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EFFECT OF GOOGLE CLASSROOM ON COMPUTER EDUCATION STUDENTS' ACADEMIC ACHIEVEMENT IN COLLEGES OF EDUCATION SOUTH- SOUTH, NIGERIA

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Abstract
This study determined effect of google classroom on computer education students' academic achievement in colleges of education south-south, Nigeria. Five objectives, three research questions and hypotheses were stated to guide the study. The study adopted pretest, post-test, control group quasi experimental design. The population of the study consisted of 571 NCE II computer education students in the eight state owned Colleges of Education. The sample comprised of 110 NCE II Computer Education students in two intact classes drawn using purposive random sampling technique in 2021/2022 school session. The researcher developed instrument for the study titled "Operating System Achievement Test" (OSAT). The draft of the instruments was face validated by three experts in the University of Uyo, Uyo. A test-retest procedure was carried out to ascertain the reliability of the instrument. The instrument was administered on 30 computer education students who were not part of the study sample and schools. Pearson Product Moment Correlation (PPMC) was used to obtain reliability coefficient of .82. The researcher employed two course lecturers and briefed as research assistants to administer the instruments. Mean and standard deviation was used for answering research questions, analysis of covariance (ANCOVA) was used in testing the null hypotheses at .05 level of significance. Findings of the study showed that there was a significant difference in the academic achievement scores of students taught operating system using Google classroom and those taught using Traditional classroom, with those in the Google classroom performing better than those in the traditional classroom. However, there is a significant difference in the cognitive performance scores of students taught operating system using Google classroom and those taught using Traditional classroom, with those in the traditional classroom performing better than those in the Google classroom. There is a significant difference in the mean retention scores of students taught operating system using Google classroom and those taught using Traditional classroom method. It was recommended that higher education institutions should encourage lecturers to regularly use Google classroom for some topics when teaching. Both lectures and students should be trained on effective utilization of Google classrooms for instruction.

Keywords: google classroom, teaching method, academic achievement, retention, gender

Introduction

Learning environment in the 21st century has extended beyond the walls of the traditional classroom settings to virtual classrooms, or hybrid classrooms all supported by digital technologies. The introduction of digital technologies has not just made learning accessible to all, but also, easier, flexible and continuous. Digital learning classrooms and environments have different modes and all offer a wide range of benefits. One of the most applied digital classrooms in recent times is the google classroom. The google classroom for Africans is a cost effective method of delivering e-learning. Google classroom has been widely used in Nigeria. However, as with every new technology, there may be issues relating to the teacher and students' adoption, all of which might impact on the academic achievement and performance of studentsin operating system.

Students' academic achievement has been a major source of concern to educationist and researchers. Academic achievement according to Steinmayr, *et al*(2015) is the performance outcome which shows the extent individuals, students, teachers and the schools have accomplished specific goals that were the focus of instruction especially in school settings. Academic achievement involves what a student had achieved in several disciplines during the course of their career which includes progress in core academic courses such as operating system, science, language, arts, and social studies and performance in areas such as athletics, music and art among others (Andortan, *et al* 2022). The above definitions imply that academic achievement covers all aspects of what a student is expected to cover during the course of schooling. This may reflect why much attention is paid on students' achievement. Despite the importance of high students' achievement in operating system and school courses generally, the problem of mass failure across the different levels of education is a common knowledge (Afolabi*, et al* 2020). This has been attributed to many factors including teaching methods and as such researchers are interested in

findings methods that may be effective in improving students' achievement especially post COVID 19 era. One of such methods the present researchers feel could be efficient in promoting student's achievement is the google classroom. This is because google classroom makes learning student-centered, motivated, creative, and improve problem-solving skills (Cook and Sonnenberg, 2014). It is imperative for the present study to investigate the effect of google classroom on students' achievement in operating system.

Google Classroom is a program for teachers to create a digital classroom for students to communicate with their teachers and peers (Phan, 2018). It is a free application that integrates e-mails and documents to save into storages. Teachers can upload files, videos, links, announcements and assignments for students to retrieve and view. Document files can be edited in class and shared with peers to learn collaborative skills. When students complete an assignment, they can submit by posting on the teacher's board or on the classroom board. This program can be accessed using any device at any place, which is convenient for both teachers and students. Google platform allows learners to chat and discuss topics learned in class, and allows teachers to view student discussion, and post comments. Different assignments can be posted such as video segments, PowerPoint presentations, documents and web quests which aid academic achievement of students.

Academic achievement is the assessment of students' performance based on procedural knowledge gained on a subject, topic or course (Harvey, 2019**).** It involves knowledge and the development of intellectual skills, including the recall or recognition of specific facts, procedural patterns, and concepts that serve in the development of intellectual abilities and skills (Lima, *et al* 2018). Academic achievement assesses cognitive domain of instruction effectively. Despite the conceptual argument that computer education engages students in general problem-solving

activities, it is agreed that it may ultimately be beneficial for acquiring cognitive skills beyond coding and systems design (Denning, 2017). Thus, the assessment of cogsnitive skills is essential. However, cognitive skills development must precede assessment and it is also predicated on the instructional method adopted by the teacher. Cognitive abilities and performance can be enhanced using appropriate instructional strategies. A broad view of the data generated by cognitive training studies suggests that the repetitive use of interactive media leads to the best chance of engendering cognitive enhancement effects (Joaquin and Adam, 2015). Thus, the use of google classroom environment might akin the development of cognitive skills.

Google Classroom is a free blended learning platform developed by Google for educational institutions that aims to simplify creating, distributing, and grading assignments. The primary purpose of Google Classroom is to streamline the process of sharing files between teachers and students. Google classroom is considered as one of the best platforms for enhancing teachers' workflow. It provides a set of powerful features that make it an ideal tool to use with students. Google classroom helps teachers save time, keep classes organized, and improve communication with students. It is available to anyone with Google Apps for education, a free suite with productivity tools including Gmail, the Google classroom application depends on Google documents and cloud storage and Gmail service in order to accomplish the required functions research and follow-up with students. On the other hand, the service also provides tools for teachers to continue to allow them to publish the assignments, homework, questionnaires and tests for students and get answers to them in real time.

According to Senad (2021), Google Classroom became an option for schools as substitute to classroom teaching. Google Classroom is defined by Oguguo *et al*(2021) as theprocess of employing technology to give education and training applications electronically, observe learners'

performances, and provide feedback on learners' progress. One of the recent additions to virtual and online learning platforms is the Google classroom.

Google Classroom is a new component in Google Apps for Education that was introduced in 2014. This classroom allows teachers to easily create and manage assignments, provide timely feedback, and communicate with their students (Shaharanee, *et al* 2018). According to Abidin and Saputro (2020), Google classroom is a useful tool for supporting learning activities because of its flexibility and numerous features. Google classroom has features that can be used in the learning process like class preparation, display student assignments, storing data on Google Drive and developing learning material, namely creating questions, creating assignments, and creating topics will be discussed in Google classroom (Ulum, 2020). Teachers can use Google Classroom to give online assignments, promote collaboration among their colleagues, students, and maintain constant communication with students. Furthermore, teachers can establish virtual courses, offer tasks, send feedback, and view all of this information in one place. One of the courses in college of education that often require student more engage is computer education.

Computer education is a vital and major programme in Nigerian colleges of education that introduces students to the workings of computer and how to teach the workings of the computer to students in secondary school. One aspect of the workings of a computer is the operating system. Unfortunately, where operating system is being offered as a major course, the rate of failure in the course is quite alarming.

Operating system is a course offered in computer education programme in the college of education. An operating system is a program that manages a computer’s hardware. It also provides a basis for application programs and acts as an intermediary between the computer user and the computer hardware. The purpose of an operating system is to provide an environment in which a

user can execute programs in a convenient and efficient manner (Brookshear, 2018). An operating system is software that manages the computer hardware. The hardware must provide appropriate mechanisms to ensure the correct operation of the computer system and to prevent user programs from interfering with the proper operation of the system.

Every instructional input has its effect on student learning and subsequent impact on academic performance. Academic performance/achievement is the extent to which a student, teacher or institution has attained a short or long term educational goal and is measured either by continuous assessment or cumulative grade point average (CGPA). This is determined by many factors most especially instructional methods and learning environment.

Retention is measured in collaboration with achievement, as the learner who is able to remember, retain or recall the learnt material or the past experience can boast of higher achievement in a subject. Closely related to male and female student achievement in computer education is retention. Retention according to Merriam web dictionary is a preservation of after effect of experiences and learning that makes recall or recognition possible. Imoke and Anyah (2014) asserted that failure in retention result to poor achievement in both internal and external examinations. Retention therefore is an act of retaining or an ability to recall or recognize what has been learnt or experienced over a long period of time. Retention is associated with memory. To support this, Okoye (2013) stated that retention is a process of transferring information from short term memory to a long term memory. Information that is interesting will be retained when it has reached the long term memory. This study may provide evidence for each gender group that has the stronger memory association when taught English language using zoom application. Male and female students may retain more or less or may retain equally when taught using e-learning methods.

Gender is seen to also have considerable effects on students' academic performances especially in science subjects. Gender is the range of physical, biological, mental and behavioral characteristics pertaining to and differentiating between the feminine and masculine (female and male) population. The importance of examining performance in relation to gender is based primarily on the socio-cultural differences between girls and boys. Some vocations and professions have been regarded as men's (engineering, computer science, arts and crafts, agriculture etc.) while others as women's (catering, typing, nursing etc.). Men and women receive certain ideas or practices differently. Pillow, (2019). In fact, parents assign task like car washing, grass cutting, bulbs fixing, climbing ladders to fix or remove things etc. to the boys. On the other hand, chores like dishes washing, cooking, cleaning and so on is assigned to the girls. In a nutshell, what are regarded as complex and difficult tasks are allocated to boys whereas girls are expected to handle the relatively easy and less demanding tasks. As a result of this way of thinking the larger society has tended to see girls as a weaker sex". Consequently, an average Nigerian girl goes to school with these fixed stereotypes. However, a study on Spanish student indicates that some differences exist between males and females on aspect of creativity related to academic achievement, although creativity is shown to be related to academic performance for gender Xixia, (2016) also found that the degree of creativity between male and female is similar but they also concluded that the most famous creative person are usually male. Some researcher reported that one gender is more creative than another gender. From the fore going the researcher is trying to find out the effect of Google classroom application student's academic achievement in operating systems in Colleges of education in south-south Nigeria.

Statement of the Problem

Students' classroom academic achievement is a key element of educational success. One way for students to shoulder the responsibility for learning is for them to be the readers, writers, speakers, listeners, thinkers in the classroom through activeclassroom engagement. Student academic achievementhas been defined as the levelof participation and intrinsic interest that a student shows in the classroom. Google Classroom academic achievementalso involves behaviours, motivation, interest, focus, collaboration and attitudes towards learning which could promote learning performance. Operating system is a difficult concept for many computer education students in Nigeria.

The current traditional method of teaching operating system in state Colleges of Education in south-south, Nigeria is seems inadequate to the detriment of the academic achievement of computer education students. Operating system is a vital and major part of computer education programme in Nigerian tertiary institutions. Unfortunately, where operating system is being offered as a major course, the rate of failure in the course is quite alarming. The summary of the analyses of computer education students' performance in operating system for 2018/2019, 2019/2020, and 2020/2021 academic sessions in eight state Colleges of Education in South- South, Nigeria: Cross River state College of education Akamkpa Calabar, AkwaIbom state College of education Afaha Nsit and Rivers College of Education Rumuolumeni, Port-Harcourt, Edo state College of education Igueben, College of education Agbor Delta State, College of education Ekiadolo-Benin, Edo state, College of education, Warri Edjeba Road, Delta State and College of Physical Education Mosogar Sapele Delta State, offering Computer Education are given as follows. For 2018/2019 academic session – out of 122 students, 46 (37.7%) passed, while 76 (62.3%) failed, for 2019/2020 academic session, out of 119 students 48 (40.3%) passed, while 71 students (59.7%) failed and For 2020/2021 academic session out, of 130 students, 51 (39.2%)

passed while 79 (60.8%) failed). If this poor performance goes unchecked, the competence of NCE Computer Education graduates becomes questionable and they will become irrelevant in the world of work. Based on the researcher's recent interaction with some students, it was observed that even with the introduction of digital classroom into learning of computer education; lecturers still prefer to use the traditional classroom in teaching operating system.

Also, computer education students believe that operating system is too technical and difficult, and that is why lecturers are finding it difficult to teach effectively. On the basis of the foregoing, the researcher is prompted to investigate the effects of Google classroom on the academic achievementof computer education students in operating system in State Colleges of Education in South-South, Nigeria. The situation presented here calls for great concern for both lecturers and students. Even at this, most students that passed did not pass at first sitting. There is a dire need to address this situation. This is what the study intends to do by investigating the effects of Google classroom on the academic achievementof Computer Education students in operating system in State College of Education in South-South, Nigeria.

Purpose of the Study

The main purpose of this study is to determine the effects of Google Classroom on Computer Education Students' Academic Achievementin Operating System in Colleges of Education South-South Nigeria. Specifically, the study sought to:

Determine the effect of Google Classroom on computer education students' academic achievement in operating system when taught using Google classroom.

Determine the difference in the mean achievement score of male and female students taught operating system using Google classroom

Determine the mean retention scores of students in operating system when taught using Google Classroom

Research Questions

What is the difference in the mean achievement score of students taught operating system using Google classroom and those taught using traditional classroom method?

What is the difference in the mean achievement score of male and female students taught operating system using Google classroom and those taught using traditional classroom method?

What is the difference in the mean retention scores of students taught operating system using Google classroom and those taught using traditional classroom method?

Research Hypotheses

There is no significant difference in the mean achievement scores of students taught operating system using Google classroom and those taught using Traditional classroom method.

There is no significant difference in the mean achievement scores of male and female students taught operating system using Google classroom and those taught using Traditional classroom method.

There is no significant difference in the mean retention scores of students taught operating system using Google classroom and those taught using Traditional classroom method

RESEARCH METHOD

The study employed a quasi-experimental research design specifically, pre-test, post-test non-equivalent control group. The study area was be south-south region Nigeria, which comprises of six (6) states and is strategically located at the point of where the Y tail of the River Niger joins the Atlantic Ocean through the Gulf of Guinea. The South – South Region was created from both the Western and Eastern Region of Nigeria on 27th May 1967 by the regime of General Yakubu

Gowon. Edo and Delta states formerly Bendel state from western region while Bayelsa, Rivers, Akwa Ibom and Cross River states from the Eastern region. The population of the study consisted of 571 second year computer education students in 2021/2022 school session from the eight (8) accredited state owned Colleges of Education in south – south Zone of Nigeria. The sample size consisted of 110 respondents drawn from the population of 571.Two colleges of education were sampled using purposive sampling technique from the eight (8) Colleges of Education owned by State government in south-south, Nigeria. Which are: Akwa Ibom State College of Education Afaha Nsit which served as experimental group and Cross River State College of Education Akamkpa, Calabar which serve as the control group. The sample consisted of 50 students in the experimental group, 22 males and 28 females, and 60 students in control group 40 males and 20 females An intact class in each of the schools was randomly assigned to experimental and control groups, in 2021/2022 academic session studying operating system in their second semester with Google Classroom as an experimental group while the same unit was taught to control group by using traditional Classroom. The instrument developed by the researcher for the study was the Academic Achievement test titled "Operating System Achievement Test (OSAT). The achievementtest contained fifty (50) multiple choice questions with four options (A-D) for students to pick the correct answer from the topics that was taught on operating system concepts in second semester year two (2) in colleges of Education South-South Nigeria. The instructional packages used for the experimental treatment was also developed by the researcher. The instrument OSPT for the study was face validated by three experts, one in Educational Foundation Guidance and Counselling Department and two experts in Computer and Robotic Education Department university of Uyo, UyoAkwaIbom State. Their comments and suggestion were incorporated into the final draft of the instrument. The motive of the validation is to ensure the appropriateness of

the instrument for the study. The reliability of the instrument was obtained using Test Retest method. Thirty students in the same area from Rivers state College of Education Rumuolumeni, Port-Harcourtwho were not part of the study were used to collect data for the reliability of the instrument. Pearson Product Moment Correlation (PPMC) was used to obtain the reliability coefficient of 0.82.

The Researcher obtained permission from the Head of the Department (HOD) of Computer Education in the selected schools. The course lecturers were brief on how to use the Google Classroom Apps by the Researcher and students were also oriented on how the system is utilized. One school was assigned as the experimental group while, the other as the control group. The experimental group was taught operating system concepts using Google Classroom while the control group was taught using the traditional classroom. Pretest was administered to both groups. The treatment lasted for six (6) weeks. The Posttest was administered during and at the end of every treatment for proper evaluation of students' engagement. The duration of the test was an hour; The test contain fifty (50) multiple choice questions with four options (A-D) five questions from each topic and each questions carried 10 marks score point for students to pick the correct answer from the topics that was taught on operating system concepts using Google classroom the responses were collated for scoring and used for analysis. Before the commencement of the study, the researchers visited the sampled schools to seek permission from the computer education Head of the department (HOD) to use their schools and students for the study. After permission was granted, the researchers recruited the services of two regular Computer education lecturers who taught Operating system (one from each intact class) as research assistants. The reason for using regular Computer Education lecturers was to ensure that the students are not aware they were involved in an experiment. The research assistants were very well informed about the objective

of the research. The research assistant for the experimental group was trained for four days on the use of Google classroom while the one of the control group was asked to use the traditional face-to-face classroom method.

The experiment lasted for a period of seven weeks. In the first week, the research assistants were trained for four days. The instrument (OSAT) was administered on both groups on the fifth day as pretest. The normal lesson periods on the school's timetables were used to conduct the experiment which lasted for 60 minutes per lesson for five times a week. The control group were taught in the class while the experimental group were taught in a computer laboratory were Google Apps for Education (GAFE) was downloaded into the computers and the Lecturers does an online class using Google Docs, Google Forms and Google Presentation. There was one computer in the laboratory that was connected to an overhead projector and interactive Smart Board from where the teachers create virtual classes, distribute assignments, send feedback, and see everything within one media. Five sets of lesson plan, with the same content, specific objectives, duration and evaluation were developed for the two groups.(See Appendix(III and IV, page 95-104). The lesson plan for the experimental group was prepared for online learning with Google classroom app while the one for the control group was prepared for traditional classroom method. At the end of every treatment, items in the same OSPT reshuffled and re-administered to the students as posttest in order to determine the effect of the treatments on the students' academic performance in operating system. The students in the experimental group rated the OSPT with Google classroom evaluation format while students in the control group were manually rated the OSPT. The treatment lasted for seven weeks. After two weeks which the posttest was administered the researcher reshuffled the questions and re-administered to the students inorder to obtain the students retention scores. The scoring obtained from pretest and posttest was analyzed using Mean and Standard Deviation to

answer the research questions. Analysis of Covariance (ANCOVA) was used to test the Null hypothesis at 0.05 level of significance. In testing the null hypotheses, probability value (p-value) was compared with 0.05 levels of significance. When probability value (p) is less than or equal to .05 ($p \leq .05$) the null hypothesis (H_O) was rejected on the other hand, when the probability value (p) is greater than ($p \geq 0.5$), the null hypothesis was retained.

Results

Research Question 1

What is the difference in the mean academic achievement score of students taught operating system using Google classroom and those taught using traditional classroom method?

Table 1: Summary of mean difference in students' academic achievement in operating system when taught using Google classroom and traditional classroom methods

Groups		Pretest		Posttest		Mean Gain
	N	Mean	SD	Mean	SD	
Google Classroom	50	49.53	4.52	69.60	6.503	20.07
Traditional Classroom	60	46.27	4.17	55.33	6.485	9.06

Data in Table 1 gives the summary of the Mean and standard deviation of achievement scores of students in operating system when taught using Google classroom and traditional classroom methods. The result shows that the Mean gain score for students taught with google classroom is 20.07, while those taught with traditional classroom is 9.06. The result shows that students taught with google classroom performed better than students in the traditional classroom group. This shows that google classroom is an effective method for teaching students operating system.

Research Question 2

What is the difference in the mean academic achievement scores of male and female students taught operating system using Google classroom?

Table 2: Summary of mean difference in students' academic achievement in operating system when taught using google classroom based on gender

Groups		Pretest		Posttest		Mean Gain
	N	Mean	SD	Mean	SD	
Google Classroom	50	49.53	4.52	60.00	6.58	10.47
Traditional Classroom	60	46.27	4.17	54.87	6.55	8.60

Data in Table 2 gives the summary of the Mean and standard deviation of academic achievement scores of students performance in operating system when taught using google classroom based on gender. The result shows that the Mean gain score for female students is 8.60 as against 10.47 for male students. This shows that male students performed better than female students in operating system when taught with google classroom.

Research Question 3

What is the difference in the mean retention score of students taught operating system using Google classroom and those taught using traditional classroom method?

Table 3: Summary of mean difference in students' retention scores in operating system when taught using Google classroom and traditional classroom

Groups		Posttest		Retention test		Mean Gain
	N	Mean	SD	Mean	SD	
Google Classroom	50	68.52	6.345	64.88	6.17	-3.64
Traditional Classroom	60	55.27	6.033	51.17	5.90	-4.10

Data in Table 3 gives the summary of the Mean and standard deviation of retention scores of students in operating system when taught using Google classroom and traditional classroom methods. The result shows that the Mean gain retention score for students in the google classroom is -3.64, while those in the traditional classroom is -4.10. The result shows that students taught with google classroom retained more taught content than students in traditional classrooms. This shows that google classroom is an effective method for helping students' retention abilities.

Hypothesis I

There is no significant difference in the mean academic achievement scores of students taught operating system using Google classroom and those taught using Traditional classroom method

Table 4: Summary of ANCOVA analysis for significant mean difference in students' academic achievement in operating system when taught using google classroom and traditional classroom

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	5551.030[a]	1	5551.030	131.66	.001
Intercept	425681.939	1	425681.939	10096.70	.001
classroom	5551.030	1	5551.030	131.66	.001
Error	4553.333	108	42.160		
Total	430468.000	110			

The data presented on Table 4 gives the summary of the Analysis of Covariance (ANCOVA) test. The result shows that the calculated F value is 131.66. The probability ofF, that is, the P value is .001. Since the P-value is less than the alpha level of .05, the result is statistically significant. Thus, the null hypothesis is rejected. Hence, there is a significant difference in the mean cognitive performance scores of students taught operating system using Google classroom and those taught using Traditional classroom method , with students in the google classroom performing better than students in traditional classroom.

Research Hypothesis 2

There is no significant difference in the mean cognitive performance scores of male and female students taught operating system using Google classroom

Table 5: Summary of ANCOVA analysis for significant mean difference in male and female students' achievement in operating system when taught using google classroom

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	25.919[a]	1	7825.919	125.59	.001
Intercept	12978.050	1	12978.050	299.69	.001
classroom	25.919	1	25.919	111.59	.001
Error	2554.933	59	43.304		
Total	186776.000	61			

The data presented on Table 5 gives the summary of the Analysis of Covariance (ANCOVA) test. The result shows that the calculated F value is 111.59. The probability of F, that is, the P value is .001. Since the P-value is less than the alpha level of .05, the result is statistically significant. Thus, the null hypothesis is rejected. Hence, there is a significant difference in the mean cognitive performance scores of male and female students taught operating system using Google classroom, with the male students performing better than female students.

Research Hypothesis 3

There is no significant difference in the mean retention scores of students taught operating system using Google classroom and those taught using Traditional classroom method

Table 6: Summary of ANCOVA analysis operating system when taught using Google classroom for significant mean difference in students' retention scores in

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	4790.478[a]	1	4790.478	125.56	.008
Intercept	417903.787	1	417903.787	10954.19	.008
classroom	4790.478	1	4790.478	125.56	.008
Error	4120.213	108	38.150		

Total	422134.000	110

The data presented on Table 6 gives the summary of the Analysis of Covariance (ANCOVA) test. The result shows that the calculated F value is 5.087. The probability of F, that is, the P value is .008. Since the P-value is less than the alpha level of .05, the result is statistically significant. Thus, the null hypothesis is rejected. Hence, there is a significant difference in the mean retention scores of students taught operating system using Google classroom and those taught using Traditional classroom method, with students in the google classroom retaining more taught content than Traditional classroom students.

Discussion

The result of analysis shows that the Mean gain score for students taught operating system with google classroom is 13.91, while those taught with traditional classroom is 7.32. The result shows that students taught with google classroom achieved better than students in the traditional classroom group. The hypothesis test confirms there is a significant difference in the mean academic achievement scores of students taught operating system using Google classroom and those taught using Traditional classroom method, with students in the google classroom achieving better than students in traditional classroom.

This finding is in tandem with Anekwe and Amadi (2020) studied the effect of google classroom on interest and performance of trainee teachers in computer education. The findings revealed that there was significant difference in the interest and performance scores of trainee teachers taught Computer Education using Google Classroom Discussion Strategy and those taught with the Face to Face Method.

The result shows that the Mean gain score for female students is 13.61 as against 13.91 for male students. This shows that male students achieved better than female students in operating

system when taught with google classroom. The hypothesis test shows that there is a significant difference in the mean academic achievement scores of male and female students taught operating system using Google classroom, with the male students performing better than female students. This finding agrees with Ekpo-Eloma, *et al* (2022) who examined the effect of Google Classroom Application on undergraduate students' performance. Findings showed that there was also a significant difference in performance scores between male and female students taught operating system using Google Classroom Application, with male students still performing better than their female counterparts. This finding is actually in variance with Anekwe and Amadi (2020), whose study findings showed that the Google Classroom Discussion strategy used in the study was not gender biased.

The result shows that the Mean retention score for students in the google classroom is 0.61, while those in the traditional classroom are -0.31. The result shows that students taught with google classroom retained more taught content than students in traditional classrooms. The corresponding hypothesis test indicates there is a significant difference in the mean retention scores of students taught operating system using Google classroom and those taught using Traditional classroom method, with students in the google classroom retaining more taught content than Traditional classroom students. This finding is supported by Khoiriyah and Pulungan (2022) who determined the effectiveness of google classroom in learning. They found that google classroom make Students to be active learners, as a Digital Tool, it provides meaningful feedback to both Students and Teachers. Google classroom enhanced the retention of taught material than traditional classroom settings.

Conclusion

Based on the findings of the study, it is concluded that google classroom was better than conventional look-and-say in teaching pupils literacy and numeracy skills. Google Classroom if utilised as learning management system (LMS) enhances students' learning, which eventually results in increased interest and better academic achievement. The study concludes that google classroom helps students retain taught content and is an effective method for teaching computer education courses.

Recommendations

Based on the findings of the study, the following recommendations are made

1. Higher education institutions should encourage lecturers to regularly use google classroom for some topics when teaching.
2. Provisions should be made in the school to support goggle classrooms in the form of internet enabled computer classrooms
3. Lecturers are encouraged to utilize google classroom to teach students operating systems.
4. Both lectures and students should be trained on effective utilization of google classrooms for instruction.

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