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Abstract

Purpose: The study examined the effect of Google Classroom Application on undergraduate students' scores in Educational Technology in the University of Calabar, Nigeria.

Methodology: Two null hypotheses were formulated to guide the study, Quasi-experimental research design using pre-test posttest non-randomized control group design was adopted for the study. The population is made up of al undergraduates offering Educational Technology as a course in the University of Calabar. A sample of 160 year two students of educational technology comprising of 85 female and 75 male were purposively sampled for the study. The Google Classroom Application and Educational Technology Performance Test (ETPT) were the instruments used for data collection. The results of the study were analyzed using Analysis of Covariance (ANCOVA).

Findings: The results revealed that there is a significant difference in undergraduates students' scores in educational technology taught with the Google Classroom Application and those taught using expository method, there was also a significant difference in performance scores between male and female students taught using Google Classroom Application,.

Unique contribution to theory, practice and policy: It was therefore recommended Google Classroom Application should be used always to promote students' academic performance in educational technology and that Lecturers should equally upgrade their skills on the utilization of Google classroom and other technological applications to stay afloat with 21st century skills online units best global practices.

Keywords: *Google Classroom, Educational Technology, Undergraduate,*

1.   Introduction

The mode of instructional delivery, the world over, has been in a constant state of flux, due largely to the ever-changing societal demands and an array emerging of digital technologies. According to Aristorink (2014)[1] and Ekpo-Eloma (2021)[2], advances in technology have

revolutionized the way and manner teaching and learning are conducted. The situation is further scaled up by the sudden eruption of the Corona Virus pandemic in December 2019, which ravaged the entire global community. Its effect on the global population has been astonishingly incalculable about 1.6 billion learners in more than 190 countries were out of school (WHO, 2020)[3].

Meanwhile, containment strategies, namely; total lockdown and observance of social distancing further gave impetus to educational planner to re-think and re-tool the curriculum to accommodate emerging challenges in the education sector. Admittedly, covid-19 forced universities to find alternatives to the traditional face-to-face instruction. Most universities are now adapting blended or hybrid learning or purely online learning options. Here situates the application of Google classroom, among other technological tools, in instructional delivery, given the fact that most undergraduates are technology savvy. Krishna (2015)[4] cautions that technology would not replace teachers but teacher who use technology would probably replace teachers who do not use. What this implies is that, there is a compelling need for 21st century teachers to explore and integrate the benefits of technology into the pedagogical process in preference to the traditional expository method.

Google classroom is a free innovative tool introduced in 2014 by Google Application for education. It enables the teacher to create a digital classroom for students to communicate with them and their fellow peers. Teachers can upload video, files, links, assignments and announcements for students to retrieve and view. Documents can equally be edited in class and shared with colleagues, and thus enhance collaborative and interactive skills. Google classroom enable teachers create and organize assignments and provide immediate feedback in real time. Students complete and post their assignment on the class board. It allows students chat, discuss topics taught in class while teachers view the discussion and post comments. Jakkaew and Hemrungrates (2017)[5] investigated the factors that affect the implementation of Google classroom in specific courses using enrolls in three courses. The result of the study showed that Google classroom can enhance students' self-directed learning (SDL) and cognitive skills.

Udosen and Adie (2019)[6] carried out a study on the use of Google classroom technology among distance learner of National Teachers' Institute, Calabar. About 19 NTI course facilitators were used for the study. The result obtained revealed that there is no Google classroom software technology at the NTI Calabar Centre, but that the facilitators at the centre possess a high level of competence to use the technology. Gupta and Pathania (2020)[7] carried out a study to assess the impact of Google classroom platform for learning at the teacher education level, using web-based learning environment inventory and Google classroom salutation survey. The sample consisted of 60 students from College of Education, Jammu city, where teaching and learning was conducted using Google classroom set-up. The result of data collected revealed that students can access their learning activities easily, communicate with other students electronically and work on their own pace and can regularly access online resources.

Bashar (2017)[8] conducted experimental on the impact of Google classroom on the teaching efficiency of pre-service teachers. The control group was taught using the traditional teaching method of face-to-face, while the experimental group was taught using Google classroom approach. The result of college students performance taught by employing Google classroom was significantly better than those of the control group exposed to the traditional face to face interaction. Also, Bisong and Anagbogu (2020)[9] investigated influence of integrating web-quest technology on learning efficiency for global competitiveness among National Open University students in Akwa Ibom study centre. The expost facto research design was adopted for the study and the sample consisted of 234 two students from the Centre. Two instruments, namely; perception of web-quest integration and students' competence questionnaire and learning effectiveness test. Data obtained were subjected to ANOVA statistical analysis. The study revealed that there was a significant influence of students' perception of integrating web-quest technology on learning effectiveness for global competitiveness among the NOWN students of Akwa Ibom Study Centre.

Similarly, Dicicco (2016)[10] and Hemrungrote and Assawaboonmee (2017)[11] highlighted the role of Google classroom as a self directed learning tool in the teaching and learning tool in chosen courses. In all, it has proved that Google classroom can enhance retention, and academic performance, and make learning easier, faster, interactive and exciting to both teachers and learners because of its collaborative tendencies.

1.2   Theoretical Framework

Expectancy theory, Vroom Rao 2000,

The expectancy theory of Victor Vroom Rao (2000)[12] is used as a framework to explore factors which motivate one to contribute and collaborate in on-line learning environment; Google classroom as compared with other social tools such as discussion forums. The expectancy theory includes the three dimensions of valence, instrumentality and expectancy when investigating choices people make. Motivation is produced by individual expectancy that a certain effort will lead to an intended performance, the instrumentality of this performance achieving a certain result, and the desirability, of this result for the individual.

This theory is relevant to this study because Google classroom provide more control in configuration, content sharing and customization than discussion forums. Diverse expectancy levels involve the efforts required that lead to the intended results in peer learning. This means that if students expects the use of Google classroom to produce desired result to them in terms of improved performance, they would be motivated to use the platform and this would result in achieving desired result among Educational Technology students.

1.3   Statement of problem

Over the years, teaching has been mostly face to face, with the teacher dishing out information for learners to regurgitates sheepishly. Infact, the teacher formatted the teaching-learning situation, while the learner was just a passive participant.

Currently, there is a paradigm shift from the conventional method of teaching to a more contemporary pedagogical method of knowledge impartation through the use of information and communication devices or tools. In spate of the current emphasis on the integration of ICT in the teaching learning process, most Nigerian universities are yet to adopt the contemporary method(s) of instruction. Observably, most university lecturers are still relying on the talk-and-chalk method of teaching, sourcing for materials from books and libraries rather than maximizing the potentials of ICT for seamless instructional delivery, such as the Google, classroom platform. This has a debilitating effect on instruction and does not reflect current best global practices.

Conversely, most university lecturers and undergraduates are technology savvy, abreast with the nitty-gritty of how to adapt and manipulate technological tools effortlessly in their quest for knowledge. It is, therefore, most expedient and salutary to incorporate the Google classroom to meet the varied needs of undergraduate students.

This study, therefore, seeks to evaluate the effect of the use of Google classroom on the academic performance of students in educational technology in the University of Calabar. Although studies have been carried out on educational technology students' academic performance in the University of Calabar to the best of the researchers' knowledge, studies on Google, classroom as an instructional tool for enhanced academic performance have not been explored. It is against this backdrop that the researchers intend to carry out this study on Google classroom and academic performance of educational technology students in the University of Calabar.

1.4   Purpose of study

Specifically, the study sought to:

1.   Compare the academic performance of Educational Technology Students taught using Google classroom application with those taught using expository method
2.   Examine the difference in academic performance between Educational Technology students taught using Google classroom and those taught using Google classrooms based on gender

1.5   Research questions

1.   What difference exists in the academic performance of Educational Technology students taught using Google classroom and those taught using expository method?
2.   What difference exists in the academic performance of students in Educational Technology taught using Google classroom and those taught using the expository method based on gender?

1.6   Research hypotheses

H0₁: There is no significant difference in the academic performance of Educational Technology   students taught using Google classroom and those taught using expository method

H0$_2$: There is no significant difference in the academic performance of Educational Technology Students taught using Google classroom and those taught using the expository method based on gender.

2. Methodology

2.1 Research design

The research design for this study is a Quasi-experimental design using pre-test post-test non-randomized control group design. Quasi experimental design is a design in which an independent variable is directly manipulated to measure its effect on a dependent variable and participants are not randomly assigned to comparison groups. Quasi-experimental design was suitable for this study because the design establishes the effect of treatment (Google classroom) on students' academic performance and will comprise students' in their intact class setting.

The pre-test provided a check on the non-random assignment of subject to groups. Moreover, comparison on the basis of pre-test performance provided further process of equating the research groups while the use of control group provided the basis for comparison of the students' performance based on treatments given.

Table 1: Diagrammatically the design as shown below:

Groups	Pre- testing	Research Condition	Post-testing
Exp. Group	0_1	X	0_2
Control Group	0_1	Y	0_2

Exp. Group - Experimental group are students taught using Google classroom

Control Group - are students taught with expository method

0_1 - Pre testing (test given before treatment)

X - Experimental treatment

Y - Control (non treatment)

.0_2 - Posttest (test given after treatment)

2.2 Sample

The sample consisted of 160 year two students of educational technology in the University of Calabar. This comprised of 85 female and 75 male students.

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2.3   Sampling technique

The purposive sampling techniques was adopted in the selection of all the 200 level students of Educational Technology based on the following criteria.

a.   Their existing knowledge on ICT resources such as media, internet, computer, web-based   tools, m-learning and e-learning.

b.   Must have received lectures, submitted assignments and interacted through an online learning platform.

c.   Must own an internet enabled / smart phone

2.4   Instrumentation

Two instruments were used for the study, namely; Educational Technology Performance Test (ETPT) and consisting of a 20 items multiple choice test with four options lettered A to D, with a score of 5 marks for each correct answer.

The second instrument used was the Google classroom treatment, comprising of ICT topics and database management system (DMS) used for the experimental study.

3.1   Data Analysis and Results

The result obtained are presented in the light of the research questions and hypotheses formulated to guide the study.

3.1.1   Answering of Research Questions

Research Question One

What difference exists in the academic performance of Educational Technology students taught using Google classroom and those taught using expository method?

Mean and standard deviation were used for answering this research question, the result of the analysis is as presented in Table 2.

Table 2: Mean and standard deviation of the difference in the academic performance of students in Educational Technology taught using Google classroom and those taught using expository method

Instructional strategies Difference	N	Pretest		Posttest		Mean
		Mean	SD	Mean	SD	
Treatment group	80	40.80	3.84	69.31	7.86	28.51
Control group	80	38.86	5.69	44.15	5.91	5.29

The result in Table 1 revealed the pretest and posttest means of treatment group (those taught using Google classroom) of 40.80 and 69.31 and their respective standard deviations of 3.84 and 7.86 respectively. The result further shows the pretest and posttest means of control group (those taught with expository method) of 38.86 and 44.15 and their respective standard deviations of 5.69 and 5.91 respectively with a mean difference of 23.22 between the treatment group and the control group. This difference in mean implies that there is difference in the academic performance of students in Educational Technology taught using Google classroom and those taught using expository method.

Research Question Two

What difference exists in the academic performance of Educational Technology Students taught using Google classroom and those taught using the expository method based on gender?

Mean and standard deviation were used for answering this research question, the result of the analysis is as presented in Table 3.

Table 3: Mean and standard deviation of the difference in the academic performance of Educational Technology Students taught using Google classroom and those taught using the expository method based on gender

Instructional strategies	N	Pretest		Posttest		Mean Difference
		Mean	SD	Mean	SD	
Treatment group Male	38	40.39	4.12	71.21	8.42	30.82
Female	42	41.16	3.57	67.59	6.97	26.43
Control group Male	37	38.91	6.24	44.13	6.30	5.22
Female	43	38.81	5.24	44.16	5.62	5.35

The result in Table 3 revealed the pretest and posttest means of male and female students' academic performance in the treatment group of 40.39 and 71.21 and 41.16 and 67.59 respectively and their respective mean differences of 30.82 and 26.43. The Table also revealed the pretest and posttest means of male and female students' academic performance in the control group of 38.91and 44.13and 38.81and 44.16respectivelyand their respective mean differences of 5.22 and 5.35. Comparing mean differences of male and female students in the treatment group and mean differences of male and female students in the control group implies that there is no difference in the academic performance of students in Educational Technology taught using Google classroom and those taught using the expository method based on gender.

3.1.2 Testing of Hypotheses

ANCOVA statistical tool was used for testing all the hypotheses at .05 level of significance.

Hypothesis 1

There is no significant difference in the academic performance of students in Educational Technology Students taught using Google classroom and those taught using expository method.

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Table 4: Result of ANCOVA analysis of the difference in the academic performance of Educational Technology taught with the Google classroom and those taught using expository method

Source	Type III Sum of Squares	Df	Mean Square	F	p-value.
Corrected Model	81.834	2	40.917	1.693	.187
Intercept	13345.938	1	13345.938	552.181	.000
Posttest Control	69.365	1	69.365	2.870	.092
Participants	12.974	1	12.974	8.537	.004
Error	3794.610	157	24.169		
Total	257721.000	160			
Corrected Total	3876.444	159			

a. R Squared = .021 (Adjusted R Squared = .009)

The result in Table 3 reveals that on the academic performance of students in Educational Technology taught using Google classroom and those taught using expository method. The Table further revealed F-value of 8.537 and a critical F value of 3.89 at 1 and 157 degrees of freedom and at .05 level of significance with a p-value of .004. Since the p-value (.004) is less than 0.05 (.004 < 0.05) the null hypothesis is rejected. It can therefore be concluded that there is a significant difference in the academic performance of Educational Technology students taught using Google classroom and those taught using expository method.

Hypothesis 2

There is no significant difference in the academic performance of Educational Technology students taught using Google classroom and those taught using expository Method based on gender.

Table 5: Result of ANCOVA analysis of the difference in the academic performance of Educational Technology Students taught using Google classroom and those taught using expository Method based on gender

Source of Variance	Type III Sum of Squares	df	Mean Square	F	p-value
Corrected Model	54.563	2	27.281	.776	.464
Intercept	2455.017	1	2455.017	69.868	.000
Posttest Experimental Group	43.731	1	43.731	1.245	.268
Gender	2.802	1	2.802	.080	.778
Error	2705.637	77	35.138		
Total	158698.000	80			
Corrected Total	2760.200	79			

a. R Squared = .020 (Adjusted R Squared = -.006)

The result in Table 4 reveals that on the academic performance of students in Educational Technology taught using Google classroom based on gender. The Table further revealed F-value of .080 at 0.05 level of significance with a p-value of .778. Since the p-value (.778) is greater than 0.05 (.778 > 0.05) the null hypothesis is retained. It can therefore be concluded that there is no significant difference in the academic performance of students in Educational Technology taught using Google classroom based on gender.

3.3 Discussion of Findings

3.3.1 Difference in the Academic Performance of Educational Technology Students Taught Using Google Classroom and those taught using Expository Method

The result of the analysis of the difference in the academic performance of students in Educational Technology taught using Google classroom and those taught using expository method revealed that there is significant difference in the academic performance of student's in Educational Technology taught using Google Classroom and those taught using expository method.

This finding is in line with the study of Basher (2017)[12], who conducted a study on the impact of Google classroom on the teaching efficiency of pre-teachers. The researcher followed the experimental approach in implementing the Google classroom on the research sample. The controlled group was taught by the traditional way while the experimental group

studied using Google classroom. The results showed that there were significant statistical differences in the result between the experimental and control group when Google classroom was used. The teaching efficiency of college students in each of the levels i.e. planning, execution and evaluation improved along with academic achievement in computers as compared to the traditional way of teaching.

3.3.2 Difference in Academic Performance of Student's in Educational Technology taught using Google Classroom based on Gender

The result of the analysis of the difference in the academic performance of student's in Educational Technology taught using Google classroom and those taught using expository method based on gender revealed that there is no significant difference in the academic performance of students in Educational Technology taught using Google classroom and those taught using expository method based on gender. This result is possible in view of the fact that Google classroom instructional strategy could lead to information easily memorized, retained as well as recalled by students in spite of their gender. This therefore means that in spite of the gender, once innovative instructional strategy is used for teaching, student's performance will be enhanced and this has nothing to do with gender difference.

4.   Conclusion and Recommendations

It has been established and rightly too, that Google classroom as a global infrastructural tool, holds great prospects for improving students academic performance, as the study shows. This may be so because, as digital natives, it is their homegrown technology. The study has shown that Google classroom has significantly impacted students academic performance in educational technology in the University of Calabar, gender notwithstanding.

On this truth, it has been recommended that;

1. Most subjects in the university curriculum should be taught using Google classroom strategy.
2. Students should be encouraged to own and effectively utilize this technological during instructional.
3. University management should make possession of smart/and android phone a deliberate policy or an entry requirement for all educational technology students at the point of admission.
4. Lecturers should equally upgrade their skills on the utilization of Google classroom and other technological applications to stay afloat with 21st century skills online units best global practices.
5. TETFUND should set aside a token as 'Data Grant' for undergraduate students for accessibility to assist them obtain data for effectively utilization of Google classroom.
6. University management should create the enabling environment for effective utilization of this infrastructure through campus internet connectivity and imported power outage.

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