Mobile devices for academic practices by students of college of sciences in selected Nigerian private universities

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Abstract

Purpose – This study aims to look at the use of mobile devices by science students with emphasis only on privately owned universities in Nigeria.

Design/methodology/approach – A descriptive research design was used, as the study was a survey research. Eighty copies of structured questionnaire were distributed to collect data from science students in advanced levels of their undergraduate programmes in Afe Babalola University, Ado-Ekiti (ABUAD) and Joseph Ayo Babalola University (JABU) Ikeji-Arakeji, in their lecture halls and laboratories with the permission and assistance of their lecturers. The data were collected within a period of five weeks. All the administered questionnaire were correctly filled and returned, yielding a 100 per cent return rate. The data were analysed using descriptive statistics which includes frequency and percentage presented in tables and charts.

Findings – The study found that science students in the selected private universities mostly (83.7 per cent) use smartphones than other mobile devices. Also, the students own mobile devices for the purpose of using educational applications (77.50 per cent) and to chat with people (72.50 per cent). The students use the Internet on their devices very often. The Internet facilities mostly used by the students are e-mails (71.25 per cent), social media (68.75 per cent) and search engines (60.50 per cent). The challenges mostly faced by the students using mobile devices for academic practices are poor Internet connectivity (81.25 per cent) and high cost of data subscription (53.75 per cent).

Practical implications – Given the knowledge gained from this study, it is desired that universities across Nigeria would encourage the integration of the use of mobile devices into core educational programmes. Also, mobile data service providers need to reduce the cost of data subscription, especially on campuses for students. Moreover, owners of private universities should ensure the provision of good Internet connectivity for mobile devices campus-wide. Free and accessible Wi-Fi hot spots should be created for students.

Social implications – Policy makers in the country should encourage mobile data service providers to reduce cost of data subscription on university campuses so as to enable students enjoy to the fullest the numerous features of mobile devices for academic practices.

Originality/value – Research on the use of mobile devices for academic practices by students is somewhat new in Nigeria more so that privately owned universities are in focus. The study has therefore opened the floor for more in-depth studies on the subject now that mobile devices should be seen as tools rather than fanciful gadgets.

Keywords Internet, Communication technologies, Smartphones, Nigeria, Mobile communications, Mobile devices

Paper type Research paper

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Introduction

Growing research into the enhancement of mobile technology has brought about an improvement in developing mobile devices so that they are capable of providing services that are acceptable and can be used anywhere at any point in time. The widening penetration of mobile services over landline connections, enriched handsets, increasing levels of bandwidth, decreasing user charges and a growing technology-savvy learner population has had a positive impact on educational institutions to make use of the potential of mobile technology for teaching and learning purposes, as well as providing an effective communication means (Kumar *et al.*, 2011). There is a paradigm shift in how people, particularly young adults, connect and interact with the Internet fuelled by the development of an increasing variety of Internet-capable mobile devices, an expansion of networks that support connectivity and an increasing focus by web content providers that are accessible through mobile devices (Ruth *et al.*, 2013). This development could be one of the effects of the explosive growth of wireless communication, which has been said to become the fastest growing communication technology (Ibrahim, 2011, as cited in Amali *et al.*, 2012).

The Oxford dictionary (2013) describes mobile devices as a portable computing device such as a smartphone or tablet computer. Mobile devices should be small enough to fit in the user's pocket and carried by the user in a habitual way (Mbanusi, 2012). Mobile devices began in Europe in the 1980s and extended to the USA in the 1990s. They were introduced in Nigeria in 2001 with the aim of making the communication system more effective and efficient in the country (Ojo *et al.*, 2011, p. 60): "[w]ith recent developments in laptop and tablets, computer technology, mobile devices with Internet connectivity and educational applications have the potential to play a positive and important role in education."

Santhalingam *et al.* (2011) reported that mobile phones have gained popularity among young adults who use them at any time to maintain their social relationships as well as to have fun. According to Ahmed (2012), on many college campuses, students, teachers and librarians are increasingly accepting mobile devices, such as tablet computers, for improving learning outcomes. He noted that the devices could make lecture rooms more interactive and collaborative by integrating and converging video, audio, websites, PowerPoint and other media. Anyone who has been in the classroom recently would have observed the trend of the increasing numbers of students using smartphones and personal digital assistants (PDAs) in place of laptop and desktop computers (Ruth *et al.*, 2013).

In developing countries and, more specifically, Nigeria which has been ranked seventh in the world's mobile phone penetration statistics (Adeyemi, 2014), primary school pupils, secondary school students, and students of higher education institutions have seen and embraced mobile phones as an adjunct to their notebooks or textbooks. Students of higher education institutions, in either public or private institutions, in Nigeria have embraced the use of these modern technologies for their social and academic activities, just like students from other parts of the world. This assertion corroborates the opinion of Edom (2012), who stressed that lecturers and students in tertiary institutions in Nigeria and elsewhere in the world need to use information and communication technology to enhance their teaching, learning and research activities. Considering these developments, this study is hereby carried out to look at the use of

mobile devices by science students, with emphasis only on privately owned universities in Nigeria.

Objectives of study

The main objective is to explore the use of mobile devices by science students in Nigeria. The specific objectives are:

- To determine the various types of mobile devices used by science students in Nigeria.
- To learn the purposes for using mobile devices by Nigerian science students.
- To discover how often Nigerian science students use the Internet on their mobile devices.
- To identify the challenges faced in the use of the Internet on Nigerian science students' mobile devices.
- To ascertain the Internet facilities most often used by science students in Nigeria.

Literature review

The invention of mobile devices has attracted the interest of various scholars in carrying out research on the use, impact and effect of mobile devices. Even though the high school students appear to look for more fully featured productivity devices, such as laptops, to support their learning activities, an online survey conducted by Harris Interactive on behalf of Pearson between 28 January and 24 February 2013 with 2,350 students revealed that smartphones and tablets are still important tools for high school students. Nine in ten of today's elementary, middle and high school students believe that mobile devices will change the way students learn in the future and make learning more fun. The findings further revealed that the majority of students would like to use mobile devices more in the classroom (PRWeb Online Visibility, 2013). Vasudev *et al.* (2012) found that the use of a mobile phone is common among science students who treat them as a necessity of life. From their study, despite the awareness of the ill effects of the devices by the students, they are still using them as a status symbol, based on their belief that the more expensive the phone is, the higher the status they have. Cassidy *et al.* (2011) stressed that college students use cell phones, laptops, e-readers and tablets on a daily basis to actively engage in social networking, text messaging, blogging, content sharing, online learning and much more.

Research conducted by Dahlstrom (2012) revealed that there was continued growth in student ownership of portable devices, while there was continued decline of desktop computer ownership by students between 2004 and 2012. Moreover, substantial growth has been reported in the use of smartphones for academic purposes from 37 to 67 per cent between 2011 and 2012, with a concurrent 24 to 70 per cent increase in the use of e-books and e-textbooks between 2010 and 2012. Page (2013) noted that the use of mobile phones may enable schools to reduce, or even eliminate, the use of heavy textbooks, workbooks and notebooks. For the students, it helps those who are sick, travelling or missing school for other reasons to be able to stay in the classroom virtually and keep up with their work, rather than falling behind due to unexpected circumstances. Ahmed (2012) completed a study using 415 college students in Minnesota and Wisconsin in 2011. Almost all college

students in the study used mobile devices for text messaging, while about nine in ten students used them for e-mails and for finding coupons and deals. Nearly eight in ten students used them for GPS navigation, playing music, checking news and making voice calls. The majority of students believed that mobile devices could help them in their academic performance.

In the area of medical education and health services, Ducut and Fontelo (2008) stressed the importance of mobile devices to deal with medical information overload and knowledge navigation. More importantly, mobile devices support existing learning tools, enhance course management, influence accreditation by providing learning experiences and are a cost-effective solution for medical schools (Rege and Keane, 2009, as cited in Kumar *et al.*, 2011). Braguglia (2008) discovered that three-quarters of smartphone users never leave home without their phone, and the majority of them used the voice and text messaging features frequently for personal communication. Amali *et al.* (2012) noted that the use of mobile phones among students has become habitual rather than conscious, and that this had an effect on education where deliberate effort was required to achieve the set objectives of teaching and the learning process in the lecture room.

However, on the negative effects of mobile devices, it has been reported that, even though mobile phones are tools for information dissemination, unbridled access by adolescents to mobile phones may not be in their best educational interest as there may be a decline in what psychologists call mental ideational (James, 2011, as cited in Amali *et al.*, 2012). Park (2005) lamented the gross damage that the mobile phone has done to the lives of various categories of students, most especially those in tertiary institutions who play away their time on games, music, pornography and Facebook. According to Ruth *et al.* (2013), mobile devices constitute a double-edged sword. Anyone who has taught in a classroom with students who have laptops or smartphones has observed them browsing the Web, sending e-mails or texting rather than paying attention in class. Their study, which included 1,222 respondents, reported that 66 per cent of students use mobile devices for e-mailing professors, 62 per cent for checking grades, 61 per cent for texting other students about coursework and 59 per cent for information browsing on the Internet outside of class.

A study by Rubinkam (2010) of 269 students at Wilkes University in Wilkes-Barre, Pennsylvania, discovered that more than 90 per cent of the respondents confirmed sending text messages during class and, surprisingly, 10 per cent of the students sent or received texts during examinations. Furthermore, 3 per cent admitted to using their phones to cheat. Students and faculty often report negative attitudes about the use of mobile devices in college classrooms, with ringing as a serious source of irritation and distraction (Campbell, 2006). In a related study, McCoy (2013) found that 89.8 per cent of students at six US universities revealed distractions caused by mobile devices prevented them from paying attention, while 80.0 per cent confirmed that they missed instructions in class.

Methodology

Research design

Descriptive survey research was used for this study. The questionnaire was adopted as the instrument for data collection. The respondents included students of:

microbiology, biochemistry, food science and technology, industrial chemistry, agricultural science, biological science, information and communication science and computer science in advanced levels in their undergraduate studies. A purposive sampling technique was adopted.

Data collection

Eighty questionnaires were distributed to the students of Afe Babalola University, Ado-Ekiti (ABUAD) and Joseph Ayo Babalola University (JABU), Arakeji, in lecture halls and laboratories with the permission and assistance of the lecturers. The data were collected within a period of five weeks. All of the administered questionnaires were correctly completed and returned, yielding a 100 per cent return rate.

Data analysis

The data extracted were analysed using descriptive statistics, which includes frequency and percentage presented in tables and graphs.

Results and discussion

Table I and Figure 1 show that from the 80 science students surveyed, 66.3 per cent of the respondents are female students while 33.8 per cent are male students. This revealed that among the respondents, female students constituted a larger portion than their male counterparts. This could be because the college of sciences has more female students than male students. It is a welcome development as females are now showing more interest in the area of sciences in the country.

Table II reveals that 58.8 per cent of the respondents are in 200 level courses, 33.8 per cent are in 300 levels, and 7.5 per cent are in 400 levels. The exclusion of 100 level students from the study was deliberate with the belief that they are still new to the university and have little experience in the use of mobile devices in the academic environment.

Table III and Figure 2 show the types of mobile devices used by the students. It was discovered that 83.8 per cent of the respondents use smartphones, 31.3 per cent use tablet computers (tablets), while only 13.8 per cent used PDAs. The findings indicated that the majority of the science students surveyed enjoyed using smartphones compared to other mobile devices. This could be a result of the emergence of and the rapid growth

Serial no.	Gender	Frequency	(%)
1	Male	27	33.8
2	Female	53	66.3
	Total	80	100

Table I.
Gender

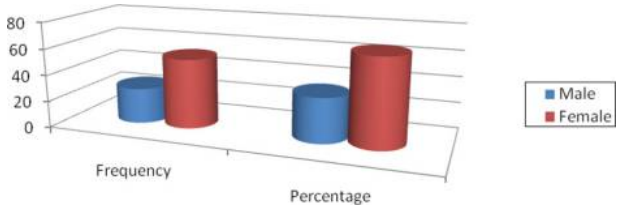

Figure 1.
Gender of the respondents

of the smartphone sector recorded in recent years. It may also be connected with the abundance of features in newer smartphones, such as numerous academic and social applications (apps), required to meet users' needs at this period of evolutional change in the telecommunication industry in Nigeria and the rest of the world. In fact, a *Cisco Forecast Report* released on 5 February 2014 stated that the average smartphone usage grew 50 per cent in 2013.

According to Table IV and Figure 3, 77.5 per cent of the respondents indicated that they use mobile devices to enable usage of educational applications. "To chat with people" totalled 72.5 per cent, while the lesser purpose "it is a mark of social status" resulted in 23.8 per cent. The findings show that science students from private universities use mobile devices as tools for their academic programs because it enables them to use educational applications on their mobile devices. The use of mobile devices to chat with people, read e-mail and maintain social networking implies that science students have considered the use of these devices to be a veritable tool they cannot do without. This correlates with the observance by Vasudev *et al.* (2012) that the use of mobile phones is common among science students who treat them as a necessity of life.

Table V depicts how often the science students use the Internet on mobile devices. Although it is remarkable to see that all the respondents had used the Internet on their mobile devices, 38.8 per cent of the respondents often used the Internet and 33.8 per cent of them used the mobile Internet very often. However, only 20.5 per cent use the mobile Internet occasionally. This is clear evidence that science students use their mobile phones to access

Table II.
Course level of the students

Serial no.	Level	Frequency	(%)
1	200	47	58.8
2	300	27	33.8
3	400	6	7.5
	Total	80	100

Table III.
Types of mobile devices

Serial no.	Types of mobile devices	Frequency	(%)
1	Smartphones	67	83.8
2	Feature phones	11	17.5
3	Tablet computers (Tablets)	25	31.3
4	Personal digital assistants (PDAs)	14	13.8

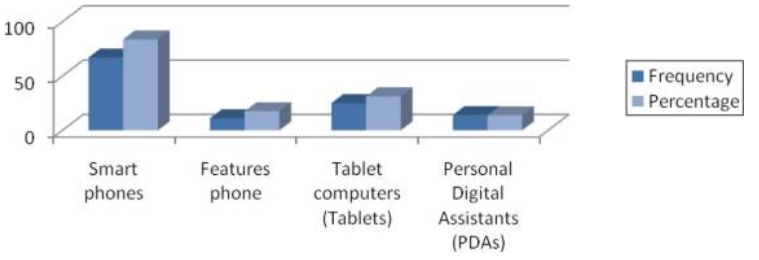

Figure 2.
Types of mobile devices used by the students

Serial no.	Purpose	Frequency	(%)
1	To enable me to use required applications	47	58.8
2	To enable me to use educational applications	62	77.5
3	To chat with people	58	72.5
4	It is a mark of social status	19	23.8
5	It is portable (to move about)	46	57.5
6	It is convenient to use	42	52.5
7	For social networking (Facebook, Google+, Twitter, etc.)	46	57.5
8	Ease of reading my e-mails	46	57.5
9	Easy response to e-mails and other messages	42	52.5
10	For geographical or directional information	30	37.5

Table IV. Purpose of using mobile devices

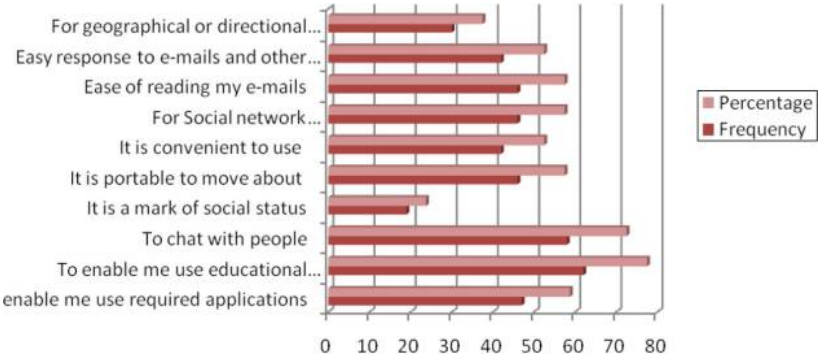

Figure 3. Purposes of using mobile devices by science students

Serial no.	How often	Frequency	(%)
1	Often	31	38.8
2	Very often	27	33.8
3	Occasionally	18	22.5
4	Rarely	6	7.5
5	Not at all	–	–

Table V. How often students use the internet on their mobile devices

the mobile Internet regularly. This is supported by the opinion of Cassidy *et al.* (2011) who noted that college students use tablets, e-readers and cell phones on a daily basis.

Table VI and Figure 4 indicate the Internet facilities most often used by the science students in private universities. About two-thirds (71.3 per cent) of the respondents said they use e-mails, followed by social media (YouTube, Facebook, Twitter) with 68.8 per cent and search engines with 60.5 per cent. The least used was open courseware with 12.5 per cent. The findings show that from all the various Internet facilities available on mobile phones, ABUAD and JABU science students prefer using e-mails. This finding is supported by Ahmed (2012) who stressed that about nine in ten students surveyed in Minnesota and Wisconsin used mobile devices for e-mails, while the majority (66.0 per cent) of the students studied by Ruth *et al.* (2013) also used them for e-mailing their professors. The use of social media by

Serial no.	Internet facilities	Frequency	(%)
1	E-reader (book reader)	30	37.5
2	Search engines	48	60.5
3	Databases	16	20.5
4	E-journals	23	28.8
5	E-books	35	43.8
6	Technical reports	11	13.8
7	Electronic theses/dissertations	7	8.8
8	Conferences/seminars/workshops	11	13.8
9	Open courseware	10	12.5
10	Mobile applications (apps)	41	51.3
11	Online courses/training	27	33.8
12	Webinars (online seminars)	19	23.8
13	Social media (YouTube, Facebook, Twitter, etc.)	55	68.8
14	E-mails	57	71.3
15	Media livestreaming	16	20.0

Table VI.
Internet facilities most often used by the students

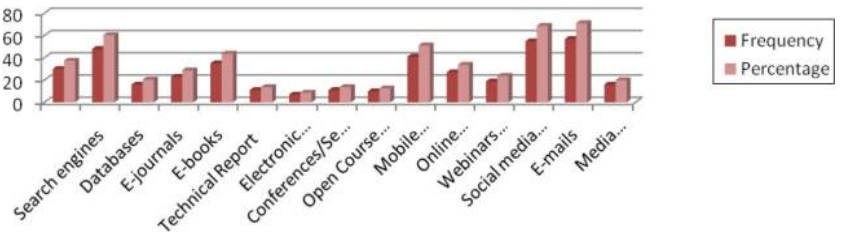

Figure 4.
Internet facilities most often used by science students in Nigeria

students is one of the platforms that serve as a tool to enhance communication among learners and their academic communities.

Table VII and Figure 5 reveal the challenges faced by the science students while using mobile devices. Of the respondents, 81.3 per cent said poor Internet connectivity was a major challenge, followed by poor or non-availability of a Wi-Fi hot spot with 56.3 per cent and the high cost of data subscription with 53.8 per cent. Difficulties in typing due to non-availability of a keyboard and leaving Internet browsing due to addiction are not really problems as they are the least with only 7.5 per cent each. It was discovered from the findings that science students were not pleased with the poor Internet connectivity that they faced when using their mobile phones. It is believed that students at private universities seemingly should enjoy ubiquitous 24-hour Internet connectivity everywhere on their campuses without interruption based on the huge amount of money (school fees) paid by their parents, but this is not so. Although the founders/owners of these private institutions in Nigeria invest heavily in Internet facilities, they still need to do more to have an effective and conducive learning environment that could favourably compete with the rest of the world.

Conclusion and recommendations

It is obvious that developments in the telecommunication industry have been boosted by the invention of social and interactive mobile devices. With feature

Serial no.	Challenges	Frequency	(%)
1	Difficulties in typing due to non-availability of a keyboard	6	7.5
2	High cost of data subscription	43	53.8
3	Poor Internet connectivity	65	81.3
4	Non-availability or lack of a Wi-Fi hot spot	45	56.3
5	Distraction as a result of the need to charge the battery from time to time	27	33.8
6	Low battery life	35	43.8
7	Difficulties in leaving Internet browsing due to addiction	6	7.5
8	Security challenges (fear of viruses and malicious software)	11	13.8
9	Distraction from academic work because it occupies much of my time	17	21.3
10	Physical problems, such as eye strain, blurred vision, etc.	14	17.5

Table VII.
Challenges faced by the students

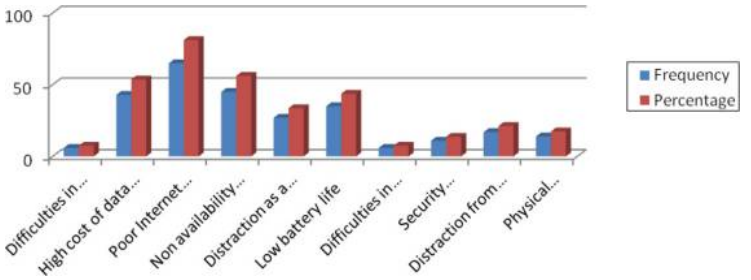

Figure 5.
Challenges faced by the science students

phones leaving the stage gradually and PDAs giving way to smartphones and tablets, the mobile phone map has been redrawn. However, mobile devices that come with loads of applications are warmly embraced by the youth class to which the student community belong. Just like elsewhere, Nigerian university students are now more technology savvy than ever. In fact, our study has shown that the majority of science students in private universities use mobile devices, particularly smartphones and tablets, for educational purposes. It is desirable that universities across the country should encourage the integration of mobile device usage into core educational programs. Mobile devices are truly new tools, rather than toys, in the hands of private university students in Nigeria.

The researchers, therefore, propose the following recommendations based on the findings of the study:

- Data service providers should reduce the cost of data subscriptions, especially on campuses for students.
- Founders and owners of private universities should ensure the provisioning of strong and reliable Internet connectivity for mobile devices campus-wide.
- Freely accessible Wi-Fi hot spots should be created for students to use.
- Further research should be conducted into how university administrators can integrate the use of mobile devices into core educational practices.
- This study can be repeated for students in public (government-owned) universities in Nigeria.

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