

IMPACT OF SMART PHONE USAGE ON ACADEMIC PERFORMANCE OF BIOLOGY STUDENTS IN FEDERAL COLLEGE OF EDUCATION, ZARIA, KADUNA STATE

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Abstract

This study examined the impact of smart phone usage on academic performance of biology students in Federal College of Education, Zaria, Kaduna State. The study sought to identify the purposes for which Biology students use smart phones as it relates to their academics and how such usage affects their academic performance. The study was guided by research questions and two hypotheses. A descriptive survey design was utilized in the study. Population for the study was 3,744 NCE student of the department of Biology, from which 360 NCE II students were selected using Taro and Yemane (1967) sampling method. Data was collected using a self-structured questionnaire entitled Use of Smart Phone and Academic Performance Questionnaire (SPUSAPQ). The data collected was analysed using frequency and percentages for the research questions, while Chi-square (X^2) was used to test the hypotheses. Findings revealed that most of Biology students own smart-phone which they use for different reasons, academic purposes inclusive. In addition, smart phone exerts some influence on academic performance of biology students, which could be positive or negative, depending on usage. Recommendations were proffered which include since social networks provide a better and convenient platform for a library to reach out to its users with much ease, and the college academic board might need to consider smart phone devices as a possible learning tool in the course of developing academic content. This research concludes that should start considering users of mobile phone when developing academic programs since these devices are proven to be effective academic tool.

Keywords: *Academic performance, Biology, Student, Smart phone*

Introduction

For over four decades, technologies have continuously influenced the educational sector through innovations and concepts that improve the teaching and learning enterprise. As such, technology is fast becoming an inevitable part of life in the 21st century. Karpinski, Kirschner, Ozer, Mellott and Ochwo (2013) and Masiu&Chukwuere (2018) assert that information and communication technologies (ICTs) have improved interactions in teaching and learning skills by providing mechanisms of communication which fosters teamwork, collaboration, and interpersonal skills development. Smart phones had recently been added to the list of devices in information and communication technology. Mobile devices such as smart-phone have proven to possess increasing value to education than just their operational function to students. With their growing computing strength, smart phone now present a huge medium for engaging learners within and without school environments (West, 2013). From a vantage point, smart phone provide students with a vast prospect of extending their contact with academic content beyond the conventional

learning environment. Overall, many educational-related applications are being produced annually, thereby providing smart-phones with the ability to access, retrieve and open nearly all the formats of information through Wi-Fi networks and the internet (Lundquist, Lefebvre & Garramone, 2014). It is therefore rational to expect that having a smart-phone is a key step towards having knowledge and educational resources readily available at one's finger tips, a concept known as e-learning.

Literature Review

Chukwuere, Mavetera & Mnkandla, (2016) noted that e-learning is a learning experience that poses no restriction, developed to augment tutor-student interaction, as well as delivery of effective teaching and learning contents across various platforms, such as smart phones, tablets, iphones, amongst others. The e-learning platform enhances self-development and efficient learning processes that enable students access to premium learning contents (Hussin, Manap, Amir & Krish, 2012; Kuznekoff & Titsworth, 2013). Boruff & Storie (2014) observed that although the system can sometimes be difficult to navigate and use, the acceptance of smart phones in classrooms could enhance students contact with e-learning materials and prospects therein. According to Siew, Nor, Nor & Nur (2017), it is still unclear on the possible effect of mobile devices on tertiary education and their impact on lifelong learning opportunities, as this is an evolving field of study. However, it is not strange that educationists are advocating the use of mobile devices such as smart-phone in education, given their affordability, popularity and realistic functions (Ismail, Bokhare, Azizan, & Azman, 2013; Pullen, Swabey, Abadoo, & Sing, 2015). The ease of use and flexibility, especially through apps, are considered the real reasons why smart phone is appealing for learning. It reduces the intrinsic obstacles in conventional processes or activities that are carried out in schools and universities (Valk, Rashid, & Elder, 2010).

The position of mobile technologies and smart phone in effective education must not be cast aside. Smart phone and other media have enabled academic learning to be innovative in advancing and enhancing the skills and expertise needed for the 21st century (Tikoria & Agariya, 2017; Emerson & Berge, 2018). Students now have experiences of digital surroundings in a concrete and individual manner, which is mostly possible through mobile devices including smart phones and tablets (Cano, 2012). As student use smart phones through connection to the internet, collaborative learning is further improved (Mokoena, 2012). It is therefore logical to assert that the use of smart phones could be a driving force for students to be more engaged in learner-centered participatory learning. There are numerous benefits that smart phones pose to the students: advancement of students understanding through increased academic performance, better social media participation and sharing of information; enhancement of students' social skills as it opens them to opportunities to seek academic support and assistance (Mokoena, 2012).

The high level of smart phone addiction proves that it could affect students' academic performance (Kibona & Mgaya, 2015). This obsession draws concerns as to whether the use of smart phones impedes or promotes students' performance generally. Chukwuere, Mbukanma & Enwereji (2017) opined that the innovation of mobile devices technology flourished with the pursuit for more knowledge. This in turn heightened the quest for information among tertiary education students. For instance, the challenges of communication with students in lecture are addressed with the use of smart phones (Kinsella, 2009). In tandem with this assertion, Mokoena (2012) observed that group work and assignment given to the students by their lecturers are seamlessly and expediently carried out with the help of smart phones. It follows that students are now able to record lecture sessions and class teachings in real time, after which they could listen

to repeatedly. This recording is achievable by the sophisticated features available on smart phones. From diverse viewpoints, it is no wonder that people accept the use of smart phones not just a communication tool (for calls and text messages), but a tool for the social and work lives of individuals, and a potential tool in their academic lives (Cano, 2012).

However, Sarwar & Soomro (2013) stated that the use of smart-phone by students could affect their academic performance negatively. These may include spending much on their smart-phones for non-academic purposes. Nevertheless, it is unclear whether such findings applies to Nigeria as well, particularly considering the fact that most of the students enrolled in Nigeria's tertiary institution are matured as they are aged 18 and above. Masiu & Chukwuere (2018) opined that there is need to plan when to use and when not to use smart phones, so as not to distract a student from the entirety of a learning process. They further stated that smart phones have operational multimedia features, which include camera function, sound recording function, and video function, among others. These features aid students in driving their learning process and academic ideas effectively and efficiently. Since it is palpable that there might be some positive and negative consequence of using smart phones, the question thus is: which outweighed the other from a student's perspective? It is in light of the foregoing that this research was undertaken, to investigate the purpose and impact for which tertiary education biology students of Federal College of Education, Zaria use smart-phones.

Statement of the Problem

All over the world, smart phones usage among tertiary education students has experienced a tremendous increase in recent times. Institutions of higher learning therefore need to develop strategies that support students' smart phone use to create a more independent learning environment. Various studies (Mokoena, 2012; West, 2013; Pullen, Swabey, Abadoo, & Sing, 2015; Siew, Nor, Nor & Nur, 2017; Masiu, & Chukwuere, 2018) have been carried out to explore the use of mobile devices. Most of the available researches reported on the benefits and limitations of smart phones, as such there is insufficient pragmatic evidence to support their claims (Chukwuere, Mbukanma & Enwereji, 2017).

Despite the fact that there are evidences supporting students' use of smart phones in tertiary institutions, there are limited studies on how smart phones use have supported learning activities and how it relates to students' academic performance. This study considered the amount of time tertiary education students use smart phones and how it influences their academic performance. Understanding this connection may provide valid insights whether smart-phone use have indeed supported increased prospects to students' learning and whether their academic performance is affected. This study seeks to answer this question so as to determine the influence of smart phone devices usage on academic performance of Biology students in Federal College of Education, Zaria.

Objectives of the Study

The objectives of the study are to:

- i. identify the extent of use of smart-phone among Biology students of F. C. E, Zaria.
- ii. determine the positive influence of smart phone usage on the academic performance of Biology students of F. C. E, Zaria.
- iii. determine the negative influence of smart phone usage on the academic performance of Biology students of F. C. E, Zaria.

Hypotheses

HO₁: There is no significant positive influence between use of smart phone and students' academic performance in biology in F. C. E, Zaria.

HO₂: There is no significant negative influence between use of smart phone and students' academic performance in biology in F. C. E, Zaria.

Methodology and Materials

Research Design

Descriptive survey design was adopted as the research design for the study. This design was adopted because it enables the researcher to generate data through the standardized collection methods, which is based on variables that are related, study concepts that are well defined and research instrument(s) that are well structured.

Population of the Study

The population of the study was all the full-time NCE biology students in Federal College of Education, Zaria, in 2018/2019 academic session. The total population comprised 3,744 NCE biology students (Academic office FCE, Zaria 2019).

Table 1: Population of the Study

S/N	Name of school	No of Students
1	NCE I	1075
2	NCE II	1703
3	NCE III	966
TOTAL		3,744

Source: Academic office FCE, Zaria 2019

Sample and Sampling Technique

A total of 360 NCE Biology students were purposively selected from the research population as research sample, using Taro and Yemanne (1967) formula. The sample also represents 9.61% of the total research population. The formula is given as:

$$n = \frac{N}{1 + N(e^2)}$$

where n represents sample size, N is the population size, 1 is constant and e is the degree of error expected which is equal to (0.5). For this study, application of the formula is:

$$n = \frac{3744}{1 + N(e^2)}$$

$$N = \frac{3744}{1 + 3744(0.05^2)}$$

$$n = \frac{3744}{1 + 3744(0.0025)}$$

$$n = 361.39 \approx 360$$

Instrumentation

The instrument was a self-structured questionnaire titled “*Smart Phone Usage and Students Academic Performance Questionnaire (SPUSAPQ)*” was used to elicit the required information from the students. The questionnaire was divided into four sections (A, B, C and D). Section A comprised of bio-demographic information of respondents, while Section B-D contained questions in relation to the research. The options are on 4-Likert scale, from Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD).

Reliability of the Instrument

A pilot sample was administered to 50 Pre-NCE students in the department of Biology. The pilot respondents were part of the research population. Split-half test using two halves of odd and even number items was used to determine the reliability of the research instrument. The instrument's reliability was calculated using Pearson Product Moment Correlation Coefficient. A co-efficient value of 0.76 was obtained. This indicates that the research instrument was reliable; as such, it was adopted for the study.

Procedure for Data Collection

The researcher personally administered the questionnaire to the respondents. Three hundred and sixty copies of the questionnaire were distributed to obtain responses from the students and were retrieved immediately.

Procedure for Data Analysis

The responses from the research instrument were analyzed thus: descriptive statistics of frequency distribution and percentage was used to analyze the research questions, while Chi-square (X^2) inferential statistics was used to test the hypotheses. All hypotheses were tested at 0.05 level of significance.

Results and Discussion

Table 2: Demographic characteristics of Respondents

Variable	Response	Percentage (%)
NCE I	140	38.89
NCE II	120	33.33
NCE III	100	27.78
Total	360	100

Source: Field Survey, 2019

Result from the Table two above shows that 38.89% of the respondents are NCE I students, 33.33% are NCE II, while 27.78% are NCE III students. From the table, majority of the students are NCE I who have left home for school with a means of communication, most likely a mobile/smart phone.

Table 3 examines the extent of smart-phone among biology students of Federal College of Education, Zaria.

Table 3: Extent of Use of Use of Smart Phone by Biology Students

Variable	Response	Percentage (%)
Very frequent	180	50
Frequent	140	38.99
Less frequent	30	8.33
Rare/Never	10	2.78
Total	360	100

Source: Field Survey, 2019

Results from table 3 indicate that over 80% of the respondents use their smart phone frequently. The reasons for their frequent usage may include, but not limited to academic purposes alone.

Table 4 examined the positive influence of smart phone usage on the academic performance of biology students

Table 4: Positive influence of Smart Phone on Students' Academic Performance

S/N	Item Statement	SA	A	D	SD	Total
1	The use of Wikipedia for research has helped improve my grades.	145 40.28	155 43.05	35 9.72	25 6.94	360 100%
2	I engage in academic forums on whatsapp and email to enhance my rate of understanding.	139 38.61	167 43.39	31 8.61	23 6.39	360 100%
3	I utilize information gotten from internet sites to supplement class lessons.	130 36.11	125 34.72	67 18.61	38 10.56	360 100%
4	I may not perform well in my academics even if I stop using social media.	85 23.61	120 33.33	92 25.56	63 17.50	360 100%

Source: Field Survey, 2019

Table 4 indicates that 40.28% of the respondents Strongly Agreed that Wikipedia has helped improved their grades, 43.05% agreed, 9.72% disagreed while 6.94% strongly disagreed. 38.61% strongly agreed to using their whatsapp and email for academic purposes 43.39% agreed. On using materials gotten from the internet to supplement their class lessons, 36.11% strongly agreed while 34.72% agreed. From the above table, majority of respondents agreed that smart phone usage could significantly influence students' academic performance. The significance of these scores will be subjected to chi-square statistical analysis.

Table 5: Chi-square Analysis on Positive Influence of Smart Phone Use on Students Academic Performance

Variables	N	Df	Ls	Crit. value	X ² Calc value	X ² Decision
Biology students positive smart phone usage	360	358	0.05	5.91	121.91	Rejected

Table 5 indicates that the chi-square calculated value is 121.91, and is greater than the chi-square critical value of 5.91. Therefore, the null hypothesis which states that there is no significant positive influence between use of smart phone devices and students academic performance in biology is hereby rejected. This mean that students' addictiveness to their smart phones could significantly influence their academic performance.

The finding revealed that student activities and addictiveness to their smart phone has a significant positive influence on their academic performance. Indeed, the social media have become a major part of the students' lives in recent times and smart phone device makes this possible. This finding agrees with the report of West (2013), who stated that the positive contributions of smart-phones towards students enables them to obtain academic aid and succor. The finding concurs with the finding of Ebiye (2015), who suggests that smart phone usage improves access to learning materials. The finding agrees with the report of Chukwuere, Mavetera and Mnkandla, (2016) who argued that the use of the internet is now a daily routine for people and a medium used by the students to search for information conveniently and comfortably.

Table 6 examines the negative influence of smart phone usage on the academic performance of biology students, below presenting the table

Table 6: Negative influence of Smart Phone on Students' Academic Performance

S/N	Item Statement	SA	A	D	SD	Total
5	With my phone, I sometimes indulge in extracurricular activities more than my studies	125 34.73	165 45.83	45 12.50	25 6.94	360 100%
6	I sometimes engage in adult content viewing with my phone	64 17.78	92 25.56	121 33.61	83 23.05	360 100%
7	Games and chatting/social networks affect my study time	145 40.28	87 24.17	80 22.22	48 13.33	360 100%
8	I prefer chatting than studying with my phone	135 37.50	40 11.11	158 43.89	27 7.50	360 100%

Source: Field Survey, 2019

Table 6 shows that most of the respondents 469 (32.56%) strongly agree that they at times indulge in extracurricular activities more than studying with their phones, engage in adult content viewing, allow game and chatting to affect their study time and prefer chatting than studying with

their phone. 384 (26.67%) Agreed, 404 (28.05%) Disagree, while 183 (12.70%) Strongly Disagree. This shows a significant negative influence of smart phone devices on their academic performance of the students. This however will be subjected to chi-square statistical analysis in the related hypothesis.

Table 7: Chi-square Analysis on Negative Influence of Use of Smart Phone on Academic Performance of Students

Variables	N	Df	Ls	Crit. value	X2	Calc value	X2	Decision
Biology students negative smart phone usage.	360	358	0.05	5.96		177.43		Rejected

Table 7 showed that the chi-square calculated value of 177.43 is higher than the chi-square critical value of 5.96. Thus, the null hypothesis which states that there is no significant negative influence on use of smart phone devices and students' academic performance in biology is hereby rejected. This insinuate that biology student's exposure to negative activities on the internet through their smart phone could have negative significant influence on their academic performance. This reveals that student's exposure to the internet and social media has significant negative influence on their academic performance. As such, negative use of the internet could influence students' academic performance negatively. This result corroborates with the report of Lundquist, Lefebvre & Garramone, (2014) who opined that nowadays, students are so absorbed with the social media that they are spend more time online at the detriment of their studies. It also corresponds with the findings of Abu-Shanab & Haddad (2015) and Kibona & Mgaya (2015), who noted that the incessant use of smart phones could be obsessive and counterproductive. The times that should be directed at studying, research and discoveries have been thwarted by the zest for chatting and social networking. Hence, most students' academics suffer setback because of distraction from the social media.

Conclusion

This study has shown that the mainstream of the students possess and use mobile phones for their educational exercises. The high rate of smart phone acceptance and usage by students for their academic activities makes it perceptible that tertiary institutions have a prospect awaiting its utilization. This opportunity demands the institutions to evolve ideas that will help exploit mobile phones for academic purposes, bearing in mind that students are pleased with their ability to perform academic activities through their phones. Thus, tertiary institutions should start considering users of mobile phone when developing academic programs since these devices are proven to be effective academic tool.

Recommendations

Smart devices are identical to social networking. As such, its availability at the Federal College of Education, Zaria affords the institution an opportunity to reform its reference services.

- i. Since social networking provides an enhanced and suitable platform for library to get in touch students with much ease, it is therefore, recommended that the library take cognizance of this prospect.

- ii. Institutions of learning should also put in place policies that can restrain students from utilizing non-academic sites and applications while attending lectures. Network jammers that restrict internet usage could be placed in some lecture halls and switched on during classes.
- iii. Since the development of a digital collection is on course by the College library, it is recommended that the developers enshrine smart phone devices in their plans. Since students access, read and utilise study materials and other online documents through their mobile devices, they would love to access the library's digital collection at their finger tips also.
- iv. The college academic board might need to consider smart phone devices as a possible learning tool in the course of developing academic content. Since the results of this research showed a high rate of smart phone usage for academic purpose, it becomes imperative for the developers of academic content to create contents that are attuned to most mobile phone operating system. The college could offer multiple services to students through their phones that are in sync with the internet.
- v. The management of the Federal College of Education, Zaria through its Computer Science Department and the Management information System (MIS) should develop college applications that are tailored to meet the peculiarities and academic needs of students of the college.

References

Abu-Shanab, E. & Haddad, E. (2015). The Influence of Smart Phones on Human Health and Behaviour: Jordanians Perceptions. *International Journal of Computer Networks and Applications*, 2(2), 52-56.

Boruff, J.T. & Storie, D. (2014). Mobile devices in medicine: a survey of how medical students, residents, and faculty use smartphones and other mobile devices to find information. *Journal of the Medical Library Association: JMLA*, 102(1), 22-30. <http://doi.org/10.3163/1536-5050.102.1.006>

Cano, E. V. (2012). Mobile learning with Twitter to improve linguistic competence at secondary schools. *New Educational Review*, 29(3), 134–147.

Chukwuere, J.E, Mbukanma, I. & Enwereji, P.C. (2017). The financial and academic implications of using smartphones among students: A quantitative study. *Journal of Economics and Economic Education Research (JEEER)*, 18(1), 1-26.

Chukwuere, J.E., Mavetera, N. & Mnkandla, E. (2016). A Culture-Oriented e-Learning System (e-LS) for Higher Education Institutions in South Africa. *Pakistan Journal of Social Sciences*, 13(4), 44-52. DOI:10.3923/pjssci.2016.44.52.

Ebiye E.V. (2015). Impact of Smartphones Tables on the Information Seeking Behaviour of Medical Students and Staff of Niger Delta University Bayelsa state- Nigeria. University of Nebraska, Lincoln.

Emerson, L. C., & Berge, Z. L. (2018). Microlearning: Knowledge management applications and competency-based training in the workplace. *Knowledge Management & E-Learning (KM&EL)*, 10(2), 125–132.

Hussin, S., Manap, M. R., Amir, Z., & Krish, P. (2012). Mobile learning readiness among Malaysian students at higher learning institutes. *Asian Journal Social Science*, 8(12), 276-283.

Ismail, I., Bokhare, S. F., Azizan, S. N., & Azman, N. (2013). Teaching via mobile phone: A case study on Malaysian teachers' technology acceptance and readiness. *Journal of Educators Online*, 2(1). 221-229.

Karpinski, A. C., Kirschner, P. A., Ozer, I., Mellott, J. A., and Ochwo, P., (2013). An Exploration of Social Networking Site Use, Multitasking, and Academic Performance among United States and European University Students. *Computers in Human Behavior*, 29: 1182-1192

Kibona, L. & Mgaya, G. (2015). Smartphones' Effects on Academic Performance of Higher Learning Student. A Case of Ruaha Catholic University Iringa, Tanzania. *Journal of Multidisciplinary Engineering Science and Technology (JMEST)*, (2)4, 777-784

Kinsella, S. (2009). Many to One: Using the Mobile Phone to Interact with Large Classes. *British Journal of Education Technology*, 40(5), 956–958.

Kuznekoff, J.H. &Titsworth. S. (2013). The Impact of Mobile Phone Usage on Student Learning. *Communication Education*, 62 (3): 233-252.

Lundquist, A.R., Lefebvre, E.J. &Garrazone, S.J. (2014). Smartphones: Fulfilling the Need for Immediacy in Everyday Life, but at What Cost? *International Journal of Humanities and Social Science*, 4 (2), 80-89

Masiu, T. M. and Chukwuere, J.E (2018) The Effect of Smart phones on Students' Academic Life: A Perceptive from a South African University. *Paper presented at the International Conference on Business and Management Dynamics ICBMD-South Africa from 21-24 July*, 174-183

Mokoena, S. (2012). *Smartphones and Regular Cellular Phones: Assessing their Impact on Students' Education at the University of Zululand*. Doctoral Dissertation, University of Zululand

Pullen, D., Swabey, K., Abadooz, M., & Sing, T. (2015). Malaysian University Students' Use of Mobile Phones for Study. *Australian Educational Computing*, 30(1). 55-71

Sarwar, M. &Soomro, T. (2013). Impact of Smartphones on Society. *European Journal of Scientific Research*, 98(2), 216-226.

Siew, F.N., Nor, S. I. C. H., Nor H. M. & Nur, A. A. M. (2017). The Relationship Between Smartphone Use and Academic Performance: A Case of Students in a Malaysian Tertiary Institution. *Malaysian Online Journal of Educational Technology* 5(4). 58-70

Tikoria, J., & Agariya, A. K. (2017). ICT Enabled Classroom Effectiveness Scale Development and Validation: A Case of Multi-Campus University. *Knowledge Management & E-Learning (KM&EL)*, 9(1), 111–127.

Valk, J., Rashid, A., & Elder, L. (2010). Using Mobile Phones to Improve Educational Outcomes: An Analysis of Evidence from Asia. *The International Review of Research in Open and Distributed Learning*, 11(1), 117-140.

West, D. M. (2013). Mobile Learning: Transforming Education, engaging Students, and Improving Outcomes. Retrieved on Tuesday, 16th December 2018 from: <http://www.insidepolitics.org/brookingsreports/MobileLearning.pdf>