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Comparative Effects of Google Classroom and WhatsApp Discussion Strategies on University Students' Performance in Computer Education

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Abstract

This study examined the effect of Google Classroom and Whatsapp groups discussion strategies on university students' performance in Computer Education Course. The quasi-experimental pre-test post-test design was adopted and the population comprised 400 level undergraduate students with a sample size of 86 students who were randomly assigned into intact classes. The instrument for data collection was a 20-item researcher-made performance test titled: Computer Education Performance Test (CEPT). Face and content validity were done by experts in Curriculum Studies and Educational technology as well as Measurement and Evaluation while a pilot testing was adopted for the reliability which yielded a coefficient of 0.82 using Kuder-Richardson 21. The mean and standard deviation were conducted to answer the research questions while Analysis of Covariance (ANCOVA) as well as Post-Hoc were used to test hypotheses. Findings showed that the Google Classroom Discussion Strategy had the most effect on students' performance followed by WhatsApp Group Discussion Strategy and finally Face-to-Face method.

Key words: Learning Management System, ICT, Education, WhatsApp Application, Google Classroom, Face-to-Face Method, Students' Performance.

INTRODUCTION

The use of internet technology in learning has undoubtedly become part of our daily life and has the capability to provide mobile learning resources in synchronous or asynchronous modes (Zengin, Arikan & Dogan, 2011). Technology has truly changed the contemporary instructive setting, providing a wide range of learning experiences to support teaching and learning. Internet technology has moved teaching and learning from its stationary state to a more active and mobile platform in a way that information and knowledge accessible to both teachers and learners are no longer confined to the borders of classroom environment but can be acquired anywhere, everywhere and at any time.

Also the internet holds enormous collection of information that is available and retrievable at few clicks of buttons without any limitation in respect to someone's location. Internet has led to the emergence of different technology enhanced learning applications such as the social networks through which information and knowledge can be constructed, refined, shared and communicated among people of same interest and related goals.

With the increasing time, scope, affordance and frequency of use, internet technologies have gradually shaped the way people construct and share content and their way of communication. Social networking technologies, which are very popular among young people, are becoming prevalent due to their nature to meet the needs of individuals towards socialization. Their nature that focuses on individuals started to shape users' process of interaction and has become one of the important elements of the daily life.

The potential of the social networks when designed in accordance with the needs of learning and information produces revolutionary changes Zaidieh, (2012), and their influence on the educational environment is increasing rapidly daily, especially with the help of the internet supported mobile technologies. These potentials, which enable cooperative synchronous and asynchronous communication together with their multimedia support, and cover the features of social networks on a large scale, should not be disregarded. Recently, instant messaging has become popular and a top-priority for learners (Cetinkaya & Sütçü, 2016; Harrison & Gilmore, 2012; Lenhart, Purcell, Smith, & Zickuhr, 2010) and are currently utilized

as learning management systems in higher institutions. The Learning Management System widely known as LMS in the circle of higher institutions is an online portal that connects lecturers and students. It provides an avenue for classroom materials or activities to be shared easily. It is also a portal that enables lecturers and students to interact out of the classroom, having discussions through forums that could otherwise take up too much of the time intended to be spent learning in the classroom.

In this period of data innovation, the web is effectively accessible and open by anyone especially in urban areas with internet data and internet enabled devices, which is the place most university and colleges are located. The web is a huge network of computers connecting different systems around the world, and it incorporates business, instructive, legislative, and different systems, all of which utilize a similar arrangement of communications.

WhatsApp was developed by Brian Anton and Ian Koom in 2009. It is a text messaging versatile application for cellphones. Clients can trade content based talks, pictures, recordings and sound media messages through internet. It for the most part relies upon the dynamic Wi-Fi arrange framework to give online clients the capacity to send and get diverse social applications. Today, WhatsApp hits 800 million dynamic clients monthly (WhatsApp, 2010). WhatsApp is an organized application which is associated legitimately to one's telephone number with no secret key or login. It has created progressively close relational system. WhatsApp offers a few advantages to its clients. It is free and simple to utilize.

WhatsApp is a portable application utilized for texting purposes to supplant the typical telephone short messages (SMS) as a result of its ability to send enormous volume of messages and media documents in most cases dissimilar to the short message services. WhatsApp has become the most prominent online life applications utilized by most youngsters since its inception (Fawzi, 2015). WhatsApp is typically introduced from Google play store or an apple store into savvy, android or window mobile phones. It can likewise be got straightforwardly from the web utilizing the window PC or workstation. Once WhatsApp application is introduced, users would then be able to make their own WhatsApp account which will be noticeable to other WhatsApp users in their telephone contact records

upon synchronization. Users can begin correspondence with individuals in their rundowns or welcome new users to WhatsApp. WhatsApp in this way enables individuals to make video or voice calls, and gatherings of individuals to make conference calls utilizing web/Wi-Fi association or information controls. The intriguing highlights of WhatsApp are its capacity to scramble messages in order to tie down calls and talks from being noticeable to outsiders or non-bunch individuals; authorize users to include media documents while talking; to demonstrate when different clients are on the web and the last time a user visited WhatsApp, and when messages are not conveyed, conveyed and read. WhatsApp has numerous highlights that can make it alluring and be of huge benefits for instructors' technique for educating as well as learners' strategies for learning, and the manner in which learners and educators interface, convey and team up inside and among themselves and learning materials/resources in the cutting edge study hall. WhatsApp usage for training designs is upheld by connectivism and constructivism learning theories.

Google Classroom on the other hand is one of the ongoing additions to virtual learning environment. It is a learning management system/framework for schools that expect to disentangle making, conveying and reviewing assignments. Google is a well-known Web 2.0 tool that offers a great deal of fascinating learning suites and applications. Google classroom, in the same way as other Web 2.0 devices, has potential for educating and learning on account of its extraordinary inherent capacities that offer academic, social and innovative affordances (Wang, Woo, Quek, Yang and Liu, 2012). Google Classroom is another learning tool presented in Google Apps for Education (GAFE) in 2014. This learning management system encourages the instructors to make and compose assignments rapidly and give feedback proficiently.

Google Classroom is considered as probably the best stage out there for upgrading educators' work process and it gives a lot of amazing highlights that make it a perfect device to use with learners. Google classroom is helping educator's spare time, keep classes sorted out, and improve correspondence with students. It is accessible to anybody with Google Apps for Education, a free productivity suites including Gmail, Drive and Docs.

Google's most recent additions to classroom carries new usefulness to Google Classroom. Incorporated into the new features is the capacity to include more than one instructor, just as to getting ready for classes ahead of time also.

At institutions and for teachers who currently signed on with Google, there are several ways in which this virtual classroom could be beneficial to students, teachers and school.

i. Google Classroom has the potential to streamline communication and workflow for students by providing a single access point to discussion threads and assigned work.
ii. It can help students keep their files more organized because all their work can be stored "paperlessly" in a single program.
iii. Teachers can more quickly identify which students may be struggling with their assignments due to the tracking mechanisms associated with assigned tasks.
iv. Grading processes can be simplified because of the grading features associated with students' submissions.

Keeler, (2014) also mentioned several other benefits of using Google Classroom. She mentioned how Google Classroom ensures streamline counseling only by posting an announcement. Crawford, (2015) stated that Google Classroom facilitates collaborative learning. Here, teacher can upload materials and can give feedback to students. Students also can upload materials and make personal comment. They can share their documents and assignment and thus they can produce the best assignment. Keeler, (2014) also states that Google classroom encourages collaboration between students which in turn arouses learners' interest.

Technology is evolving at a very fast rate, and what most people did not even think could be real a few years ago, is now becoming a reality.

STATEMENT OF PROBLEM

The knowledge of the relevance of information and communication technology in education and related concepts has become extremely important in today's technology savvy society irrespective of the field of endeavor one chooses to pursue, hence leveraging on the

affordances of technology to provide innovative teaching strategies which have the capacity to facilitate learning, spur interest and enhance academic performance is of utmost to stakeholders in education. There has been perceived downward slide in the performances of university students in computer related courses irrespective of the learning resources and learning-enabling technology at students' reach. This downward trend in academic performance is generally attributed to the traditional methods of teaching which denies learners' ownership and control of the learning experience, hence the urgent need for an innovative teaching strategy which has capacity to keep learning relevant and learners engaged, focused and motivated. The problem statement of this study in a question form reads thus: What are the effects of Google Classroom and WhatsApp group discussion strategies on university students' performance in Computer Education Course"?

AIM AND OBJECTIVES

This study's aim was to investigate the effects of Google Classroom and Whatsapp groups discussion strategies on university students' performance in Computer Education Course. The precise objectives of the study are to:

1. examine the effect of Google Classroom discussion strategy (GCDS) and WhatsApp Group discussion strategy (WGDS) on university students' performance in Computer Education Course
2. ascertain the effect of GCDS and WGDS on the performance of male and female university students in Computer Education Course

RESEARCH QUESTIONS

The following research questions guided the study;

1. What is the effect of Google Classroom discussion strategy (GCDS) and WhatsApp Group discussion strategy (WGDS) on university students' performance in Computer Education Course?
2. What is the effect of GCDS and WGDS on the performance of male and female university students in Computer Education Course?

HYPOTHESES

The following hypotheses were formulated to guide the study

1. There is no significant difference in the effect of Google Classroom discussion strategies, WhatsApp group discussion strategies and Face-to-Face method on university students' performance in Computer Education Course
2. There is no significant difference in the effect of Google classroom discussion strategies, WhatsApp group discussion strategies and face-to-face method on the performance of male and female student in Computer Education Course

METHODOLOGY

This study adopted quasi-experimental design. The population for the study consisted of 400 level university students in the faculty of Education, University of Port Harcourt. Simple random technique was used to select departments and three options. The selected options were randomly assigned into two experimental groups and control group. The sample size comprised 86 (37 male and 49 females) students. The instrument used for data collection was a Computer in Education Performance Test (CEPT), which consisted of twenty structured multiple choice questions. The CEPT was used as a pre-test to ascertain baseline ability of the students as well as a post-test after treatment to determine the effect of the treatments on students' performances. The instrument was given to two experts in Curriculum Studies and Educational Technology and another expert in Measurement and Evaluation to establish the face validity of the instruments. Their corrections were followed in producing the final draft copy of the instrument. The test retest method was used to determine the reliability coefficient of 0.82 using Kuder-Richardson 21 (KR-21). The data collection procedure was done in phases. First permission was sought from the Head of Departments as well as Computer Education Course lecturers. This was followed by the readiness assurance phase to expose students to the features of Google Classroom and WhatsApp applications. The subsequent phase was the administration of pretest and the treatment commenced and lasted for three weeks of 120 hours every week the experimental and control groups respectively. Social networking, digital divide as well as search engines were the topics taught utilizing various teaching

strategies. In the final phase, the CEPT was administered as post-tests. The pre-test and post-test scores were analyzed using Analysis of Covariance (ANCOVA) and the independent samples t-test.

RESULTS

The results of the analysis of the pre-test scores in the CEPT for the experimental groups and the control group were analyzed and the results are shown below.

Table 1. Analysis of Variance (ANOVA) of the Pre-test Scores.

Source of Variation	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	10.542	2	5.271	2.60	0.226
Within Groups	246.052	84	3.466		
Total	256.595	86			

p>0.05

Table 1 shows that there is no significant difference between the means of the three groups ($F = 2.60$, $p > 0.05$). This means that the F value is not significant at $p > 0.05$ level and between groups mean square is not significantly greater than within groups' mean square. This result clearly shows that there were no significant differences in the pre-test scores across the three groups; it was therefore ascertained that the three groups started with equivalent means which reveals the baseline ability of the students in the three groups prior to the commencement of the treatments.

Research Question One: What is the effect of Google Classroom discussion strategy (GCDS) and WhatsApp Group discussion strategy (WGDS) on university students' performance in Computer Education Course?

Table 2. Mean and Standard Deviation Analysis

Group	Mean	Std. Deviation	N
GCDS	8.40	1.50	27
WGDS	6.53	1.95	28
F2F	5.35	1.72	31
Total	6.42	2.09	86

Table 2 shows the mean scores of the students in the GCDS, WGDS and the Face-to-Face method as 8.40, 6.54 and 5.35 respectively. This indicates that students exposed to GCDS had the best performance among the three groups**.**

Research Question Two: What is the effect of GCDS and WGDS on the performance of male and female university students in Computer Education Course?

Table 3: Male and Female students' performance in Computer in Education in GCDS and FTFM

	GCDS		**WGDS**		**F2FM**	
n	Male	Female	Male	Female	Male	Female
	13	15	15	12	18	13
Pretest Mean (SD)	5.02 (1.29)	4.98 (2.12)	4.61 (2.11)	3.75 (1.84)	2.79 (0.87)	2.65 (0.82)
Post-test Mean (SD)	8.65 (2.02)	8.82 (2.55)	6.98 (2.14)	6.11 (2.15)	3.01(1.01)	3.06 (1.06)
Mean Difference	3.63	3.84	2.37	2.36	0.22	0.41

From to the results displayed in Table 3, it can be seen that when the mean difference of male and female students in the group taught using GCDS was computed, male students had a mean difference of 3.63, while female students had a mean difference of 3.84. Furthermore, it was shown that for the students taught using WGDS, male students had a mean difference of 2.37, while female students had a mean difference of 2.36. Also for the group taught using F2FM, the male had a mean difference of 0.22 while the female had 0.41. On the basis of these mean values obtained, it can be observed that students in the GCDS groups performed consistently better at post-test phase irrespective of gender.

Hypothesis One: There is no significant difference in the effect of Google classroom discussion strategy, WhatsApp group discussion strategy and Face-to-Face method on university students' performance in Computer Education Course

Table 4. ANCOVA of the performance of students exposed to GCDS, WGDS and F2FM.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	104.958a	3	34.986	11.495	0.000	0.330
Intercept	438.313	1	438.313	144.009	0.000	0.673
Group	102.920	2	51.460	16.907	0.000	0.326
Pre-test	10.606	1	10.606	3.485	0.066	0.047
Error	213.055	83	3.044			
Total	3367.000	87				
Corrected Total	318.014	86				

sig. at $p < 0.05$

Table 4 shows the ANCOVA of the students' scores in the three groups ($F= 16.907$, $p < 0.05$). The result suggests a statistical significant effect of the strategies on students' performance in Computer Education Course. The Post-Hoc test presented in table 5 indicates the direction of the experimental effect

Table 5. Pair-wise Comparisons of Students' Scores.

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.b	95% Confidence Interval for Difference	
					Lower Bound	Upper Bound
WGDS	GCDS	-2.050	0.567	0.002	-3.441	-0.659
	F2FM	1.191	0.455	0.032	0.075	2.307
GCDS	WGDS	2.050	0.567	0.002	0.659	3.441
	F2FM	3.241	0.559	0.000	1.871	4.612
F2FM	GCDS	-1.191	0.455	0.032	-2.307	-0.075
	WGDS	-3.241	0.559	0.000	-4.612	-1.871

The results in table 5 shows that the mean difference between the GCDS group and WGDS group (2.050) was lower the mean difference between the GCDS and F2FM (3.241). This points to the difference in effect of three strategies in improving university students' performance in Computer Education Course with GCDS showing the highest effect followed by the WGDS and then the F2FM. Since the since the Google Classroom Discussion Strategy (GCDS) improves students' performance in Computer Education Course than WhatsApp

Group Discussion Strategy (WGDS) and the Face-to-Face method, the null hypothesis is rejected.

Hypothesis Two: There is no significant difference in the effect of Google classroom discussion strategy, WhatsApp group discussion strategy and face-to-face method on the performance of male and female student in Computer Education Course

Table 6: Summary of ANCOVA on the effect of the strategies based on performance of Male and Female students

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Remark
Corrected Model	11.34	2	5.67	0.39	0.00	
Intercept	1345.28	1	1345.28	91.98	0.00	
Pretest (Covariate)	2.61	1	2.61	0.18	0.67	
Gender	8.79	1	8.79	0.61	0.44	NS
Error	1272.45	82	14.63			
Total	17471.00	86				
Corrected Total	1283.79	85				

Table 6 reveals that the F-value (0.61) of the posttest score of male and female students in the three groups is not significant at 0.05 alpha level (p = 0.44). Thus, the null is accepted. This means that the three strategies used do not have statistically significant effect on university students' performance in Computer Education Course.

DISCUSSION OF FINDINGS

Findings from this study showed that the students had equivalent baseline knowledge during the pretest before the introduction of the teaching strategies. Results from research question and hypothesis one revealed that the three strategies used had effect on performance of students in Computer Education Course. This was indicated in the mean difference between the post-test and pretest scores of the three strategies studied. Findings from this study was consistent with Said's (2015) study which investigated the effectiveness of using WhatsApp Messenger as one of mobile learning technique to develop students' writing skills. It revealed that WhatsApp technique yielded significant effects on students' writing skills. Similar findings in McCormick's study (2008) were found to further support engaging

activities to promote student motivation in learning, especially computer-based activities. The study's findings revealed that GCDS has the most significant effect in the teaching and learning of Computer Education. This result might be attributed to the fact that the teaching strategy (GCDS) exposes students to not only the theory but the practical aspect of teaching and learning. With Google Classroom, students are better poised to experience and appreciate the integration of technological tools into educational packages. Google classroom and WhatsApp might have also improved students' performance than FTFM because students can carry their learning to anywhere, even in their homes, unlike the FTFM where students can only learn when with their lecturers. Furthermore, students exposed to Google Classroom and WhatsApp group discussions can explore related concepts on the internet with fewer limitations unlike in FTFM where students might be prevented from accessing the internet due to administrative, logistic or human limitations. In agreement with the findings from this study, Ballew (2017) conducted a recent study to assess teachers' perceptions regarding implementing of a technology-based course in the classroom via Google Classroom and Google Chrome books. His findings showed that teacher participants' responses regarding Google Classroom were found to be dependent upon their years of experience, grade level assignment, and subject matter. Latif (2016) conducted a study to identify the factors responsible for poor engagement of students in Google classroom and to explore other critical barriers behind the underutilization of this virtual learning platform. The findings revealed that empirically unearths peer influence as a significant determinant of the effectiveness of Google classroom. Also, the majority of learners were found more comfortable while teachers play passive facilitators' role instead of active intervention whereas the availability of Facebook groups as a popular alternate platform for interaction may limit the utilization of Google classroom. The implication is that students do better in academics and participate more in classroom when they are taught using Google strategy.

It was also found that the teaching strategies are not gender bias and therefore significantly enhanced the performance of male and female students especially in Google Classroom discussion group.

CONCLUSION

Based on the findings of the study it is concluded that Google Classroom Discussion Strategy and WhatsApp Group Discussion have significant effect on students' performance in Computer in Education course. Therefore institutions of higher learning should be aware of students' current needs and interest related to their learning environment for better knowledge acquisition and academic performance.

RECOMMENDATIONS

In light of the findings and conclusion of this study, the following recommendations are relevant:

1. Students should be encouraged to use more mobile applications in learning Computer Education and other related courses.
2. Making mobiles a part of our teaching process. The teachers can communicate with their students through these applications. Also, it may be used as additional means for setting home assignment and projects.
3. Google classroom discussion strategy should be adopted in higher education as a form of blended learning strategy in addition to using other methods of teaching
4. WhatsApp application should be adopted in teaching and also as a means of exchanging files between students and teachers.
5. Teachers should be adequately trained in the use of learning management systems and other innovative teaching strategies, in order to enhance teaching and learning in higher institutions.

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