the duplication of sensory channels and the

richness of elaborated information are features that contribute to the ease of learning and also to the strength of retention of verbal information. Educational instruction video is used to achieve objective which are supposed to reflect in the attitude of the learners (Adeosun, 2002). According Yusuf and Afolabi (2010) they make learning more permanent and offer experiences. Video resources if properly used will enhance students' academic performance.

Gender is another variable in this study which is defined as a set of characteristics distinguishing between male and female. Depending on the context, the discriminating characteristics vary from sex to social role to gender identity. Ekeh, (2000) Viewed gender as a socio-cultural construct that assigns roles, attitudes and values considered appropriate for each sex. Researches revealed that it is one of the factors that affect academic performance in Mathematics. Mutemeri and Mugwemi (2005) are of the view that the idea that Mathematics is for boys may result in low motivation in girls and could widen the gender gap in Mathematics achievement in favour of boys. This resulted to low performance in Mathematics and Mathematics related courses by female students.

The term Algebra is from Arabic word "al-jabr" meaning "reunion of broken parts", it is one of the major parts of mathematics (Sale, 2017). It simply refers to the study of mathematical symbols and the rules for manipulating these symbols. While emphasizing the important of algebra, Erbas (2004) states that, without algebra, advancement into most areas of mathematics, and the study of other disciplines requiring mathematical abstraction and modeling are limited, if not impossible.

As we knew that computational skills are seen as a prerequisite for conceptual understanding. And in several countries higher education is using entrance tests involving basic algebraic skills. Results on such tests. Secondary school teachers, accused of being too soft on teaching skills; as a result, they lack the elementary number sense and the factual knowledge to notice that there is a relationship between two numbers. The core goal of algebra is the development of strategic problem solving and reasoning skills, symbol sense and flexibility. The concepts of algebra can be observed in many of the current secondary school. This shows that various structural features of algebra are connected together to form broader conceptions within algebra in conformity with its development. It further shows how algebra is related to the other branches of mathematics. These ideas are especially useful when selecting and including algebraic concepts in a test for a certain level in the secondary school.

Statement of the problem

Despite the crucial role Mathematics plays in science and technology, the academic performance of students in Mathematics at the secondary school level in Nigeria is still below average. The WAEC Chief Examiner's Report, (2024) which revealed the persistent failure of students in Mathematics over the years.

The low students' academic performance in Mathematics has become a source of concern in Mathematics education. Researchers such as; Osokoya (2007), Gakuru (2013).identified many factors that attributed to this poor academic performance like poor instructional resources, poor teaching methods, poor students' background, lack of motivation, large class size, poor evaluation, lack of students' concentration, unqualified teachers, poor syllabus coverage among others. But Teaching Mathematics especially at the secondary school level have overwhelmingly remain teachers-centered, and use of textbook rather than helping students to think critically across subject areas and applying the knowledge to real-life situation. Considering the problems above, this study will propose a way of teaching Algebra through the use of Youtube via projector for the student's motivation and solving some problems stated before.

Objectives of the Study

The objective of this study generally is to examine the impact of youtube enhance instruction on the student's performance in Algebra. Specifically, the study seeks: to

1. Ascertain the effect of YouTube on SSII senior secondary school students' performance in algebra.
2. Examine the effect of YouTube on SSII senior secondary school students' performance in algebra by gender.

Research Questions.

The following research questions guided the study;

1 What is the difference between the mean performance scores of senior secondary school students taught algebra with Youtube and those taught using Conventional Method?

2 What is the difference between the mean performance scores of male and female students Taught algebra with YouTube?

Null Hypotheses

The following null hypotheses were formulated and tested at $p = 0.05$ level of significance:

1 There is no significant difference between the mean performance scores of SSII students taught algebra with Youtube and their counterparts taught using Conventional Method.

2 There is no significant difference between the mean performance score of male and female SSII students taught algebra with YouTube.

Methodology

The study was carried out with aim of finding the impact of you tube enhanced instruction on academic performance in Algebra. A sample of 124 students from two secondary schools was randomly selected and assigned as Experimental and Control groups. The research design of this study is Quasi-experimental and control group design using intact classes by Kelinger (I973). The study involved two groups: experimental and control groups. Two intact classes (one as experimental and the other as control groups) were used for the study. The two study schools were selected from the four pre-tested schools out of the study population. The essence of the pre-testing is to ensure selection of samples that are not significantly different in abilities in terms of performance before the treatment. After the pre-testing, two homogeneous schools were assigned into experimental and control groups using the balloting technique. The Experimental Group (EG) were taught the concept of Algebra with Youtube via Projector (X_1) for six (6) weeks according to the SS2 Mathematics curriculum and scheme of work also the researcher will provide all the necessary materials for the teaching and learning of this group. While the Control Group (CG) were taught the same concept using Conventional Method (Xo) for the same time period. After the treatment, post-test (O_2) was administered to the two groups to determine the effect of the two instructional strategies on students' performance in Algebra. The data collected were analysed using SPSS and reported as follows:

Results

Research Question 1: What is the difference between the mean performance scores of students taught algebra with Youtube and those taught the same concept using conventional method?

This research question, Mean Standard deviation and Mean Difference of post-test APT scores for experimental and control group were used.

Research Question 2: What is the difference between the mean performance scores of male and female students taught algebra using YouTube.

This research question, Mean Standard deviation and Mean Difference of post-test APT scores of male and female students in the experimental group were used.

The result shows that the students were categorized into two study groups. The first group consists of 61 students representing 49.1% which is the Experimental group taught algebra with YouTube and the other group of 63 students representing 50.9% which is the Control group taught with Conventional method. Alltogether there are 124 students for this study.

Data Analysis and Result Presentation

The data collected for this study using Algebra Performance Test (APT) and Inventory (SASI) were analyzed. Results obtained were used to answer the research questions and test the null hypotheses as follow:

Answering Research Questions and Testing the Null Hypotheses

Question One What is the difference between mean performance scores of Secondary school Mathematics students taught Algebra Concept using YouTube Instructional Strategy and those taught using Conventional method?

Result of the Descriptive Mean t statistics showed that large difference exist between the mean performance scores of SSII Secondary school Mathematics students taught Algebra Concept using YouTube Instructional Strategy and their counterparts taught using Conventional method. Their computed mean performances are 33.02 and 19.06 of SSII Secondary school Mathematics students taught Algebra Concept using YouTube Instructional Strategy and their counterparts taught using Conventional method respectively, with a mean performance difference of 13.96 in favour of students taught Algebra Concept using YouTube Instructional Strategy. Meaning that the Mean performance of students taught Algebra using youtube is higher than thus that taught using conventional Method, Youtube enhance better performance in the research question one.

Hypothesis One: There is no significant difference between the mean performance scores of SSII Secondary school Mathematics students taught Algebra Concept using YouTube Instructional Strategy and their counterparts taught using Conventional method.

Result of the independent t-test statistics showed that significant difference between the mean performance scores of SSII Secondary school Mathematics students taught Algebra Concept using YouTube Instructional Strategy and their counterparts taught using Conventional method. Reasons being that the calculated p-value of 0.00 is lower than the 0.05 alpha level of significance and the computed t-value of 31.1 is greater than 1.96 t-critical value at df 122. Their computed mean performances are 33.02 and 19.06 of SSII Secondary school Mathematics students taught Algebra Concept using YouTube Instructional Strategy and their counterparts taught using Conventional method respectively, with a mean performance difference of 13.96 in favor of students taught Algebra Concept using YouTube Instructional Strategy. Therefore the null hypothesis which states that There is no significant difference between the mean performance scores of SSII Secondary school Mathematics students taught Algebra Concept using YouTube Instructional Strategy and their counterparts taught using Conventional method, is hereby rejected.

Question Two: What is the difference between the mean performance scores of male and female students taught Algebra Concept using YouTube Instructional Strategy?

Result of the descriptive Mean statistics showed that there is no difference between the mean performance score of male and female SSII students taught Algebra Concept using YouTube Instructional Strategy. Their computed mean performances are 33.00 and 33.03 of Male and female SSII Secondary school Mathematics students taught Algebra Concept using YouTube Instructional Strategy respectively. This shows that both male and female students have the same level performance when taught Algebra Concept using YouTube Instructional Strategy, meaning that use of youtube is equally effective in enhancing performance in both male and female students in the research question two.

Hypothesis Two: There is no significant difference between the mean performance score of male and female SSII students taught Algebra Concept using YouTube Instructional Strategy.

Result of the independent t-test statistics showed that there is no significant difference between the mean performance score of male and female SSII students taught Algebra Concept using YouTube Instructional Strategy. Reasons being that the calculated p-value of 0.937 is greater than the 0.05 alpha level of significance and the computed t-value of -0.080 is lower than 1.96 t-critical value at df 59. Their computed mean performances are 33.00 and 33.03 of Male and female SSII Secondary school Mathematics students taught Algebra Concept using YouTube Instructional Strategy respectively. This shows that both male and female students have similar level of mean performance when taught with students taught Algebra Concept using YouTube Instructional Strategy Therefore the null hypothesis which states that there is no significant difference between the mean performance score of male and female SSII students taught Algebra Concept using YouTube Instructional Strategy.

Result of the Findings

This study was carried out with the aim of finding the impact of youtube be enhanced on academic performance in Algebra. The results show that students in the experimental group had a higher mean performance score than those in the control group. The difference was significant as indicated by the t-test analysis in Table 4.3. This signifies that students taught Algebra concepts with YouTube had a significantly higher mean performance score than those taught using Conventional Method. By implication, the YouTube was able to foster a significantly higher performance than the Conventional Method. The significant difference implies rejection of null hypothesis and retaining alternate hypothesis. Therefore, null hypothesis that states that there is no significant difference in the mean performance score of SSII students taught algebra with YouTube and their counterparts taught using Conventional method is rejected. The significant difference indicates that students in experimental group recorded the higher mean score than those in the Conventional Method. This finding supports that of Gambari, Shittu, Daramola and Jimoh (2016). These researches revealed that students exhibited significant improvements in performance as a result of treatment with Video as compared to the conventional method. The findings of this study also are in agreement with findings of Osokoya (2007), Yamauchi (2008), Gakuru (2013) and Magno, Gustilo, Lapinid and Barrot (2015). The finding of this study also concurs with the assertion of Abubakar (2017) that effective use of Video facilities in teaching should be employed as it will enhance student's performance of in SS level of education. The finding also provides support to the research findings of AbdulKareem (2018) that students exhibited significant improvements in performance as a result of treatment with Video as compared to the conventional method.

On the other hands, it was revealed that their is no significant difference in the performance of male and female students when exposed to YouTube. This showed that the strategy is gender friendly in terms of performance. This is in harmony with the findings of Gambari, Shittu, Daramola and Jimoh (2016)

found that boys in heterogeneous groups do not dominate their female counterparts in performance. Osokoya (2007), Thomas and Israel (2014) in their independent studies revealed that gender has no significant on performance among secondary school students when exposed to Video-Resources. But John, Musa and Waziri (2018) revealed that male students' achievement in different areas is higher than their female counterpart when exposed to YouTube.

Conclusion

This study investigated the Impart of YouTube enhanced instruction on Academic Performance in Algebra among Senior Secondary Schools Students in Zaria, Kaduna State, Nigeria. Four research questions and four null hypotheses were formulated to guide the study. In this study, the reviewed literature are related to the research topic and based on the following sub-headings: Theoretical Framework, Concept of Youtube media, Mathematics Teaching Methods, Teaching of Algebra at Secondary School Levels, Performance and Learned Concepts Algebra, Youtube network and Algebraic Performance, Gender and Performance in Algebra as well as overview of similar studies. Based on the findings of this study, the following conclusions were made:

The acquisition of Academic performance can be fostered significantly by the use of YouTube in the Present Study.

Recommendations

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

1. Secondary School Mathematics teachers in Kaduna State should frequently employ the use of YouTube in teaching difficult and abstract concept in Mathematics like Algebra.
2. Mathematics teachers in Zaria or Kaduna should consistently encourage students to actively participate in YouTube explorations, discussions and elaboration of learnt concepts for better acquisition of performance in mathematics,
3. School administrators like Principals and Senior Masters in Kaduna should constantly encourage and support Mathematics teachers by providing conducive avenue for with Youtube to facilitate teaching and learning of mathematics in Nigeria.
4. The Federal and State Governments through the Ministries of Education of Kaduna should provide standard Mathematics laboratories and adequate instructional materials in secondary schools to enable Mathematics teachers use the YouTube for the acquisition of performance level of the students in mathematics.

REFERENCES

Abakporo J. E. (2005). Effectiveness problem solving in mathematics: Challenges and prospects. *Journal of issues in mathematics education. The Annual Publications of Mathematics, Panel of STAN, 8(1): 19-33.*

Abdulkareem, A. A. (2018). The use of Multimedia in Teaching Biology and Its Impact on Students' Learning Outcomes. ICEMST 2018: International Conference on Education in Mathematics, Science and Technology. *The Eurasia Proceedings of Educational & Social Sciences (EPESS). Vol 9, 157-165*

Abubakar, A .K. (2017). Effects of Advanced Organizers on Retention and Performance in Conservation Concepts among Secondary Biology Students in Jahun, Jigawa State, Nigeria. *M.ED Dissertation in the Department of Science Education, Ahmadu Bello University, Zaria*.

Adetula, L.O & Ale S. O. (2010). Mathematics: A cognitive tool for national development building*. Reflective and Intellective position papers on mathematics Education. Abuja. Marvelous Press.*

Ekeh, P. U. (2000). Gender issues in Nigerian education the poor child and educational deprivation. in J. Mkosemani (ed). *Nigerian education: Matters arising Portharcort. Abe publishers. Environment. Journal of education.www.ncef.org*

Gakuru, M. P. (2013*). Effect of Physics Instructional Videos as an e-Learning Resource On Performance among Secondary School Students in Githunguri District, Kiambu County, Kenya.* A thesis for Master of Education. Accessed on April 10, 2019 from https://irlibrary.ku.ac.ke/bitstream/handle/5/Maina%20Paul%20Gakuru.pdf?sequence=1

Gambari, A. I., Shittu, A. T., Daramola, F. O. & Jimoh, M. A. (2016). Effects of video Instructional Packages on Achievement of Senior Secondary School Students Mathematics in Minna, Nigeria. *ATBU, Journal of Science, Technology & Education (JOSTE); Vol. 4 (2),* Accessed On July 22, 2019 from: https://www.researchgate.net/publication/312017189

Gambari, A.I., Shittu A.T., & Taiwo, O.A. (2016) Enhancing students understanding of algebra concepts through cooperative computer instruction, Gazi Journal of Education, (1)1, 29-43.

.]Hallinan M T (2000) ―Hand Book of Sociology of Education‖, New York: Kluwer Academic/Plenum Publishers.

Kerlinger, F. (1973) *Foundation of Behavioural Research.* New York: Holt Reinhercht and Winaton Inc.

Korau, Y. K. (2009). Senior secondary school Certificate Examination (SSCE) Mathematics failure; Challenge for Counselors. *ABU Journal of Educational Psychology and Counseling Vol.1 No.1 p 25*

Kurumeh M.S., Jimin N. & Mohammed,A. S. (2012). Enhancing Senior Secondary Students' Achievement in Algebra Using Inquiry Method of Teaching in Onitsha Educational Zone of Anambra State, Nigeria, *Journal of Emerging Trends in Educational Research and Policy Studies (JETERAPS) 3(6): 863-868*

Musa, M. (2018). The Relative Effect of Teaching Method for Enhancing Academic Performance in Chemistry among Senior Secondary Schools Students. *Unpublished Master's Thesis A.B.U. Zaria*

Mutemeri, J. & Mugweni, R. (2005). The extent to which mathematics instructional practices in early childhood education in Zimbabwe relates to or makes use of children's experiences. *African Journal of Research in Mathematics, Science and Technology Education, 9(1), 49-54.*

Naroth, C. (2010). Constructive teacher feedback for enhancing learner performance in mathematics Dissertation

Ofili, G.O. (2003). The effect of video tape recording on the academic of secondary school biology students in Niger state. unpublished master thesis. Minna: Federal University of Technology Minna.

Osokoya, I. O. (2007). Effects of Video-taped Instruction on Secondary School Students' Achievement in History. *International Journal of African & African American Studies Vol. VI, No. 1, Jan 200.7* Accessed: On July 22, 2019, from: http://ojcs.siue.edu/ojs/index.php/ijaaas/article/view/87/14

.Salman, M. F. Ayinla, J. O. Adeniyi, C. O. Ogundele, L. O. & Ameen S. K. (2012) "Effect of Problem-Solving Instructional Strategy on Senior Secondary School Students" Attitude towards Mathematics in Ondo, Nigeria*", International Journal of Asian Social Science, Vol. 2, No. 7, pp. 1056-1066.*

Thomas, O.O. & Israel, O.O. (2014). Effectiveness of Animation and Multimedia Teaching on Students' Performance in Science Subjects. *British Journal of Education, Society & Behavioural Science. 4(2): 201-210, 2014* SCIENCEDOMAIN *international www.sciencedomain.org*

Walberg, H. J., Fraser, B. J., & Welch, W. W. (1986). A test of a model of educational productivity among senior high school students. *Journal of Educational Research,* 79, 133-139 West African Examinations Council-(2020). *Chief Examiners report.* Lagos: WAEC.

Witzel, B. S., Mercer, C. D., & Miller, M. D. (2003). Teaching algebra to students with learning difficulties: An investigation of an explicit instruction model. *Learning Disabilities Research & Practice, 18*(2), 121–131.

Yamauchi, L. G. (2008). *Effects of Multimedia Instructional Material on Students' Learning and their Perceptions of the Instruction.* A Master published thesis, Iowa State University Digital Repository. Accessed on 22 July, 2019 from: https://lib.dr.iastate.edu/rtd/15324

Yusuf, M. O. & Afolabi, A. O. (2010). Effects of computer assisted instruction (CAI) on secondary school students' performance in biology. *The Turkish Online Journal of Educational Technology.* 9 (1) Retrieved on the 25th June, 2017 from http://www.tojet.edu.com