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INFLUENCE OF SMARTPHONE INTEGRATION ON ACADEMIC PERFORMANCE IN NIGERIAN HIGHER LEARNING INSTITUTIONS

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Abstract

The proliferation of smartphones among students in Nigeria has become a noteworthy phenomenon, particularly with the integration of mobile learning devices into higher education curricula. This research examines the impact of smartphone usage on the academic performance of higher learning students. Data was gathered from 91 students through questionnaire schedules and analyzed using descriptive statistics and logit regression.

Findings reveal that 51% of respondents are male, and 49% are female. A significant majority (89%) utilize smartphones for both social and academic purposes, with Whatsapp being the predominant social networking platform (70%). The distribution of CGPA among respondents indicates that 45% fall within the range of 2.4-3.49, while only 1% have CGPA below 2.0. Among students who use tablets for both academic and social purposes, 6% achieved a CGPA of 4.5 and above, contrasting with 1% scoring below 2.0. Notably, those who solely use tablets for academic purposes have none with a CGPA of 4.5 and above, but 33.33% within the range of 2.0-4.49.

The study identifies the significance of factors such as level of study and average time spent on studying at $p<0.05$, with primary usage being significant at $p<0.1$. Recommendations include the full integration of smartphone usage into educational curricula at post-secondary and tertiary levels to enhance academic performance. Additionally, efforts should be made to ensure the affordability and quality of smartphones. Encouraging educators to actively participate in social platforms is suggested to foster enhanced student-teacher interactions and engagements.

1.0 INTRODUCTION

1.1 Background to the Study

Smartphones, characterized by their compact size and multifunctional capabilities, transcend the conventional realm of mobile phones. Their incorporation of macro computer features, such as internet services, multimedia functions (video and audio players, camera, recorders), and office programs for document viewing and editing,

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positions them as powerful tools with diverse applications. These devices seamlessly integrate mobile phone functionality with computer features, making them indispensable for addressing users' multifaceted needs, including document handling, multimedia consumption, gaming, and internet access (Ally, 2009).

In the context of this study, the term "performance" is understood as the tangible manifestation of an individual's ideas, skills, knowledge, and capacity, with academic achievement, indicated by grades, occupying a pivotal role (Tuckman, 1975). Mobile learning, exemplified by the design of lecture notes accessible on smartphones, fosters new avenues for knowledge access and sharing. This technological shift extends beyond education, influencing various facets of art, employment, language, commerce, and learning (Ally, 2009).

1.2 Statement of Problem and Review of Literature

While technologies like smartphones are developed to enhance life, they may introduce challenges and usage biases. The prevalent use of smartphones and other mobile learning devices among tertiary institution students raises questions about the purposes for which these devices are employed and the resultant effects on academic performance. Notably, existing studies often focus on developed countries, leaving a dearth of research in developing or underdeveloped countries, particularly in Sub-Saharan Africa where smartphone usage is pervasive. This study addresses this gap by investigating the impact of smartphone usage on academic performance among tertiary learners in Nigeria.

Existing literature highlights the widespread use of mobile phones among students during lectures (Amali et al., 2012), the varied patterns of smartphone usage among college students (Nwachukwu and Onyenankeya, 2017), and the influence of smartphone usage on academic performance within specific academic faculties (Kamal et al., 2019). However, these studies often leave critical gaps unexplored. For instance, this research builds upon Amali et al.'s work by specifically focusing on smartphones, exploring their empirical effects on academic performance among tertiary learners.

Moreover, this study expands on the findings of Nwachukwu and Onyenankeya by delving into the empirical effects of smartphone usage on academic performance. Kamal et al.'s research on smartphone usage within a specific faculty is complemented by this study, which employs more robust quantitative measures to uncover the nuanced relationship between smartphone usage and academic performance across diverse academic disciplines.

The relationship between Facebook use and academic performance has been explored by Junco (2012), revealing a negative association between time spent on Facebook and overall CGPA. Mahmood's research (2014) further explores the negative relationship between Facebook addiction and academic performance. This study, extending beyond Facebook, comprehensively investigates the empirical effects of smartphone usage on academic performance among tertiary learners.

Closing the existing research gaps is not the sole motivation for this study. The findings promise practical implications for smartphone designers, manufacturers, students, teachers, university administrators, and policymakers. Designers can utilize this information to tailor mobile applications that align with students' needs. Students, in turn, can regulate and optimize their smartphone usage for improved lifestyles. The management of tertiary institutions and policymakers can leverage the outcomes to design programs that seamlessly integrate learning and communication tools.

The significance of this study lies in its multidisciplinary approach within a tertiary institution in Nigeria. The investigation aims to determine the effect of smartphone-integrated learning on academic performance among tertiary learners, with specific objectives centered on socioeconomic status, purposes and frequency of smartphone usage, academic performance levels, the relationship between smartphone usage and academic performance, and determinants of academic performance among tertiary learners.

METHODOLOGY

2.0 Study area and Data Collection.

The study was carried out in the University of Ilorin permanent site, located in Ilorin South. The university was established by the decree of the federal Military Government of Nigeria in 1975, and located in Tanke, Ilorin, Kwara State, Western Nigeria. The campus comprises of 12 faculties ranging from faculty of; Agriculture, Arts, Education, Engineering, Law, Life science, Physical science, Pharmaceutical science, Social science, Veterinary medicine, environmental science, and Management science, during the research period, with an institutional motto: "Probitas Doctrina".

This study employed a randomized sampling research design which involves random collection of data from registered students in 200 level (second year of study) and above irrespective of their faculties, using questionnaire schedules developed by the researcher which consists of 11 items and is made up of 2 sections. Section A soughts information on the socioeconomic characteristics of the students, while section B soughts information on students' smartphone usage, and academic performance. Out of 103 questionnaires administered, only 91 was utilized for this research due to nonresponse/ non return of research instrument.

2.1 Analytical Techniques.

The data collected were analyzed with the use of descriptive statistics ranging from mean, percentage, frequencies etc., to profile the socioeconomic and demographic characteristics of students while Logit regression analysis was used to analyse the determinants of academic performance among students. **a. Academic performance.**

The CGPA as classified by the University academic council is used in the following order; 4.50-5.0 =First-class; 3.50-4.49 =Second class upper, 2.40-3.49 =Second class lower; 1.50-2.39 =Pass; 1.0-1.49 =Certificate of attendance; 0.0- 1.0 =Failed/expulsion.

b. Determinants of academic performance.

i. Logistic Regression Model.

Logistic regression model was used to explore the factors that determines academic performance. The model is suitable where prediction of the presence or absence of an outcome based on values of a set of predictor variables is needed. This model is similar to a linear regression model but it is suited to models where the dependent variable is dichotomous.

If Yi is the random variable (dichotomous), it can then be assumed that Yi takes on the values 0 or 1, where 0 denotes the non-occurrence of the event in question and 1 denotes the occurrence. If X1,....., Xn are characteristics to be related to occurrence of this outcome, then the logistic model specifies that the conditional probability of event (i.e., that Y = 1) given the values of X,.....Xn as follows:

$$p(y) = \beta_0 + \sum_{i=1}^{k} \beta_i x_i + \varepsilon_i$$

Y = Unity if passed (CGPA ≥2.4), Y = Null if failed (CGPA<2.4).

Where: B_0 =Intercept, B_i =Slope, E_i =Error term, X_1=Gender (Dummy, Male=1, Female=0), X_2 =Age in years, X_3 =Academic level, X_4 = Intensity of Facebook Usage, X_5= average time spent socializing on smartphone (Hours), X_6= Average time spent studying on smartphone (Hours), X_7=Primary usage (Dummy; Single purpose=1, Both Purposes=2).

CHAPTER THREE 3.0. RESULTS AND DISCUSSIONS 3.1. Socioeconomic characteristics

The result on the socioeconomic characteristics of the respondents shows that about 51% are male while 49% are female, and most (60%) of the respondents falls between the age range of 20 -25 years while only about 1% of the respondents are above 28 years. Also, most (95%) of the respondents are single.

Table 1: Gender distribution of the respondents

Gender	Frequency	Percent
Male	46	50.55
Female	45	49.45
Total	91	100.0
Age		
<19	25	27.47
20-23	55	60.44
24-27	10	10.44
>28	1	1.10
Mean	21	
Min	16	
Max	30	
Total	91	100.0
Marital Status Single		
	87	95.60
Married	4	4.40
Total	91	100.0

Source: Analysis of field survey data

3.2.1. Purpose of smartphone usage

The result on tablet usage purpose among the respondents presented in table 2 shows that, most of the respondents (89%) used smartphone for both social and academic purposes while only about 1% solely used it mainly for social purposes.

Table 2: Showing the purpose of smartphone usage by respondents

PURPOSES	FREQUENCY	PERCENT
Social Purpose	1	1.10
Academic	9	9.89
Both	81	89.01
Total	91	100.0

Source: Analysis of field survey data

3.2.2. Social networking frequency

The result on smartphone usage for nonacademic purposes among respondents is presented in table 3, where Whatsapp was found to be the most used of the social networking platforms (70%) while about 6.67% uses Twitter extremely often. This might be due to the interactive, economic and flexibility of whatsapp relative to other available social networking platforms.

Table 3: Distribution of smartphone usage for social networking.

Usage frequency SNS	EO %	O %	R %	N %	Total %
Facebook	10.00	55.55	25.56	8.89	100.00
Twitter	6.67	16.67	26.67	43.33	100.00
Instagram	12.09	60.44	14.29	13.19	100.00
Whatsapp	70.33	29.67	0.00	0.00	100.00

Source: Analysis of field survey data

KEY: **SNS**: Social networking site; **VO**- Very often, **O**- Often, **R**- Rarely, **N-** Never.

3.2.3. Average duration spent daily on smartphone usage

The result on the daily average duration spent on smartphones shows that most (41%) of the respondents spent about 3-5 hours daily on social networking, while that most (41.76%) of the respondents spends about 1-3 hours on daily study. This is also in line with the findings of Charles Nwachukwu & Kevin Onyenankeya (2017). **Table 4: Showing average duration spent on daily tablet usage.**

Purposes Durations	Social Networking			
	Frequency	Percentage	Study Frequency	Percentage
<1 hours	8	8.79	14	15.38
1-3 hours	32	35.16	38	41.76
3-5 hours	37	40.66	28	30.77
>5 hours	14	15.38	6	6.59
Total	91	100	91	100

Source: Analysis of field survey data

3.3. Average CGPA of the respondents

The result on the distribution of the average CGPA among the respondents is shown in table 5. The table shows that, most of the respondents (45%) has CGPA ranging between 2.4-3.49, while only about 6% has CGPA above 4.49.

Table 5: Showing average CGPA of the respondents.

CGPA	FREQUENCY	PERCENT
<2.0	1	1.10
2.0-2.39	16	17.58
2.4 - 3.49	41	45.05
3.5-4.49	28	30.77
>4.49	5	5.49
Total	91	100.0

Source: Analysis of field survey data

3.4. Relationship between purposes of smartphone usage and academic performance

The result on tablet usage purpose- CGPA relationship distribution analysis of the respondents is presented in table 6. The result shows that, about 6% of the 81 students (89%) who use tablet for both academic and social purposes has CGPA of 4.5 and above while only about 1% has CGPA below 2.0 while in the case of those who utilize their tablets solely for academic purposes, none has CGPA of 4.5 and above but about 33.33% has CGPA of 2.0-4.49. Controlled/disciplined usage of tablet for social/ nonacademic purposes while using it for academic

purposes help users to maximize smartphone usage and also helps to prevent/reduce boredom which in this case might be detrimental to students' academic performance.

Table 6: Showing purposes of tablet usage- CGPA relationship distribution of the respondents.

PURPOSES	<2.0		2.0-2.39		2.4 - 3.49		3.5-4.49		>4.5		Total	
	Freq	Perc	Freq.	Perc	Freq	Perc	Freq	Perc	Freq	Perc	Freq	Perc
Academic	0	0.00	3	3.33	3	33.33	3	33.33	0	0.00	9	100.00
Social	0	0.00	0	0.00	1	100	0	0.00	0	0.00	1	100.00
Both	1	1.23	13	16.0	37	45.68	5	30.86	5	6.17	81	100.00
Total	1	1.0	16	17.58	41	45.05	28	30.77	5	5.49	91	0.00

Source: Analysis of field survey data.

3.5. Determinants of academic performance.

The table below shows the result of the analysis on determinants of academic performance among smartphone users. The logit regression model estimate revealed that out of the 7 factors hypothesized to influence students' academic performance, three variables were statistically significant and found important in explaining features determining academic performance from smartphone usage.

The coefficient of academic level is 0.0862779 and positive. This implies that a yearly increase in academic level has a likelihood of increasing students CGPA by 0.086. This is likely due to the fact that students are able to improve on their academic performance over time when they become adapted to their environment, lecturers and their course of study compared to otherwise, while the coefficient of average time spent on daily study is 0.0794481. This implies that an hourly increase in time spent on studying, using tablet has a likelihood of increasing students CGPA by 0.079.

Also, the coefficient of primary usage purpose is 0.1704466 with duo (both for academic and social purpose) usage as the reference point. This implies that usage of tablet for both academic and social purposes has a likelihood of increasing students CGPA by 0.17 compared to sole usage for either academic or social purposes.

Table 7: Determinants of academic performance among the respondents.

$LR\ chi^2(10) = 19.41$

$Prob > chi^2 = 0.1667$

$Pseudo\ R^2 = 0.1199$

VARIABLES	Dy/dx	Standard Error	P –values (P > t)
Gender |	-0.0377594	0.0823534	0.647
Age	0.0071328	0.0198589	0.719
Study level	0.0862779	0.0476894	0.070**
Facebook	-0.0320709	0.0357419	0.370
Average time spent on social	-0.0057134	0.0358642	0.873
Average time spent on studying	0.0794481	0.0403971	0.049**
Primary usage purpose	0.1704466	0.1141874	0.136*

Source: Analysis of field survey data ***1%, **5%, *10%.

CHAPTER FOUR 4.0. CONCLUSION AND RECOMMENDATIONS

This study investigates the effect of smartphone incorporated learning on academic performance among tertiary learners. It is revealed that about 51% of the randomly selected respondents are males while 49% are females, and most of the respondents are Single (95%). Most of the respondents (89%) uses smartphone for both social and Academic purposes while only about 1% solely uses it social purposes. Whatsapp was found to be the most used of the social networking platforms as about 70% of the students uses whatsapp extremely while about 6.67% extremely uses Twitter. Most of the respondents (45%) has CGPA ranging between 2.4-3.49, while only about 1% has CGPA below 2.0.

Also, about 6% of the 81 students (89%) who use tablet for both academic and social purposes has CGPA of 4.5 and above while only about 1% has CGPA below 2.0 while in the case of those who utilize their tablets solely for academic purposes, none has CGPA of 4.5 and above but about 33.33% has CGPA of 2.0-4.49. finally, smartphone primary usage purpose, in addition to level of study, and time spent on studying using smartphones have a positively significant effect on students' academic performance at ($p<0.1$), ($p<0.05$), and ($p<0.05$) respectively.

Consequently, this study hereby recommends that the use of smartphone should be fully incorporated into the educational curriculum into tertiary education curriculum in order to ease students' learning while enhancing academic performance. Also, seeing that smartphones are important mobile learning devices, they should be made readily available at affordable prices without compromising the quality. In order to optimise the social/academic usage purposes, teachers/lecturers should be encouraged to be active on social platforms by interacting with the students on social network platforms, for instance creating a function group on where views/ideas about subjects of concern can be discussed/exchanged especially during off school or scheduled hours. This will in turn ensure a more productive use of Social networks to improve students' academic performance. Well updated course materials/ study packs should be incorporated into the tablets in readable formats. This will reduce the time and other valuable resources e.g. cost of data subscription spent on searching for academic information seeking online. It is thus expedient for students to be informed via talks, forums and periodic orientation/programmes on the importance of time management through self-discipline while using the various social networking sites since some of them may become so much excessively engrossed in the process at the expense of study/learning time.

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