Use of mobile phones for project based learning by undergraduate students of Nigerian private universities

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ABSTRACT

A university's objective is to educate its students using information and communication technologies (ICTs) and teaching techniques that would enable its graduates become flexible and life-long learners that can easily adapt to the changes eminent in the information society. Achieving this aim requires among other factors, the adoption of appropriate teaching model such as the project based learning (PBL) which supports the inculcation of collaborative and lifelong learning skills, technology use skills, knowledge sharing skills and social networking skills into students. Consequently, this study was carried out to evaluate the use of mobile phones by students involved in PBL in three randomly selected private universities in Nigeria. The questionnaire was used as the instrument for data collection from 750 undergraduates students distributed across the three selected private universities in southwestern Nigerian states. This is to say that 250 students were sampled from each of the participating private universities whose population was estimated to be about 2000 students each. Also, the use of stratified sampling technique ensured that only those students that were in their second, third, fourth and fifth year in the sampled universities, who were presumed to have acquired required learning experiences, participated in the study. The result showed that a significant percentage of the students studied had mobile phones and that they used their mobile phones for communication, interactions, getting information, browsing the Internet, and sharing knowledge anytime they were involved in PBL. It was also revealed that mobiles phones can be used to strengthen PBL in higher institutions and can be used to implement information services provided for students in their university. Although private universities in southwestern Nigeria amounts to about 43.9% of private universities in Nigeria, a percentage that makes them a sizable representation of private universities in Nigeria, the fact that the study sampled population was drawn from only three southwestern Nigerian based private universities made generalizing the results of this study as the situation in Nigeria in appropriate. The study however, provides first hand information on the prospects, gains and challenges mobile phones offer as appropriate education technology for implementing PBL in Nigerian universities.

Keywords: Mobile Phones, Project Base Learning, Nigerian Private Universities, Knowledge Sharing, University Libraries

INTRODUCTION AND BACKGROUND

The proliferation of Information and Communication Technologies (ICTs) and the increase in the quest for their use in educational institutions have not only affected the structure of university education but has also affected the way teaching and learning is done in these institutions. One of the primary factors used to define an information society compliant university is the extent of its infusion of ICT into its teaching and learning programmes. Hence, teaching and learning techniques in contemporary universities have been continuously redesigned in such a manner

that the use of ICT for their delivery has become *sine-qua-non* (Dale and Povey 2007, Varis 2007 and Al-Khanjari 2005). The urgent need for the production of information society compliant workforce that are flexible learners and that can easily adapt to the fast changing socio-cultural, technological and economic environments has made the provision and adoption of ICTs for teaching and learning in Nigerian universities a primary challenge. In fact, several Nigerian authors have produced scholarly works that assessed the extent to which Nigerian universities have tried to infuse ICT based teaching and learning techniques (Olatokun and Opesade 2008, Erinosho, 2007, Obanya 2006 and Ojokoh and Asaolu 2005). This is also the case in other countries of the world as shown by the growth of the literature on issues concerning how universities use ICT to perform their statutory duties of teaching, learning, research and community development (Berglund, *et al*. 2006, Zenios, *et al.* 2004, and Conceicao, *et al.* 1998).

Obanya (2009) also reveals that the models for the delivery of higher education in the information society is distinct and has its own special characteristics. He enumerated six domains of futuristic view of university education in the information society that should define requirements and objectives of university education in Nigeria:
1. Assumptions and aims of university education- broad-based and personality development for adaptability
2. student entry which has become flexible and fluid by accommodating young and old, full-time and part-time, in-campus and off-campus including distance learning- lifelong learning skills with greater emphasis on EQ (Emotional Intelligence Quotient)
3. organization of programs- flexible organization of programs
4. teaching/learning- group and task oriented
5. the teacher- knowledgeable, field-oriented, highly creative, multi disciplinary compliant
6. the graduate profile- able learner with appropriate intrapersonal and interpersonal capabilities.

He concluded that "higher education [in] today's world has been making a set of futuristic demands [and] a new view of role and mission and functioning… p. 227)." Adeogun (2003 and 2006) also outlined that the challenges the information society places before African universities in terms of facility requirements, teaching and learning skills requirements, and the need to frequently update and upgrade teaching models and curriculum.

Consequently, Project Based Learning (PBL) has been viewed as a very important teaching/learning model that can be used to inculcate e-learning, independent learning and lifelong learning skills required to operate in the information society into university students in the world over. According to Milentijevic *et al* (2008) PBL is a,

> *constructivist pedagogy that intends to bring about deep learning by allowing learners to use an inquiry based approach to engage with issues and questions that are rich, real and relevant to the topic being studied…[in situations] students are expected to use technology in meaningful ways to help them investigate or present knowledge (p. 1331).*

Newby, *et al.* (2000) opine that "with constructivist strategy, teacher and students share responsibility for directing learning. Students learn by collaborating with one another… (p. 37)"
Lee (2009) citing Adderley, *et al.* provide five factors that describe PBL scenarios:
• they involve the solution to a problem often
• they involve initiative by the student or group of students, and necessitate a variety of educational activities
• they commonly result in an end product
• the work often goes on for a considerable length of time
• teaching staff are involved in an advisory, rather than authoritarian role.

The hallmark of this learning scenario is that it is technology based and also requires students to carryout projects independently; develop strategies among themselves and reach informed conclusions that will help them meet the project objective(s). Within the learning group,

technology use for knowledge sharing is paramount as members are required to work as a team, share knowledge and also reach conclusions that are agreeable to all contributing members of the group. Because of this, PBL has been adjudged to be one of the relevant teaching/learning models that are appropriate for university education in the information society.

Although Nigeria has about one hundred and seventeen universities owned by the federal government, various state governments, and private individuals and entities, university education has faired very poorly in it going by the standards of the information society. Divides such as digital divide, digital knowledge divide and knowledge creation capacity divide have constantly plagued Nigerian universities (Barry *et al.* 2008 and World Bank 2001). The incessant strike actions embarked upon by the Academic Staff Union of Universities (ASUU) to force Nigerian governments to rationalize these divides in the Nigerian university system have become so frequent that stakeholders are beginning to consider them banes to university education in Nigeria (Okonji 2007). Irrespective of these obvious factors, Nigerian universities still work towards producing a workforce that are comparable to those produced elsewhere around the world who can function appropriately in the information society. Hence, tangible and measurable effort like the Nigerian Universities Network (NUNet) which is based on the use of Information Technology (IT) and the Internet to establish academic cooperation, integration and resource sharing among Nigerian universities has been initiated by the National Universities Commission (NUC) **in 2006**. Private teaching/learning ICT initiatives in Nigerian private universities have also improved the rate in which ICTs have been made available within the Nigerian university system.

Irrespective of all these efforts, the fact that Nigeria's Internet penetration, student-computer ratio and bandwidth size are still low constitute banes to the appropriate use of ICTs for teaching and learning in Nigerian (http://www.internetworldstats.com). The non-existence of a reliable power sector in Nigeria has also taken its toll on ICT adoption for teaching and learning technique such as the PBL. However, the introduction of Global System for Mobile communications (GSM) and the consequent high use of mobile phones across the country and in university campuses in particular have given rise to reliable alternative for Internet connectivity, online knowledge sharing and technology divide rationalization. The opportunity is capable of serving as a way out for students involved in PBL that are required to use ICTs especially when they are involved in PBL. The use of mobile phones for PBL can be easily attained because most mobile phone sets possess the capacity of an Internet ready mini computer and also have the potential to cover more of the cyberspace using telephony wireless connections. Based on observation, large population of students own and use mobile phones for various reasons.

There are considerable efforts in the literature that cover ICT use for teaching and learning purposes in Nigerian universities while very little effort has been geared toward studying the use of mobile phones as educational technology in universities, including Nigerian universities. This is despite the fact that as far back as 2006 Nigeria has large mobile phone subscriber base which was put at about 22.3 out of 100 people (World Bank 2009). This definitely must have further grown as the sector has expanded in terms of subscribers' and GSM service providers' numbers.

This study was therefore, carried out to cover the omission of mobile phone studies in the literature with a particular aim of assessing how mobile phone can be used as reliable alternative in a society that digital technology divide has greatly challenged the attainment of its higher education goals. Specifically, the study sets out to:
1. Evaluate the frequency in which Nigerian private university students are involved in PBL
2. Determine the number of students that have and use mobile phones
3. Document mobile phone services available in the mobile phones students enrolled in Nigerian private universities use
4. Examine the frequency of their use of the available services for knowledge sharing when they are involved in PBL

5. Find out how mobile phones to share when they are use by students involved in PBL
6. Determine the barriers they face in their quest to use mobile phones as educational technology when they are involved in PBL
7. Establish the implication(s) of mobile phone use to faculty and university libraries.

LITERATURE REVIEW

The information society and its consequent high demand for knowledge production and ICTs use has affected the way education is valued. Most developed societies which are also information society, are hence, adjudged as those with the best philosophy of education and those that were able to develop sound pedagogy, teaching techniques, and invest in educational research instructional technology and multimedia. It is because of this that research on university education and how to appropriately develop efficient and effective teaching models and techniques have been increasing. These include research dealing with how technological innovations of the information society are transforming the ways teachers teach, how learners learn and how societies are adjusting their cultural transmission and socialization processes to sooth current information society trends (Varis 2007, Dale and Povey 2009 and Reis and Karadag 2009).

In the light of this, Newby *et al.* (2000) compared three prevalent perspectives of learning: behavioural, information processing and constructivist perspectives. They argued that constructivist perspective (which is the premise upon which PBL is based) requires learners to task their knowledge and environments more than in information processing and behavioural perspectives. Apart from this, they also argued that the level of cognitive processing required to complete tasks in the three perspectives is higher in constructivist perspective. In other word, research on constructivist perspective have been able to establish that PBL tasks learners' knowledge and their cognitive processing more than other learning perspectives. Basbay and Ales (2009) studied the effects of PBL on computer student teachers in Ege University and found out among other things that it allowed student to learn from experience, learn to learn and derive social network benefits. Sancho-Thomas *et al.* (2009) also developed a study to proffer how the social constructivist pedagogical approach can be adopted to teach software development students how to work in teams.

The literature on how technology is being used for knowledge sharing within the ambit of the constructivist perspective like PBL has also been developed. For instance, Al-Khanjari *et al.* (2005) presented the case of the use of Web-based Instruction through Course Management System (WBI-CMS) in a university in Oman. Their argument was developed from the vital role instructors play in the success of new education initiative and the effects of instructors' awareness of new technologies and their eventual use of new technologies for teaching and knowledge sharing. Enkenberg (2001) looked at collaborative teaching models from the perspective of instructional design with the aim of identifying differences in their effect when applied for individuals or for a group. Woodard (2003) examined the role technology play in creating information rich environment for constructivist based learning and information literacy teaching.

In the recent time, studies are beginning to build up on the use of mobile phones for educational purposes. Such studies have relied on the methodologies used in previous studies that dealt with the use of multimedia (Vavoula *et al.* 2009). Markett *et al.* (2006) studied the use of short message service (SMS) to encourage interactivity in the classroom between students and teachers. Sharples (2000) also studied how mobile technology is being used to support lifelong learning. Although the literature has covered a lot of issues surrounding PBL as a teaching model, it has also comprehensively dealt with the use of ICTs including mobile phones. One

obvious omission is the limited number of research in the literature that dealt with the assessment of how mobile phones can be used to support teaching and learning under PBL conditions. Authors that have assessed PBL looked more at the underlying educational theory behind it. This particular study did not lay strong emphasis on educational theory underlying PBL, but how mobile phones are used as educational technology by students involved in PBL.

METHODOLOGY

The study is a descriptive research that adopted survey research method. Its aim was to evaluate the use of mobile phones for PBL by undergraduate students in private universities in Southwestern Nigeria. Private universities came into being in Nigeria in 1999 when its government decided to deregulate the higher education sector by allowing private universities to run along side public universities. Three private universities were licensed in 1999 and by 2010 the number grew to twenty three private universities. These private universities are characterized by their ownership (mostly religious organizations), size (number of students mostly averaging between 1500 and 2000 students), level of education (mostly undergraduate programs) and location (mostly in southern part of Nigeria which comprise south-south, south east and south west geo-political regions). However, there were 18 private universities in Southwestern Nigeria, which were estimated to be 43.9 % of the total number of private universities in Nigeria. Three of these 18 private universities were selected using convenient sampling technique to participate in the study. Non-probabilistic sampling technique was also used to determine the number of students from each of the sampled universities that participated in the study. Since there were about 2000 students enrolled in each of the three universities, 250 students were therefore sampled from each of the three private universities using convenient sampling technique. This resulted to a total sample size of 750 students. The sample population was assumed to have amounted to about 12.5 % of the students' population in the three private universities. However, the sampled population was stratified to include only students in their second, third, fourth and fifth years in the university, that were presumed to have gained appropriate university education experience required to participate in the study. The researchers expected that the study unit must have participated at least twice in PBL based learning situations.

A self-designed questionnaire which contained forty nine questions presented in four sections was adopted as the primary data collection instrument for the study. Section one of the questionnaire was used to elicit data regarding respondents' demographic data, while section two contained closed questions used to elicit data from respondents on their mobile phones ownership status. Section three contained six scaled Likert scale questions that were used to elicit data on respondents' PBL participation and mobile phone use frequencies. Section four of the questionnaire also contained six scaled Likert scale questions that were used to elicit data on the barriers associated with respondents' use of mobile phones for PBL. However, the questionnaire response rate recorded is as follows: Redeemer's University (RUN): 203, Joseph Ayoola Babalola University (JABU): 198 and Caleb University (CALEB): 131, which amounted to 532 (71.0 %) response rate.

FINDINGS

Demography and Mobile Phone Ownership

All the respondents were undergraduates distributed across three academic years as follows: second year: 245 (46.3 %), third year: 125 (23.5 %) and fourth year: 162 (30.5 %). It was revealed that over half of the respondents, that is, 315 (59.2 %) were between the age range of 16-20 years. 181 (34.0 %) of the respondents also claimed that they were between the age

range of 21-25, while 22 (4.1 %) were between the age range of 26-30 years. However, 14 (2.6 %) did not indicate their age ranges. The age range disparity which skewed towards respondents within the age range of 16-20 years may have resulted from the high percentage of respondents in their second year in the university and the new trends in age distribution of university students and candidates seeking admissions into universities globally.   Obanya (2006) commented on this thus: "…yesterday's [pre-information society] university student was an adult, while tomorrow's [information society] student will be an adolescent." 303 (57.0 %) of the respondents reported that they were female, while 205 (38.5 %) reported that they were male. 24 (4.5 %) did not report their gender type.

The distribution of respondents academic disciplines showed that they were distributed into three faculties/colleges: Natural and Applied Sciences, Management/Social Sciences and Humanities. Specifically, 319 (60.0 %) of the respondents claimed that their academic discipline was Management/Social Science based. 108 (20.2 %) claimed that their academic disciplines were Natural and Applied Science based, while 105 (19.7 %) claimed that their academic discipline was in the humanities.

It was revealed that as much as 510 (95.9 %) of the respondents had mobile phones, while 12 (2.3 %) did not have mobile phones. However, 4 (0.8 %) have lost their mobile phones, another 4 (0.8 %) claimed that their mobile phones have been damaged due to use, while 2 (0.4 %) did not give responses on their mobile phone ownership status. However, 287 (53.9 %) of the respondents that claimed they had mobile phones had one mobile phone set each, 206 (38.7 %) had two mobile phone sets, while 27 (5.1 %) had three mobile phone sets.

Mobile Phone Services and Use of Mobile Phones for PBL

In other to know how often respondents were involved in PBL in their universities a five scale Likert analysis of the frequency of their involvement in PBL was assessed. The results showed that only 81 (15.2 %) respondents were involved in PBL very often, 151 (28.4 %) respondents were often involved in PBL, 63 (11.8 %) respondents were not sure of the frequency of their involvement in PBL, while 138 (25.9 %) respondents were not often involved in PBL, while 92 (17.3 %) of the respondents claimed also that they did not very often involve in PBL. 7 (1.4 %) of the respondents did not respond to the frequency of their involvement in PBL. The consequence of the result shown above is the assurance that the respondents have had some kind of learning experience under PBL condition in their universities.

Table 1: Distribution of Mobile Phone Services Available in Respondents Mobile Phone Sets

S/N	Mobile Phone Services	Number	Percentage
1	**Voice Calls**	**532**	**100**
2	**Short Message Service (SMS)**	**532**	**100**
3	Internet Services	412	77.4
4.	Multimedia Message Service (MMS)	411	77.3
5.	Camera (images and videos)	401	75.4
6.	Radio	386	72.6
7.	Voice Mail	385	72.4
8	Audio Recording	371	69.7
9.	Television (TV)	80	15.0

Voice calls and SMS services were available in all the mobile phones sets owned by the respondents. Other services enlisted in Table 1 were reported to be widely available except television services.

Table 2: Distribution of Respondents Self Assessment of the Frequency of their Use of Available Mobile Phone Services when they were Involved in PBL

Mobile Phone Services	Very Often		Often		Not Sure		Not Often		Not Very Often		Not At All		No Response	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Voice Calls	**240**	**45.1**	**90**	**16.9**	**24**	**4.5**	**66**	**12.4**	**22**	**4.1**	**87**	**16.4**	**3**	**0.6**
SMS	**274**	**51.5**	**139**	**26.1**	**15**	**2.8**	**31**	**5.8**	**25**	**4.7**	**45**	**8.5**	**3**	**0.6**
MMS	58	10.9	75	14.1	41	7.7	98	18.4	55	10.3	198	37.2	7	1.4
Voice Mail	58	10.9	40	7.5	32	6.0	81	15.2	50	9.4	266	50.0	5	1.0
Internet Services	**202**	**38.0**	**94**	**17.7**	**25**	**4.7**	**39**	**7.3**	**26**	**4.9**	**141**	**26.5**	**5**	**1.0**
Radio	115	21.6	98	18.4	23	4.3	42	7.9	32	6.0	216	40.6	6	1.2
TV	39	7.3	61	11.5	9	1.7	41	7.7	20	3.8	356	66.9	6	1.2
Audio Recording	101	19.0	80	15.0	34	6.4	71	13.3	35	6.6	205	38.5	6	1.2
Video Recording	119	22.4	82	15.4	44	8.3	55	10.3	34	6.4	193	36.3	5	1.0
Camera	153	28.8	76	14.3	21	3.9	30	5.6	31	5.8	216	40.6	5	1.0

As shown in Table 2, three mobile phone services were significantly used by respondents anytime they were involved in PBL. The three services (Voice Calls, SMS and Internet Services) are particularly used in people's everyday life for communicating and information and knowledge sharing. The peculiarity of these mobile services manifested in the ways the respondents claimed that they used.

Table 3: Distribution of Respondents Self-Assessment of what they Use Mobile Phone for when they were Involved in PBL

S/N	Mobile Services	Number	Percentage
1.	**To Get Information from members of PBL Group**	**413**	**77.6**
2.	**Communicating directives and action plans among group members**	**397**	**74.6**
3.	**Exchange information about new findings**	**395**	**74.2**
4.	**Browse the Internet**	**350**	**65.8**
5.	Communicate with lecturer in charge of course	306	57.5
6.	Collect Data, e.g. recordings	262	49.2
7.	Send Email to members of the PBL Group	176	33.1
8.	Access OPAC	155	29.1
9.	Send Email to lecturer	143	26.9

Table 3 revealed that mobile phones were used by respondents to interact, get information and share knowledge. The interaction may have been in the form of communicating (directive and new findings) between respondents involved in PBL. Also, respondents claimed that they get information from the Internet using their mobile phones when they were involved in PBL. They

also shared knowledge in the form of new findings from their PBL experience. The used of mobile phones to access OPAC and to send emails was not popular among respondents.

Table 4: Distribution of Barriers Impeding Respondents' Use of Mobile Phones for PBL

Barriers	No Effect		Lowest Value		Low Value		Mid Point		High Value		Highest Value		No Response	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Cost	58	10.9	15	2.8	41	7.7	**121**	**22.7**	**84**	**15.8**	**210**	**39.5**	3	0.6
Access to Alternatives	92	17.3	26	4.9	29	5.5	**130**	**24.4**	**90**	**16.9**	**165**	**31.2**	-	-
Reliability of Mobile Lines	201	37.8	59	11.1	34	6.4	104	19.5	49	9.2	80	15.9	5	0.9
Mobile Phone Capacity	206	38.7	45	8.5	30	5.6	82	15.4	60	11.3	104	19.5	5	1.0
Affordability of Mobile Phone with Required Capacity	265	49.8	59	11.1	31	5.8	63	11.1	45	8.5	64	12.0	5	1.0
Usability of Mobile Phone Keyboards	228	42.9	43	8.1	34	6.4	117	22.0	50	9.4	57	6.7	3	0.6
Size of Mobile Phone Screen	195	36.7	66	12.4	35	6.6	91	17.1	54	10.2	86	16.2	5	1.0
No Electricity to Charge Mobile Phone Regularly	267	50.2	42	7.9	38	7.1	75	14.1	32	6.0	73	13.7	5	1.0

The two barriers that were prevalent among the factors that impeded the use of mobile phones for PBL were cost of using mobile phones as knowledge sharing tool and availability of, and access to alternative knowledge sharing tools. In other word, respondents claimed that their use of mobile phones for factors measured in the study was limited by their access to alternative technologies. Surprisingly, issues like availability of power to recharge mobile phone sets, usability of mobile phone set due to keyboard and screen sizes did not constitute barriers to the extent respondents used mobile phones when they were involved in PBL.

DISCUSSIONS

One of the primary observations in this study was the frequency of respondents' involvement in PBL. Despite the importance of PBL to contemporary university education, the Nigerian private universities studied seem not to be keen on using the PBL technique for teaching and learning. This is despite the fact that the constructivist theory upon which PBL is based helps learners to imbibe flexible learning, collaborative learning and social networking skills that are important skills in the information society. However, the frequency of their involvement in PBL notwithstanding, the study's aim of assessing respondents' use of mobile phones for PBL was achieved. Another primary observation is the age range distribution where over half of the respondents were between the age range of 16-20 years. Surprising as this may be, it is in line with Obanya (2006) position that the university student body of the information society would undergo a significant age distribution change. Also, the gender distribution may have resulted from the dividend of the growing enlightenment on gender issues in Nigeria especially in the Southwestern states where the study was conducted. Apart from this, majority of the students in Nigerian private universities belong to high income homes and can afford to a high extent, the cost of private university education.

Mobile phones were popular among the respondents as revealed by the percentage of respondents that had mobile phones and those that had more than one mobile phone. This revealed the non-existence of mobile phone divide among the respondents. Also, the study revealed that the mobile phones sets respondents claimed that they had had mobile phone services that can support knowledge creation and sharing. This was exemplified by available services listed in Table 1 that can support verbal communication, text communication, multimedia data creation and communication, audio recording and communication, and creation of photographs using mobile phone camera. Available services in respondents' mobile phones

pointed to the fact that respondents who may want to use mobile phones to share knowledge when involved in PBL can easily do so.

However, of the ten mobile phone services evaluated in the study only three (Voice Calls, SMS and Internet Services) were often used by respondents when they were involved in PBL. Table 4 revealed that a significant percentage (77.6 %) of the respondents used their mobile phones to get information from other students in their PBL group. Other significant uses of mobile phone services recorded in the study were for communication of directives and new findings to members of the PBL group. The numbers of respondents that used their mobile phones to browse the Internet for resources they need to complete their tasks were not as much as those that used their mobile phones for exchanging communication. However, the fact that more than half of the respondents used their mobile phones to access the Internet when involved in PBL revealed a new sources of Internet access among university students. It shows that students do not have to be in cyber cafés, in the library or own a laptop to access the Internet. This shows that even though mobile phones can be used for various educational reasons that the respondents used them for conventional services they are known for. If it was revealed in the study that respondents used mobile phones to send pictures of specimens or other forms of recordings such as voice recording of interviews and video clips required for their studies, the study would have boasted that it recorded the use of mobile phones for non-conventional uses that were triggered by educational needs.

Of significant interest to the outcome of this study are the barriers respondents claimed they face in their bid to use mobile phones when they were involved in PBL. Cost of using mobile phones when involved in PBL and access to alternative knowledge sharing technologies, constituted significant barriers to the respondents out of the eight barriers evaluated in the study. Cost in this context may have been expressed in terms cost of buying airtime and the cost of using each of the available mobile phone services. For instances, the average cost for sending an SMS is ₦ 15:00, about ten cents, while voice calls per minute costs between ₦ 45:00 to ₦ 50:00 (about 30 to 35 cents). Information and communication exchanges may take minutes, and therefore may constitute high cost such that is expressed by the respondents in the study.

Availability of alternatives, which may include free access to computers and the Internet in the library, cybercafés and personally owned laptops and PCs, were recorded as significant barriers. The effect of alternative technologies on the use of mobile phones as educational technology may have emanated from cost and/or ergonomic factors. Respondents may have found PCs and Laptops more convenient to use than mobile phones, especially for sending mails, downloading and uploading resources and as storage devices. Again, access to alternative free information sources within university library is a likely factor. This is because Internet access in university libraries of the three universities investigated were reported to be free and may be a better choice than mobile phones. This may justify why most of the respondents did not use their mobile phones to access OPAC. Interestingly, all the barriers evaluated in the study had effects at varying levels, which points to the fact that mobile phone use for knowledge sharing by respondents was not devoid of barriers

Implication for Faculty and University Libraries

Several factors abound that challenge the claims made by faculty in contemporary universities about their effectiveness, efficiency and contributions to the training of undergraduate students in universities. the fact that the cost of running universities has continuously increased have increased the level of scrutiny parents and university management give to faculty, especially as it concerns the extent they are able to adopt new teaching techniques and new technology for better delivery of university education. The primary challenge technology based teaching technique such as PBL face in a country like Nigeria is the growing digital divide inherent among

students. The fact that mobile phones offer new opportunity as educational technology that can be used for technology based teaching techniques means that academics may not need to consider low technology availability when trying to adopt teaching techniques that are technology based. Although this particular study is a descriptive first hand information based study, it has shown that if faculty take their time to evaluate the opportunities mobile phones offer, that they can derive more benefit from them and also adopt them as new education technology.

In the same vein, university libraries all over the world have been faced with challenges of meeting the growing needs of their users, more so when they are involved in PBL which is knowledge and technology-use tasking. The result of this study may make available to university libraries basic knowledge of how students' mobile phones can serve as alternatives for rationalizing the technology divide which has rocked Nigerian universities. Since mobile phone have the capacities of mini computers and had been used to access the Internet, they therefore become very important technology for students use. University libraries can begin to work out ways in which management, administrators, lecturers, librarians and students can better harness mobile phones as instructional technology that can be used to generate information and share knowledge. Obviously, mobile phones can be used as a reference tool by librarians; their cameras can be used as tools for creating digital resources from non-digitally born resources and for sharing recorded knowledge available only in the library. Although ths new practice may raise copyright question and the need for librarians to educate students how to use mobile phones within the confirms of existing copyright law. The ability of librarians to think up uses of mobile phones in the context of information management, and for teaching and learning will definitely improve mobile phone use beyond the ways that were revealed in this study.

CONCLUSION

Mobile phones represent new and fast growing development in ICTs innovations. Their adoption for teaching and learning models that have been adjudged information society compliant has also been growing. It has been reported so far that mobile phones are reliably used by students involved in PBL for knowledge sharing, although at a rate which can be described as basic and uncoordinated. The prospect revealed in the study is that mobile phone posses the potential to become very reliable instructional technology that can be used by lecturers and librarians to achieve feats that have been hampered by technology divide. The fact that mobile phones can be taken to any location where teaching and learning are taking place and still receive Internet signals makes them unique. However, much is still left to be done in terms of harnessing them for education purposes and this may need the collaboration of various stakeholders. If proper assessment is done universities in a country like Nigeria with long history of digital divide would make out good alternative to instructional technologies from mobile phones.

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