

RELATIONSHIP BETWEEN SOCIAL MEDIA USAGE AND BIOLOGY STUDENTS' ACADEMIC ACHIEVEMENT IN PUBLIC UNIVERSITIES IN GOMBE STATE, NIGERIA

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Abstracts

The study was designed to investigate the relationship between social media usage and Biology students' academic achievement in public universities in Gombe State, Nigeria. two research questions and three hypotheses guided the study. The research design adopted for this study was correlational design. The study was conducted in Gombe state. The population of the study was 671 300 level students offering Biology Education in Federal University of Kashere and Gombe State University, Gombe state. The sample size of the study was 399 which was determined using Krejcie and Morgan table. Two instruments were used for data collection titled: Social Media and Academic Achievement questionnaire and a profoma that collected stuents' results of 2023/2024 academic session. The reliability of the instrument was determined using Cronbach alpha and reliability coefficient of 0.82 was obtained. Data collected were analyzed by using descriptive statistics, mean and standard deviation was used to answer the two research questions and the three hypotheses were tested using linear and multiple regression. The findings of the study revealed that; (i) there is a significant relationship between Facebook usage and students' academic achievement in public universities in Gombe state, (0.025); (ii) there is a significant relationship between Twitter (x) usage and students' academic achievement in public universities in Gombe state (0.017). (v) there is a significant relationship between social media (Facebook and Twitter (x)) usage and Biology students' academic achievement in public universities in Gombe state (0.077). Based on the results, it was recommended that Universities should develop a social media policy that promotes the responsible and educational use of platforms like Facebook, YouTube, WhatsApp, and Twitter (X) to support students' learning while minimizing distractions.

Background to the Study

Technology has become an essential tool that simplifies work and plays a critical role in various aspects of life, especially in education. In Nigeria, the educational sector is increasingly adopting technology, with some institutions like the National Open University of Nigeria fully implementing e-examinations, while others such as University of Ilorin and Covenant University partially use electronic systems for student assessment (Adegbija, Fakomogbon & Daramola, 2012; Aworanti, 2016). Additionally, many public universities now utilize e-application, e-admission, and e-registration processes, reflecting a growing trend towards digital education management (Taiwo & Adewuni, 2013).

Technology has revolutionized education by enabling instant dissemination of knowledge and enhancing communication between students and educators (Spears, 2012). E-learning systems, especially those leveraging the internet, have significantly impacted student engagement and learning methods (Jamieson-Proctor, 2018). The application of ICT in academic settings promotes innovative solutions to educational challenges and fosters collaboration, particularly in higher institutions (Jamieson-Proctor, 2018; Castells & Katz, 2020).

Social media platforms such as Facebook, Twitter (X), YouTube, and WhatsApp play crucial roles in educational communication and collaboration. Facebook, with over 1.7 billion active users, allows students to connect and share information but also poses risks like distraction and academic dishonesty (Statista, 2016; Azad & Faraj, 2022). Twitter has been shown to improve teaching and learning experiences by enabling resource sharing and networking beyond immediate environments (Ajibo, 2021; Forte, Humphreys & Park, 2012). YouTube serves as a versatile educational tool for introducing concepts and sharing research resources (Jones & Cuthrell, 2018; Chenail, 2018). WhatsApp fosters peer interaction and facilitates both formal and informal learning, enhancing collaborative learning among students (Church & De Oliveria, 2013; Rilwan & Umoru, 2021).

The influence of social media on academic performance is mixed. While many studies highlight negative effects such as distraction, addiction, and reduced study time, leading to poorer academic outcomes (Banquil et al., 2009; Jaffar et al., 2019; Karpinski & Duberstein, 2009), others emphasize positive impacts like increased motivation, improved communication, and enhanced collaborative learning (Rifkin et al., 2010; Revere & Kovach, 2018). The degree to which social media affects academic success depends largely on the individual's use and management of these platforms (Ezeani, 2013; East, 2016).

Given these diverse outcomes, it is important to study how social media affects students' academic achievement in specific contexts. This study focuses on public universities in Gombe State, Nigeria, aiming to understand both the benefits and challenges social media presents to students' academic performance, recognizing that technology, while a powerful educational tool, requires careful regulation to maximize its positive effects (Idakwo, 2018; Landry, 2014).

Statement of the Problem

The use of social media in education provides students with the ability to get more useful information, to connect with learning groups and other educational systems that make education convenient. Social network tools afford students and institutions with multiple opportunities to improve learning methods. Contrary to this, some students have diverted social media usage towards non-educational, unethical and inappropriate actions and behaviors. It appears that some students, instead of taking advantage of the opportunities afforded by social media for learning purposes, have shifted their attention to using it for other reasons.

It was observed by the researcher that the new technological innovations (especially social media) disrupt higher education delivery ride of educators in higher education hence, the unwillingness attitude towards full scale adoption of proven technologies.

As such, the use of social media in public universities students has reached unprecedented stages and it has affected their study time, encourage the use of improper language when socializing on social media as well as taking their attention away from their studies. Students spend more time on social networking than on academic pursuits in

the current day and this has impacted their emotional, psychological, and intellectual scores. One of the studies viewed revealed that majority of the students spend an average of five hours and less on social media per day. They have inculcated the habit of writing in shorthand. Abbreviations and incomplete sentences are mostly used while communicating via social media and they apply such in tests and examinations. For instance, okay is represented as ok, because is replaced with bcos or cz, you are represented as u, the is d, I am is written as am, why is y. As such, the negative consequences on the student academics are distraction, mismanagement of time, sleep deprivation cyber-bullying, decreased attention span, plagiarism. Based on these problems, the researcher is interested in examining the relationship between social media and students' academic achievement in public universities Gombe state, Nigeria.

Purpose of the Study

The purpose of this study was to examine the relationship between social media usage and Biology students' academic achievement in public universities in Gombe State, Nigeria. Specifically, the study determined the relationship between:

1. Facebook usage and Biology students' academic achievement in public universities in Gombe State, Nigeria.
2. Twitter (x) usage and Biology students' academic achievement in public universities in Gombe State, Nigeria.
3. Social media usage (Facebook, twitter,) and Biology students' academic achievement in public universities in Gombe State, Nigeria.
- 4.

Research Questions

In order to find out the relationship between social media and students' academic achievement, this study answered the following questions:

1. What is the level of Facebook usage by Biology students in public universities in Gombe state, Nigeria?
2. What is the level of twitter (x) usage by Biology students in public universities in Gombe state, Nigeria?
- 3.

Research Hypotheses

The following research hypothesis guided this study and was tested at 0.05 alpha level of significance:

- H₀₁ There is no significant relationship between Facebook usage and Biology students' academic achievement in public universities in Gombe State, Nigeria.
- H₀₂ There is no significant relationship between Twitter(x) usage and Biology students' academic achievement in public universities in Gombe State, Nigeria.
- H₀₃ There is no significant relationship between Social media usage (Facebook, twitter,) and Biology students' academic achievement in public universities in Gombe State, Nigeria.

Methodology

The study employed a correlational research design to examine the relationship between social media use and Biology students' academic achievement in public universities in Gombe State, Nigeria. Correlational research aims to determine whether and to what extent a relationship exists between variables without implying direct cause and effect (Narejo, 2015; Siegle, 2015; Obodoeze, 1996). The focus was on 300-level Biology

Education students from Federal University Kashere and Gombe State University.

Gombe State, located in northeastern Nigeria, is the research site. The study population consisted of 671 students from the two universities, from which a sample of 399 students was selected using Morgan's formula to ensure representativeness. Data were collected using two instruments: a structured questionnaire called the Social Media and Academic Achievement Questionnaire (SMAAQ), which covered Facebook and eTwitter (X), usage, and students' academic achievement record from the 2023/2024 academic session.

The SMAAQ questionnaire included demographic information and 40 Likert-scale items measuring levels of social media use, with responses ranging from Very High to Very Low. To ensure reliability, the instrument was pilot-tested on 30 students at Modibbo Adama University, yielding a Cronbach's alpha of 0.82, indicating good internal consistency. Data were analyzed using SPSS version 21.

Descriptive statistics (mean and standard deviation) were used to answer research questions, with specific cut-off points defining levels of social media use. Inferential statistics involved linear regression analysis for hypotheses one and two and multiple regression analysis for hypothesis three, using a significance level of 0.05 to determine hypothesis acceptance or rejection.

Results and Discussion

The chapter presents data analysis, results and the findings and discussion. This was done in the sequence of the research questions and null hypotheses which were used to guide the study.

Research Question 1: What is the level of Facebook usage by Biology students in public universities in Gombe state, Nigeria?

Table 1: Mean and Standard Deviation of Level of Facebook Usage by Biology Students in Public universities in Gombe State, Nigeria

S/N	Item (n = 399)	Mean	S. D	Remark
1	Keen about having lots of friends on Facebook.	4.02	0.83	HL
2	Excessive amount of time on Facebook.	3.97	0.84	HL
3	Feeling anxious whenever I do not log into Facebook.	3.95	0.85	HL
4	Feeling obsessed with Facebook fame.	3.94	0.87	HL
5	Tired in the morning due to long hours spent on Facebook.	3.95	0.91	HL
6	Feeling depressed whenever I get comments on status update.	3.97	0.90	HL
7	Feeling depressed whenever I get fewer “likes” on my profile picture update.	3.87	0.97	HL
8	Cannot stay a day without Face booking.	3.95	0.92	HL
9	Face booking gradually taking the place of my other activities.	3.93	0.90	HL
10	Measure the level of my popularity by the number of “likes” I get on Facebook.	3.93	0.90	HL
Grand Mean		3.95	0.89	HL

The results in Table 1 show the mean and standard deviation of the level of Facebook usage by Biology students in public universities in Gombe State, Nigeria. The results indicate that Biology students in public universities in Gombe State are highly involved in Facebook usage, as evidenced by the high mean scores across all items, ranging from 3.87 to 4.02, with a grand mean of 3.95.

Research Question 2: What is the level of twitter (x) usage by Biology students in public universities in Gombe state, Nigeria?

Table 2: Mean and Standard Deviation of Level of Twitter (x) Usage by Biology Students in Public universities in Gombe State, Nigeria

S/N	Item (n = 399)	Mean	S. D	Remark
1	Learning through twitter videos is interesting.	3.90	0.90	HL
2	Watched my profile pictures on twitter.	3.89	0.93	HL
3	Feeling obsessed with twitter fame.	3.97	0.89	HL
4	Feeling depressed whenever I get fewer “likes” on my profile picture update.	3.88	0.95	HL
5	Excessive amount of time on twitter interferes with academic activities.	3.90	1.02	HL
6	Twitter aids study habit of people.	4.04	0.91	HL
7	Constantly changing picture on twitter.	3.96	0.87	HL
8	Cannot stay a day without twitting.	3.93	0.91	HL
9	Keen about having lots of friends on twitter.	3.75	0.88	HL
10	Twitting distracts one’s studies	3.73	0.93	HL
Grand Mean		3.90	0.92	HL

The result presented in Table 2 reflects the perceptions of Biology students in public universities in Gombe State, Nigeria, regarding the Twitter (x) usage.

The table, which includes responses from 399 participants, shows a series of statements related to Twitter (x) use, each rated on a scale from 1 to 5, where a higher score indicates a higher level of agreement or frequency.

The grand mean of 3.90 with a standard deviation of 0.92 suggests a relatively high level of agreement across the items. This high level of agreement is consistent across the board, with all items marked as

“HL”. Biology students find learning through Twitter (x) videos interesting (mean = 3.90), suggesting that Twitter (x) may serve as a valuable educational tool.

Testing Hypotheses

H₀₁: There is no significant relationship between Facebook usage and Biology students' academic achievement in public universities in Gombe state, Nigeria.

Table 3a: Summary of ANOVA of Linear Regression of Relationship between Facebook usage and Biology Students' Academic Achievement in Public universities in Gombe State, Nigeria.

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	5.341	1	5.341	10.219	.002 ^b
	Residual	207.507	397	.523		
	Total	212.849	398			

a. Dependent Variable: CGPA

b. Predictors: (Constant), FACEBOOK

Results of Analysis in Table 5a shows summary of ANOVA of linear regression used to test whether there is significant relationship between Facebook usage and Biology students' academic achievement in public universities in Gombe state, Nigeria. The result revealed that there is significant relationship between Facebook usage and Biology students' academic achievement in public

universities in Gombe state, Nigeria, $F_{(1, 398)} = 10.219$, $p < 0.05$. Since the p – value (0.002) is less than 0.05 alpha level, we can conclude that the null hypothesis should be rejected. This means that there is significant relationship between Facebook usage and Biology students' academic achievement in public universities in Gombe state, Nigeria.

Table 3b: Model Summary

Model	R	R Square	Adjusted Square	R Std. Error of the Estimate
1	.158 ^a	.025	.023	.72297

a. Predictors: (Constant), FACEBOOK

The result in Table 5b shows a model summary which shows how the independent variable explains the variance in the dependent variable and the strength of the relationship between the variables. The result shows that the Facebook usage explained 2.3% of the

variance in students' academic achievement. The result also shows that there is small relationship between Facebook usage and Biology students' academic achievement as indicated by the r – value of 0.158.

Table 3c: Coefficients of Beta

Model		Unstandardized Coefficients	Std. Error	Standardized Coefficients	t	Sig.
		B		Beta		
1	(Constant)	3.475	.218		15.926	.000
	FACEBOOK	-.173	.054	-.158	-3.197	.002
	K					

a. Dependent Variable: CGPA

The result in Table 5c indicates the Beta coefficient of the regression analysis of Facebook usage and Biology students' academic achievement. The result shows a beta coefficient of -0.158, $p < 0.05$. This indicates that there is low negative significant relationship between

Facebook usage and Biology Students' academic achievement.

H₀₂ There is no significant relationship between Twitter (x) usage and Biology students' academic achievement in public universities in Gombe state, Nigeria.

Table 4a: Summary of ANOVA of Linear Regression of Relationship between Twitter (x) usage and Biology Students' Academic Achievement in Public universities in Gombe State, Nigeria.

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	2.599	1	2.599	4.908	.027 ^b
	Residual	210.249	397	.530		
	Total	212.849				

a. Dependent Variable: CGPA

b. Predictors: (Constant), Twitter

The analysis of results presented in Table 6a summarize the application of linear regression in testing the presence of a significant relationship between Twitter (x) usage and Biology students' academic performance in public universities in Gombe state, Nigeria. The findings indicate a statistically significant relationship, as evidenced by the

ANOVA results $F_{(1, 397)} = 4.908$, $p < 0.05$. With a p-value of 0.027, which is below the 0.05 alpha level, reject the null hypothesis, concluding that there is indeed a significant relationship between Twitter (x) usage and Biology students' academic achievement in public universities in Gombe state, Nigeria.

Table 4b: Model Summary

Model	R	R Square	Adjusted Square	R Std. Error of the Estimate
1	.111 ^a	.012	.010	.72773

a. Predictors: (Constant), Twitter (x)

The findings displayed in Table 6b provide a model summary that illustrates the extent to which the independent variable accounts for the variability in the dependent variable and the intensity of the relationship between them. According

to the results, Twitter (x) usage accounted for 1.0% of the variance in Biology students' academic achievement. Additionally, the analysis reveals a slight relationship between Twitter (x) usage and Biology students' academic

achievement, as evidenced by the r-value of 0.111.

Table 4c: Coefficients of Beta

Model	Unstandardized Coefficients	Standardized Coefficients	T	Sig.
	B	Beta		
1	(Constant) 3.249		15.336	.000
	Twitter (x) -.117	-.111	-2.215	.027

a. Dependent Variable: CGPA

The findings presented in Table 6c demonstrate the Beta coefficient derived from the regression analysis of Twitter (x) usage and Biology students' academic achievement. The result reveals a Beta

coefficient of -0.111, with a significance level of $p < 0.27$. This suggests a weak negative relationship between Twitter (x) usage and Biology students' academic achievement.

Table 5a: Summary of ANOVA of Linear Regression of Relationship between Social Media Usage (Facebook, Twitter (x)) and Biology Students' Academic Achievement in Public universities in Gombe State, Nigeria.

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	16.487	4	4.122	8.270	.000 ^b
	Residual	196.362	394	.498		
	Total	212.849	398			

a. Dependent Variable: CGPA

b. Predictors: (Constant), Facebook, Twitter (x).

Results of Analysis in Table 9a shows summary of ANOVA of linear regression used to test whether there is significant relationship between social media (Facebook and Twitter(x) usage and students' academic achievement in public universities in Gombe state, Nigeria. The result revealed that there is significant relationship between social media usage and students' academic achievement in

public universities in Gombe state, Nigeria, $F_{(1, 398)} = 8.270$, $p < 0.05$. Since the p – value (0.000) is less than 0.05 alpha level, we can conclude that the null hypotheses should be rejected. This means that there is significant relationship between social media (Facebook and Twitter) usage and students' academic achievement in public universities in Gombe state, Nigeria.

Table 5b: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.278 ^a	.077	.068	.70596

a. Predictors: (Constant), Facebook, Twitter

The result in Table 9b shows a model summary which shows how the independent variable explains the variance in the dependent variable and the strength of the relationship between the variables. The result shows that social media (Facebook and Twitter (x)) usage

explained 6.8% of the variance in students' academic achievement. The result also shows that there is moderate relationship between social media (Facebook and Twitter(x)) usage and students' academic achievement as indicated by the r – value of 0.278.

Table 5c: Coefficients of Beta

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	3.353	.281		11.922	.000
	Facebook	-.155	.060	-.142	-2.597	.010
	Twitter(x)	-.232	.065	-.221	-3.559	.000

a. Dependent Variable: CGPA

The analysis in Table 9c displays the coefficients from a multiple regression analysis, illustrating how each variable in the model contributes to predicting academic achievement. Facebook usage is associated with a beta value of -0.142, indicating that it accounts for 14.2% of the variation in academic achievement, with a t-value of -2.597 and a p-value of 0.010. Twitter (x)usage, with a beta value of -0.221, explains 22.1% of the variance in academic achievement, with a t-value of -3.559 and a p-value of 0.000.

Summary of Findings

The summary of findings is as follows:

1. There is a significant relationship between Facebook usage and students' academic achievement in public universities in Gombe state, by r – value of 0.025.
2. There is a significant relationship between Twitter (x) usage and students' academic achievement in public universities in Gombe state by r – value of 0.017.
3. There is a significant relationship between social media (WhatsApp, YouTube, Facebook and Twitter (x)) usage and students' academic achievement in public universities in Gombe state by r – value of 0.077.

Discussing of Findings

The finding of this study revealed that, a significant and positive relationship between Facebook usage and Biology students' academic achievement in public

universities in Gombe State. As such, the posited relationship between the two constructs was rejected. Kabre and Brown (2018) agreed with this finding by reporting that Facebook has a huge impact on student's academic achievement. The researchers further reported that students have a tempting desire to connect with their friends due to easy 24 hours' access to each other's updates.

In addition, González, Gasco and Llopis (2016) stated that Facebook has some positive aspect too and it can be used as a teaching gadget. The authors further stated that in some cases, majority of researchers focused on the benefits of Facebook as a space for cooperation, teamwork, and communication. Though, on the contrary, Lau (2017) disagreed with this finding stating that Facebook harmfully affect social life and non-academic activities of students, such as lacking experience and learning of practical affairs which negatively affects the student's classroom performance.

The finding of the study also indicate a significant and positive relationship between YouTube usage and students' academic achievement in public universities in Gombe state, as such, the null hypothesis was rejected. Saadoon and Alnoori (2021) agreed with this finding stating that college students watch more content, academic or not, on the Internet than on any other media. The authors further stated that using any of

these media, especially YouTube.com in particular, is an effective way to not only enrich students, but also capture their attention and interest while increasing retention of academic. In addition, Trishu and Shutf (2019) concur with this finding stating that YouTube also provides qualitative research of Saadoon and Alnoori (2021) with the ability to view and share their own learning resources to interested people.

The finding indicated that there is relationship between Twitter (x) usage and students' academic achievement in public universities in Gombe state. This suggests that hypothesis three which stated there is no significant relationship between Twitter (x) usage and students' academic achievement in public universities in Gombe state was rejected. Carpenter and Krutka (2014) agreed with this finding highlighting that the interaction in traditional classroom is foreseeable, which may make the communication dull and less enjoyable. However, using a digital kind of a communication like using Twitter (x) in the class may boost students' motivation and willingness of the student to learn. Also, Honeycutt and Herring (2009) concur with the findings of this study stating that Twitter (x) can be effectively used for conversation, daily chatter, reporting news, sharing information of URLs (Uniform Resource Locator) as a supplement vehicle to education. The authors further stated that If learners become aware of the advantages of using Twitter (x), they can be motivated to use it in their daily lives as well. In like manner, Grosseck and Holotesco (2008) argued that the incorporation of microblog models with good pedagogy can be responsive to the student's learning needs. The authors further argued that Twitter (x) can change the classroom dynamics and acts as a useful tool to share information.

Conclusion

Social media such as Facebook, Twitter (x), YouTube and WattsApp has a significant positive relationship with Biology students' academic achievement. They are sources of information and communication among students, they have become an integral part of students everyday as they the students use it virtually every day. In addition, social media enhances the students' ability to excel in academic achievement, and deepen their learning. Finally, it helps students to join educational networks, interact with their peers, and deepen the concept of e-learning in Gombe State Universities.

Recommendations

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

1. Lecturers and university administrators should create academic-focused Facebook groups or pages where students can engage in discussions, access academic materials, and receive updates related to their courses.
2. Academic departments should utilize Twitter (X) to share important academic tips, reminders, scholarly articles, and motivational content to help students stay informed and focused on their studies.
3. Universities should develop a social media policy that promotes the responsible and educational use of platforms like Facebook, YouTube, WhatsApp, and Twitter (X) to support students' learning while minimizing distractions.

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