



Awareness, Utilization, and Students' Attitudes Toward YouTube in Learning Mathematical Concepts in Ikom LGA, Cross River State, Nigeria

^{*1}Okri, J.A., ²Nja, C.O., ²Obi, J.J., ¹Opoh, D.A., & ¹Udo, D.M.

¹Department of Mathematics and Computer Science Education, University of Calabar, Calabar

²Department of Physical Science Education, University of Calabar, Calabar.

***Corresponding author email:** okrijohn@yahoo.com

Abstract

This study assessed awareness, utilization and students' attitudes towards YouTube in learning Mathematical concepts in Ikom LGA, Cross River State, Nigeria. Three research questions were raised and three hypotheses were formulated to guide the study. This study adopts a descriptive survey design. This design enabled the researchers to obtain information from a representative sample of the population. A stratified sampling technique was used to select a sample of 110 secondary school students from a population of 3150 public secondary school students in Ikom LGA. Two instruments were used for data collection termed Mathematical Concepts Performance Test (MCPT) and the questionnaire tagged 'Awareness, Utilization and Students' Attitude towards YouTube Questionnaire (AUSATYQ)'. To determine the reliability of the instruments, Kuder Richardson (KR - 21) reliability method was used for the 'MCPT' and Cronbach Alpha method for the 'AUSATYQ'. Data were dully coded and analyzed for appropriate statistical measures. Frequency count and simple percentages were used to analyze the data, to answer the research questions, while independent t-test analysis was used to test the hypotheses at a 0.05 level of significance. The result revealed that there was a significant influence of the awareness of YouTube on students' academic performance in learning Mathematical concepts in the study area; utilization of YouTube has no significant influence on students' academic performance in learning Mathematical concepts in the study area. Also, the finding revealed that attitude significantly influences students' academic performance in learning Mathematical concepts using YouTube in the study area. It was recommended among others that the Government and school authorities organize in-service training of teachers on basic computer applications.

Keywords: YouTube, Mathematical Concepts, Student Attitudes, Learning Resources, Education Technology

Introduction

For a modern society, education is of utmost importance. Education is a powerful agent of change, and improves health and livelihoods; contributes to social stability and drives long-term economic growth. Education is an important key of achieving sustainable national development. For a state to achieve sustainable national development, the quality of its education should be improved. The Federal Republic of Nigeria (FRN) (2013) sees education as an expensive social service which requires enough provision from the three tiers of government for successful implementation and achievement of its goals. Over the years, Mathematics achievement has been linked to general cognitive ability which involves the ability to reason, plan, solve abstract problems, think abstractly, comprehend complex ideas, and maintain and manipulate complex materials (Ihendinihu, 2022). Understanding the factors related to strong Mathematical achievement or abilities is extremely important as academic achievement occupies a very important place in education as well as in the learning and learning of school children. Academic achievement is defined as the extent to which a student or institution has achieved either short- or long-term educational goals. Academic achievement of students has always been measured using traditional intelligence tests or other forms of standardized examination which are mainly cognitive. The degree and direction of attitude towards Mathematics are largely determined by the kind of interest developed by students for it (Edoho et al., 2021). The restriction of movements and social distancing, occasioned by the COVID-19 pandemic have brought changes in methods and strategies of teaching and learning. Therefore, there is a need for alternative approaches to teaching of Mathematical concepts, which is with the use of digital technological tool.

Technology-based tools transform mathematics concepts to an understandable form for teachers and learners (Orim & Opoh, 2022). With the technology potentials, educational institutions are now seeking for new paradigms to reform their educational curricula and classroom facilities to bridge the existing technology gap in education. This process however requires effective adoption of technologies into existing environment, in order to provide learners with the required knowledge to promote meaningful learning (Opoh & Ekwueme, 2022).

There are so many strategies that can be adopted by the teacher in the course of teaching. Among strategies that can be adopted in Mathematical concepts teaching to engage today's students in classroom activities is YouTube software. This software makes it easy for Mathematics teachers to interact with students or other YouTube users. According to Horstman (2015) educators need an adequate level of technological knowledge to confidently incorporate various forms of technology through YouTube into their teaching practices. The results showed that a deeper understanding of teacher practices related to the use of YouTube as a platform for viewing video content; students feel comfortable using these resources. Because Mathematics is a human activity, then YouTube videos as a starting point for learning Mathematical concepts must be based on realistic problems or those that are close to students' minds. The National Policy on Education (NPE) emphasized positive attitude, cultivation and character molding, which are the focus of the Nigerian educational system. While many students express positive attitudes towards using YouTube, these attitudes may not translate into consistent or effective usage patterns. Chao et al. (2020) found that despite favorable perceptions, a significant number of students still prefer traditional learning methods, indicating a gap between awareness and actual utilization. Attitudes are learnt predispositions to respond positively or negatively to certain objects, situations or persons. Attitudes are said to be positive when they are favourably directed towards a target. When they are unfavorably directed towards a target, they are said to be negative. A student's attitude is their tendency to respond a certain way towards something. Naturally, the student's response can be on a continuum of positive to negative or good to bad. The attitude of teachers and students towards a subject affects the teaching and learning process. Attitude is central to the education process. It either promotes or inhibits students' behavior or influences choices to attend, respond, value, participate or make commitment to educational activities. Negative attitude of secondary school students towards certain subjects has been a very big problem. Using YouTube in an appropriate manner is one of the biggest challenges for the teachers to manage in a blended learning environment. Hence, it is against this background that the study seeks to examine the awareness, utilization and students' attitude towards YouTube in learning Mathematical concepts in Ikom LGA, Cross River State, Nigeria.

Awareness of YouTube software and Students' Academic Performance in Mathematical concepts

YouTube was invented in 2005 and purchased by Google in 2006. It now works under the Google as one of its subsidiaries. It is a video sharing service where people across the world can upload, like, share and comment a video. In the modern world of information, the tradition learning methods have failed to survive and with this YouTube emerged as a good digitized pedagogical tool to meet the demands of generation Z. YouTube has wide variety of content from entertainment to education. A study by Alharbi (2019) found that students are increasingly aware of YouTube as a supplementary educational resource, with many using it to clarify concepts not fully understood in traditional classroom settings. Chao et al. (2020) found that although students are aware of YouTube's educational potential, they often struggle to integrate it into their study routines effectively. This gap highlights the need for better guidance on how to leverage YouTube for academic success in Mathematical concepts. A study by Khan et al. (2021) revealed that many students appreciate the accessibility and variety of content available on YouTube, which caters to different learning styles. However, despite this favorable attitude, there are concerns regarding the credibility of the information presented, as highlighted by Hussain et al. (2022). This skepticism can affect students' willingness to rely on YouTube as a primary learning tool.

Ayşegül et al. (2020) conducted a study to determine the views of teacher candidates on the use of YouTube for educational purposes. Study group consisted of 14 teacher candidates learning at faculty of education. In this research where quantitative research method is used, a semi-structured interview form developed by the researchers within the purpose of the research was used as a data collection tool. According to the results, it was determined that teacher candidates generally found YouTube as an appropriate educational material for different lessons; they think that YouTube promotes permanence and reinforces learning.

Utilization of YouTube software and Students' Academic Performance in Mathematical concepts

Several studies have been carried out on the influence of YouTube on students' academic performance. Edache-Abah and Dike (2019) conducted a study to find out how the use of YouTube as an educational tool can arouse the interest of secondary school students in the subject Mathematical concepts. Four research questions, four

hypotheses were raised, answered and tested at 0.05 level of significance. Quasi-experimental design was employed by using pre-test post-test control group. Population was 2,221 SS2 Mathematical concepts students in secondary schools in study area. A sample size of 109 students from two schools using purposive sampling technique was used. The instrument "Mathematical concepts Interest Scale" (BIS) was validated by experts in science education. A reliability of $r = 0.93$ of internal consistency was calculated using Cronbach's alpha. Mean and standard deviation were used to answer the research questions, while t-test was used to test the hypotheses. The findings show that YouTube improves students' interest. And that the control group also had a high level of interest even when not taught with YouTube but there was no significant difference.

Kanchan (2018) conducted a study to investigate the effect of instructional videos and real-life activities on the mathematical achievement and attitude of developmental students. The study also investigated the attitude of developmental students towards learning mathematics through instructional videos and real-life activities. The study was conducted at an urban community college with transitional mathematics classes. The four mathematics classes in the study received various combinations of real-life activities, instructional videos, and traditional teaching while learning basic concepts such as decimal place value, percentages, and fractions. Pre-and post-tests were conducted to measure student achievement. Attitude scales, surveys, and interviews were used to measure attitude changes. Results showed that, overall, the mathematics achievement of the classes receiving consistent exposure to videos and real-life activities was greater than classes receiving only some of the special instructional treatments. Students interviewed believed that instructional videos and real-life activities improved their understanding of the mathematical concepts involved in the study. This review is relevant to this present study as it will elicit mathematics teachers' interest on incorporating YouTube software in their instructional delivery.

Sethela et al.(2014) conducted research to investigate the use of YouTube videos and interactive activities in stimulating critical thinking among students from a public university in Malaysia. There were 50 students of mixed background, comprised of local and foreign students who participated in this study which lasted for one semester. Data was collected using a few approaches which included video recording of the lessons, students' and researcher's reflections and role play. The study focuses on the students' reflections of their experience while using YouTube videos. Thematic analysis was conducted to examine the themes that emerged in their reflections. Using Lewin's Action research model supported by Constructivism Theory, a-four stages action research consisted of planning, acting, observing and reflecting were conducted. The researchers found that YouTube Videos were fun and interesting, increased students' participation and engagement and enhanced their critical thinking skills. The students were able to participate actively and demonstrated strong interest in the learning process as they were able to understand lectures better by visualizing the content and relating it to real workplace. The study revealed the potential of YouTube video as a tool for stimulating students' learning and enhancing their critical thinking.

Grace (2019) examines the integration of YouTube videos in teaching and learning of English language speaking skills among secondary school students in Nakuru County-Kenya. The study adopted a mixed method; qualitative and quantitative research. The research was experimental in design and was carried out in six schools in Nakuru county, Nakuru North sub-county. These include a national school, two extra-county schools, one county school and two sub county schools. The sample size comprised 360 students and 12 teachers. 180 students were in the control group and 180 in the experimental group. Data was collected using standard students' assessment tests (SSAT), Class observation schedule and questionnaires. Data was analyzed using independent t- tests and analysis of variance (ANOVA) of the Statistical Package for Social Sciences (SPSS). The results showed that there was a significant difference between the experimental group that had been treated with videos from YouTube and the control group that had not been treated $t = 10.5386$, $p < 0.01$). The second observation was that the experimental group exhibited better analytical skills of the test items compared to the control group. The third observation is that teachers perceive YouTube videos as a resource that can make learning meaningful and interesting.

Guerrero et al (2015) conducted an experimental study that investigated the effectiveness of the flipped classroom in an undergraduate finite mathematics course and examined changes in students' attitudes towards mathematics, engagement, and achievement. The researchers conducted a quasi-experimental design that utilized pre -and post-measures of each independent variable to compare the effectiveness of the flipped classroom model with a more traditional model. One class was assigned the flipped classroom model ($n = 37$) and the other class was taught in a more traditional approach ($n = 31$). Students in the flipped classroom were assigned to watch videos for homework, and, during class time, students worked in groups to solve problems. Videos students watched for homework were screen casts of the notes given to the control group. An effort was made to also pose questions to

students during the video and encourage students to pause the video while taking notes. To measure the change in student attitudes towards mathematics, the Attitude towards Mathematics Inventory (ATMI) was administered twice, first to measure the student attitudes before the experiment and again at the end of the course to see the change in attitude. The ATMI survey consisted of 40 Likert scale items divided into four sub-categories: self-confidence, value, motivation, and enjoyment. Researchers found that student enjoyment and value of mathematics significantly increased in the flipped classroom.

Students' Attitude and their Academic Performance

Numerous studies have been conducted on the influence of students' attitudes towards YouTube software. Maziriri, Gapa and Chuchu (2020) carried out a study to examine student perceptions towards the use of YouTube as an educational tool for learning and tutorials. The study was quantitative in nature where 377 registered students from a selected university were chosen through non-probability sampling. In order to analyze the data SPSS 25 and AMOS 25 were utilized for descriptive statistics and structural equation modeling respectively. The perceived usefulness of YouTube and perceived ease of use were proposed as antecedents of attitudes and intentions while the adoption of YouTube as an educational tool was anticipated to be the outcome. The main findings suggested that perceived usefulness was observed to have a more significant impact on student perceptions toward learning through YouTube in comparison to the perceived ease of use.

More still, Nja et al. (2022) carried out a study to examine students' attitude and academic achievement in a flipped classroom. A quasi non-equivalent, non-randomized factorial design, examined Chemistry students' attitudes towards chemistry and academic achievement in second year Bachelor of Education students taught with the flipped classroom strategy. In the study of 100 students, a pre-attitude test of a 30-items questionnaire was apportioned to ascertained students' attitude towards chemistry. Pre-test was also apportioned to the control and experimental group. This was followed by teaching using the flipped classroom strategy for experimental group and the control group was taught using the traditional approach. Thereafter, students in the experimental group wrote a post attitude test. A post-test was administered to both the experimental and control group. The result of the post-attitude showed a significantly higher mean when compared to the pre attitude score. The result of the analysis using sample t-test showed students having a positive attitude towards chemistry, when taught using flipped classroom. The study also sought to find out the academic achievement of students taught with and without the flipped classroom strategy. Findings from the investigation of academic achievement revealed that students' academic achievement was significantly higher than those in the conventional group. The implications of these findings are that the flipped classroom strategy could improve attitude of students towards chemistry, thereby enhancing their academic achievement. This is so as students can play the lesson videos again and again at the comfort of their homes for mastery of concept in their lesson. The result of this study is especially relevant to the learning and teaching of Mathematical concepts in secondary in Calabr Metropolis, Nigeria inclusive. This is so as the teacher per student ratio is high such that the teacher cannot carry every student along in the class within the short period provided.

Gbolahan (2017) carried out a study to assess the impact of YouTube videos about academic writing and its skills on the writing performance of students. The population is 40 students belonging to a class aimed at assisting disadvantaged students in their academic writing in Scottsville, Province of KwaZulu-Natal and South Africa. The students were broken into two groups – control/traditional teaching and the treatment/YouTube facilitated groups. Consequently, a dominant qualitative approach is adopted using focus group discussion, interviews and tests to identify underlying patterns, methods and approaches to best fit academic writing guides and videos to improve user experiences of the software for academic writing. The fundamental results show that positive characterizations of user experiences include innovation, surprise, playfulness and stimulation whereas the narratives that are not satisfying are categorized as dissatisfaction, frustration, dissolution, disappointment, anger, confusion and irritation. Ultimately, the major findings of the research have the potential to improve user experiences on the platform by highlighting how and when the positive and negative experiences of users occur and a mapping of the differences in the academic writing performance between the two groups and best practices.

Owan et al. (2020) carried out a study to examine the path analytic study of factors affecting students' attitude towards test-taking in secondary schools in Afikpo Education Zone, Ebonyi State, Nigeria. A structural equation modelling approach was used to analyse 32 factors affecting students' attitudes towards test-taking in secondary schools. Data for the study were obtained from a sample of 1,276 students using the proportionate stratified random sampling technique. The instrument used for data collection was a Rating Scale on Factors Affecting Students' Attitudes Towards Test-Taking (RSFASATTT). Findings of the study revealed a total of 21 factors that

significantly affect students' attitudes towards test-taking in secondary schools. Out of these significant factors, 14 had a positive effect while 7 factors negatively affected students' attitudes towards test-taking. However, 11 factors were not significant predictors of students' attitudes towards test-taking. Based on these findings, it was concluded that students' attitudes towards test-taking are affected by several factors. These factors are either traceable to the students' emotions, their family background, or the school environment. What is more, Rono and Rono (2016) carried out a study sought to determine the attitudes of form two and three students towards History and Government in Selected Secondary Schools in Bomet County. The target population comprised of all public secondary schools, all the fifty two principals, all the History and Government teachers teaching History and Government in form two and form three and all the students taking History and Government in the study area. From the target population, the researcher used stratified random sampling to select 18 secondary schools, 18 school principals, 24 History and Government teachers and 410 forms 2 and 4 students taking History and Government. The researcher used both closed questionnaire to obtain information from History and Government teachers and students. Semi-structured interview schedule was used to elicit information from school principals. Descriptive statistics were used to analyze the collected data using SPSS software. Out of the four hundred and ten students who responded to the questionnaire 71% of them expressed that they enjoy learning History and Government. 87.3% of the students considered the subject useful for their future careers. Only 12.7% responded that they do not enjoy learning History and Government the main reason being that it is not enjoyable since it lacked room for creativity and challenging content and its lessons are hence boring. 88.9% of principals agreed that students in their schools like History and Government. The research concluded that majority of the students had positive attitude towards History and Government.

Hassan (2020) conducted a study to investigate the attitudes held by Saudi EFL students and the difficulties they have in learning English literature. A cohort of 180 Eighth level majors at three Saudi colleges completed a researcher-developed 28-item questionnaire probing their general motivational orientations to learn English and attitudes towards English literature. Participants were found to hold positive attitudes towards English literature. Intrinsic motivation was found to be a significant predictor of positive attitudes towards English literature. Finally, a significant positive relationship was found between general motivational orientations to learn English and attitudes towards English literature, and performance in literary courses. Oluyinka (2018) carried out a study to examine the effect of attitude and school type on the academic achievements of senior secondary school students in Christian Religious Studies (CRS) in Ibadan, Nigeria. 305 students offering CRS from 12 schools in Ibadan South–West Local Government Area of Oyo State were sampled using students' attitude in CRS questionnaire ($r = 0.79$). Data were subjected to analysis of covariance and post hoc test at 0.05 level of significance. The finding of the study indicated that there was no significant effect of students' attitude to CRS, and there was a significant main effect of school type on students' achievement in CRS ($f_{(2,305)} = 15.01$, partial $\eta^2 = 0.001$). Learners' attitude and school type are powerful tools which can bring positive change on the academic achievement of secondary school students in CRS in Ibadan, hence, school management and CRS teachers should ensure the provision of good learning environment. From the reviews above, none has been conducted in Ikom LGA with regards to YouTube software influence on students' academic performance. Hence, the gap to fill.

Statement of the Problem

Effective and efficient teaching methods that could help improve student's performance in Mathematical concepts are most desired. The advent of COVID-19 pandemic has exposed this weakness in the Nigerian educational system. This therefore calls for an innovative approach with the utilization of YouTube to engage the students in teaching and learning. Many Mathematics teachers have a lack of relevant skills to use computers and applications to use in teaching Mathematical concepts. There is a global recognition of the important role Mathematics play in national and international developments. In Nigeria for instance, the study of Mathematics is made compulsory for students in all schools and a credit pass in Mathematics is a pre-requisite admission requirement for all courses in tertiary institutions. WAEC Chief Examiner Reports reported that students demonstrated significant weakness in core Mathematical concepts (WAEC, 2023). To make Mathematics interactive, practical and provide real life example, teacher have to integrate technology that not only appeal to sense of hearing but all senses. YouTube has been described as powerful instrument in the hand of teachers that can be used in designing interactive learning experience that are practical in nature. This application gives teachers ample opportunities to integrate any format of media resources that is not possible through chalkboard. Going by the value of ICT in teaching, Cross River State equipped public secondary schools in Ikom area of Cross River State with computer and projectors with high optimistic that teachers will integrate the computer provided in their instructional delivery. The preinstalled applications such as YouTube are expected to be used in uploading videos that can enhance teaching and learning process. Based on researcher's observation, this platform is not being used for Mathematics instruction. This

scenario of not using provided school facilities that can enhance teaching and learning of Mathematics has been linked to factors such as level of teacher's readiness, teacher's perception and the actual utilization. It is against this background that the study examines the awareness, utilization and students' attitude towards YouTube in learning Mathematical concepts in Ikom LGA, Cross River State, Nigeria.

Purpose of the study

The main purpose of the study is to examine the awareness, utilization and students' attitude towards YouTube in learning Mathematical concepts in Ikom LGA, Cross River State, Nigeria. Specifically, the objectives of the study are to:

1. Determine influence of the awareness of YouTube and students' academic performance in Mathematical concepts
2. Examine influence of the utilization of YouTube and students' academic performance in Mathematical concepts
3. To find out the students' attitudes and their academic performance in learning Mathematical concepts using YouTube

Research Questions

The following research questions were formulated to guide the research study:

1. To what extent does awareness of YouTube usage influences students' academic performance in Mathematical concepts?
2. Does utilization of YouTube has influence on students' academic performance in Mathematical concepts?
3. What is the influence of students' attitude on their academic performance learning Mathematical concepts using YouTube?

Hypotheses

In the light of the above stated research questions, the following hypotheses were formulated for this study:

1. There is no significant influence of the awareness of YouTube usage on students' academic performance in learning Mathematical concepts in Ikom LGA
2. Utilization of YouTube has no significant influence on students' academic performance in learning Mathematical concepts in Ikom LGA
3. There is no significant influence of students' attitude on their academic performance in learning Mathematical concepts using YouTube in Ikom LGA

Methodology

This study adopts a descriptive survey design. The researchers adopted this design because the study is focused on establishing the nature of existing conditions by accurately and objectively describing existing phenomena or nature of a situation as it exists at the time of investigation. This design enabled the researchers to obtain information from a representative selection of the population and from that sample present findings as pointer to population trends (Anagbogu, 2022). The study involved sampling of 110 secondary school students from a target population of 3150 public secondary school students in Ikom LGA. Stratified random sampling was used in mixed schools to separate sexes before randomly selecting the sample. The researchers who draw their sample because of special considerations like ease of data collection or the element being judged as typical, or the population as in essence carrying out purposive sampling. The researchers creditably and intentionally select the sample size based on the following principles:

- a. The schools must all be public senior secondary schools
- b. The senior secondary schools should be co-educational schools
- c. Schools that had qualified Mathematical concepts teachers

The instruments used for data collection and analysis were Mathematical concepts Performance Test (MCPT) and questionnaire tagged 'Awareness, Utilization and Students' Attitude towards YouTube Questionnaire (AUSATYQ)'. The instrument (MCPT) was a multiple-choice test questions with four response options (A-D). Respondents were expected to choose the correct answer from the different options given. The 'AUSATYQ' was set based on the sub-variables. To determine the face and content validity of the instruments, copies of the 'MCPT' and 'AUSATYQ'; the instruments were given to three experts; one from Measurement and Evaluation unit of Department of Educational Foundations and the other two, from the faculty of Science Education. The experts read the instruments to confirm that it measured what it is intended to measure. To determine the reliability of the

instruments, Kuder Richardson (KR - 21) reliability method was used for the 'MCPT' and Cronbach Alpha method for the 'AUSATYQ'. The copies of the instruments were administered once and the respondents were required to attempt all the items of MCPT. The scores obtained from the administration of the instruments were analyzed using KR - 21 to obtain an index of reliability of the instrument 0.71, and the Cronbach Alpha ranges from 0.70 to 0.76.

Results

Frequency count and simple percentages were used to answer the research questions, while independent t-test was used to analyze the data to test the hypotheses at 0.05 level of significance.

Awareness of YouTube Software

Students were asked if they are aware of YouTube software in teaching and learning Mathematical concepts. Their responses were captured in the questionnaire. Analysis was done and results tabulated as shown on Table 1.

Table 1: Awareness of students on YouTube Software usage in Mathematical concepts instruction

Responses	Frequency	Percentages (%)
Yes	65	59
No	43	39
Not sure	2	2

From Table 1 above, students' response on awareness of YouTube software in learning Mathematical concepts revealed that most students in secondary schools in Ikom LGA are aware of the software which indicates 59%. 39% of respondents indicate not been aware of learning of Mathematical concepts via YouTube software, while 2% of respondents were not sure whether the YouTube software is available for teaching and learning Mathematical concepts in the study area.

Utilization of YouTube Software

When asked whether they utilize YouTube software in learning Mathematical concepts, students responded as given in table 2. Results are given in percentages.

Table 2: Utilization of YouTube Software in learning Mathematical concepts

Responses	Frequency	Percentages (%)
Yes	45	41
No	65	59
Not sure	0	0

The data on utilization of YouTube software in learning Mathematical concepts revealed that most students in secondary schools in Ikom LGA do not utilize the software. This is indicated by 59% on not utilizing the software as more than those that says yes to utilization of the software (41%).

Students' Attitude towards YouTube Software

Students were asked if they are aware and utilize YouTube Software in learning Mathematical concepts. Their responses were captured in the questionnaire. Analysis was done and results tabulated as below.

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Table 3: Students' Attitude towards YouTube Software in learning Mathematical concepts

Responses	Frequency	Percentages (%)
Positive	62	56
Negative	45	41
Indecisive	3	3

From Table 3 above, students' response on whether they are aware and utilize YouTube software in learning Mathematical concepts, revealed that most secondary schools students in the study area has positive attitude towards the use of the software in learning Mathematical concepts having percentage of 56%. 41% of respondents has negative attitude towards the use of the software, while 3% of respondents are indecisive of knowing and utilizing YouTube software in learning Mathematical concepts in the study area.

Test of hypotheses

In this section, each hypothesis is re-stated and the result of data analysis carried out to test it is presented. Each hypothesis of the study was tested at 0.05 level of significance.

Hypothesis 1: There is no significant influence of the awareness of YouTube on students' academic performance in learning Mathematical concepts in Ikom LGA. Independent t- test analysis was employed to test data collected in respect to this hypothesis. This is because awareness of YouTube was measured categorically (aware and not aware). The hypothesis was tested at 0.05 level of significant. The summary of result is as presented in table 4.

Table 4 Independent t-test analysis of awareness of YouTube on students' academic performance in learning Mathematical concepts (N = 110)

Awareness of YouTube	N	$(\bar{x})$	SD	t-value
Aware	65	64.15	2.06	7.20
Not aware	45	46.28	1.94	

Significant at 0.05 level; D/F = 108; critical t-value of 1.984

The summary of results presented in Table 4 shows that the calculated t-value of 7.20 is greater than the tabulated t-value of 1.984 at 0.05 level of significance with 2 and 108 degrees of freedom. On this note, the null hypothesis was rejected while the alternate hypothesis was upheld. This means that, there was significant influence of the awareness of YouTube on students' academic performance in learning Mathematical concepts in the study area.

Hypothesis 2: Utilization of YouTube has no significant influence on students' academic performance in learning Mathematical concepts in Ikom LGA. Independent t- test analysis was employed to test data collected in respect to this hypothesis. This is because utilization of YouTube was measured categorically (utilized and not utilized). The hypothesis was tested at 0.05 level of significant. The summary of result is as presented in Table 5.

Table 5:Independent t-test analysis of the influence of utilization of YouTube on students' academic performance in Mathematical concepts (N = 110)

Utilization of YouTube	N	$(\bar{x})$	SD	t-value
Utilized	45	46.28	1.94	1.73
Not utilized	65	64.15	2.06	

Significant at 0.05 level; D/F = 108; critical t-value of 1.984

The summary of results presented in Table 5 shows that the calculated t-value of 1.73 is less than the tabulated t-value of 1.984 at 0.05 level of significance with 2 and 108 degrees of freedom. On this note, the null hypothesis was upheld while the alternate hypothesis was retained. This means that, utilization of YouTube has no significant influence on students' academic performance in learning Mathematical concepts in the study area.

Hypothesis 3: There is no significant influence of students' attitude on their academic performance in learning Mathematical concepts using YouTube in Ikom LGA. Independent t-test analysis was employed to test data collected in respect to this hypothesis. This is because attitude was measured categorically (positive and negative). The hypothesis was tested at 0.05 level of significance. The summary of the result is as presented in table 6.

Table 6: Independent t-test analysis of attitude on students' academic performance in learning Mathematical concepts using YouTube (N = 110)

Students' attitude	N	$(\bar{x})$	SD	t-value
Positive	62	64.32	2.14	6.84
Negative	48	47.03	1.98	

Significant at 0.05 level; D/F = 108; critical t-value of 1.984

The summary of results presented in Table 6 shows that the calculated t-value of 6.84 is greater than the tabulated t-value of 1.984 at 0.05 level of significance with 2 and 108 degrees of freedom. On this note, the null hypothesis

was rejected while the alternate hypothesis was upheld. This means that, students' attitude significantly influences their academic performance in learning Mathematical concepts using YouTube in the study area.

Discussion

The first hypothesis states that there is no significant influence of the awareness of YouTube usage on students' academic performance in learning Mathematical concepts in Ikom LGA. This null hypothesis was rejected while the alternate hypothesis was upheld on the ground that the calculated t-value obtained from the analysis of data was statistically greater than the critical t-value. The implication of this result is that there was significant influence of the awareness of YouTube on students' academic performance in learning Mathematical concepts in the study area. The finding of this hypothesis is in line with the earlier position of Alharbi (2019) found that students are increasingly aware of YouTube as a supplementary educational resource, with many using it to clarify concepts not fully understood in traditional classroom settings. The finding of hypothesis one also agrees with the earlier finding of Ayşegül, Başak and Burak (2020) who conducted a study to determine the views of teacher candidates on the use of YouTube for educational purposes. According to the results, it was determined that teacher candidates generally found YouTube as an appropriate educational material for different lessons; they think that YouTube promotes permanence and reinforces learning. In addition, teacher candidates stated that YouTube might lead to addiction to technology and lack of eye contact during lesson might be regarded as one of the disadvantages of using YouTube. Hypothesis two states that Utilization of YouTube has no significant influence on students' academic performance in learning Mathematical concepts in Ikom LGA. This null hypothesis was upheld while the alternate hypothesis was retained on the ground that the calculated t-value obtained from the analysis of data was statistically less than the critical t-value. The implication of this result is that utilization of YouTube has no significant influence on students' academic performance in learning Mathematical concepts in the study area.

The result of the finding of hypothesis two disagrees with the earlier finding of Kanchan (2018) who conducted a study to investigate the effect of instructional videos and real life activities on the mathematical achievement and attitude of developmental students. Results showed that, overall, the mathematics achievement of the classes receiving consistent exposure to videos and real-life activities was greater than classes receiving only some of the special instructional treatments. Students interviewed believed that instructional videos and real-life activities improved their understanding of the mathematical concepts involved in the study. The result of the finding also agree with the earlier finding of Edache-Abah and Dike (2019) who conducted a study to find out how the use of YouTube as an educational tool can arouse the interest of secondary school students in the subject Mathematical concepts. The findings show that YouTube improves students' interest. And that the control group also had a high level of interest even when not taught with YouTube but there was no significant difference. There was also no significant difference in the mean interest scores of both male and female students, it was then concluded that despite the urge and need to blend traditional classroom teaching/learning with some online YouTube contents to arouse students' interest, students can still have high level of interest when taught concepts in Mathematical concepts using the conventional teaching method.

The third hypothesis states that there is no significant influence of students' attitude on their academic performance in learning Mathematical concepts in Ikom LGA. This null hypothesis was rejected while the alternate hypothesis was upheld on the ground that the calculated t-value obtained from the analysis of data was statistically greater than the critical t-value. The implication of this result is that students' attitude significantly influences their academic performance in learning Mathematical concepts using YouTube in the study area. The finding of this hypothesis is in line with the earlier position of Oluyinka (2018) who carried out a study to examine the effect of attitude and school type on the academic achievements of senior secondary school students in Christian Religious Studies (CRS) in Ibadan, Nigeria. The finding of the study indicated that there was no significant effect of students' attitude to CRS, and there was a significant main effect of school type on students' achievement in CRS ($f_{(2,305)} = 15.01$, partial $\eta^2 = 0.001$). The result of the finding also agree with the earlier finding of Maziriri, Gapa and Chuchu (2020) who carried out a study to examine student perceptions towards the use of YouTube as an educational tool for learning and tutorials. The main findings suggested that perceived usefulness was observed to have a more significant impact on student perceptions toward learning through YouTube in comparison to the perceived ease of use. In addition, it was also discovered that intention to use YouTube and adoption of YouTube as an educational tool had the strongest relationship of all tested hypotheses.

Conclusion

The study's findings revealed that awareness of YouTube has a significant impact on students' academic performance in learning mathematical concepts. However, the actual utilization of YouTube did not show a significant influence on academic performance. Instead, it was the students' attitude towards using YouTube that played a crucial role, with a significant influence on their academic performance in learning mathematical concepts. This suggests that having a positive attitude towards using YouTube for learning can make a substantial difference in students' academic outcomes.

Recommendations

Based on the findings of the study, it was recommended that:

1. Government and school administrators should organize training that will build teachers skills in the use of basic computer application such as YouTube.
2. Specialists in computer application should be employed as a permanent staff to mentor other teachers in the use of YouTube for instruction.
3. Teachers should use teaching and learning activities that encourage learners to view YouTube Mathematical concepts videos.
4. School administrators should organize seminars to orientate students on positive attitude towards using YouTube software, and effect of negative attitude on their academic performance.

References

- Alharbi, A. (2019). The role of YouTube in enhancing learning outcomes in higher education. *Journal of Educational Technology*, 15(3), 45-59.
- Anagbogu, G. E. (2022). Research Process in Education and Social Sciences. *University of Calabar Press*.
- Ayşegül, N.; Başak, B. & Burak, D. (2020); Teacher Candidate Views on the Use of YouTube for Educational Purposes; *Online Journal of Communication and Software Technologies*: 10(2).
- Chao, C. M., et al. (2020). The impact of YouTube on student engagement in Mathematical concepts education. *International Journal of Science Education*, 42(7), 1123-1137.
- Edoho, E.A. Opoh, D.A. & Udobong, D.M. (2021). Influence of self-concept on the performance of secondary school students in Mathematics in Calabar South Local Government Area, Cross River State – Nigeria. *Inter-Disciplinary journal of Science Education (IJ-SED)*, 3(1): 26-36.
- Esu, A.E.O. (2004). Competences for effective teaching. In Uche, S.C. & Erukoha, O.I. (ed.) *Professional Skills for Effective Teaching*, Calabar: Rehoboth Fsvourd Books.
- Grace, M. W. (2019); Integration of YouTube Videos in Teaching and Learning of English Language Speaking Skills among Secondary School Students in Nakuru County, Kenya
- Hassan, M. K. (2020). Attitudes towards English Literature: The Case of EFL Students at Three Saudi Colleges. *Studies in English Language Teaching (Online)*, 8(3):38-51.
- Horstman, A. (2015). YouTube in the Classroom? Cases on Educational Technology Integration in Urban Schools, (April), 58-60.
- Hussain, S., et al. (2022). Challenges of using YouTube in higher education: A case study in Mathematical concepts. *Educational Research Review*, 17, 100-115.
- Ihendinihu, U. E. (2022). Predicting Secondary School Students' Achievement in Mathematics through Emotional Intelligence Factors. *Ifé Journal of Behavioural Research*, 10(1): 121-134.
- Khan, A., et al. (2021). Students' perceptions of YouTube as a learning tool in Mathematical concepts. *Mathematical concepts Education Research*, 23(2), 204-215.
- Khathibul, U. Z. N.; Wahyu, W. & Zamzaili, D. H. (2019); The Ability to Solve Mathematical Problems Through YouTube Based Ethnomathematics Learning: *International Journal of Scientific & Technology Research*, 8(10).
- Kumar, A., & Kumaresan, S. (2008). Use of Mathematical Software for Teaching and Learning Mathematics. *The International Congress on Mathematical Education (ICME) 11*, 373–388.
- Marc – Jackman, W. and Patricia, R. (2021). Students' Perspectives on Youtube Video Usage as an E-Resource in the University Classroom: *Journal of Educational Technology Systems*, Vol. 42(3) 273-297, 2013-2014).
- Mayer, R. E., Moreno, R. (2003). Nine ways to reduce cognitive load in multisoftware learning. *Educational Psychologist*, 38(1), 43-52.
- Maziriri, E. T., Gapa, P., & Chuchu, T. (2020). Student Perceptions Towards the use of YouTube as An Educational Tool for Learning and Tutorials. *International Journal of Instruction*, 13(2), 119-138.

- Nja, C. O., Orim, R. E., Neji, H. A., Ukwetang, J. O., Uwe, U. E., & Ideba, M. A., (2022). Students' attitude and academic achievement in a flipped classroom. *Heliyon Journal*. 8(3).
- Oluyinka, S.A. (2018). Attitude and school type on academic achievements of senior secondary schools' students of Christian Religious Studies (CRS) in Ibadan, Nigeria. *Ibadan Journal of Educational Studies (IJES)*, 15(1&2): 121-126.
- Omojunwa, J. (2007). Teacher Education in the 21st Century: making a difference through a commitment to effective teacher preparation programme. A lead paper presented at the Festschrift in honour of Professor Mbong AkpanUdofot at the University of Uyo.
- Orim, R.E. and Opoh, D.A. (2022). Cultural practices and mathematics academic performance among basic secondary school students in post-covid-19 era in Obudu LGA of Cross River State, Nigeria. *Ife Journal of Behavioural Research*, 10(1): 112-123.
- Owan, V. J., Bassey, B. A., & Agurokpon, D. C., (2020). Path Analytic Study of Factors Affecting Students' Attitude towards Test-Taking in Secondary Schools in Afikpo Education Zone, Ebonyi State, Nigeria. *American Journal of Creative Education*, 3(1): 10-20.
- Rono, D., & Rono, O. C. (2016). An Assessment of the Attitudes of Students towards History and Government in Selected Secondary Schools in Bomet County in Kenya. *Journal of Education and Practice*, Vol.7, No.19,
- Sethela, J; Aizan, Y. & Yeoh, K. K. (2014); Assessing the Use of YouTube Videos and Interactive Activities as a Critical Thinking Stimulator for Tertiary Students: An Action Research published by Canadian Center of Science and Education; *International Education Studies*; Vol. 7, No. 8; 2014.
- Weimer, M. (2013). *Learner-centered teaching: Five key changes to practice*. San Francisco: Jossey-Bass.