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Effect of Facebook-Based Learning on Students' Performance in Educational Technology Concept

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ABSTRACTS

This study investigated the effect of Facebook-based learning on the students' academic performance. The study was a quasi-experimental using pre-test, post-test design which used for data collection from 30 colleges of education students forming the sample for the study. The performance test comprises of two different sets of objective questions. Multiple choice and completion test responses. The reliability coefficient of 0.75 was obtained from Kuder-Richardson (KR-20) formula for the multiple-choice test and Split-half reliability statistic was used to determine the reliability coefficient of the completion test responses which yielded 0.76. The research questions were answered using mean and standard deviation while paired sample t-test was used to test hypothesis 1 and independent sample t-test was used to test hypothesis 2. The findings of the study showed that there was a significant difference in the pretest and posttest performance of the Facebook-based group; and there was no significant difference in the performance of male and female students exposed to Facebook-based learning. The study concluded that the performance of the colleges of education students was enhanced when they are exposed to Facebook-based teaching methodology. It was recommended that colleges of education lecturers should be encouraged to adopt Facebook-based as an instructional strategy.

ARTICLE INFO

1. INTRODUCTION

Education has been identified as a veritable and also an essential instrument for development. To attain any meaningful human and national development, education is a major factor. Education describes all the process of human learning by which valuable skills are developed and knowledge is imparted. It is an essential opportunity through which both individuals and groups tend to acquire relevant knowledge (Celine, 2019). Education is something that was once not available in some certain parts of the world. Even in countries where there was education, there were still many issues with getting it to the general public. Education is easily gotten to the general public anywhere anytime with the help of the advent of technology.

Teaching through technology promises to allow students not just to acquire subject-specific knowledge but also become lifelong learners in a digitally linked world. However, despite much effort in enforcing technology-driven pedagogies in higher education, there seem to be more challenges than success. These challenges are being considered solved through the knowledge of educational technology which is the study of ethical practice in solving educational problems. Educational technology is the study of technology, in which students learn about the methods and know-how related to technology. As a discipline of study, it covers the human capability to form and change the physical world to meet needs, by manipulating materials and tools with methods. Educational Technology is the development, evaluation and application of strategies and systems that help the students to improve the technique of learning and thereby enables the individual to identify their potentials (Laleye, 2015).

Educational technology is an essential course of study in Nigerian teacher educational establishments, such as Colleges of Education. The main aim of educational technology is to improve the skill of teachers by producing teachers that can support theory with practice in teaching and learning process (Eze, 2016). Taking this further, Educational technology is a systematic and organized technique of making use of modern technology to enhance the quality of education in Nigerian colleges of education (Abidoye & Fatoki, 2014). It is a systematic way of conceptualizing the execution and evaluation of the educational process, that is, teaching and learning which helps with the application of current instructional techniques toward the training of pre-service teachers in the colleges of education. It includes instructional materials, methods and organization of work and relationships, that is, the behavior of all participants in the instructional method (Lazar, 2015). Educational technology is best incorporated into school system with information and communication technology due to the diversity of the learners.

Information and Communications Technologies encourages the transformation of instruction from instructor centeredness to learner centeredness (Amosa *et al.,* 2016). One of the most common motives for the use of ICT in education is that ICT tools enhance the quality of education through growing learners' engagement and motivation, by way of encouraging group discussion among the students (Amosa *et al.,* 2016). It needs to be properly integrated into the educational system. The proper integration of ICT related tools in the field of education has unveiled new learning possibilities within and outside the classroom. One of the ICT related applications that is generally accepted among the students because of its easy accessibility and popularity among students is Facebook.

Connectivity has emerged as a way of being and living this life. Many teachers live the fascination of these cyber times, but additionally, there are a number of challenges to be confronted in the area of education when we put in question the collective production and

dissemination of knowledge. These challenges could be solved with the proper application of the use of Facebook through the creation of Facebook groups which has been proven to be effective on students' learning only when the activities are constructively integrated into course design and an instructor in the form of the moderator is present (Nazir & Brouwer, 2019). Also, the instructor and the learners need to be properly orientated on the use of Facebook as a prospective source of learning. It is flexible in use and not time-specific. therefore, it is possible for students who work day time to have access to the material when they get free time or when they are at home. Facebook is a potential learning source for every student who has access to the internet at any part of the world (Zafar *et al.,* 2016).

Facebook allows self-expression through the profile and offers several opportunities to share facts on one's friendship networks, personal culture, likes and other different elements that contribute both to identity construction and to the relationships with others. Students in the Facebook groups use Facebook as an instructional tool without the notion of discussing with a complete stranger. Facebook is used within the delivery of information, assignments and course sessions. Instructors and learners have the opportunity to share materials (video files, audio files, pictures and presentation), deliberate on the material in the form of group discussion within the created Facebook group, share videos concerning courses on Facebook and different documents of the experts that may be shared by forming links to Google documents (Joseph, 2018).

With the emergence of Facebook groups that do not require members to be friends but at least a mutual friend binding each group members, the option of creating a study group with students and Instructors is on the rise, and the effects of using Facebook groups as an alternative to the four walls of the classroom has become increasingly relevant (Nitza & Margarita, 2018). Facebook groups are used to facilitate communication between students to foster a positive social climate, to create dialogue and to share learning material among group members (Nitza & Margarita, 2018). Any lecturer can easily set up a Facebook group. After the group is created, the group administrator can invite other students to join the group by either adding them from the friend list of sending the group invitation link to each student. Groups can choose to confine membership to specific students or open the group for access by anyone. Unlike other Facebook activity, a closed learning group does not appear in any student's activity records and is published only among the members of the group.

The main uses of Facebook learning groups include posting questions about the discussed topic, homework, test material and sharing synopses uploaded by students. Facebook is among the latest examples of communications technologies that have been widely adopted by students and consequently, have the potential to become an important resource to support their educational collaboration and communication with their colleagues in the form of group discussion (Dulamă *et al.,* 2016). It is the duty of the lecturer or the instructor to create the group explicitly for a course. Students can communicate and deliberate on relevant class information with their classmates and teachers simultaneously. Teachers can send a notice to the entire group, set up and prompt the students about events. Facebook group discussion can be used with the combination of the traditional mode of instruction which connotes blended learning. An important factor that needs to be considered as one of the possible factors that could influence technological implementation on student's performance is gender.

Gender issues have been linked with the overall performance of students in educational tasks in several studies but without any definite conclusion (Yusuf & Afolabi, 2010). Female students tend to use Facebook mainly for academic purposes and following daily updates higher than the males while male students use Facebook mainly for making new friends at a

rate higher than the females' students which has a negative impact on their academic performance. Similarly, male and female students use Facebook differently and thereby perform differently in thereby academics. Female students use Facebook to keep in touch with old friends either living nearby or in other schools while male students use Facebook to find potential friends and find people with similar interests (Courage *et al.,* 2018). Therefore, Female students performed better in their academic while the males performed relatively better on social relations and daily activities factors.

However, female students compared to male students considered themselves to be persons that are more similar online as offline, and their Facebook activity represented more who they were than it did for males. Females students are embedded in photos sharing more often overall and share images more frequently on Facebook which has a negative effect on their academic performance. Females also tend to have more privacy-related concerns but are more willing, in principle, to interact more through others' images shared on timelines and groups by liking and commenting on them. Though Female students show more involvements in group discussion, Male, on the contrary, is more conscious to post on the group. Furthermore, female students are more likely to feel addicted and spend more time on Facebook, post public messages, post pictures, use Facebook to follow the program and as a teaching resource. On the other hand, male students are more likely to use Facebook to make new friends, discuss and learn about events mostly out of there course of study.

Learning implies not only access to information but also access to other people; in this context, Facebook appears well suited for educational use, since they offer social space for people to gather online and make connections. New paper finds that effective social media does help to attract and retain students. Therefore, it is necessary to examine students' performance using various medium which they can interact and learn purposefully taking into consideration how the variable; gender has an effect on students' academic performance. hence, this study seeks to examine the effect of Facebook-based on Kwara State Colleges of Education Students' Performance in Educational Technology concept.

Facebook is used by almost all students to connect with their friends and family around the globe. Facebook has become second nature to learners' daily activities; they are mostly hooked on Facebook. The use of Facebook platforms has grown so fast that it has attracted the attention of colleges of education students; they are so attached in the sites that they have almost completely forgotten about their academic work. Students are considered the endangered species of social media sites more than any group of people as it negatively impacts their academic performance (Babatunde & Adeyinka, 2015). Students easily get tempted to use Facebook platforms when trying to obtain learning materials online. In most cases, the students end up spending almost all their times on Facebook communicating with friends and forget about the course materials they initially intend to look for which has a negative influence on their academic performance.

Therefore, instructors should not ignore developments in information and communication technology which create rich learning environments. One of these developments is Facebook-based learning. These prompted the researcher to carry out this research in other to identify loopholes in teaching methods in relation to the students' use of Facebook and mobile devices that negatively influence their academic performance, with the aim of suggesting possible solutions using empirical evidence. it is in the light of these that this study attempts to examine the effect of Facebook-based on Kwara State Colleges of Education Students' Performance in Educational Technology Concept.

The main purpose of this study is to examine the effect of Facebook-based on Kwara State Colleges of Education Students' Performance in Educational Technology Concept. Specifically, the study:

1. determined the effect of Facebook-based learning on the students' academic performance; and
2. determined the effect of gender on students' performance taught using Facebook-based learning;

The following research questions are formulated and were answered in this study:

1. What is the effect of Facebook-based learning on students' academic performance?
2. What is the effect of gender on students' performance taught using Facebook-based learning?

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

H01: There is no significant difference between pretest and posttest performance of students exposed to Facebook-based learning

H02: There is no significant difference in gender on students' performance taught using Facebook-based learning.

This study focused on examining the effect of Facebook-based on Kwara State Colleges of Education Students' Performance in Educational Technology Concept. Experimental of pre-test, post-test design was used to examine the performance of students who were exposed to Facebook-based in Educational Technology concept. The concept includes: Introduction to Educational Technology, Instructional media: Relevance in Instruction, Classification of instructional media and Communication. The population consists of all the students of the public colleges of education in Kwara state. Computer Science Education students offering Educational Technology in one of the Colleges of Education were purposively selected.

2. METHODS

The study adopted an experimental using pre-test, post-test design. This involves the treatment using Facebook application in the form of online classroom instruction. The independent variable in this study are teaching methodology. This is: Facebook-based Learning. The dependent variable is the post-test performance of the students. The moderating variable is the gender of students in the study.

As shown in the **Table 1**, Pre-test was administered on the experimental group before the treatment. The experimental group was subjected to the treatment of an educational technology concept using the Facebook-based learning mode of instruction. A post-test at the end of the treatment (four weeks) on the performance test questions was administered to measure the performance of the students.

Table 1 illustrate the variables. Where,

O_1 represents the pre-test of the Facebook Based-Learning Group
O_2 represents the post-test of the Facebook Based-Learning Group
X_1 represents the treatment for the first Experimental Group

Table 1. Research design layout.

Groups	Pre-test	Treatment	Post-test
Experimental Group	O_1	X_1 (Facebook-based learning)	O_2

The population for this study includes all the students of the Colleges of Education in Kwara State. The target population for this study consist of all the 200 Level students in one of the three public Colleges of Education in Kwara State. The sample size includes the 200 level computer science students of the colleges of education. 30 computer science students from one of the colleges of education were purposively sampled. The choice of the 200 level students was based on the following criteria: (i) the students owned a computer system or a mobile device (mobile phones, laptop and tablets) with internet access to communicate in the Facebook group and download information, (ii) they have basic pre-requisite knowledge of ICT related applications (iii) the concepts treated in this study are some of the compulsory 200 level general education course.

Three research instruments were used by the researcher to gather relevant information for this study. The instruments are: The Treatment Instrument: (i) Lesson plan, and (ii) Facebook Based-Learning. The Test Instrument: (iii) Students' performance test on Educational Technology concepts

1. Lesson Plan: The lesson plan consists of four topics which was sub-divided into four lessons. The topics were extracted from Educational Technology student's handbook used in the two colleges of education. The lesson plan was prepared by the researcher using the two main educational technology recognized textbooks from the colleges of education, critical issues used as reading resources for Educational Technology students, university of Ilorin, materials from the Internet and contributions from the course lecturers. The selected concepts are: Introduction to Educational Technology, Instructional media: Relevance in Instruction, Classification of Instructional Media and Communication.

2. Facebook Based-Learning: this instrument was used by the researcher as a mainly online mode of instruction in the form of direct classroom instruction. It's a researcher created Facebook group on the Facebook application platform. It is used as the treatment of educational technology concept using the researcher designed lesson plan as a guide. The instrument was used for the actual treatment of the subjects in the first experimental group. All the lesson periods were taught on the created Facebook group.

3. Students' performance test on Educational Technology concepts; the test instrument that was used for collecting data for this study was the Educational Technology performance test. The concept includes: Introduction to Educational Technology, Instructional media: Relevance in Instruction, Classification of instructional media and Communication. The educational technology performance test contains two sections. Section A comprises of demographic data of the students such as gender. Section B of the educational technology performance test contained 25 items with multiple-choice responses with four options (A-D) as the possible answers to each question and 15 completion test questions.

The performance test was extracted from the four concepts that was taught for four weeks using the two handbooks from the two selected colleges of education as a guide. This instrument was designed by one lecturer from the colleges of education and the researcher. Students were required to indicate the correct answers by ticking the appropriate option with a precise letter (A-D) that corresponds to the correct options for each item. And on the completion test response, students were required to fill in the gaps. The educational technology performance test was administered to the experimental groups as pretest and posttest respectively. To reduce the retest effects, the questions were reshuffled and administered in a different random order as pretest and posttest.

One lecturer each from the colleges of education and three educational technology lecturers from the department of educational technology, University of Ilorin validated the lesson plan and the performance test that covered the content on a selected Educational Technology concept. The lecturers also examined all the items in the instrument with reference to the: appropriateness of the contents, the extent to which the content covered the topics they were designed to cover. Finally, comments, opinions and suggestions of the lecturers were effected appropriately. To ensure the reliability of the test instrument, a pilot study was conducted at Emmanuel Alayande College of Education, Oyo State. The Educational Technology performance test was administered to 20 selected computer science education students from Emmanuel Alayande College of Education, Oyo State which is not part of the sampled schools for the study. The reliability coefficient of 0.75 was obtained for the multiple-choice responses using Kuder-Richardson (KR-20). Split-half reliability statistic was used to determine the reliability coefficient of the completion test responses which yielded 0.76 (see appendices III and Appendix IV). Hence the instrument was considered to be reliable and consistent.

The researcher presented letters of introduction which was taken to the target College of Education. The researcher visited the selected College of Education to examine the students so as to determine their suitability for the study after official permission to use the school and their students might have been sought from the respective colleges of education authorities. Data was collected with the help of research assistant. Educational technology lecturer from the selected college of education were the research assistant. The research assistant was properly oriented on the use of Facebook for instruction and how it could be properly integrated into teaching methodology. The research assistant was also briefed about the motives of the study.

The experimental group (Facebook-based learning) received online learning using two class hours per week in the computer classroom or anywhere. While in the computer classroom or anywhere as far as internet connectivity is available on their mobile devices, students logged into their Facebook application, join the Facebook group to have access to the learning materials. The class hour was in the form of discussion forums. The research assistant (Educational Technology Lecturer from the college of education) and the researcher were available online to serve as an instructor and as a guide to the students and to answer related questions. However, there was no face-to-face interaction with the lecturer. At the beginning of the experiment, a pretest was administered to the group while posttest was administered after four weeks of treatment to measure their performance. Data obtained from the pretest and posttest were subjected to data analysis.

The researcher ensures strict adherence to all ethical considerations guiding the conduct of the research during the instrument administration. By so doing, the participants were allowed voluntary participation in the study. Furthermore, the utmost confidentiality and anonymity of the participants were maintained during the administration, collection, and report of the research findings. Hence, all response was strictly for the purpose of this study. Mean and Standard Deviation was used to answer research question one in other to establish the direction of difference in the tested hypothesis using the Statistical Product for Service Solutions (SPSS). For hypothesis testing, paired sample t-test was used to test hypothesis one. Independent t-test was used to test hypothesis two. All hypothesis was tested at 0.05 level of significance.

3. RESULTS AND DISCUSSION

This chapter presents answers to the research question raised and shows the results of the tested hypotheses. The chapter also presents the summary of the findings which were based on the research questions raised and the hypotheses formulated. **Table 2** shows that 30 students participated in the study.

Table 3 indicates that out of the 30 students that were involved in this study, 15 (53.3%) were male while the remaining 14 (46.7%) were female. The result from this table implies that the male students were more than the female students.

The results of the hypotheses tested on the corresponding research questions 1-2. paired sample t-test was used to test hypothesis one. independent sample t-test was used to test hypothesis two. All hypothesis was tested at 0.05 level of significance.

Hypotheses One: There is no significant difference between pretest and posttest performance of students exposed to Facebook-based learning.

To determine whether there was a significant difference in the pretest and posttest mean score of the students exposed to Facebook-based learning strategy, paired sample t-test was done as shown in **Table 4**.

Table 4 reveals the difference in the pretest and posttest of students' academic performance using a Facebook-based learning approach. The table shows that there is a significant difference between the pretest and posttest mean scores of the students' performance in the college of education. (df=29; t=23.48; p<0.05). based on this result, hypothesis 1 is rejected. In order to establish the direction of difference in the pretest and posttest mean score, the mean and standard deviation was conducted on the corresponding research question 1 to find out the mean gain score as the direction of the difference.

Table 2. Demographic Information of the participant Based on Groups.

Group	Frequency	Percentage	Cumulative Percent
Experimental group (Facebook-based Learning)	30	100.0	100.0
Total	30	100.0	

Table 3. Demographic information of participants based on gender distribution.

Gender	Frequency	Percentage	Cumulative Percent
Male	16	53.3	53.3
Female	14	46.7	100.0
Total	30	100.0	

Table 4. Summary of t-test showing difference between pretest and posttest performance of students exposed to facebook-based learning.

Variable (Posttest Scores)	N	Mean	Standard Deviation	df	T	Sig(p)	Remark
Pretest	30	26.67	8.26	29	23.48	0.00	S
Posttest	30	69.80	4.40				

Research Question 1: What is the effect of Facebook-based learning on students' academic performance?

Table 5 shows that the students who were pre-tested in the Facebook-based group had the mean score of 26.67 with the standard deviation value of 8.26 while the same number of students that were post-tested after they were exposed to the online teaching through Facebook application had the mean score of 69.80 with the standard deviation of 4.40. This result reveals an appreciable difference in the values of mean scores with 43.13 has the mean gain score. Therefore, it can be said that there is a difference in the pretest and posttest mean score of students exposed to Facebook-based learning. Hence, Facebook-based learning is effective in the teaching and learning of the selected educational technology concepts.

Hypotheses Two: There is no significant difference in gender on students' performance taught using Facebook-based learning.

To determine whether there was a significant difference in the performance of male and female students in the first experimental group (Facebook-based), independent sample t-test was done as shown in **Table 6**.

Table 6 shows the difference in the performance of male and female students in the Facebook-based learning group. The table shows that there is no significant difference between the male and female mean scores of the students' performance in the college of education (df=28; t=0.68; p>0.05). based on this result, hypothesis 4 is not rejected.

The t-test result revealed that there was a significant difference between pretest and posttest mean score of the students' academic performance exposed to the online teaching strategy. This implies that there is a significant difference in the result of the students that were pretested and post-tested after the treatment of the Facebook-based teaching strategy. These findings are consistent with the findings of prior studies which Nazir and Brouwer, (2019). indicate that proper application of the use of Facebook through the creation of Facebook groups has been proven to be effective on students' learning only when the activities are constructively integrated in a course design and an instructor in the form of moderator is present.

The findings of Zafar *et al.,* (2016) showed that Facebook is proven to be an effective teaching strategy. It is a key example of an educational setting in which students can relate with their colleagues as well as instructors comfortably and motivate each other towards academic success which agrees with the findings of this present study that Facebook-based teaching strategy produces a positive effect on the students' academic performance.

Table 5. Performance of students exposed to facebook-based learning.

Group	N	Mean	Standard Deviation	Mean Gain Score
Pre-test Score	30	26.67	8.26	43.13
Post-test Score	30	69.80	4.40	

Table 6. Summary of t-test showing the difference in performance of male and female student in the first experimental group (Facebook-based).

Variable (Posttest Scores)	N	Mean	Standard Deviation	df	T	Sig(p)	Remark
Male	16	70.31	3.09	28	0.68	0.51	NS
Female	14	69.21	5.60				

The result is also in line with Joseph (2018) whose findings revealed that Facebook is an effective teaching strategy. It enables the teachers to link with their students within and outside of the classroom. Students can also use Facebook to connect with classmates about inquiries relating to class homework. The exceptional posttest means score performance of the students was to testify to the fact that using a Facebook-based teaching strategy is an effective mode of instruction in the colleges of education.

The t-test result revealed that there was no significant difference between male and female mean score of the students' academic performance exposed to the Facebook-based teaching strategy. These findings contradict with the findings of prior studies that finds out that Female students tend to use Facebook mainly for maintaining academic purposes and following daily updates while male students use Facebook mainly for making new friends which has a negative impact on their academic performance. Female students tend to perform significantly better than male students. Similarly, the findings of Courage *et al.,* (2018) showed that male and female students use Facebook differently and thereby perform differently in their academics.

Based on the findings of this study, the following implications can be drawn; the findings of this study have great implication on instructional methods, strategies, techniques and approaches of teaching and learning educational technology in colleges of education in Nigeria. It is a clear indication that the performance of colleges of education students in educational technology would be improved if the students are exposed to ICT based instructional strategy such as Facebook Application. The adoption of Facebook instructional strategy into course design would help the colleges of education to learn at their own pace and access to learning material anywhere and anytime. The proper integration of Facebook into course design would help produce a better academic performance in colleges of education generally and educational technology students in particular.

The result of the study revealed that students' gender is not a barrier to their academic performance when learning with Facebook (purely online). This implies that Facebook would improve the academic performance of both the male and female students, thus reducing the discrimination of gender in the utilization and implementation of ICT-Based tool like Facebook into an instructional strategy in the colleges of education. This research has contributed to the education and knowledge particularly in the area examining the effect of an instructional delivery strategy (Facebook-based Leaning) for teaching and learning educational technology in the colleges of education and its effect on their academic performance.

4. CONCLUSION

This study examines the effect of Facebook-based learning on Kwara State Colleges of Education Students' Performance in Educational Technology Concept. The result obtained from the data gathered and analyzed in this study finds out that Facebook-based learning mode of instruction was found to be effective for learning educational technology concept. However, there was no significant difference between male and female students that were exposed to Facebook-based learning. This implies that Facebook-based teaching methodology can bridge the gap between gender disparity in students' academic performance.

Facebook therefore, brings out effective learning of educational technology and positive improvement in the academic performance of the students. This is an indication that it is a motivating and attractive alternative to supplement teaching methodology within the school system. It is hoped that the proper integration of Facebook into teaching strategy in

educational technology class will allow a better understanding of the topics and improve students' performance generally.

5. RECOMMENDATION

Based on the major findings of this study, the following recommendations were made:

1. The teaching methodology in Nigeria colleges of education should not rely on the conventional mode of teaching in relation to teaching strategy. Instead, other strategies of teaching such as (Facebook) in the form of direct classroom instruction need to be introduced which makes the teaching and learning process more flexible in terms of place and time.
2. ICT seminars and workshops should be made available for lecturers on regular bases to upgrade and get conversant with latest technological trends like the use of Facebook for instruction. This will enable the lecturers to develop, adapt and keep to the latest online learning technologies within the education system.
3. Government and appropriate educational authorities should encourage and support the use of the Facebook platform in the colleges of education as this could enhance students' academic performance.

6. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. The authors confirmed that the paper was free of plagiarism.

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