Journal of Education and Practice
ISSN 2222-1735 (Paper) ISSN 2222-288X (Online)
Vol.14, No.30, 2023

Smartphone Incorporated Learning and Its Effects on Academic Performance Among Tertiary Learners: Evidence from University of Ilorin Students

Popoola David Prince
School of Postgraduate Education, National Open University, Nigeria

Abstract
The usage of Smartphone among students is an emerging trend in Nigeria as higher institutions now incorporates mobile learning devices into their curriculum. This study sets to investigate the effects of smartphones usage on academic performance among higher learning students, using data obtained from 91 students via questionnaire schedules, and analysed using descriptive statistics and logit regression. About 51% of the respondents are males while 49% are females. Also, most of the respondents (89%) used smartphone for both social and academic purposes, and Whatsapp was the most (70%) used of the social networking platforms. Most of the respondents (45%) has CGPA ranging between 2.4-3.49, while only about 1% has CGPA below 2.0. 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 and in the case of those who utilised 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. Level of study, and average time spent on studying, are both significant at ($p<0.05$), while Primary usage was found to be significant at ($p<0.1$). It was recommended that smartphone usage should be fully incorporated into the educational curriculum in post-secondary and tertiary institution, for enhanced academic performance besides making them readily available at affordable prices at good quality. Educators should be encouraged to be active on social platforms in to enhance students-teacher interactions/engagements.
Keywords: Smartphones, Multimedia, Academic performance, Tertiary learners, University of Ilorin.
DOI: 10.7176/JEP/14-30-01
Publication date: October 31st 2023

CHAPTER ONE
1.0 INTRODUCTION
1.1 Background to the Study
Smartphones with their mini keyboards are not mere mobile phones, they are usually manufactured with some macro computer features such as internet enabled services and features; multimedia features such as video and audio players, camera, recorders, and office programs for reading and editing documents alongside other communication services. The multimedia phone features such as camera, video, sound recordings are advanced and can compete with specialized equipments.

Smartphones are customisable with new user's choice softwares, and the variety of these programs is increasing, while the social communication platforms (like Facebook, Twitter, Instagram, Whatsapp, GPS, etc.) functions are especially popular. They integrates the functionality of a mobile phone with other computer features usually of portable – intermediate sizes, making them important devices that are no doubt capable of meeting users' multifaceted needs with their features such as document viewer/editor, multimedia, gaming, and internet features, amongst other needs to influence users' performances/productivity.

According to Tuckman (1975), performance is the obvious expression or demonstration of sympathy, ideas, skills and knowledge, capacity etc., of a person while attained grade usually indicates the performance of a student. Hence, student's academic performance are given more emphasis in this study.

Mobile learning creates new ways of accessing and sharing knowledge for aexample, designing lecture notes to be viewed by the students on their mobile phone in preparedness for school lectures. Looking at the wider context of mobile learning, mobile and are responsible for the new forms of art, employment, language, commerce as well as learning, and they are part of every transformation of discourses and knowledge (Ally, 2009).

1.2 Statement of problem and Review of literature
Technologies are developed to ease life but may however not be always without any predicament(s), and usage bias(es). The use of Smartphone and other mobile learning devices among students of tertiary institutions is becoming widespread and not much has been done so far to investigate the purpose or purposes for which these devices were used and the effect that their usage imposes on the academic performance of the student users.

Furthermore, most of the existing studies and researches focused on tertiary institutions in the developed countries while little of such studies has been conducted in developing/ underdeveloped countries to investigate

the effect of smartphone devices in enhancing students' academic performance in tertiary institutions. Little attention has been paid to Sub-Sahara African universities where smartphones are widely accepted as its usage is becoming increasingly widespread among students. Hence, this study aims to investigate the effect of smartphone usage on the educational status among tertiary learners.

Regarding some existing related works, Amali et al., (2012) in their work titled; A Survey of University of Ilorin Students' use of mobile phone in lecture rooms and its implications in education development using questionnaire data obtained from 378 students of University and analysed using arithmetic mean rating and chi-square. The finding revealed that students are in the habit of using mobile phones for various purposes during lectures and that gender is insignificant in the usage of mobile phone during lecture hours. The study magnified the educational implications of using mobile phones during lectures and suggests ways forward. To close existing gaps, this research instead focused on smartphones (multimedia enabled device) usage, and went further to explore its empirical effect on academic performance among the tertiary learners.

In a research by Charles Nwachukwu and Kevin Onyenankeya (2017) titled; use of Smartphones among college students in Nigeria: revelations and reflections, using data obtained from 55 respondents completed via a self-administered questionnaire. The results showed that 38.2 percent of students spent between 1-5 hours per day on their phones. About 75% used their smartphones for social networking. Only 24% of students engaged their smartphones for academic activities. To close existing research gaps, this research instead went further to explore the empirical effect of smartphone usage on academic performance among students.

In a research conducted by Kamal et al., (2019) on; Influence of smartphone usage on academic performance of students in the Faculty of Communication and Information Sciences, University of Ilorin, Ilorin, Nigeria, using questionnaire for data collection. Results showed that 68.4% of the respondents used smartphones, 88.4% agreed that the use of smartphone enhanced academic performance, 76.4% indicated that smartphone usage lead to fatigue and sleeplessness. This research instead went further to explore the empirical effect of smartphone usage on academic performance among students using more robust quantitative measures to unravel the actual state.

The relationship between Facebook use and grades was examined in a large sample by Junco 2012, and reveals that unlike previous research, his study used university records to collect CGPA data. Time spent on Facebook was negatively related to overall CGPA. Time on Facebook was also negatively related to time spent preparing for class. Some Facebook activities were positively and some negatively related to outcomes. This research instead went further to explore the empirical effect of smartphone usage on academic performance among students.

According to U. F. Mahmood (2014), in a research data analysed using, Extroversion, neuroticism and openness to experiences are all positively correlated to FBA (Facebook Addiction). Also, there was negative relationship between FBA and Academic performance. This research instead went further to explore the empirical effect of smartphone usage on academic performance among tertiary learners.

Aside closing the existing research gaps, this research work is worth embarking upon as the findings will be useful to both smartphone designers/manufacturers, students and teachers as well as the university management, administrators, and policy makers. The smartphone designers could use this information to design better mobile applications targeting students' needs and expectations. The students can easily apply the findings of this study in regulating, controlling and improving their daily smartphone usage for optimized lifestyles. The management of tertiary institutions, and policy makers will also find the outcomes of this study imperative in designing relevant programmes that resolutely integrates incorporated learning and communication tools.

The significance and relevance of the present study is that it was conducted in a multidisciplinary tertiary institution located within our society for the purpose of investigating the use of smartphone devices in relation to academic performances among tertiary learners, with a general objective of determining the effect of smartphone incorporated learning on academic performance among tertiary learners and specific objectives includes to; summarise their socioeconomic status, explore the purposes and frequency of smartphone usage, determine their academic performance levels, compute the relationship between smartphone usage and academic performance, and analyse the determinants of academic performance tertiary learners.

CHAPTER TWO
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	Social Networking		Study	
Durations	**Frequency**	**Percentage**	**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.

REFERENCES

Ally, M. (2009). Mobile Learning. Canada. AU Press, Athabasca University.

Amali, I.O.O., Bello, M.B, and Hassan, I. (2012), A Survey of University of Ilorin Students' Use of Mobile Phone in Lecture rooms and its Implications in Education for Nigeria Development. *Journal of Education and Practice* www.iiste.org ISSN 2222-1735 (Paper) ISSN 2222-288X (Online) 3(10). Pp1.

H. P. Tuckman, "Teacher effectiveness and student performance," *The Journal of Economic Education,* vol. 7, pp. 34-39, 1975.

Kamal, T.O., Abdulrasaq, A., Ahmed, U.A., Hajarat, A., and Kabir, A,S., (2019). Influence of smartphone usage on academic performance of students in the Faculty of Communication and Information Sciences, University of Ilorin, Ilorin, Nigeria. *Journal of Library Services and Technologies* 1(2), 83 - 98 ISSN: 2616-1354.

Nwachukwu and Kevin Onyenankeya (2017). Use of Smartphones among College Students in Nigeria: Revelations and Reflections. *Journal of Communication.* 8(2): 171-182. DOI: 10.1080/0976691X.2017.1396007.

R. Junco, "Too much face and not enough books: The relationship between multiple indices of Facebook use and academic performance*," Computers in Human Behavior*, vol. 28, pp. 187-198, 2012.

U. F. Mahmood, "Facebook Addiction: A Study of Big-Five Factors and Academic Performance amongst Students of IUB," *Global Journal of Management and Business Research*, vol. 14, 2014.