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## Use of Mobile Phone Technology in Education for Easy Accessibility of Information: Challenges and Prospects

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### Abstract

Information and communication technology has opened up such tremendous vistas for modern societies that any failure to master it would mean a life of permanent subordination. The evolution  of Mobile phone makes it possible to work with distance learning, achieve a closer collaboration among teachers and students and

also pave way for a new pedagogical approach where there is unparalleled ability to spread knowledge and disseminate information. This research adopted a survey design which sought information from respondents on the Use of Mobile phone Technology in Education for Easy Accessibility of Information. Three research questions guided the study. The population comprised five thousand, eight hundred secondary school graduate teachers in 265 public secondary schools in Anambra State. Disproportionate stratified-random sampling technique was adopted in selecting one thousand three hundred and sixty-five teachers for the study. A questionnaire entitled "Use of Mobile Phone Technology in Education" was developed by the researcher, validated by experts and used for data collection. Pearson's Product Moment Correlation Co-efficient was used to obtain a reliability coefficient of 0.84. Data were collected and analyzed using mean and standard deviation. The findings revealed services obtained from the use of mobile phone in education to include making and receiving of voice calls, sending and receiving SMS, browsing the wireless application protocol sites, taking photos and recording videos, receiving local AM/FM stations, sharing and receiving multimedia messages/calls, connection to the internet & WWW etc. Challenges include lack of skilled ICT personnel, related infrastructure, reliable source of power supply, technologist for routine repairs among others. Based on the findings, recommendations include among others that government should organize workshops, seminars, and conferences for stakeholder and teachers to be trained on the use of mobile phone in education, adopt ICT international standard in Nigerian educational curriculum and provide reliable source of power and relevant infrastructures in the schools.

**Key word***: Mobile Phone, Technology, Education, Challenges & Prospects*

## Introduction

Science and Technology are powerful instruments for economic growth of any nation. Science is concerned with finding out about things in our environment. Technology is referred to as the things people device to accomplish particular tasks or different categories of human productive effort and the processes people use to change various aspects of their world. Rodney (1972) defined technology as the material means which includes tools, techniques and knowledge by which man meets his needs and desires. At the center of the concept are knowledge and its application in solving human problems especially those posed by the environment. Education, a heritage to all societies not only offers knowledge to its beneficiaries but also equips them with varying degrees of skills, attitudes and all the information necessary for the performance of their responsibilities (Unachukwu & Nwankwo, 2008).

Educational systems around the world are under increasing pressure to use the new Information and Communication Technology (ICT) because the use of ICT

brings about changes to classroom teaching and learning (UNESCO (2002). According to Daniels (2002) ICTs have become within a very short time, one of the basic building blocks of modern society. Many countries now regard understanding ICT and mastering the basic skills and concepts of ICT as part of the core of education, alongside reading, writing and numeracy. However, there appears to be a misconception that ICTs generally refers to 'computers and computing related activities'. This is fortunately not the case, although computers and their application play a significant role in modern information management, other technologies and/or systems also comprise of the phenomenon that is commonly regarded as ICTs.

According to UNESCO (2002) information and communication technology (ICT) may be regarded as the combination of 'Informatics technology' with other related technology, specifically communication technology. Informatics refers to the science dealing with the design, realization, evaluation, use and maintenance of information processing systems, including hardware, software, organizational and human aspects, and the industrial, commercial, governmental and political implications of these. Informatics Technology on the other hand is defined as the technological applications (artifacts) of informatics in society. From a less technical viewpoint the term information and communication technology (ICT) refers to the range of technologies that are applied in the process of collecting, storing, editing, retrieving and transferring of information in various forms (Haddad and Draxler, 2002). The foregoing definition implies that a broad range of technological equipment such as computers, mobile telephones, MP3/MP4/WMA storage devices, file transfer protocols, listservs, satellites, world wide web, internet etc. are used for information exchange among people for different purposes. These devices are capable of both synchronous and asynchronous communication formats, and the most advanced of these technological applications is the concept of multimedia, which refers to teaching and learning devices that include a combination of data manipulators e.g. video, CD ROMs, floppy disks etc. which facilitates interactive communication between and among individuals. Given these descriptions of the components of ICTs, it should be clear why ICTs are considered a more robust and all-encompassing phenomenon than the popular narrowly held conception of mere application of computers in human activities. Globalization and technological change are one of the main goals of ICT.

Mobile phone technology as one of the leading ICTs nowadays can be utilized for students learning. Mobile technology focuses on the viability of short message system (SMS) for distance learning, pedagogy, teachers' training and personnel management. University of Nigeria Open University (UNOU) is one of the best examples of education transformation that empowers the potential of ICT in the Nigerian educational system. By maximizing the use of technology to create a wide range of learning, UNOU promotes lifelong learning in a more convenient way. The

poor presence of information technology infrastructure in Nigeria triggered the introduction of Global System for Mobile Communication (GSM). The GSM network is a wireless network designed to provide a roaming traffic via satellite link which allows people visiting or working in different locations around the country or region to use their mobile phones to make and receive calls (Osuagwu 2005). The ongoing telecommunication renaissance sweeping the country right now is driven largely by mobile or wireless technology that is cheaper and easier to deploy than wired network. GSM phones can enable subscribers to send and receive short text message, browse the wireless' application protocol (WAP) sites, and make voice calls. Thus if you remove wireless access in Nigeria today, internet penetration will collapse. Most cyber cafes and tele-centers in Nigeria are connected via wireless. Part of the GSM technology is the deployment of analogue mobile phone network to provide additional services such as voice mail; short message services (SMS) and prepaid subscriptions. The SMS platform allows subscribers to send and receive text message of up to 160 characters.

In recent years, development in mobile computing and communication led to the proliferation of mobile phones, tablet computers, smart phones, and net books. This made the Internet and computing more accessible to people, especially in emerging markets and developing countries where most of the world's poor reside. Furthermore, these consumer electronic products are equipped with basic mobile communication hardware like, WiFi and 2.5G/3G Internet USB sticks. These allowed users to connect to the Internet via mobile and wireless networks without having to secure a landline or an expensive broadband connection via DSL, cable Internet or fiber optics. Moreover, data from the International Telecommunication Union's measuring the Information Society 2011 report shows that mobile phones and other mobile devices are replacing computers and laptops in accessing the Internet. These developments and growth in mobile communication and its penetration in developing countries are expected to bridge the digital divide between least-developed countries and developed countries although there are still challenges in making these services affordable. (ICT4D Wikipedia, 2013)

Mobile learning or M-learning according to Traxler (2005) is the exploitation of ubiquitous handheld technologies together with wireless and mobile phone networks to facilitate, support, enhance and extend the reach of teaching and learning. Advancement in hardware and networking technologies made it possible for mobile devices and applications to be used in the field of education (Caudill 2007). Newer developments in mobile phone technology makes them more embedded, ubiquitous and networked, with enhanced capabilities for rich social interactions and internet connectivity. Such technologies can have a great impact on learning by providing a rich, collaborative and conversational experience to both teachers and students (Naismith, Lonsdale, Vavoula & Sharples, 2004). The hole in the wall (also

known as minimally invasive education) and the utilization of mobile phone technology are projects which focus on the development of computer literacy and the improvement of learning to improve educational outcome (ICT4D Wikipedia, 2013).

Mobile learning is adapted in classes since it helps in the enhancement of students' learning and also helps teachers to easily keep track of the students' progress. Communication when needed is possible at any given time. Discipline and responsibility must go through with the contents in mobile learning since whatever is posted is made available to those who are given access (Peña-López, 2010). Despite the challenges that it presently faces, both technical and pedagogical, experts still remain positive about the concept of mobile learning. The most commonly expected advantages from adopting mobile technology in education include their potential to be engaging for students, to enable interactive learning, and to support personalization of instruction to meet the needs of different students (Interactive Educational Systems Designs Inc. 2012). The use of mobile phones as part of information and communication technology for development initiatives has proven to be a success as the rapid distribution of mobile telephony has made it possible for poor people to have easy access to useful and interactive information (Languepin, 2011). The unexpected growth of affordability and coverage of mobile telephony services has increased its importance not just as a means of two way communication but that of ease-of-access to information as well. Mobile phones are capable of much more than the exchange of information between two people through calling or text messaging. Advanced models of mobile phones can take photos, record video, receive local AM/FM stations radio frequencies, share and receive multimedia and even connect to the Internet: almost all the features that come with being connected to the World Wide Web. These features make them an even better device to aid in the use of ICT in education. Sanyal (2001) stated that ICT provides new educational approaches and UNESCO (2002) noted that ICT enhances international dimension of educational services and thus can be used for non-formal education like health campaigns.

According to a study conducted in Tanzania as citied in ICT4D Wikipedia, (2013), the use of mobile phones has impacted rural living in the following ways: entrepreneurship & job search, easy access to information, market inefficiencies, transport substitution, disaster relief, education, health, social capital and social cohesion etc. Young (2002) stated that mobile technologies and seamless communication technologies support 24 x 7 teaching and learning. Choosing how much time will be used within the 24 x 7 envelope and what periods of time are challenges that will face the educators of the future. Botttino (2003) and Sharma (2003) noted that the use of ICT can improve performance teaching, administration and develop relevant skills in the disadvantaged communities. It also improves the quality of education by facilitating learning by doing, real time conversation, delayed

time conversation, directed instruction, self-learning, problem solving, information seeking and analysis, critical thinking as well as ability to communicate, collaborate and learn (Yuen, Law & Wong, 2003). The e-learning Africa 2011 conference as cited in ICT4D Wikipedia, (2013) highlighted the worldwide phenomenon of distance learning by mobile phone stating that more Africans learn by mobile phone. The development of mobile phone learning in Africa is being encouraged by a huge demand for distance education. ICT eliminates geographical barriers as learners can log on from any place (Bhattacharya & Sharma, 2007; Cross & Adam 2007; Mooji 2007; Sanyal 2001). Use of ICT in education develops higher order skills such as collaborating across time and place and solving complex real world problems (Bottino 2003; Bhattacharya & Sharma 2007). The only challenge students rushing to use mobile phone learning is that logistics do not match the exponential growth of students demand. Mobile learning at our distance learning center focuses on SMS. Our students are often school teachers in very remote areas who have restricted or no access to electricity and the internet. They use bulk SMS – short messages that can be sent to many students at the same time – as well as interactive SMS services. These help students communicate with staff about the subject matter or on administrative issues thereby providing speed dissemination of education to target disadvantaged groups (UNESCO 2002).

There has also been appreciable growth in the spread and rural penetration of mobile telephony from 38% coverage in 2000 to 58% in 2006 (World Bank 2006). On the average, mobile telephony has overtaken use of the Internet which stands at 6.75 per 100 people (ITU, 2007). This wide margin is not unrelated to the fact that it costs five times more to access the Internet compared to the mobile phone. Access to computers is dismally low and has not increased significantly with 0.8 people per 100 (ITU, 2007). Older ICTs like the television are available only to 32% of the population (World Bank 2006). As mentioned earlier, Nigeria has an IT policy in place with the use of ICTs in education as one of its objectives. In this regard, individual institutions are engaging in partnerships to improve their ICT infrastructural base. For example, several universities receive support in this regard from the Partnership for Higher Education, an initiative funded by seven major foundations in the United States. Other institutions, like the University of Lagos, have received support from major telecommunication service providers like the MTN in providing networked computer laboratories for students.

Deployment of technologies in underdeveloped areas face well known problems concerning crime, problems of adjustment to social context and also infrastructural problems. The literacy issue is one of the key factors why use of mobile learning fail in rural areas; as education in literacy sets the foundation for digital and information literacy, proper education and training are needed to make the user at least understand how to manipulate the applications to get the information

they need. Constant follow-up with the students is needed to monitor if mobile learning has been successfully implemented and is being used meaningfully. The affordability of mobile phones allowed more people to acquire mobile phones before learning to use personal computers and desktops. This unfamiliarity with computers could be seen as problematic as it creates digital divide if technological devices provided are computers; a disconnection between computing technology and people causes difficulty for some of the ICT for development project initiative to take effect (ICT4D Wikipedia, 2013). Other challenges to the use of mobile phone in education include: lack of relevant infrastructure, facilities and trained professionals for computer teaching and maintenance, lack of means to maintain the mobile learning facilities because maintenance is sporadic and if a component breaks, it is costly to obtain skilled people and parts to make a repair; social contexts: the potential users living in rural marginalized areas often cannot easily see the point of ICTs because of the impediments of hunger, disease and illiteracy; possibility of encouraging brain drain and corruption (ICT4D Wikipedia, 2013).

According to Olakulehin (2007), the disparity in access to information and communications technology in Nigeria is occasioned by many and diverse problems including, low bandwidth for internet access, lack of funds to embark on full scale computerization, irregular supply of power, inadequate functional telephone lines and other infrastructural facilities needed to support the efficient and effective introduction and development of the technology. Nigeria is also short of manpower for effective utilization of software and for maintenance. Qualified programmers, engineers and technicians are equally difficult to find and when they are found, the (public) education sector cannot afford to retain them, as competition from the private sector is fierce. This lack of manpower breeds a compendium of other problems. Teachers can only pass on skills and ideas to the learners, if they are masters of their trade, and they are at the cutting-edge of knowledge and developments in their disciplines. Most teachers at all sectors of the education system have minimal or no ICT skills and hardly use existing opportunities to develop them. This will make them not survive the challenges posited by the contemporary social realities due to their level of ignorance, technophobia and information paranoia. This development, therefore calls for a re-thinking of the strategies that are adopted for teacher production in order to enhance the drive towards sustainable development.

It is against this background that the researcher sought to find the uses of mobile phone technology in education for easy accessibility of information: challenges and prospects. The pertinent question at this point is: what are the services that can be obtained from the use of mobile telephony and what are the challenges facing its use in educational system? Proffering answers to these questions are the thrust of this study.

**Research Questions**

1.  What services can be obtained from the use of mobile phone technology in education?
2.  What are the challenges facing the use of mobile telephony in education?
3.  What strategies should be used to improve the use of mobile telephony in education?

**Methodology**

The research adopted a descriptive survey design which sought information from respondents on the use of mobile telephony in education for easy accessibility of information. The population is made up of all the secondary school teachers in Anambra State public secondary schools. Data from the Post Primary School Service Commission (PPSSC) as at August 2014 stated that, there were a total of 5, 800 teachers who were teaching in the 265 public secondary schools in the state. The disproportionate stratified-random sampling technique was adopted in selecting 1,365 teachers for the study. The schools were stratified on the basis of their education zones and 20 percent of the schools in each education zone were randomly selected. From each selected school, 23 teachers representing 20 percent of the teachers were randomly picked. This gave a total sample size of 1,365 teachers. A self-developed questionnaire entitled "Use of Mobile Phone Technology in Education UMPTE" was used for data collection. The instrument has two sections (1&2) that elicited the extent of agreement of the respondents to the item statements. Section '1' was the demographic data of the respondents while sections '2' contained three sections separated into three clusters. Cluster A consisted of eight items that were concerned with the services from mobile phone technology. Cluster B contained ten items that required the respondents to provide information on the challenges facing the use of mobile phone in secondary education in Anambra State. Cluster C comprised nine items on the strategies for improvement. The items in the questionnaire were structured on a 4-point scale that ranges from strongly agree (4 points), Agree (3 points), Disagree (2 points), Strongly Disagree (1 point). The instrument was face validated by two experts in the Department of Measurement and Evaluation and two experts in ICT in Nnamdi Azikiwe University, Awka.

Their corrections were effected in the final draft. Split half method for testing reliability was applied to obtain a reliability of the instrument using 40 teachers from five schools in Imo state. Pearson's Product Moment Correlation Co-efficient was used to obtain a reliability co-efficient value of 0.84 which seems enough for the study. The copies of the instrument were administered on the sampled respondents in their schools through the help of six research assistants. All the questionnaires are

correctly filled and returned. The research questions were answered using mean and standard deviation. The mean of 2.50 and above were regarded as agreement to the items while 2.49 and below were regarded as disagreement to the items.

## Results

**Table 1: Mean and Standard Deviation of respondents on the services obtained from the use of mobile phone**

| S/N | Item:   Services from Mobile Phone Technology | X | SD |
|---|---|---|---|
| 1. | Making and receiving of voice calls | 3.19 | 1.01 |
| 2. | Sending and receiving short text messages | 3.40 | 0.77 |
| 3. | **B**rowsing the Wireless Application Protocol (WAP) sites. | 3.44 | 0.73 |
| 4. | Short message service (SMS) | 3.41 | 0.77 |
| 5. | Interactive Short Message System | 3.24 | 0.68 |
| 6. | Provision of voice mail | 3.56 | 0.58 |
| 7. | Prepaid subscriptions | 3.58 | 0.66 |
| 8. | Taking photos | 3.53 | 0.60 |
| 9. | Recording video | 3.54 | 0.55 |
| 10. | Receiving local AM/FM stations, radio frequencies etc. | 3.42 | 0.82 |
| 11. | Sharing and receiving multimedia messages/calls | 3.41 | 0.67 |
| 12. | Connection to the internet | 3.37 | 0.72 |
| 13. | Connection to  all features of World Wide Web | 3.48 | 0.78 |
| 14. | Development of computer literacy | 3.25 | 0.67 |

Table 1 indicated that all the respondents had mean ratings of 2.50 and above. This meant that all the items are identified services that can be obtained from the use of mobile phone technology.

**Table 2: Mean and Standard Deviation of respondents on the challenges facing the use of mobile phone technology in education**

| S/N | Item: Challenges facing the use of mobile phone in education | X | SD |
|---|---|---|---|
| 15. | Lack of skilled teacher of ICT. | 3.14 | 0.86 |
| 16. | Lack of reliable source of power supply. | 3.06 | 1.07 |
| 17. | Lack of technologists for routine repair. | 2.76 | 0.97 |
| 18. | Lack of ICT infrastructures in the schools. | 3.40 | 1.21 |
| 19. | Weak telecommunications backbone. | 2.60 | 0.80 |
| 20. | Lack of fund for the purchase & maintenance of equipment | 3.20 | 0.77 |
| 21. | Lack of facilities for training of teachers in ICT use. | 3.44 | 0.90 |
| 22. | Poor policy implementation strategies among stakeholder. | 2.89 | 0.99 |
| 23. | Inadequate telephone lines particularly in the rural areas | 2.78 | 0.46 |
| 24. | Management attitude and teachers own lack of interest | 2.96 | 1.25 |
| 25. | Lack of means to pay for the weekly/ monthly recharge subscription on the mobile phone. | 3.29 | 1.17 |

Table 2 indicated that all the respondents had mean ratings of 2.50 and above. This meant that all the items are identified challenges facing the use of mobile phone technology in education.

**Table 2: Mean and Standard Deviation of respondents on the strategies to improve the use of mobile phone technology in education**

| S/N | Item: Strategies for Improvement | X | SD |
|-----|----------------------------------|---|----|
| 26. | Adoption of ICT international standard and its inclusion in Nigerian education curriculum. | 3.25 | 0.89 |
| 27. | Employment of ICT experts for instruction design and development through seminars, workshops & conferences. | 2.80 | 0.75 |
| 28. | Training of teachers and stakeholders on the use of mobile phone in education. | 2.55 | 0.81 |
| 29. | Provision of relevant infrastructures in different schools. | 3.02 | 0.84 |
| 30. | Provision of reliable source of power supply | 2.89 | 0.99 |
| 31. | Provision of technologists for routine repairs | 2.67 | 0.71 |
| 32. | Establishment of information center for teachers to exchange ideas all over the world | 3.42 | 0.78 |
| 33. | Development of mobile phone assembly plants to make Phones which average Nigerian can buy. | 2.91 | 0.88 |
| 34. | Implementation of the National Telecommunication policy and National Information Technology policy | 2.70 | 0.78 |

Table 3 indicated that all the respondents had mean ratings of 2.50 and above. This meant that all the items are identified strategies to improve the use of mobile phone technology in education.

### Discussion

From the study, the result of the analysis made from table 1 indicated that the services obtained from the use of mobile phone technology include: Making and receiving of voice calls; Sending and receiving short text messages, browsing the Wireless Application Protocol (WAP) sites; Provision of voice mail, short message service (SMS), interactive SMS and prepaid subscriptions; Taking photos and recording video; Receiving local AM/FM stations, radio frequencies etc.; Sharing and receiving multimedia messages/calls; Connection to the internet and all the

features that come with being connected to World Wide Web (WWW); Development of computer literacy and means of communication between two people. This affirmed the report of Languepin (2011) who stated that the use of mobile phones has made it possible for people to have easy access to useful and interactive information.

The result of table 2 indicated the challenges facing the use of mobile phone technology in education to include: Lack of skilled teacher of ICT; reliable source of power supply; technologists for routine repair; ICT infrastructures in the schools; fund for the purchase of equipment and training of teachers in computer education; Weak telecommunications backbone; Poor policy implementation strategies among stakeholder; Inadequate telephone lines particularly in the rural areas; Management attitude and teachers own lack of interest; and Lack of means to pay for the weekly/ monthly recharge subscription on the mobile phone. This affirmed the report of ICT4D Wikipedia, (2014) who noted challenges to the use of mobile phone in education to include: lack of relevant infrastructure, facilities and trained professionals for computer teaching and maintenance, lack of means to maintain the mobile learning facilities because maintenance is sporadic and if a component breaks, it is costly to obtain skilled people and parts to make a repair; social contexts: the potential users living in rural marginalized areas often cannot easily see the point of ICTs because of the impediments of hunger, disease and illiteracy; possibility of encouraging brain drain and corruption. Olakulehin (2007) also noted that the disparity in access to information and communications technology in Nigeria is occasioned by problems such as low bandwidth for internet access, lack of funds and professional ICT personnel to embark on full scale computerization, irregular supply of power, inadequate functional telephone lines and other infrastructural facilities needed to support the efficient and effective introduction and development of the technology.

The result from table 3 indicated that the strategies to improve on the use of mobile phone technology in education include: Adoption of ICT international standard and its inclusion in Nigerian education curriculum; training of teachers and ICT experts through organization of workshops, seminars and conferences, Government support through adequate provision of fund and ICT infrastructures among others.

**Conclusion**

Information technology has opened up such tremendous vistas for modern societies that any failure to master it would mean a life of permanent subordination. The evolution of mobile telephony makes it possible to work with distance learning to achieve a closer collaboration among teachers and students and also pave way for a new pedagogical approach where there is unparalleled ability to spread knowledge and disseminate information. Information technology is more than a form of power, it

is a power system. The technology which it involves is not just one form of technology but an ability to make use of other techniques to give or refuse access to a whole range of information, scientific data and knowledge and thus design new models of development in educational system is a challenge. Thus Nigerian education system needs urgently to embrace this technology in order not to be cut off from the rest of the world. It has become one of the major catalysts for globalization with its attendant benefits that failure to master and use in education will indeed mean a life of permanent subordination to the industrialized civilizations of the world.

## Recommendations

Based on the findings, the following recommendations are made:

1. School administrators should organize seminars, workshops and conferences on the use of mobile phone technology in education for teachers to learn and inculcate these strategies into the curriculum.
2. Teachers should avail themselves for professional development programmes so as to learn the best practices in the use of mobile technology in education.
3. Industries, companies, phone operators like MTN, GLO, CELTEL etc. should be encouraged to invest in education to share vision and collaborative approach with teachers and students on the best practices on the use of mobile phone in education.
4. Principals should endeavour to care and influence the attitudes and beliefs of all the students because the use of mobile phone can affect the bonding process between the teacher and the student as it becomes a communication tool rather than face to face conversation thereby increasing transactional distance.
5. Government should provide a reliable source of power supply for all secondary schools through the provision of stand-by generator per school for their practical works.
6. Government should also assist schools and parents (PTA) in the provision of ICT facilities in schools.

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