Comparative Effectiveness of Google Classroom and Lecture Method in Teaching Educational Technology: Implications for Counselling

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Abstract

This study determined the comparative effectiveness of Google Classroom application and lecture method of teaching educational technology on undergraduate students' academic performance in Kashim Ibrahim University, Maiduguri. Two objectives were formulated to guide the study and two null hypotheses were tested at 0.05 level of significance. The study used quasi experimental research design with one experimental group and one control group. The target population for this study was four hundred and sixty two (462) comprised of all 300 level education students of Kashim Ibrahim University, Maiduguri. To obtain the subject of the study, the six programmes of the Department of Education were stratified based on gender. The study used 208 students from 4 intact classes using simple random sampling. The instrument used for data collection was Performance Test in Educational Technology (PTET), made up of thirty (30) items multiple choice type. The test items were drawn within the scope of educational technology syllabus. The instrument was validated by specialists in the Department of Education, Kashim Ibrahim University, Maiduguri. A pilot testing of the instrument was done in one University which was not part of the main study to test the validity and the reliability of the instrument using test retest method with 0.8 reliability coefficient of Cronbach's Alpha Value. The study lasted for six weeks. The findings revealed that Google Classroom application was effective in teaching educational technology it also revealed that there was no significant difference in the mean performance scores of male and female students taught educational technology using the Google Classroom application. The study concludes that despite these challenges the findings show that Google Classroom is highly effective in improving students' academic performance compared to the traditional lecture method. Additionally, gender does not influence students' academic performance when taught using Google Classroom. The study recommends that regular training workshops should be organized for both students and lecturers to improve competency in using google classroom and other e-learning tools.

Keywords: Application, Educational, Effectiveness, Google, Technology, Undergraduate, and Performance

Introduction

Information and Communication Technology (ICT) is a pivot for the existence of a global world in terms of the social, economic, political and educational development of any nation and allows for the advancement of any country. However, the adoption of ICT requires an environment that encourages open competition and normalization, increases access to the internet and telecommunications information and increases ICT literacy (Bello & Aderbigbe,

2021). In developing countries, most especially in sub-Saharan, Africa, the level of accessibility and utilization of ICT facilities is still very low, especially its effective usage in teaching and learning within the four walls of the classroom and beyond the use of ICT facilities in teaching and learning is an indispensable part of the education system as their application enhances and facilitates teachers' pedagogical activities (Yusuf, 2023).

Today's learning has used a variety of ways and technologies as the main supporting tools to increase student knowledge and competency. The Google Classroom application is a learning application that uses internet technology that is easily accessed through Smartphone devices and develops the activeness and independence of student learning. The Google Classroom application creates a digital learning environment that helps learners explore their potential, and have easy access to learning resources, fosters student interest in learning, trains student learning discipline, makes students learn anytime and anywhere and supports blended learning when outside the classroom. The Google Classroom also allows adding multiple apps to create further fun and expand the learning resources access for students, teachers can create or upload assignments in Google Docs or Google Forms which can be auto-graded securely with password protection, (Afolabi, 2021).

On the other hand, the Google Classroom application places high demands on the teacher who is already overburdened by large class sizes. The large class size compromises the individualized and personalized teaching and learning demanded by the Google Classroom application. As such, for the teacher, creating application-based materials for the class learning the necessary skills and updating information can be time-consuming. Several benefits can accrue through establishing a website, but maintaining it is time-consuming as there is a need to always check that external links are working and to monitor online class discussions.

Google Classroom features communication and discussion tools such as online debates, forums, reviews, brief messages, and emails, allowing students to engage in collaborative learning which can be used for teaching and learning. Besides Google Classroom may be considered as one of the inquiring-based learning media since can fully engage students' talents in finding, understanding, exploring, analyzing, and formulating learning outcomes (Ghofur, 2021). Cacace (2020) found that students' achievement did not show much improvement and that students were not very passionate about using Google Classroom to complete assignments but preferred it for keeping track of assignments. However, Oyarinde and Komolade (2020) showed that the Google Classroom platform positively affected students' academic performance, attitudes and perception. Another study by Senad (2021) revealed that students have positive perceptions of using Google Classroom in mathematics. More so, Sari and Yin (2021) revealed that the group of students who were exposed to the Google Classroom using a collaborative approach showed a better interest in economics learning than the group of students who were not exposed to it. In a similar vein, Srisamitay, Redhana and Suja (2021) revealed that students learning achievement taught by online learning in the Google Classroom was better than that of the WhatsApp group. Adamu, Kolo and Amuda (2023) reported that learning is the acquisition of knowledge by individuals which may cause adjustment in behaviour or perception resulting from experience and discoveries within the micro and macro environments.

Krishna (2021) is cautious that technology would not replace teachers but teachers who use technology would probably replace teachers who do not use it, what this implies is that there

is a compelling need for 21st-century teachers to explore and integrate the benefits of technology into a pedagogical process in preference to the conventional lecture method. Gupta and Pathania (2020) carried out a study to assess the impact of the Google Classroom platform on learning at the teacher education level, using a web-based learning environment inventory and a Google Classroom salutation survey. The sample consisted of co-students from the College of Education, Jumma City, where teaching and learning were conducted using Google Classroom setup. The result of the data collected revealed that students can access their learning activities easily, communicate with other students electronically work at their own pace and can regularly access online resources. Basher (2023) conducted an experimental study on the impact of Google Classroom on the teaching efficiency of pre-serve teachers. The control group was taught using the traditional treading method of face-to-face, while the experimental group was taught using the Google Classroom approach. The next of college students' performance.

Meanwhile, after the emergence of Corona Virus Pandemic in December 2019, which ravaged the entire global community, containment strategies, namely; total lockdown and observance of social distancing further gave impetus to educational planners to re-think and re-tool the curriculum to accommodate emerging challenges in the education sector. This has necessitated Universities to find alternatives to 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 (Adeniyi, 2021).

Different teaching strategies are being used by lecturers in the teaching-learning process. Effective teaching is a result of the different technologies that enable students to learn on their own. However, there is no single best method of teaching, and therefore teachers are encouraged to get acquainted with different teaching strategies to achieve better learning outcomes. The lecturer method, also known as a transmissive method, is based on vertical learning, whereby the teacher has all the knowledge which they transmit to the students. Babayemi, Ahmed, Yisau and Babalola (2022) examined the effect of enhanced conventional lecture methods (conventional lecture method and PowerPoint presentation) on students' academic achievement in basic science in Oyo State. The results indicated that the students taught basic science using the enhanced convention lecture method performed significantly better in post-test achievement mean scores than their counterparts taught basic science using the conventional lecture method. This finding indicated basic science could be taught and learn meaningfully through the use of enhanced conventional lecture methods because it is more learner-friendly and student-centered.

One of the commonly used methods in teaching is the lecture method. The lecture method is characterized by the use of an organized verbal presentation of the subject matter which is at times augmented by visual aids and is also characterized by the active participation of the teacher in delivering information. It has been observed that the method is mostly used at the tertiary level of learning. At that level, lecturing involves uninterrupted take from a teacher to students who are passive recipients of information. It is characterized by one-way communication. It places more emphasis on the presentation of the content and the activities within the classroom are teacher-centered, teacher-controlled and information centered, (Basha, 2021). The lecture method is also characterized by several weaknesses which induce

the following, negligible participation of students, ignoring the need to develop students" capacities; failure to cater for individual needs and differences, failure to promote the participatory approach to learning; does not development any scientific skills in students and tends to be authoritarian. Other weaknesses associated with the lecture method are that it is not student-centred, as it ignores the practical aspects of learning and that it is knowledge-centred rather than development-centred (Basha, 2021).

Different teaching strategies are being used by lecturers in the teaching-learning process. Effective teaching is a result of the different technologies that enable students to learn on their own. However, there is no single best method of teaching, and therefore teachers are encouraged to get acquainted with different teaching strategies to achieve better learning outcomes. Information and Communication Technology has an important role in learning. Many people believe that ICT will make the learning process more fun and interesting, but learning activities with technology is one of the new challenges in higher education because many teachers struggle to integrate it for several reasons. Perez (2022) moreover expressed that they are not fulfilled with the viability of computerized apparatuses and have challenges to execute it. Agreeing with Cox (2020) executing classroom innovation in school is required since it can offer assistance to understudies to get ready for the long term and as we are within the advanced time which makes we ought to know how to utilize it properly. Other challenges relate to connectivity. Connection to the internet may be slow and unreliable. Google Classroom application has to go beyond the classroom. In developing countries there are still challenges related to access to computers and laptops may let as the Internet. In some cases, students have the gadgets, but lack of connectivity disadvantages them. Low academic performance of students in educational technology is may be attributed to the inappropriate use of teaching tools and facilities. Effective teaching strategies are supposed to improve the quality of education for effective academic performance of educational technology students, in conversations. The performance of the students on the intended learning outcomes provides the validation loop on the success of the interaction and instruction. Gender alone does not determine academic performance, it can be influenced by other factors which include, the environment of the learners (rural and urban) socioeconomic, study habits, teacher qualifications, experience, availability of instructional materials, and infrastructure among others (Ibrahim, 2022).

Statement of the Problem

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

Objectives of the Study

The objectives of the study are to determine:

1. Difference in the performance of students taught educational technology using Google Classroom application with those taught using lecture methods in Kashim Ibrahim Universities, Maiduguri.
2. Gender differences in the performance of students taught educational technology using the Google Classroom application in Kashim Ibrahim Universities, Maiduguri.

Hypotheses

The following null hypotheses were tested at 0.05 level of significance:

Ho$_1$: There is no significant difference between the performance mean scores of students taught educational technology using the Google Classroom application and those students taught with the lecture method.

Ho$_2$: There is no significant difference between the mean scores of male and female students taught educational technology using the Google Classroom application.

Theoretical Framework

John Dewey (1938) Experiential Learning theory

John Dewey was a most famous proponent of hands on learning and one of the first to formally define and advocate experiential education. He regards experience as an essential component of the educational process. Dewey Notes, "I Assume the amid all uncertainties there is one permanent frame of reference; namely the organic connection between education and personal experience. Dewey's theory of experience learning consists of a logical sequence which involves perceiving a problem followed by its articulation. Dewey believed that the meaning of a given experience is the result of interaction between what the learner brings to the given situation and what happens there. When Dewey emphasized practical ideas in both his philosophical and educational theories, always striving to show how abstract concepts could work in everyday life. He also advocated education that will fulfill and enrich the current lives of students as well as prepared them for the future

David Ausubel (2000) Theory of Meaningful Verbal Learning

David Ausubel (2000) theorized that people acquired knowledge primarily by being exposed directly to it rather than through discovery, Ausubel believed that understanding concepts, principles and ideas are achieved through deductive reasoning. He is a proponent of lecture, expository or didactic teaching methods. Ausubel contributed much to the theoretical body of cognitive learning theory the most notable contribution for classroom application was the advance organizer. Advance organizer is information presented by an instructor that helps the students organize new incoming information. This is achieved by directing attention to what is important in the coming material, highlighting relationship and providing a reminder about relevant priori knowledge. It is a tool or mental learning laid to help students integrate new information with their existing knowledge leading to meaningful learning" as opposed to rote learning.

Implications for the Study

John Dewey's Theory emphasizes hands on learning to develop manipulative skills relevant to practical causes like educational technology

David Ausubel theory of meaningful verbal learning focuses on meaningful learning of concepts, ideas and principles through memorization.

Educational technology is a practical cause that benefits from hands – on learning and Google application is a strategy that encourages this approach.

Effective teachers design situations that allow students to learn by doing, developing manipulative skills.

Both theories support the use of Goggle Classroom application in teaching educational technology, promoting meaningful learning and hands on experience.

Methodology

This study used quasi experimental research design. According to Umoru (2004) stated that quasi experimental design is used in investigating the cause and effect between independent and dependent variables. Similarly Sambo (2008) asserted that quasi experimental design explore the opportunity of collecting data in situation where nature has performed. The target population for this study was four hundred and sixty two (462) comprised of all 300 level education students of Kashim Ibrahim University, Maiduguri. To obtain the subject of the study, the six programmes comprised of 208 students of the Department of Education were stratified based on gender. The study used four intact classes using simple random sampling. Randomization of the groups was done to minimize bias and ensure that groups are comparable to meet ethical provision students were told to know they are part of a study and agree to be assigned to either group. The instrument used for data collection was Performance Test in Educational Technology (PTET), made up of thirty (30) items multiple choice type. The test items were drawn within the scope of educational technology syllabus. The instrument was validated by specialists in the Department of Education, Kashim Ibrahim University, Maiduguri. A pilot testing of the instrument was done in one University which was not part of the main study to test the validity and the reliability of the instrument using test retest method with 0.8 reliability coefficient of Cronbach's Alpha Value. The study lasted for six weeks. The data collected was analyzed using descriptive statistics of mean, standard deviation and percentages while hypotheses were tested using independent sample t-test.

Results

Ho_1: there is no significance difference between the performance mean scores of students taught educational technology using the Google Classroom application and those students taught with the lecture method.

Table 4.1a: Descriptive statistics on the difference between the performances mean scores of students taught educational technology using the Google Classroom application and those students taught with the lecture method.

S/N	Variable	N	Mean	%	Std. D	Df	T	sig	Remark
1	Exp, pre test	104	57.74	55.52	4.61	103	114.38	0.000	SG
2	Contr. Pre test	104	55.85	53.70	5.95	103	95.78	0.000	

Table 4.1a. Presents the results of Pretest **Means, Experimental Group Mean = 57.74** (Std. Dev = 4.61) and **Control Group Mean = 55.85** (Std. Dev = 5.95). At the pretest stage, the mean scores of both groups are close, with only a small difference of **1.89 points**. This shows that **both groups started at almost the same performance level** before the treatment was introduced. **Significance (p-value), p = 0.000**, which is **less than 0.05**. This means there is a **statistically significant difference** between the pretest scores of both groups.

Table 4.1b: Summary of t-test on the difference between the performance mean scores of students taught educational technology using the Google Classroom application and those students taught with the lecture method.

S/N	Variable	N	Mean	%	Std.D	Df	T	sig	
1	Exp. Post test	104	60.14	57.83	4.39	103	139.87	0.000	Sg
2	Contr. Post test	104	54.58	52.48	5.61	102	98.76	0.000	

Table 4.1b, present the results of Post-test Means are: Experimental Group Mean = 60.14 (Std. Dev = 4.39) and **Control Group Mean = 54.58** (Std. Dev = 5.61). The difference in post-test scores is now **substantial**. Students taught with **Google Classroom performed better**, with a **mean advantage of 5.56 points** over those taught with the lecture method. **Significance (p-value) p = 0.000**, less than **0.05**. This indicates a **highly significant difference** in performance after the treatment. The experimental group (Google Classroom) significantly outperformed the control group after the intervention.

Ho2: There is no significant difference between the mean scores of male and female students taught educational technology using the Google Classroom application

Table 4.2: Summary of t-test on the difference between the performance mean scores of male and female students taught educational technology using the Google Classroom application and those students taught with the Google Classroom Application.

S/N	Variable	N	Mean	%	Std.D	Df	T	sig	Remk
1	Male	60	60.69	101.15	4.07	102	1.50	0.137	Sg
2	Female	44	59.39	134.98	4.74	84.18	1.47	0.147	

The findings in table 4.3 revealed that Male Students (N = 60) and the Mean = **60.69** and Std. Dev = 4.07; while **Female Students (N = 44);** Mean = **59.39** and Std. Dev = 4.74 Male students scored slightly higher than female students by **1.30 points** on average. This difference is **small** and not large enough to indicate any meaningful performance gap. Both p-values

(**0.137** and **0.147**) are **greater than 0.05**. This means that the difference between male and female performance scores is **not statistically significant**. Even though males had a slightly higher mean score, the difference is **not significant**. The results indicate that: **Both male and female students benefited equally from the use of Google Classroom.** And Gender **does not influence** students' performance when taught using Google Classroom. The null hypothesis (H_{02}) is **accepted**. There is **no significant difference** in the mean performance scores of male and female students taught educational technology using the Google Classroom application.

Discussion of Findings

Finding on there is no significance difference between the performance mean scores of students taught educational technology using the Google Classroom application and those students taught with the lecture method. (null hypothesis one) revealed that there **is** a significant difference in the mean performance of students taught educational technology using Google Classroom compared to those taught with the lecture method in favour of Google Classroom. This findings is in line with experiential learning theory propounded by John Dewey who emphasized on practical ideas in both his philosophical and educational theories, always striving to show how abstract concepts could work in everyday life. He also advocated education that will fulfill and enrich the current lives of students as well as prepared them for the future. This finding is in contrast with Babalola (2022) who examined the effect of enhanced conventional lecture methods (conventional lecture method and PowerPoint presentation) on students' academic achievement in basic science in Oyo State. The results indicated that the students taught basic science using the enhanced convention lecture method performed significantly better in post-test achievement mean scores than their counterparts taught basic science using the conventional lecture method. Also corroborating Afolabi, (2021) stated that Google Classroom application creates a digital learning environment that helps learners explore their potential, and have easy access to learning resources, fosters student interest in learning, trains student learning discipline, makes students learn anytime and anywhere and supports blended learning when outside the classroom. The Google Classroom also allows adding multiple apps to create further fun and expand the learning resources access for students, teachers can create or upload assignments in Google Docs or Google Forms which can be auto-graded securely with password protection.

Findings on there is no significant difference between the mean scores of male and female students taught educational technology using the Google Classroom application (null hypothesis two) revealed that there is **no significant difference** in the mean performance scores of male and female students taught educational technology using the Google Classroom application. This finding is in line with Ibrahim, (2022) who found that performance of the students on the intended learning outcomes provides the validation loop on the success of the interaction and instruction. Gender alone does not determine academic performance, it can be influenced by other factors which include, the environment of the learners (rural and urban) socioeconomic, study habits, teacher qualifications, experience, availability of instructional materials, and infrastructure among others.

Implications for Counselling

Student support

Counsellors must help students develop the digital readiness skills needed for online learning improve Google Classroom.

Cousellors should teach effective time management techniques support students in planning and organization online tasks and help students build concentration and reduced digital distraction

Counselors should provide individual counselling for students experiencing anxiety with technology and guidance sessions that help students identify their preferred learning style and adapt appropriately.

Faculty Support

Faculty Management should organize awareness workshops on the importance of digital learning for academic success, encourage students to embrace technology as a tool for lifelong learning and address misconceptions or resistance to using Google Classroom

Strengthening better communication channels and teacher-student relationship. Counsellor should encourage students to leverage messaging for academic support, promote respectful responsible digital communication and sensitize lecturers to promote timely feedback and enhance student engagement.

Institution Support

Incorporated counselling session into academic programme making it a part of the curriculum.

Organize workshops, seminars and orientations to educate students about available counselling services and nsure a reasonable counsellor –student ratio to provide personalized attention.

Conclusion

The study concludes that although students generally have positive attitudes toward Google Classroom, the availability of essential facilities to support its effective use is extremely low. Poor internet connectivity, limited access to digital devices, and inadequate Google Workspace tools significantly hinder students' utilisation of the platform. Despite these challenges, the findings show that Google Classroom is highly effective in improving students' academic performance compared to the traditional lecture method. Additionally, gender does not influence students' performance when taught using Google Classroom. There is need for Counsellors to incorporate guidance on participating actively in online discussion, submitting assignments electronically and using digital resources for research and study.

Recommendations

Government and institutions should provide strong internet connectivity and digital devices to enhance Google Classroom usage.

Schools should ensure the availability of essential Google tools such as Google Drive, Docs, Slides, and Meet.

School counsellors should integrate technology-use guidance into student support services to promote better engagement with digital learning tools.

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