EFFECT OF GOOGLE CLASSROOM ON INTEREST AND PERFORMANCE OF TRAINEE TEACHERS IN COMPUTER EDUCATION

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ABSTRACT

This study investigated Google classroom application and undergraduate trainee teachers' interest and performance in Computer Education course in University of Port Harcourt, Rivers State. Five research questions were raised and answered. Five hypotheses were formulated to guide the study. A quasi-experimental design was adopted. The population of the study comprised one thousand four hundred and sixty (1460) final year trainee teachers in the faculty of Education, University of Port Harcourt. The sample size comprised 275 participants from two selected departments. Two instruments were used for data collection. A researcher-made achievement test titled Computer in Education Achievement Test (CEAT) and a Computer in Education Interest Inventory (CEII). Mean, standard deviation and mean difference were used in answering the research questions while paired sample t-test, one-way ANCOVA and two-way ANCOVA were used in testing the hypotheses. 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. Also, the study showed that the Google Classroom Discussion strategy used in the study was not gender biased, this manifested in the interest scores and performances of male and female participants which did not differ significantly. The study concluded that Google Classroom if utilised as learning management system (LMS) enhances students' learning, which eventually results in increased interest and better academic performance. The researcher therefore recommended that 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. Also, teachers should be adequately trained in the use of learning management systems in order to enhance the teaching and learning of Computer Education courses.

KEYWORDS: *Google Classroom Application, Face-to Face, Trainee Teachers, Teaching Discussion Strategy*

INTRODUCTION

In the modern day and age, technology is very much ubiquitous, in other words it is anywhere, everywhere and at any time. The most fascinating aspect of this trend is that the educational systems are adapting to technology at a rapid pace. This is increasingly assisting the careers of students as well as the teacher.

Technology has really changed the modern day educational landscape. Internet technology has shifted teaching and learning from its immobile state to a more dynamic and mobile platform in such a way that information and knowledge available to both teachers and learners are no longer tied to the boundaries of classroom environment but can be acquired anywhere anytime, even on-the-go.

Internet has been found to hold vast array of information that are accessible and retrievable just at the click of buttons without any restriction in respect to one's location. This internet has also led to the emergence of different technology applications such as the web 2.0 tools through which these information and knowledge can be constructed, shared and communicated among people of related interest and goals.

In recent years, methods of teaching and learning in universities and higher education institutions have evolved gradually from the traditional face-to-face classroom to an online learning environment that defies the need for synchronous time and geographical distance. Education has developed with the use of these technologies. Students increasingly use technological advances to improve their learning, for the purpose of grasping excellent academic performance.

As institutions of higher education integrate technology into classroom curriculum to improve the efficiency of academic standard, university students have generally been swift to adopt these new instructional technology tools in their learning to construct knowledge. They use various educational mobile learning technologies, computer gadgets, electronic devices and ICT tools to support their learning (Wylie, 2015).

The integration of these technologies is not a necessarily new trend in the field of education. For decades, schools around the world have attempted to implement technology plans which aim to supply more frequent use of technology to their students. The assumption is that technology can not only improve day-to-day classroom instruction but also that its interactive nature and necessity for life after school have lasting effects on the students (Iftakhar, 2016).

Over the course of the last decade, there has been a fundamental shift to promote and support teachers to adopt technology in education. Prominent among this shift is the adoption of virtual classrooms that enable teachers to interact with students in real time.

A virtual classroom is an online classroom that allows participants to communicate with one another, view presentations or videos, interact with other participants, and engage with resources in work groups. The Virtual classroom, a synchronous form of e-learning has been embraced by many organizations in their attempt to promote workforce learning while trying to save time and cut costs associated with face to face instructor-led training (Xanthoula, 2015).

Google Classroom is one of the recent additions to virtual classroom. It is a learning management system for schools that aim to simplify creating, distributing and grading assignments. Google is a popular Web 2.0 tools that offers a lot of interesting facilities and applications. Google, like many other Web 2.0 tools, has potential for teaching and learning because of its unique built-in functions that offer pedagogical, social and technological affordances (Wang, Woo, Quek, Yang & Liu, 2012). Google Classroom is a new tool introduced in Google Apps for Education (GAFE) in 2014. This classroom facilitates the teachers to create and organize assignments quickly, provide feedback efficiently, and communicate with their classes with ease.

Google Classroom is considered as one of the best platforms out there for enhancing teachers' workflow. It provides a set of powerful features that make it an ideal tool to use with students. Helping teachers save time, keep classes organized, and improve communication with students. It is available to anyone with Google Apps for Education, a free suite of productivity tools including Gmail, Drive and Docs.

Google's latest announcement brings new functionality to Google Classroom. Included in the new functionality is the ability to add more than one teacher, as well as to preparing for classes in advance as well.

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.

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. Google classroom encourages collaboration between students which in turn arouses learners' interest. Interest could be seen as the focusing of the sense organs on or giving attention to some person, activity, situation or object. It is an outcome of experience and for educators; technology affords an important opportunity to increase students' interest and engagement.

Central to students' interest is the relationship between student and teacher in designing learning experiences. A new piece of technology will not keep students engaged on its own but an observation of how students interact with technology, gathering feedback on technology use directly from the students themselves and ensuring that they are effectively using technology specifically for the purpose of learning. Teachers often focus on the fact students are "digital natives" but this does not mean they know how to use technology in the context of a classroom. Teacher's guidance in the use of technology can boost student's interest and engagement to foster inclusive learning and improve academic performance.

In today's technology-savvy world, every student has the passion to perform at peak level. But it is also a surprising fact that many students and educators ignore the significance of technology that can boost their academic performance. Technology aids visualization of concepts helping better comprehension of subject as well as providing ubiquitous access to knowledge and helping a wider coverage of knowledge on the subject suiting learners' appetite and interest which provides for enhanced academic performance.

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.). 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.

In view of the belief that students' gender may have impact on the students' academic performance, this study will examine the relationship between them if any.

Development of any nation is a measure of her development in the area of Technology. Technological growth of a nation leads to its social and economic development. In the world today, science and technology has become a dominant power development indicator. America, Russia, Japan and China are typical examples of nations which are now referred to as developed, as a result of their development in the area of Science and technology. At the heart of science and technology is information and communication technology (ICT). In fact, literacy is now being said not to be a function of ability to read or write, rather literacy is now digitally divided.

Computer science is the study of the theory, design, use and analysis of computer devices. This entails knowing the computer itself, its operation, what it can do, how it can do it and why it is doing it, these form the basis of computer science in higher institution. Therefore, computer science course introduced in the curriculum in Nigeria which exposes students to ICT needs to be given due recognition because of its unquantifiable significance to introducing students to ICT on a wider scope.

STATEMENT OF THE PROBLEM

The relevance of the knowledge of Computer science for sustainable development of any nation is immeasurable. Computer science has indisputably affected the entire human race in such a way that in order to survive, one has to be on par with the continuously unfolding trends of the time. So, it has become extremely important to receive quality computer education irrespective of what field one has chosen to pursue. However, the perceived lack of interest and poor academic performance of students in Computer in Education have become a great concern to all stakeholders in Education. Observation reveals that

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teacher-centred face to face approach has dominated the teaching of Computer in Education courses in higher education institutions. This method is one of the major impeding factors to the teaching and learning of Computer in Education thereby resulting to low class attendance and truancy on the part of students. Therefore, there is an urgent need to employ an innovative teaching approach which has the capability of providing ubiquitous learning experience that will engage students, spur their interest and consequently enhance academic performance in Computer in Education. Therefore, this study seeks to find out the extent to which Google Classroom Discussion Strategy (GCDS) can enhance the interest and academic performance of trainee teachers in Computer in Education.

AIM AND OBJECTIVES OF THE STUDY

This study aimed at investigating the effect of Google classroom discussion strategy (GCDS) on interest and academic performance of trainee teachers in Computer in Education course in Faculty of Education, University of Port Harcourt.

The following are the targeted objectives of the study to;

1. Determine the effect of Google Classroom Discussion Strategy (GCDS) on the interest of trainee teachers towards Computer Education with regard to their pretest and post-test mean scores.

2. Ascertain the effect of Face-to-face method (FTFM) on the interest of trainee teachers in Computer Education course with regards to their pretest and post-test mean scores.

3. Examine the difference in trainee teachers' interest towards Computer Education between those taught using GCDS and those taught using FTFM

4. Ascertain the effect of GCDS on the academic performance of trainee teachers in Computer Education Course.

5. Investigate the effect of GCDS on the academic performance of male and female trainee teachers in Computer in Education.

RESEARCH QUESTIONS

The understated research questions guided this study:

1. What are the effects of Google Classroom Discussion Strategy (GCDS) on trainee teachers' interest towards Computer Education Course with regard to their pretest and post-test mean scores?

2. What are the effects of Face-to-Face Method (FTFM) on trainee teachers' interest towards Computer Education Course with regard to their pretest and post-test mean scores?

3. What is the difference in the interest scores of trainee teachers in Computer Education Course between those taught using GCDS and FTFM?

4. What are the effects of Google Classroom Discussion Strategy on the academic performance of trainee teachers in Computer Education Course with regard to their pretest and post-test mean scores

5. What are the effects of GCDS and FTFM on the academic performance of male and female trainee teachers in Computer in Education course?

HYPOTHESES

The understated null hypotheses were formulated to guide the study and were tested at 0.05 alpha level.

H01. There is no significant difference in the pretest and post-test mean scores of trainee teachers' interest in Computer Education Course in the GCDS group.

H02. There is no significant difference in the pretest and post-test mean scores of trainee teachers' interest in Computer Education Course in the FTFM group.

H03. There is no significant difference between the interest mean post-test scores in Computer Education Course of trainee teachers taught using GCDS and FTFM.

H04. There is no significant difference in the pretest and post-test scores in academic performance of trainee teachers in Computer Education course in the GCDS group.

H06. There is no significant difference in the mean academic performance of male and female trainee teachers taught Computer Education course using GCDS and FTFM.

METHODOLOGY

This research used two designs, the experimental design and a descriptive design. The former was to assess the effects of Google Classroom application on trainee teachers' performance in Computer Education, while the later described their interest toward learning through Google Classroom application. The population of the study consisted of 1460 final year trainee teachers in the Faculty of Education University of Port Harcourt in 2018/2019 academic year. A purposive sampling technique was adopted in selecting two departments namely; Educational Foundation (EDF) and Curriculum studies and Educational Technology (EDC). The sample size for this study comprised a total of 275 participants in the intact classes. Two instruments for data collection for the study included a

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Researcher-made Computer in Education Interest Inventory (CEII) and an Achievement Test on Computer in Education course titled; Computer in Education Achievement Test (CEAT). In order to ensure the validity of the instruments of this study, the draft copy of the instruments, the statement of the problem, purpose and research questions were given to an expert in Educational Technology and subsequently two experts in Measurement and Evaluation in University of Port Harcourt for validation. These experts modified some aspects of the instrument before it was finally administered to the students. The instruments were trial tested to participants outside the study and reliability coefficients of 0.78 and 086 were determined using Cronbach Alpha and Kuder Richardson 21 respectively. The method of data collection was done in phases. The researcher sought for permission in using the trainee teachers as well as some facilities in the selected departments from the course lecturers as well as the Head of Departments. The readiness assurance process followed for the experimental group. The experimental Procedure involved the administration of the CEAT and CEII as pre-tests to the experimental group and the control group to ascertain the equivalence in ability of the students.

Thereafter, treatment commenced and lasted for three weeks of twelve periods. At the end of the treatment, the test items from the instruments were re-organized and re-administered to the same students. Scores for both the pretest and posttest were collected and recorded for analysis. Research questions were answered using mean and standard deviation while the hypotheses were tested with paired sample t-test and ANCOVA at 95% alpha level of significance, using SPSS version 22.

RESULTS

Research Question One: What are the effects of Google Classroom Discussion Strategy (GCDS) on trainee teachers' interest towards Computer Education Course with regard to their pretest and post-test mean scores?

Table 1a: Mean and Standard Deviation of Interest towards Computer Education in GCDS

Test	n	Mean	SD	Mean Gain
Pretest	140	16.14	3.98	
Post-test				11.27
	140	27.41	3.39	

From the result displayed in Table 1a above, it is shown that the pretest mean score of trainee teachers' interest towards Computer Education in the group taught using GCDS was 16.14 (S.D = 3.98), while their post-test mean score was 27.41 (S.D = 3.39). Based on these values, it can be observed that there was a mean gain of 11.27. On the basis of the mean gain, this result therefore shows that Google Classroom Discussion Strategy has a positive effect in trainee teachers' interest towards Computer Education.

Hypothesis One: There is no significant difference in the pretest and post-test mean scores of trainee teachers' interest in Computer Education Course in the GCDS group.

Table 1b: Paired Sample t-test pretest and post-test of the effect of GCDS on trainee teachers' interest in Computer Education

Tests	n	Mean	SD	Mean Gain	df	t	p	α	Decision
Pretest	140	16.14	3.98						Rejected HO$_1$
				11.27	139	25.94	0.0005	0.05	p<0.05
Post-test	140	27.41	3.39						

From the result displayed in Table 1b, it can be observed that when the pretest mean score of 16.14 (SD = 3.98) and the post-test mean score of 27.41 (SD = 3.39) towards Computer Education in the group taught using GCDS was subjected to paired samples t-test, a mean gain of 11.27 was obtained with a calculated t-calculated value of 25.94 at 139 degrees of freedom with a corresponding p-value of 0.0005. Since the p-value of 0.0005 was lesser than the chosen alpha of 0.05 guiding the study, it therefore implies that the mean difference of 11.27 obtained indicates a significant effect of GCDS on trainee teachers' interest in Computer Education. The null hypothesis was therefore rejected.

Research Question Two: What are the effects of Face-to-Face Method (FTFM) on trainee teachers' interest towards Computer Education Course with regard to their pretest and post-test mean scores?

Table 2a: Mean and Standard Deviation of Interest towards Computer Education in FTFM

Test	n	Mean	SD	Mean Gain
Pretest	135	17.32	4.09	
				0.53
Post-test	135	17.85	4.59	

From the result displayed in Table 2a, it is shown that the pretest mean score of trainee teachers' interest towards Computer Education Course in the group taught using FTFM was 17.32 (S.D = 4.09), while their post-test mean score was 17.85 (S.D = 4.59). Based on these values, it can be observed that there was a mean gain of about 0.53. On the basis of the mean gain, this result therefore shows that Face-to-Face Method has no significant effect in trainee teachers' interest in Computer Education.

Hypothesis Two: There is no significant difference in the pretest and post-test mean scores of trainee teachers' interest in Computer Education Course in the FTFM group.

Table 2b: Paired Sample t-test pretest and post-test of the effect of FTFM on trainee teachers' interest in Computer Education

Test	n	Mean	SD	Mean Gain	df	t	p	α	Decision
Pretest	135	17.32	4.09						Accepted HO$_2$
				0.53	134	1.16	0.247	0.05	
Post-test	135	17.95	4.59						p>0.05

From the result displayed in Table 2b, it is shown that when the pretest mean score of 17.32 (SD = 4.09) and the post-test mean score of 17.95 (SD = 4.59) in Computer Education in the group taught using FTFM were subjected to paired samples t-test, a mean gain of 0.53 was obtained with a calculated t-calculated value of 1.16 at 139 degrees of freedom with a corresponding p-value of 0.247. Since the p-value of 0.247 was greater than the chosen alpha of 0.05 guiding the study, it therefore implies that the mean difference of 0.53 obtained indicates no significant effect of FTFM on trainee teachers' interest in Computer Education. The null hypothesis was therefore accepted.

Research Question Three: What is the difference in the interest scores of trainee teachers in Computer Education Course between those taught using GCDS and FTFM?

Table 3a: Pretest and Post-test mean analysis of interest in Computer Education of trainee teachers taught using GCDS and FTFM

Group	N	Pretest Mean (S.D)	Post-test Mean (S.D)	Mean Difference
GCDS	140	16.14 (3.98)	27.41 (3.39)	11.27
FTFM	135	17.32 (4.09)	17.85 (4.59)	0.53

From the result obtained and displayed in Table 3b, it can be observed that when the pretest and post mean scores of students interest in Computer Education Course were subjected to mean difference analysis, it was observed that those in the experimental group taught using GCDS had a mean difference of 11.27, while those in the control group taught using FTFM had a mean difference of 0.53. From the mean difference value, it can therefore be observed that GCDS had a higher effect on trainee teachers' interest in Google Classroom than FTFM.

Hypothesis Three: There is no significant difference between the interest mean post-test scores in Computer Education Course of trainee teachers taught using GCDS and FTFM.

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Table 3b: ANCOVA analysis of the difference in trainee teachers' interest in Computer Education based on teaching strategies

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	6145.193[a]	2	3072.597	188.765	.000
Intercept	7714.116	1	7714.116	473.916	.000
Pretest	.004	1	.004	.000	.988
Group	6016.235	1	6016.235	369.607	.000
Error	4427.454	272	16.277		
Total	153109.890	275			
Corrected Total	10572.647	274			

After subjecting the posttest scores of trainee teachers taught using both GCDS and FTFM, with the pretest score as the covariate, the result obtained as displayed in Table 3b shows that an F-value of 369.607 was obtained from the row labeled group. Furthermore, it can be seen that a p-value of 0.0005 was gotten at 1 and 272 degrees of freedom which was lesser than 0.05, the chosen alpha guiding the study. Since the p-value obtained from the analysis, is lesser than the chosen alpha of the study, it therefore indicates that GCDS had a significantly greater effect than FTFM in improving trainee teachers' interest in Google classroom.

Research Question Four: What are the effects of Google Classroom Discussion Strategy on the academic performance of trainee teachers in Computer Education Course with regard to their pretest and post-test mean scores?

Table 4a: Mean and Standard Deviation of Academic Performance in Computer in Education in GCDS

Test	n	Mean	SD	Mean Gain
Pretest	140	11.95	3.65	
				5.28
Post-test	140	17.23	3.41	

From the result displayed in Table 4, it is shown that the pretest mean score of trainee teachers' performance in Computer in Education in the group taught using GCDS was 11.95 (S.D = 3.98), while their post-test mean score was 17.23 (S.D = 3.41). Based on these values, it can be observed that there was a mean gain of 5.28 on the academic performance of trainee teachers in Computer in Education. On the basis of the mean gain, this result therefore shows that Google Classroom Discussion Strategy has a positive effect in students' academic performance in Computer in Education.

Hypothesis Four: There is no significant difference in the pretest and post-test scores in academic performance of trainee teachers in Computer Education course in the GCDS group.

Table 4b: Paired Sample t-test pretest and post-test of the effect of GCDS on trainee teachers' academic performance

Test	n	Mean	SD	Mean Gain	df	t	p	α	Decision
Pretest	140	11.95	3.66						Rejected
				5.28	139	12.23	0.0005	0.05	HO₄
Post-test	140	17.23	3.12						p<0.05

From the result displayed in Table 4b, it can be observed that when the pretest mean score of 11.95 (SD = 3.66) and the post-test mean score of 17.23 (SD = 3.39) of academic performance in Computer in Education in the group taught using GCDS were subjected to paired samples t-test, a mean gain of 5.23 was obtained with a calculated t-calculated value of 12.23 at 139 degrees of freedom with a corresponding p-value of 0.0005. Since the p-value of 0.0005 was lesser than the chosen alpha of 0.05 guiding the study, it therefore implies that the mean difference of 5.28 obtained indicates a significant effect of GCDS on

trainee teachers' academic performance in Computer in Education. The null hypothesis was therefore rejected.
Research Question Five: What are the effects of GCDS and FTFM on the academic performance of male and female trainee teachers in Computer in Education course?

Table 5a: Male and Female trainee teachers' performance in Computer in Education in GCDS and FTFM

	GCDS		FTFM	
	Male	Female	Male	Female
n	60	80	63	72
Pretest Mean (SD)	12.18 (4.29)	11.78 (3.12)	13.61 (3.11)	13.75 (2.84)
Post-test Mean (SD)	17.65 (3.02	15.82 (3.55)	14.08 (3.14)	14.11 (3.15)
Mean Difference	5.47	4.04	0.47	0.36

From to the results displayed in Table 5a, it can be seen that when the mean difference of male and female trainee teachers in the group taught using GCDS was computed, male trainee teachers had a mean difference of 5.47, while female trainee teachers had a mean difference of 4.04. Furthermore, it was shown that for the trainee teachers taught using FTFM, male had a mean difference of 0.47, while female had a mean difference of 0.36. On the basis of this mean value obtained, it can be observed that trainee teachers in the GCDS groups performed consistently better at post-test phase irrespective of gender. This result implies that GCDS improved their performance irrespective of gender

Hypothesis Five: There is no significant difference in the mean academic performance of male and female trainee teachers taught Computer Education course using GCDS and FTFM.

Table 5b: Two-way ANCOVA of male and female trainee teachers' performance in GCDS and FTFM groups

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	698.244[a]	4	174.561	16.184	.000
Intercept	3944.887	1	3944.887	365.731	.000
Pretest Performance	5.633	1	5.633	.522	.471
Group	676.793	1	676.793	62.745	.000
GENDER	8.283	1	8.283	.768	.382
Group * GENDER	9.446	1	9.446	.876	.350
Error	2912.306	270	10.786		
Total	71309.292	275			
Corrected Total	3610.550	274			

The result as shown in Table 4.14 indicated that when the mean performance scores of male and female trainee teachers' in Computer in Education were subjected to mean and standard deviation analysis, an F-value of 0.768 was obtained for gender with a corresponding p-value of 0.382, Furthermore, for difference in group performance, an F-value of 62.745 was obtained with a p-value of 0.000. Furthermore, the interaction between group and gender yielded an F-value of 0.876 with a p-value of 0.350. On the basis of this result, it can be stated that gender did not significantly determine trainee teachers' performance in computer in Education Course. The null hypothesis was therefore accepted.

DISCUSSION
Effect of Google classroom discussion strategy (GCDS) on students' interest in Computer in Education
The result from this study showed that Google classroom discussion strategy (GCDS) has a significant effect on the interest of trainee teachers in

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Computer in Education. This result was obtained because the post-test interest scores of participants were significantly better than their pretest scores. Furthermore, when the result was compared against the interest of trainee teachers in the control group who were not taught using Google classroom discussion strategy (GCDS), but traditional face-to-face method, it showed that participants in the experimental group had significantly improved interest than those in the control. This result was expected because trainee teachers who were taught using GCDS are more likely to appreciate the importance of the course (computer in education) since they practically experienced how the computers can be used in education. Likewise, the primary purpose of Google Classroom is to streamline the process of sharing files between teachers and students (Magid, 2014). Keeler, (2014) also stated that Google classroom encourages collaboration between students, this validates the present findings. In the study carried out by Mostafa and Sohail (2016) to investigate the impact of Google Apps at work from the perspective of the higher educational institutions. Their findings revealed that the administrative staff were more positive toward using Google Apps than the academics in performing their work while 58.8 % of the Academics indicated that they were using Google Apps in processing their work. The results of this study also indicated that Google Apps are highly perceived by both academic and administrative staff. The implication of this study is that Google discussion strategy has a significant impact on performance among both students and staff of higher institution.

From the study, the findings revealed that trainee teachers taught using GCDS had more interest scores in computer education than those taught using FTFM. This result might have been obtained due to the abstract nature of FTFM where the students do not experience the direct application of computer application in education. This result is similar to that obtained by Williams, Adesope and Yinka (2016) who carried out a study to ascertain the attitude of students on the use of social media for educational purposes. It was revealed that social media are used for educational purposes in terms of rapid development in science and technology through ICT. In addition, it was found out that students are highly motivated by the need to find and bond with new peers and potential social group. It further revealed that significant differences exist in usage of social media between male and female respondents; and in attitude of students towards social media. These assertions agree with the present study.

Selevičienė and Burkšaitienė (2015) carried out a similar study to determine students' attitudes and habits towards Web 2.0 technologies and their impact on the acceptance of these technologies for learning English for specific Purposes. The findings of the research revealed that the surveyed students can be considered to be typical representatives of the so called digital natives' generation, i.e. people who were born in the last decades of the 20th century and who "have spent their entire lives surrounded by and using computers, videogames, digital music players, video cams, cell phones, and all the other toys and tools of the digital age". This implies that universities should be aware of students' current needs and interest related to their learning environment for better knowledge acquisition and academic achievements.

Effect of GCDS on trainee teachers' academic performance in Computer in Education

From the study, the findings revealed that GCDS has 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 might have also improved participants' performance than FTFM because students can carry their learning to anywhere, even in their homes, unlike the FTFM where learners can only learn with their lecturers present in class. Furthermore, students exposed to Google Classroom 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 empirically unearth 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 classroom discussion strategy.

Academic performance scores of male and female trainee teachers taught with GCDS and FTFM

From the study, the findings revealed that male and female trainee teachers taught computer in education using GCDS performed better than when taught using FTFM. This finding was consistent in that male participants in the GCDS group performed better than male participants in the FTFM group, with the same result obtained for female participants too. Similarly, male trainee teachers in the GCDS group did not perform significantly better than their female counterparts in both GCDS. From these results, it can be observed that students' performance in computer in education course is not due to their gender differences but the method of instruction used. This finding is similar to that of Heggart and Yoo (2018), who conducted a study to examine the effectiveness of using Google Classroom for final year primary teacher education students to encourage student voice and agency, and to consider how the platform might influence future pedagogies at the tertiary level. The findings revealed that Google Classroom increased student participation and learning and improved classroom dynamics. It also revealed concerns around pace and user experience. Their findings agreed with the present study. In a similar study, Shaharanee, Jamil, and Rodzi (2017) undertook a study to explore the effectiveness of Google Classroom's active learning activities for data mining subject under the Decision Sciences program. The findings showed that majority of the students satisfy with the Google Classroom's tools that were introduced in the class where all ratios are above averages. The implication is that comparative performance is good in the areas of ease of access, perceived usefulness, communication and interaction, instruction delivery and students' satisfaction towards the Google Classroom's learning activities.

CONCLUSIONS

Based on the findings of the study it is concluded that Google Classroom Discussion Strategy has significant effect on trainee teachers' interest in Computer in Education and their performance in the 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.

Also, learners performed better when they own the pace and time of their learning, participate more in classroom and taught using a good learning management system.

Furthermore, comparative performance is good in the areas of ease of access, perceived usefulness, communication and interaction, instruction delivery and students' satisfaction towards the Google Classroom's learning activities.

Recommendations

Based on the findings and conclusion of the study, it is recommended as follows:

1. 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.
2. Computer in education courses should be taught using Google classroom discussion strategy.
3. Teachers should act as guides on the side and allow learners to take control of their learning; this will enhance their participation thereby increasing their academic performance.
4. Learner should be encouraged to engage in interaction with both teachers and their colleagues during learning, as it will enhance their interest in the subject matter.
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 universities.

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