

## Understanding the Patterns of the Usage of Mobile Telecommunication Services by Selected Undergraduate Students in Nigeria

Omotayo Kayode Abatan  
*University of KwaZulu-Natal*

Manoj Maharaj  
*University of KwaZulu-Natal*

### Abstract

*The New technology and information tend to have a lot of attractions on students, especially young adults which constitute the sample of this paper. However, mobile telecommunications offer various services that interest young people. These services are used to create and maintain social interactions while also relying on it for educational purposes. This paper is based on empirical research to examine the academic and social uses of mobile telecommunication services by first-year Information Technology (IT) students at Lagos State University, Nigeria (LASU). Students' use of mobile telecommunications services is analyzed using the Technology Acceptance Model (TAM) and the theory of planned behaviour. The study identifies challenges that could affect the use of mobile telecommunication services and it also pinpoints some factors that influence the acceptance and usage of mobile phones in education. The analysis enables the understanding of the significance of the variables and their influences on students' perceptions. The significance of these factors as well as limitation of the study was ascertained. This paper provides insight into the usage of mobile telecommunication services for different academic and social activities as well as presenting the impact of mobile telecommunication services on students' life.*

### 1. Introduction

Mobile telephones have become globally accepted as a better means of communication [1]. This is as a result of an assortment of services that subscribers to mobile telecommunications could use. Mobile telephone service is known to be a system for providing services to multiple, mobile receivers or subscribers using two-way radio communication over a limited number of frequencies [2]. Mobile subscribers are subscribers who are connected to a network via a radio link that allows them to move through areas, called cells, which are served by various fixed stations: cellular radio [3]. The subscribers, in this paper, refer to the users of mobile telecommunication services. Subscribers encounter a range of experiences in their use of mobile telecommunication services which often define their perception of the quality of service.

Understanding the concept of user experience is very important in the context of provision of telecommunication services. Generally, user experience is based on the opinion or feeling that users of a particular service have about a company or the service that the company provides [4]. Direct contact of customers with a company includes purchase and use of service while indirect contact involves coming across a company's products or services. The whole idea of quality service is that user experience should not only be exciting but should be trouble-free. Trouble-free experience is not the only service expected from network providers, provision of service that will increase user's satisfaction is also important, and this can be achieved through the quality in delivery of services. Mobile telecommunication network operators seek to develop the quality of mobile telecommunication services by investing in new technology and adopting innovative ways of communication.

The next section of the paper discusses the models that constituted the theoretical framework of the study. It then presents the research method, as well as the mode of data collection and analysis. In what follows, the paper provides a brief profile of the Nigerian telecommunication sector. A general discussion of students' use of mobile telecommunications narrows down into the description of the study's findings in respect of first-year IT students at Lagos State University (LASU). Finally, the paper concludes with an argument for the integration of mobile telecommunication services into teaching and learning.

### 2. Theoretical framework

Several studies have utilized the Technology Acceptance Model (TAM) and theory of planned behavior to explicate the use of technologies by people. TAM suggests that attitude would be a direct forecaster of the intention to use technology which would in turn predict the actual usage of the technology [5]. However, perceived usefulness and perceived ease of use are critical factors that influence the use of technology [6].

Contributing to the factors, the awareness of the availability of technology is crucial to determining the intention of using the technology and the actual use of the technology. The assumptions of TAM

offer some utility to this study. The use of mobile telecommunication services by students is dependent on the awareness about the availability of such services. Students' behaviour in the form of their attitudes and intentions, perceived usefulness as well as perceived ease of use of mobile telecommunication services also determine the actual use of the services. Therefore, it is possible to unpack user behaviour (namely the behaviour of first-year IT students) with reference to the acceptance and use of mobile telecommunication services through the extrapolation of the assumptions of TAM.

The theory of planned behaviour is also used to understand people's intention to engage in a number of activities [7]. Some of the activities described in this study include the use of mobile telecommunication services for academic and social activities. Therefore, the theory of planned behaviour presupposes that intentions to involve and relate with a particular programme is achieved by attitudes towards using information and communication technology, supposed social pressure to do so and by perceived control over the interaction [8].

Students' behaviour in the form of their attitudes and intentions, perceived usefulness as well as perceived ease of use of mobile telecommunication services also determine the actual use of the services. The attitudes and intentions of first-year IT students towards technology in general and mobile telecommunications in particular are reflected in their use of mobile telecommunication services for academic and social activities. The academic activities entail finding new information, information sharing, research and the use of Short Message Services (SMS) to check examination results. Some of the social activities include keeping in touch with family, keeping in touch with friends, making new friends and using data services for social networking sites i.e., Facebook.

Consequently, there is a possibility of unpacking the preferences of first-year IT students with reference to the acceptance and the usage of mobile telecommunication services through the extrapolation of the assumptions of TAM. Furthermore, the theory of planned behaviour implies that the intention to connect and relate with a programme or application has an effect on the attitudes directed at the usage of mobile telecommunications services by first-year IT students.

### 3. Methodology

#### 3.1. Population and sampling techniques

The data for this paper was generated from research conducted in 2011 amongst first-year IT students at Ojo Campus of the Lagos State

University. An estimated population of 950 first-year IT students enrolled in 2011. The sample for the study was obtained through simple random technique. Simple random sampling of finite population is described by choosing elements randomly from a population one step at a time and at each step the remaining elements in the population are guaranteed that they have the probability of being selected [9]. Using this logic, a 50% simple random sample was selected by distribution of 500 questionnaires to the student cohort. A total number of 310 questionnaires were obtained out of the 500 handed out.

Table 1. Description of sample

Description of Sample - LASU					
		Frequency	%	Valid %	Cumulative %
Valid	Male	129	41.6	42.0	42.0
	Female	178	57.4	58.0	100.0
	Total	307	99.0	100	
Missing	System	3	1.0		
Total		310	100.0		

#### 3.2. Data collection instrument

A self-administered questionnaire was designed for the primary data collection procedure. The self-administered questionnaires consisted of structured, closed format, biographical and rating scale type of questions. The format of the questionnaire elicited information about the relevant issues on the use of mobile telecommunication services amongst first-year IT students in LASU. The data and information collected are pre-structured according to the assumed relationship between the concepts of the models used [10]. Data analysis was elaborated using set of statistical techniques for data diagnosis such as data preparations, data descriptions and scale analysis so as to improve the validity and reliability of findings.

Descriptive and inferential analyses were used to analyze the collected data. Basic features of the collected data were described and interpreted. A combination of statistical software Statistical package for Social Sciences (SPSS) and Microsoft Excel was used for the data analysis. The analysis of findings is presented in a subsequent section of this paper. An overview of Nigeria's telecommunications sector follows.

#### 4. Overview of mobile telecommunication in Nigeria

The appearance of mobile telephony is one of the major revolutions of communication in Nigeria. This

is simply because no other technology has been so beneficial to all like the mobile telephony. In the early days of mobile telecommunication technology in Nigeria, only the rich were able to afford the services. However, within a few years of its introduction to Nigeria, the technology became commercially available. Many young people were fascinated by the Global Systems for Mobile Communication (GSM) technology/handsets, a lot of them spent their savings just to acquire one. Nowadays, mobile phones are no longer possessed only by the rich but are available to almost all persons [11]. During the early period of mobile telecommunication technology in Nigeria, the analogue cellular phones were used which only allowed voice communication services.

Mobile cellular services made their debut in 1993 on the Nigerian market with a federated service operated by Nigerian Telecommunications Limited (NITEL) and Mobile Telecommunication Services (MTS) that operated within Lagos State only with a joint subscriber base. They offered voice services over an analogue Extended Total Access Communication Systems (E-TACS) network, with basic value added services like paging and voicemail from three switches in Abuja, Enugu and Lagos. MTS closed operations in 1995 due to failure to pay interconnection fees to NITEL. Subsequently, Mtel surfaced as NITEL's Mobile service provider. NITEL was owned by the Nigerian government, it was the principal telecommunication company in Nigeria until it was sold to Mtel.

The Nigerian telecommunication market offers many opportunities for telecommunication operators. The Nigerian Communication Commission (NCC) is the self-governing national regulatory authority for telecommunication sector in Nigeria. The commission is accountable for permitting and creating enabling environment for competition amongst telecommunication network operators in Nigeria. NCC also ensures the delivery of quality and effective telecommunication services all over the country. The government of Nigeria reopened GSM licensing in late 2000 from the GSM licensing process that was cancelled earlier the same year.

A few winners emerged from the process of auctioning mobile cellular licences which include; Econet Wireless Nigeria, Mobile Telephone Network (MTN) Communications Nigeria and Mtel, the mobile telephony arm of NITEL. The market grew exponentially under a period of three years from 2001 to 2003 [12]. All operators were to operate in the 900MHz and 1800MHz spectrum bands, where there is room for upgrading of future network to General Packet Radio Switching (GPRS), Third Generation (3G) and so on.

Figure 1 shows Nigeria's GSM market share in 2003. (Subscribers' data for recent years up to 2013 can be found in Figure 3). Figure 1 indicated the

earlier GSM market share in Nigeria and it is divided into three parts. There were two multinational mobile telecommunication network operators (MTN and ECONET). ECONET Zimbabwe and Sothern government owned Transnet both have interest in ECONET Wireless International (EWI). Both companies held a 60% stakes in the Nigerian ECONET [13]. MTN has the highest GSM market share of 54%, ECONET has a market share of 39% and Nigerian Government owned NITEL has the lowest share of the market of 7% as at the end of 2002 [12].

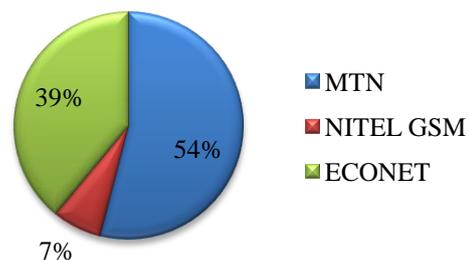


Figure 1. Early GSM market share - 2003

However, the recent GSM market share of mobile network operators in Nigeria telecommunication is shown in Figure 2. It indicates that MTN has the highest market share of mobile operation with the highest number of 47.64%, Globacom in second place with 24.17% of market share, Zain (Airtel) in third place with 19.5% of the market share, Etisalat in fourth place with market share of 8.36% and in fifth position with the lowest market share of mobile operation is Mtel with 0.32%.

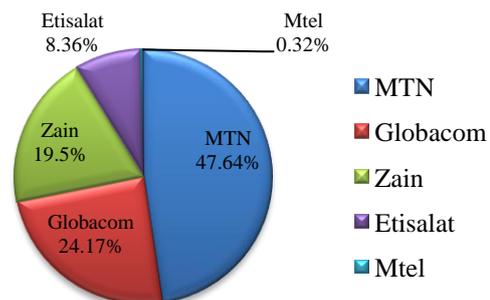


Figure 2. Recent GSM market share – 2013

The liberalization of the mobile phone market in Nigeria has allowed new telecommunication companies to emerge, and as of 2013 there are five major GSM network providers in Nigeria that are operating on the 900/1800 MHz spectrum which include Etisalat, Globacom, Mtel, MTN and Zain (Airtel). Nigeria only had approximately 500,000 land line for over 100 million people when the GSM technology was first introduced in 2001 [14]. The

introduction of mobile phone made individual cellphone owners became small-scale entrepreneurs by converting their personal cellphone into informal businesses. As a result, cellphone owners started opening call centers with one attendant across the country including major cities and rural areas with no/insufficient electricity or no/insufficient water supply.

It was estimated that more than 10,000 people in Nigeria were employed by GSM network operators, another 1 million indirect employment opportunities created within the operations of GSM [15]. These include the airtime voucher hawkers (well known as recharge card hawkers in Nigeria) and resellers with canopy phone kiosks who offer telephone services to the public. The cost of making phone calls has declined over the years in Nigeria. Although, Africa still grapples with higher phone call prices compared to the average world standard. To attain reduction in call prices, more competitors have to make a difference in the African mobile telecommunication sector [16]. The price of a SIM card has also declined dramatically over the years. Some companies offer free SIM cards as part of their periodic marketing campaigns.

In September 2013, an annualized report on telecommunications active lines was released by NCC [17]. The rapid increase of mobile telecommunication subscribers has grown dramatically in which Figure 3 shows the graphical teledensity for fixed and mobile telephone subscribers' data. From 2001 to 2013, the number of active subscribers has grown from 866,782 to 121,888,014 respectively from the Nigeria's population of over 150 million citizens. This is evident that mobile telecommunications technology is beneficial and the country has witnessed a meaningful expansion of their telecommunications network and outstanding productivity.

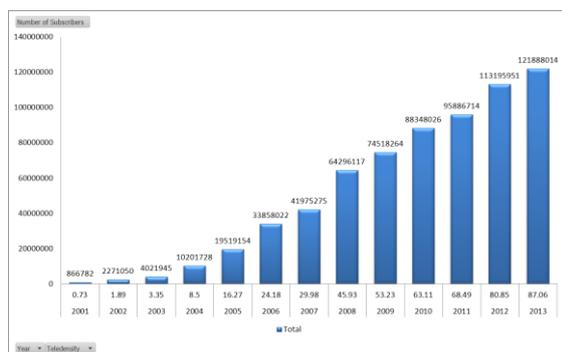


Figure 3. Subscriber/Teledensity data 2001-2013

The Nigerian telecoms statistics share by technology as of September 2013 is described in Figure 4. Mobile (GSM) has the largest technology share of 97.69%. Next is the mobile Code Division Multiple Access (CDMA) with 2.01% technology

share and lastly the fixed line (wired and wireless) technology is 1%. Figure 3 buttressed all that has been described regarding mobile telecommunication network operators in Nigeria.

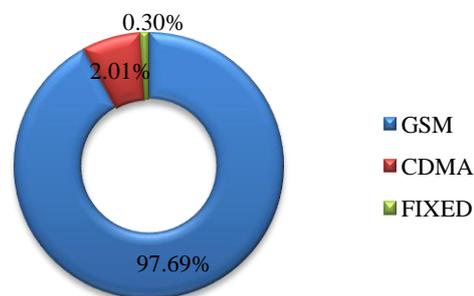


Figure 4. Percentage of market share by technology

## 5. Challenges of mobile telecommunications in Nigeria

Most African countries are still at their developing or partially developed phase regarding technology usage. Surprisingly, mobile telecommunication technology is a form of struggle to assert state power in a country like Nigeria. Hence, it is not a surprise that the emergence of mobile telephony came with the rebirth of the civilian rule in May 1999 [18]. This provides evidence that there is political interference in telecommunication transformation. However, some researchers to mention a few have worked on topics related to the politics of telecommunications (e.g. [18], [19]).

Nigeria is faced with different challenges that must be addressed in its ICT formulation policy [19]. The major challenge indicated is stability of power (electricity) source provided by Power holding company of Nigeria (PHCN). Electricity is a necessary condition for effective ICT operation environment. Hence, the growth of mobile telecommunications in Nigeria has exceeded all estimations and predictions. The question now is not about where the demand is but instead the question is how to meet the demand considering the huge population of subscribers?

## 6. Findings

### 6.1. Students' perceptions of mobile telecommunication services - LASU

A total of 310 first-year IT students at LASU indicated the mobile telecommunication services that they use. Findings shows the number and corresponding percentage of participants who use each service. The use of each service is measured in relation to all participants at LASU. The vast

majority of students constituting 92.9% use SMS, followed by the use of MMS at 62.9%. Voice call is used by 59.4% of students surveyed while conference call and data services are used by 54.5% and 52.9% respectively. Global Positioning System (GPS) services and International roaming have the lowest percentage usage of 19.7% and 11.6% respectively.

### **i. Academic activities**

Questions were asked in LASU amongst the first-year IT students in respect to identifying the academic activities that they use mobile telecommunication services for and as well identify the frequency at which they use the service in order to enhance their academic agendas. Communicating with lecturers is the greatest attraction that mobile telecommunication services have for participants in LASU. 87.2% of participants from LASU use mobile telecommunication services to communicate with their lecturers. The reason for this is because lecturers in LASU provide their cell phone numbers to students. The second greatest attraction that mobile telecommunication services have is for information sharing as 79.9% of LASU participants use mobile telecommunication services for this purpose. The third attraction that mobile telecommunication services have is finding new information as 68.9% of participants in LASU use mobile telecommunication services for this purpose.

About 50.81% of participants indicated that they use mobile telecommunication services for their research works, another 40.33% of participants use mobile telecommunication services to communicate with tutors/mentors and a small number of participants (10.5%) indicated that they use mobile telecommunication services to get their exam results. This shows that only a few students in LASU use mobile telecommunication services to obtain their exam results. This is attributable to the inadequacy of infrastructural amenities within the university to support this service. From the result gathered in LASU, it shows that students use mobile telecommunication services to communicate with their lecturers, find new information, share information which is significant to academic activities.

Another important use of mobile telecommunication services for academic activities from the perspective of participants is reflected in the data collected which indicates the frequency of the use of mobile telecommunication services for academic purposes in LASU. A number of participants (48.9%) rarely use mobile telecommunication services for academic activities. Over a quarter of participants that is 34% use mobile telecommunication services for academic purposes every day. Furthermore, in terms of frequency 8.4%

of participants use mobile telecommunication services every week for academic activities. Another group of participants (7.8%) also use mobile telecommunication services for academic activities once in two weeks and only 1% of participants never use mobile telecommunication services for academic activities. Those in the categories of every day, every week, and once in two weeks constituted over half of the participants. The total amount of those in those categories (50.2%) use mobile telecommunication services regularly for their academic work.

### **ii. Social activities**

LASU participants were asked to indicate the social activities that they use mobile telecommunications for. Fig. 7 shows the social activities that students use mobile telecommunications for or do not use it for. 36.4% of LASU participants make new friends through the use of mobile telecommunications and a high percentage of 85.5% of participants keep in touch with friends through the use of mobile telecommunications. The highest percentage of students (95.1%) use mobile telecommunications to keep in touch with family. The third highest percentage of students constituting 45.6% use mobile telecommunications for social networking. Only a very few participants (30.9%) use mobile telecommunications for downloading MP3s and multimedia videos while the smallest number of students constituting 9.4% of participants indicated their use of mobile telecommunications for shopping. Majority of the students that participated in the study are either funded by parents or through scholarships/bursaries. So they may not have the ability to engage in mobile payments but it is significant that they engage in social activities by keeping in touch with family and friends through the use of mobile telecommunications.

In what follows, the frequency of the use of mobile telecommunication services for social activities and the relevance of mobile telecommunications to social interaction is implied. The smallest percentage of participants (1.3%) never use mobile telecommunications for social activities. A quarter (25.2%) of participants rarely use mobile telecommunications for social activities. A small group of students representing 6.6% of participants use mobile telecommunications for social activities once in every two weeks. A further 9.6% of participants use mobile telecommunications services for social activities every week. The highest percentage of students with 57.1% of participants use mobile telecommunication services for social activities every day. It is indicated that the highest number of participants use mobile telecommunications to keep in touch with family and friends. Almost two-third of participants (those in the everyday and every week categories) use mobile

telecommunication services regularly for social activities. The findings suggest that there is a sense in which mobile telecommunication contribute to social interactions.

## 6.2. Impact of mobile telecommunication services on students' life

### i. Academic endeavours

Figure 5 below provides relevant information on the impact of mobile telecommunication services on participants' academic endeavour in LASU. It is necessary to find out the impact of mobile telecommunication services have on participants' academic endeavour based on participants' perceptions. The description of the findings in this aspect of the study is presented according to the sequence of impact assessment as portrayed in the figure below. Only 1.3% of participants described the impact of the use of mobile telecommunication services on their academic endeavour as overwhelmingly negative.

Next is another group of participants (14.4) who described the impact of mobile telecommunication services on their academic endeavour as somewhat negative. The lowest number of students with only 1% of participants did not know the impact that mobile telecommunication services had on their academic endeavour. It is said that participants in this category could not or had yet to establish a correlation between academic performance and their use of mobile telecommunication for their academic purposes.

A very huge and the highest number of students with 77.5% of participants identified the impact of the use of mobile telecommunication services on their academic endeavour as somewhat positive. The last group of participants in terms of sequence, representing 5.9% of participants indicated that the impact of mobile telecommunication services on their academic endeavour is overwhelmingly positive. Putting into consideration, the students in the category of somewhat positive and overwhelmingly positive. There is a positive relationship between the use of mobile telecommunication services for academic purposes and academic performance. It is considered that the use of mobile telecommunication services for academic purposes produced positive impacts.

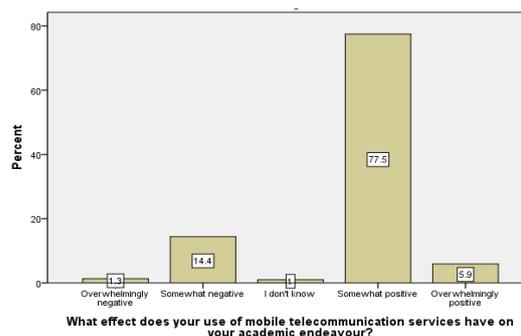


Figure 5. The effect of mobile telecommunication on academic endeavours

### ii. Social life

In the light of the frequency of the use of mobile telecommunications for social activities, the study considers participants articulation of the impact of mobile telecommunications on their social life. Figure 6 below depicts the impact assessment from participants' perspectives. The description of findings is represented according to the sequence of impact assessment as portrayed in figure 6. A small amount of students (0.7%) described the impact of mobile telecommunication services on their social life as overwhelmingly negative. It is followed by the group of participants (3.6%) who described the impact of mobile telecommunication services as somewhat negative. Having said that negative impact assessment is underscored by the potential and actual drawbacks associated with the use of mobile telecommunication services namely, possible impairment of interpersonal physical contact and distraction as well as addiction to technology.

The smallest group of students representing 0.3% of participants did not know the impact that mobile telecommunication services have on their social life. The highest number of students (48%) described the impact of the use of mobile telecommunication services as somewhat positive. The last group of students in terms of sequence with 47.4% of participants identified that the impact of mobile telecommunication services on their social life is overwhelmingly positive.

It can be said that participants in the last two categories (Somewhat positive and overwhelmingly positive) implied positive correlation between the use of mobile telecommunication services for social activities and improved social interactions.

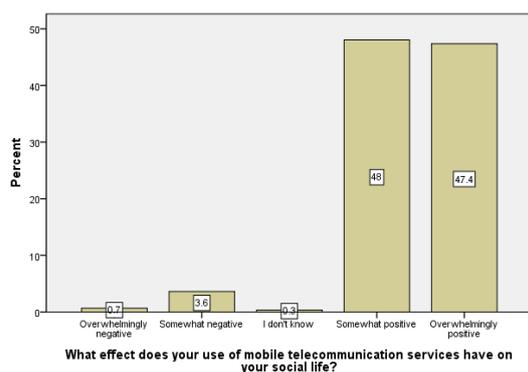


Figure 6. The effect of mobile telecommunication on social life

### 7. Discussions of findings

The findings of this study were analyzed using inferential statistics mainly in the form of cross-tabulation and chi-square test. These analyses enable the understanding of the significance of the variables and their influence on participants' perceptions.

However, there are some factors that influence adoption and usage of mobile phones in education. These factors constitute part of the requirements of any mobile telecommunication networks' quality of service. In order to probe the formation of the factors (i.e., Cost/billing services, Customer care services, Network availability, Network stability, User satisfaction and Voice clarity) that influence adoption and usage of mobile phones in education, participants were asked to identify the level of significance of these factors and the findings are presented in Table 2.

Table 2. Significance of factors

Factors	Level of significance (% of respondents)				
	Of no significance	Of little significance	Of some significance	Significant	Very significant
Cost/Billing Services	0.3	0.7	0.7	2.6	95.7
Customer Care Services	0	0	0.3	1.7	98
Network Availability	0	0	0	0.7	99.3
Network Stability	0	0	0	1.3	98.7
User Satisfaction	0	0	0.7	2.3	97
Voice Clarity	0.3	1.3	0.3	1	97

The responses show that each factor identified is very significant in the adoption and usage of mobile phone in education. It is obvious that network availability (99.3%) is the most significant factor. The availability of mobile telecommunication networks will greatly influence the attitude towards using the technology as well as impact in the behavioural intention to use the technology which will in turn allow the actual usage of the technology amongst participants. The acceptance and the usage of these mobile telecommunication services (drawing from the assumptions of TAM) have influenced participants' intention to use the services. Hence, the

understanding of people's intention to engage or relate with these factors is achieved by participant's attitudes towards using information and communication technology through the assumption of the theory of planned behaviour.

### 8. Limitations

An obvious limitation in this research is its focus exclusively on first-year IT students at LASU. This study's findings help to understand the orientations and attitudes of first-year IT students towards an aspect of technology acceptance and use. However, the behavioural patterns and nuances presented in this study may not necessarily apply to students at higher levels of study in the same discipline or in other disciplines within the university.

### 9. Conclusion

The actual usage of mobile telecommunication services by students largely depends on individual characterization or discretion of students. Nevertheless, varying uses of mobile telecommunication services for academic activities suggest that mobile telecommunications could serve as an important educational tool. An understanding of the patterns of usage of mobile telecommunication services by students engenders opportunities to explore ways through which mobile technology could be integrated into teaching and learning processes. It is envisaged that the integration of mobile telecommunications into teaching and learning in universities will facilitate student-centered learning. The integration of mobile telecommunication services lends itself readily to efforts at mainstreaming ICTs into the teaching and learning processes in universities across the world.

Finally, this paper provides insights into the usage of mobile telecommunication services for different academic and social activities by first-year IT students at LASU. While first-year IT students may find it expedient, beneficial or relatively easier to use mobile telecommunication services for these purposes, this may not necessarily be the case for students in other disciplines. Further research with respect to students in other disciplines will likely reveal commonalities and divergences in students' use of mobile telecommunication services. These commonalities and divergences could, in turn, stimulate further scholarly inquiry that could engender benefits for students and academics. In addition, mobile telecommunication network operators could gain from such insights as they seek to streamline services to meet the needs of users in a changing and increasingly competitive operational environment.

## 11. Acknowledgements

Special acknowledgement goes to Ayo Whetho for contributing towards the concepts of the study. Portion of this study have been presented at the International Conference on Information Society (i-Society), University of Toronto, Canada, 24-26 June 2013.

## 10. References

- [1] P. N. Howard, and N. Mazaheri, Telecommunications Reform, Internet Use and Mobile Phones Adoption in the Developing World. *World Development* Vol 37, No. 7, 2009, pp. 1159-1169.
- [2] A. Basso, and H. Kalva, Beyond 3G Video Mobile Conversational Services: An overview of 3G-324M based messaging and streaming. *IEEE Sixth International Symposium on Multimedia Software Engineering*, 2004, pp. 1-8.
- [3] J. V. Duuren, P. Kastelein, and F. C. Schoute, *Fixed and Mobile Telecommunications: Networks, Systems and Services*. Harlow: Addison-Wesley, 1996
- [4] C. Meyer, and A. Schwager, Understanding Customer Experience. *Harvard Business Review*, 2007.
- [5] F. D. Davis, R. P. Bagozzi, and P. R. Warshaw, User Acceptance of Computer Technology: A comparison of two theoretical models\*. *Management Science*, 1989, pp. 985.
- [6] M. Bertrand, and S. Bouchard, Applying The Technology Acceptance Model to VR with People Who Are Favorable to Its Use. *Journal of Cyber Therapy and Rehabilitation*, 2008, pp. 200-201.
- [7] L. Siragusa, and K. C. Dixon, Planned behaviour: Student attitudes towards the use of ICT interactions in higher education. *Proceedings ascilite Melbourne Bently*, Sydney: Curtin University of Technology, 2008, pp. 942-953.
- [8] M. Fishbein, and I. Ajzen, *Belief, Attitude, Intention and Behaviour: An Introduction to Theory and Research*. Philippines: Addison-Wesley Publishing Company, 1975.
- [9] D. R. Anderson, D. J. Sweeny, T. A. Williams, and T. A. Williams, *Statistics for Business and Economics*. Mason: Thomson Higher Education, 2009.
- [10] A. J. Mills, G. Durepos, and E. Weibe, *Encyclopedia of Case Study Research* Vol 1. California: Sage Publication Inc., 2010
- [11] O. Oyewola, The evolution of mobile telephony in Nigeria. Retrieved 2011, 17-May from IT News Africa: <http://www.itnewsafrika.com/2007/06/the-evolution-of-mobile-telephony-in-nigeria/>, 2007.
- [12] A. Wills, and G. Daniels, Nigerian Telecommunication Market: A Snap Short View. *Africa Analysis*, 2003, pp. 5-6.
- [13] J. O. Ajiboye, E. O. Adu, and J. I. Wojuade, Stakeholders' Perceptions of the Impact of GSM on Nigeria Rural Economy: Implication for an Emerging Communication Industry. *Journal of Information Technology Impact*, Vol. 7, No. 2, 2007, pp. 131-144.
- [14] D. J. Smith, Cell Phones, Social Inequality, and Contemporary Culture in Nigeria. *Canadian Journal of African Studies*, Vol 40, No. 3, 2006, pp. 496-523.
- [15] O. Osibanjo, and I. C. Nnorom, Material flows of mobile phones and accessories in Nigeria: Environmental

implications and sound end-of-life management options. *Environmental Impact Assessment Review*, 28, 2008, pp. 198-213.

[16] C. Djiofack-Zebaze, and A. Keck, Telecommunications Services in Africa: The Impact of WTO Commitments and Unilateral Reform on Sector Performance and Economic Growth. *World Development* Vol. 37, No. 5, 2009, pp. 919-940.

[17] NCC. Nigerian Communication Commission, Industry Statistics. <http://www.ncc.gov.ng/> (Access Date: 15/01/2014).

[18] E. Obadare, Playing Politics with the Mobile Phone in Nigeria: Civil Society, Big Business and the State. *Review of African Political Economy*, Vol. 33, No. 107, State, Class & Civil Society in Africa, 2006, pp. 93-111.

[19] L. I. Diso, Information Technology Policy Formulation in Nigeria: Answers without questions. *The International Information & Library Review*, Vol. 37, 2005, 295-302.