

EFFECTIVENESS OF FACEBOOK AND WHATSAPP SUPPORTED INSTRUCTIONAL PLATFORMS ON UNDERGRADUATE STUDENTS' ACHIEVEMENT IN EDUCATIONAL TECHNOLOGY

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Abstract

This study investigated the effectiveness of facebook and whatsapp supported instructional platforms on undergraduate students' achievement in educational technology. A three by two (3x2) factorial design was adopted using pretest- posttest approach. Three research questions were raised to guide the study and three hypotheses were tested. A total of 180 educational technology students selected from three universities out of five universities offering educational technology in Nigeria were randomly assigned to Experimental Group I (exposed to facebook supported instructional platform), Experimental Group II (exposed to whatsapp supported instructional platform) and Control Group (taught through lecture method). Educational Technology Achievement Test was used for data collection. ETAT was validated by experts and the reliability coefficients of 0.734 were obtained using Pearson Product Moment Correlation Coefficient formular. Data gathered were analyzed using Analysis of Variance and t-test analysis and significance was ascertained at 0.05 alpha levels. Findings revealed that significant difference exists in the mean achievement of the three groups ($F_{cal} = 117.393$; $df = 179$; $P < 0.05$). And there was no significant different existing between gender levels when both were taught using facebook supported instructional platforms ($P > 0.05$ level of significance ($P = 0.179$)). It was therefore recommended among others that Facebook and whatsapp supported instructional platform should be made as one of the major teaching strategies for Educational Technology courses in universities.

Keywords: Facebook, Whatsapp, Achievement, Educational Technology, Lecture method

Introduction

It is an established fact that educational technology is the vehicle through which instruction is being driven in the teaching and learning environment. This underpinning knowledge provides educators and learners with the framework of establishing themselves in the technology realm of life by sharing and participating in learning through social media. Learning through social media demands social presence which can only be done through social participation using appropriate educational technology tools to integrate technology in the classroom and to promote learning in a diverse society. Educational technology is a systematic and organized process of applying modern technology to improve the quality of education. It is a systematic way of conceptualizing the execution and evaluation of the educational process, the learning and teaching and the application of modern educational teaching techniques (Lazar, 2015). With the application of educational technology, students can independently progress in mastering materials, choose the pace of work, repeat the material that is not sufficiently clear, get results of their performance and track down their progress.

Social media are one of the educational technology tools used in promoting meaningful and qualitative interactions among learners and teachers (Okereke, 2014). Social media are platforms that enable one to connect with friends and family, share photos, videos, music and

other personal information with a wider group of people. They are online service platforms that focus on building and reflecting social relations among people who share interest and activities (Effiong & Odey, 2013). They are mainly designed for information, entertainment and educational reasons. For educational purposes, it serves both teachers and learners as educationists believe that social media help teachers in adequately preparing their lessons, designing and implementing lessons with the most efficient and effective teaching methods as well as evaluating the learning outcomes (Olugbemi, 2013). Marco, Letizia, and Alessandra, (2016) identified Facebook and Whatsapp as among the communication tools employed by teachers and students in carrying out educational purposes.

There are different researches carried out to highlight the effects of facebook and whatsapp on students' academic achievement. Angadi and Hegadi (2015) researched on Facebook as an instructional tool in fostering academic achievement, social interaction skills and attitude towards use of facebook. Their studies show that Facebook is an effective teaching strategy which not only helps in academic gains but also in developing the learners' potential skills. Similarly, Aicha (2014) researched on the impact of Whatsapp mobile social learning on the achievement and attitude of female students compared with face to face learning in the classroom. The results of the experiment showed that the students taught using Whatsapp mobile social learning performed significantly better than students taught using face to face learning in the classroom. Also the findings of a study on the impact of social media networks websites usage on students' academic performance at University of Jordan conducted by Maqableh, Rajab, Quteshat, Masa'deh, Khatib, and Karajeh, (2015) revealed that social network improves the student's academic performance. However, Ghareb and Sharif (2015) in their study on the effect of facebook on academic performance and social life for undergraduate students of university of human developments found out that daily usage of facebook affects academic performance of students and suggested that if lesser time would be spent on facebook students' academic performance would be increased.

Apart from the impact of the use of social media learning strategies, gender differences have long been observed to have link with performance of students in academic tasks especially in higher institutions. Gender has been found to affect academic achievement. It could be defined as an attribute that differentiates a male and a female in classroom interactions, in the case of the present study, in social media interaction. Gender is an attribute to human sexes. It is a social connotation that has sound psychological background (Nnamani & Oyibe, 2016). Most social media contexts involve a mix of both genders. Social media technologies have a long history of shaping and being shaped by the gender of their users. Many studies have found that girls on average spend more times on social network sites and use them more actively than boys do (Brenner, 2012; Rideout *et al.*, 2010). Haq and Chand (2012) carried out a research on pattern of facebook usage and its impact on academic performance of university students: A gender based comparison. The study revealed among other findings that Facebook use; in general, adversely affect the academic performance of male students as compared to female students. However, Brown and Kabre (2011) carried out research on the influence of Facebook usage on the academic performance and the quality of life of college students. The general objective of the study was to examine the impact of facebook usage on the academic performance and the quality of life of college students. Their findings indicated that the number of hours per week spent on facebook did not affect academic performance of students. It was also reported that females did better than males with higher Grade Point Averages (GPAs). Johnson and George (2014) researched on the impact of Whatsapp messenger usage on

students' performance in tertiary institutions in Ghana. It was observed that the performance response of the female students far outweighed their male counterpart by 66:34%.

Statement of the Problem

Despite technological advancements in the teaching sector and the educational benefits of social media, university lecturers especially in the developing countries like Nigeria are yet to adopt the use of social media in teaching. University educational institutions that ignore newer technologies for teaching and learning, such as the social media, may become less relevant in the development of human capital, thereby, undermining national economic growth and development. Therefore, there is a need to introduce the concept of social media as a new form of Educational Technology in teaching because of its educational benefits. Social media teaching cannot replace the conventional teaching methodology in education but rather it will support, complement and enhance its effectiveness. This will provide students with greater experience in dealing with the world of work related issues they encounter. Social media teaching methodologies will lead to a learning society in which the creative and intellectual abilities of students will allow them to meet the goals of transformation and development. Consequent upon the foregoing, the current research therefore investigates the effectiveness of facebook and whatsapp supported instructional platforms on undergraduate students' achievement in Educational Technology.

Aim and Objectives of the study

The aim of this study is to investigate effectiveness of facebook and whatsapp supported instructional platforms on undergraduate students' achievement in educational technology. Specifically, the objectives of the study are:

- (i) To determine the achievement of students taught educational technology concept using Facebook and Whatsapp supported instructional platform and lecture method.
- (ii) To find out the influence of gender on the achievements of students taught educational technology concept using Facebook supported instructional platform.
- (iii) To find out the influence of gender on the achievements of students taught educational technology concept using Whatsapp supported instructional platform.

Research Questions

The following research questions were raised to guide the study:

- (i) What are the mean achievement scores of students taught educational technology using Facebook and Whatsapp supported instructional platforms and Lecture method?
- (ii) Is there any difference in the mean achievement scores of male and female students taught educational technology using Facebook supported instructional platform?
- (iii) Is there any difference in the mean achievement scores of male and female students taught educational technology using Whatsapp supported instructional platform?

Research Hypotheses

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

- Ho₁:** There are no significant differences in the mean achievement scores of students taught educational technology using Facebook and Whatsapp supported instructional platforms and lecture method.
- Ho₂:** There is no significant difference in the mean achievement scores of male and female students taught educational technology using Facebook supported instructional platform.

Ho₃: There is no significant difference in the mean achievement scores of male and female students taught educational technology using Whatsapp supported instructional platform.

Methodology

The design adopted for this study was a factorial research design. This is a complex experimental design that permits multiple independent variables trying to find their effects on the dependent variables. A three by two (3x2) factorial design was adopted using pretest-posttest approach. The design represented three levels of treatments and two levels of gender (male and female). The three groups were taught five units of instruction on distance education courses. The experimental group 1 was taught using facebook supported instructional platform, experimental group 11 taught using whatsapp supported instructional platform while the control group was taught using lecture method.

The Population of this study comprised all Educational Technology students in the five public universities offering Educational Technology in Nigeria comprising 3,056 students. The target population comprised of 180 second year Educational Technology students from three out of five universities offering Educational Technology in Nigeria. Simple random sampling was used to select three out of the five public universities offering Educational Technology in Nigeria.

The instruments used to gather data for the study were Educational Technology Achievement Test (ETAT). There is also a treatment instrument called Facebook Supported Instruction (FSI) and Whatsapp Supported Instruction (WSI). The facebook Supported Instruction (FSI) and Whatsapp Supported Instruction (WSI) were developed by the researcher in collaboration with an online course developer. These broadly constitute the body of instructions which the students were exposed to. The topics treated were concept of distance education; characteristics, types, merits and demerits of distance education; modes of delivery in distance education; methods of teaching and learning in distance education; and modes of assessments in distance learning. ETAT was made up of fifty (50) multiple choice objectives questions that were validated and its reliability determined as 0.734 using Pearson Product Moment Correlation Coefficient formular.

Results

Research Question One: What are the mean achievement scores of students taught educational technology using Facebook and Whatsapp supported instructional platforms and Lecture method?

Table 1: Mean and Standard Deviation of Pretest and Posttest Achievement Scores of Experimental and Control Groups

Group	N	Pretest		Posttest		Mean Gain
		\bar{X}	SD	\bar{X}	SD	
Exp. Group One (Facebook)	60	23.68	12.95	73.48	9.08	49.8
Exp. Group Two (WhatsApp)	60	21.53	9.60	66.93	5.72	43.4
Control Group	60	21.47	9.76	52.90	7.36	31.43

Table 1 shows the mean and standard deviation of achievement scores of experimental group one, experimental group two and the control group in the pretest and posttest. The result revealed that experimental groups one and two and control group had mean gain of 49.8, 43.4, and 31.43 respectively. Experimental group one therefore has the highest mean gain of 49.8.

Research Question Two: Is there any difference in the mean achievement scores of male and female students taught educational technology using Facebook supported instructional platform?

Table 2: Mean and standard deviation of pretest and posttest achievement scores of male and female experimental group one

Group	N	Pretest		Posttest		Mean Gain
		\bar{X}	SD	\bar{X}	SD	
Male	30	28.57	15.34	75.07	8.70	46.5
Female	30	18.80	7.53	71.90	9.32	53.1

Table 2 shows the mean and standard deviation of pretest and posttest scores of male and female experimental group one. This gives a mean gain of 46.5 in favour of the male posttest achievement score and a mean gain of 53.1 in favour of the female posttest score, the mean difference of 6.6 between the posttest mean gain of male and female in favour of the male.

Research Question Three: Is there any difference in the mean achievement scores of male and female students taught educational technology using Whatsapp supported instructional platform?

Table 3: Mean and Standard Deviation of Pretest and Posttest Scores of Male and Female Experimental Group Two

Group	N	Pretest		Posttest		Mean Gain
		\bar{X}	SD	\bar{X}	SD	
Male	30	20.60	9.88	69.00	6.78	48.4
Female	30	22.47	9.39	64.87	3.43	42.4

Table 3 shows the mean and standard deviation of pretest and posttest scores of male and female experimental group two. The result reveals the mean difference of 6 between the posttest mean gain of male and female in favour of the male.

Hypothesis One: There are no significant differences in the mean achievement scores of students taught educational technology using Facebook and Whatsapp supported instructional platforms and lecture method.

Table 4a: ANOVA comparison of the post test mean scores of the experimental groups I, II and control group

Sources of variation	Sum of square	df.	Mean	f- cal	Sig.
Between Groups	13270.211	2	6635.106		
Within groups	10004.117	177	56.520	117.393*	.000
Total	23274.328	179			

*: Significant at 0.05

Table 4a shows the ANOVA result of the comparison of posttest mean achievement scores of students taught educational technology in Experimental Group I, II and the Control Group. An examination of the table shows $F(2, 177) = 117.393$, $P < 0.05$. On the basis of this, hypothesis one was rejected. Therefore, there was significant difference in the achievement of students taught Educational Technology in Experimental Group I (those taught using Facebook Supported instructional platform), Experimental Group II (those taught using Whatsapp instructional platform) and those in Control Group (through lecture method only). Sidak post-hoc analysis was carried out to locate where significant difference exists as presented in Table 4b.

Table 4b: Sidak post-hoc analysis of the posttest mean achievement scores of students in experimental group I, II and the control group

Treatment	Experimental I	Experimental II	Control
Exp. I (Facebook)	-----	6.595 *	20.630*
Exp. II (Whatsapp)	-6.595*	-----	14.035*
Control (Lecture)	-20.630*	-14.035*	-----

*: Significant at $p = 0.05$ level.

Table 4b shows the Sidak post-hoc analysis of posttest mean achievement scores of students in Experimental Group I, Experimental Group II and the Control Group. The table indicates that significant difference exist between the mean scores of students in Experimental Group 1 and Experimental Group 11 (mean difference = 6.595). It also shows that significant difference exist between Experimental Group I and the Control Group (mean difference = 20.630) and also between Experimental Group II and Experimental Group 1 (mean difference = -6.595). The implication of the analyses presented in Table 4b is that the use of Facebook Supported

instructional platform improves students' achievement towards Educational technology better than Whatsapp instruction while the use of Whatsapp instruction method also improves students' achievement better than the use of lecture method.

Hypothesis Two: There is no significant difference in the mean achievement scores of male and female students taught educational technology using Facebook supported instructional platform.

Table 5: t-test comparisons of the mean achievement scores of male and female students taught educational technology using facebook supported instructional platform

Variables	N	df	Mean	SD	t-values calculated	Sig.
Male	30	58	75.07	8.706	1.360 ^{ns}	.179
Female	30		71.90	9.323		

Not significant at 0.05 level.

Table 5 shows t-test comparisons of the mean achievement scores of male and female students taught educational technology using Facebook supported instructional platform. The table indicated that there was no significant difference since $P > 0.05$ level of significance ($P = 0.179$). On the basis of this, hypothesis two was retained. Therefore, there was no significant difference in the mean achievement scores of male and female students taught educational technology using Facebook supported instructional platform. An indication that facebook supported instructional platform is gender friendly.

Hypothesis Three: There is no significant difference in the mean achievement scores of male and female students taught educational technology using Whatsapp supported instructional platform.

Table 6: t-test comparisons of the mean achievement scores of male and female students taught educational technology using Whatsapp supported instructional platform

Variables	N	df	Mean	S.D	t-cal	Sig.
Male	30	58	69.00	6.782	2.978*	.004
Female	30		64.87	3.431		

*Significant at 0.05 level.

Table 6 shows t-test comparisons of the mean achievement scores of male and female students taught educational technology using Whatsapp supported instructional platform. The table indicated that there was significant difference since $P < 0.05$ level of significant ($P = 0.004$). On the basis of this, hypothesis three was rejected. Therefore, there was significant difference in the mean achievement scores of male and female students taught educational technology using whatsapp supported instructional platform. The significant difference was in favour of male students.

Discussion

Findings on the mean achievement scores of students taught Educational Technology using Facebook and WhatsApp supported instructional platforms and lecture method show that the arithmetic means of the experimental groups are higher than arithmetic mean of the control group. Based on descriptive statistics values, the difference between the two arithmetic means is in favor of the experimental groups. The result of testing its corresponding research hypothesis indicated a significant difference in favour of the students in the experimental group I and 11 as against the control group. Sidak post hoc test was carried out to find out where the differences between the three groups occur. It indicated that there was significant difference between the mean achievement scores of the students exposed to Facebook supported instructional platform and Whatsapp Supported instructional platform as against the control group which was taught using lecture method. This result agrees with earlier findings of Angadi & Hegadi (2015) who investigated on Facebook as an instructional tool in fostering academic achievement, social interaction skills and attitude towards use of facebook. Their findings revealed that Facebook method helped in increasing achievement in Educational Psychology subject than the traditional lecture method of teaching. The study shows that Facebook is an effective teaching strategy which not only helps in academic gains but also in developing the learners' potential skills. It is also in line with the work of Aicha (2014) who found out a statistical difference existing between the experimental group and the control group. The experimental group taught using whatsapp mobile social learning performs better than the control group taught using face to face learning in the classroom. Maqableh, *et al* (2015) supported them by attesting that social network improves the student's academic performance. This work disagrees with the work of Ghareb and Sharif (2015) that researched on facebook effect on academic performance and social life for undergraduate students of university of human developments and found out that daily usage of facebook affects academic performance of students and suggested that if lesser time would be spent on facebook students' academic performance would be increased.

However, finding emanating from research question two shows that facebook supported instructional platform enhanced the performance of both male and female students taught Educational Technology using Facebook supported instructional platform. Comparing their achievement mean score with the pre-knowledge instruction at pre-test shows that the facebook supported instructional platform improved their academic achievement implying that the platform is gender friendly and supportive. Its corresponding hypothesis tested using T-test revealed that there was also no significant difference in the mean achievement scores of male and female students taught educational technology using Facebook supported instructional platform. . This implies that facebook supported instructional platform is a gender friendly platform. The study contradicts the work of Brown and Kabre (2011) that carried out research on the influence of Facebook usage on the academic performance and the quality of life of college students and recorded significant difference in favour of female students. They reported that females did better than males with higher Grade Point Averages (GPAs). The work is also in total contradiction with the findings of Haq and Chand (2012) which revealed that Facebook use in general; adversely affect the academic performance of male students as compared to female students.

The finding on mean achievement scores of male and female students taught Educational Technology using WhatsApp supported instructional platform revealed that WhatsApp supported instructional platform enhanced the performance of male students more than female

students. T-test comparison tested this hypothesis and recorded a significant difference in the mean achievement scores of male and female students taught Educational Technology using WhatsApp supported instructional platform. The male students did significantly better than the female students. This disagrees with the work of Johnson and George (2014) who observed that the performance response of the female students far outweighed their male counterpart by 66:34%.

Conclusion

The purpose of this study was to find out the effectiveness of facebook and whatsapp supported instructional platforms on undergraduate students' achievement in educational technology. Indeed Facebook and WhatsApp supported instructional platforms improved teaching and learning significantly. Findings showed that Facebook and WhatsApp supported instructional platforms enhanced the performance of students more than the lecture method.

Recommendations

Government should ensure that facebook and whatsapp supported instructional platforms are made as one of the major teaching strategies for Educational Technology courses in universities.

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