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# A Review of Literature on Using Mobile Technologies to Change the Nature of University Library Service Delivery

By

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**Abstract**
The fundamental objective of a library is to make available reliable information to their clientele in a timely, accurate and pertinent manner. With the advent of Information and Communication Technology which allows easy access to information in a convenient form, the traditional methods of accessing library services is being altered. Academic libraries are changing their methods of service delivery; they are experimenting with mobile devices and providing services to support the information needs of their users irrespective of time or distance. They are bringing the Internet into the daily living activities of their users, thereby enabling easier accessibility and retrieval of information from anywhere and at any time. Through mobile technology, information is becoming intertwined with our daily lives. This paper provides a review of the wide array of mobile technologies such as blogs, wikis, RSS, which could be used to provide better services to library users as a way of increasing clients' accessibility and interaction with library resources.

**Introduction**

Technological innovations are increasingly influencing the way information is communicated through diverse channels particularly the Internet.These changes are also shaping the way people access information. In Higher Education Institutions (HEIs), the ever-changing context of the information society has created greater challenges for re-designing the learning process to align with current technological innovations. The continuing use of Information and Communication Technology (ICT) to support teaching and learning has also provided significant opportunities for them to explore and formulate new ways of delivering educational services (Tanko, 2012: 86). This paper examines the concept of mobile technologies as a channel for information dissemination and efficient service delivery.Itexplores the use of mobile devices in providing easy access to information resources. Among other things, the paper discusses current trends in technological applications and how they are changing academic library services. It also offers recommendations for developing a plan of action for user education programmes as well as training for library staff in the use and application of mobile devices in academic libraries in Nigeria.

**Mobile technologies and the Internet**

Mobile technologies as defined by Jarvenpaa and Lang refer to "...handheld IT artefacts that encompass hardware (devices), software (interface and applications), and communication (network services)..." (2005: 8).The invention of mobile phones such as smart phones, tablets, iPads, iPhones, e-book readers and netbooks which have advanced computing abilities, complete operating systems and internet connectivity have enabled seamless access to information irrespective of time or distance. Mobile technologies are distinguishable by their small size and portability, their portable nature and communication options provide easy access from a single device (Solvberg&Rismark, 2012: 23). Access to information from mobile devices are often determined by the desire for quick and often context-specific information such as e-mails, weather report, banking, video chat, local news, sports news and social networks like Facebook and Twitter (Hu & Meier, 2010). The proportion of users who never or infrequently use the desktop web, relying solely on mobile access, is growing. This is true of developed countries such as the United Kingdom and the United States, as well as in developing countries (Mobi Thinking, 2010). In Nigeria, the increasing availability of mobile devices and convenient accessto information has thus meant an explosion in mobile internet use.Recent statistics has indicated that as of May 2013, a total of 69 out of every 100 Nigerian own a mobile phone and a total of 114,000,000 mobile phones are actively in use in Nigeria out of a population of about 165,200,000 (Business Monitor International, 2014).These statistics suggest that with the advancement in technology, and the rise in smartphone use, people are taking advantage of being connected to information at every point of their lives.

**Mobile technologies in higher education**

Mobile devices are becoming part of many aspects of Higher Education Institutions (HEIs) with the potential they provide for more versatile learning experiences and information services. Some universities have been able to adopt mobile technologies for administering some of their courses through podcasts and other mobile-friendly course materials. Other commercial course management systems such as Blackboard and Moodle have designed educational tools to aid student learning through mobile applications (Hu & Meier, 2010). Mobile technologies are thus creating a lot of opportunities and the potential to improve and facilitate learning among a growing community of students in HEIs. The challenge therefore, is for HEIs to respond to the constant changes in technology by exploiting the opportunities provided by these technological innovations and work towards making learning more accessible and flexible for students.

Within the context of these changes in HEIs, academic libraries are also exploring various avenues to deliver their services through mobile phones. Specifically, libraries are seeking ways to provide options to information sources and develop the needed skills to deliver enhanced user services. Libraries are harnessing the power of these technologies by incorporating them into library services such as information resources, orientation, circulation, reference services, user instruction and marketing. They are utilizing a variety of technological applications likeQuick Response (QR) codes, instant messaging and others to move traditional services to the digital era (Seeler, 2011). Among the new methods for the delivery of library services through mobile devicesinclude simple text message alerts for such services

as renewal/reservation of books, announcement of new arrivals of resources in various subject disciplines, information on full access to eBooks and journal articles through their library's subscriptions, and so on. Academic libraries are also creating mobile versions of their websites for such services; usually, the most common Web 2.0 tools that could be presented on the library websites are: Facebook,blogs, wikis, Research Site Summary (RSS), and Twitter. Stephens (2006) describes Web 2.0 features as a tool that is forcing library professionals to integrate Web 2.0 technologies in libraries to offer library services.

**Academic libraries and mobile technologies**

Early conceptions of what constitute a mobile library refer to a van with shelves of books and journals which serve as a bookstore to various communities; this idea has changed with current developments in mobile technology and the Internet. Academic libraries function to support the educational teaching, learning and research needs of their community. What has become obvious with the digital revolution is the need for a shift in their services through the provision of content and services that are suitable for mobile devices.Lippincott (2010) noted that some of the activities that can be done using a single handheld mobile device include:

- Voice and video calling
- Sending and receiving e-mail
- SMS text messaging
- Searching the internet
- Searching databases of scholarly information
- Organizing citation
- Accessing a course management system
- Reading or listening to books and articles
- Taking photos
- Playing videos
- Making videos
- Setting an alarm clock
- Using a GPS navigation system
- Playing games

A number of studies have explored the implementation of mobile technologies within academic libraries.In Nigeria, Fatoki (2005) in her paper on the "Prospects of GSM Technology for Academic Library Services" examined the emergence of mobile communications and their implications on library services. The paper highlighted the use of mobile technologies in library services in Nigeria and some of the challenges experienced with respect to inadequate infrastructure. She noted from the findings that the general acceptance of mobile technology in Nigeria has great potentials for enhancing the communication and information technology-related services in academic libraries and information centres in Nigeria (Fatoki, 2005: 272).

Similarly, Iwhiwhu, Ruteyan and Eghwubare (2010) explored the prospect of providing library services through mobile phones in Delta State University, Abraka, Nigeria. The main objective of the study was to examine the benefits derived from the use of mobile library operations and to encourage librarians and library users to

integrate mobile technology in library operations in the University. Findings from the study revealed the nature of challenges being experienced by the University such as inadequate telecommunications infrastructure, poor power supply and lack of trained staff which has hindered the library from fully integrating mobile technology to its services. The authors recommended that better collaboration with mobile operators in the country is needed to help improve transmission quality and ensure network connectivity to the University.

Seeholzer and Salem (2011: 9) conducted a focus group study of the mobile web and the academic library at Kent University. The purpose of the study was to investigate students' perceptions of mobile academic library websites and to determine how much time students were using the web on their mobile devices, which features of the library they were using on these devices, and other services they would be interested in having from the library. Outcomes from the study indicated that some of the students used their mobile web access for popular websites like Facebook, Tweeter and e-mail while others stated that they used their mobile devices to access resources from the library especially to begin a research project (Seeholzer and Salem, 2011: 14).

Mills (2013: 3) in her study on "The Information Use on the Move project" sought to identify trends in the way people interact with information using mobile phones. The project which explored two academic libraries in the United Kingdom namely, Cambridge University and the Open University (OU) was aimed at developing better strategies for academic library services through mobile devices. From the findings, Mills (2013: 9) suggested that the increasing dependence on mobile technology by library patrons indicates that academic libraries could exploit the potentials of adopting mobile technologies in such areas as reference service, mobile Online Public Access Catalogue (OPAC) service interface, text alert services and audio tours of the library for more efficient service delivery.

Aharony's study (2014: 202) investigated students' perception of mobile technologies and the level of its acceptance by academic libraries for library services in Israel. The study employed the Technology Acceptance Model (TAM). From the findings of the study, the author noted that students had a more favourable attitude towards the use of mobile technology and appreciated mobile services from the library while the attitude shown by librarians indicated that more exposure, as to the advantages and uses of mobile technology in library services, is needed for them to adapt to changing technological innovations.

Consequently, the impact of mobile technology is providing the opportunity for academic libraries to transform the nature of their services through various formats and enrich student learning experiences by making it more accessible flexible and personalised (Baldwin, 2012: 3).

**Impact of mobile technologies on academic libraries**

Due to the impact of these technological innovations, academic libraries are challenged to integrate these technologies into more efficient library service delivery. Some of the library services that are being executed through mobile devices are as follows:

- ***Mobile Online Public Access Catalog (MOPACs), Mobile Version of Website and Databases*** - The number of students that search for information through the Internet are increasing daily, it is therefore necessary that such information is made available in a mobile-friendly format. Libraries are encouraged to provide access to the OPAC system and to subscription databases through mobile-optimized websites. To maximize mobile access, it is important for library mobile services to accommodate various handheld Operating Systems.
- ***Mobile Circulation:*** Mobile circulation for example, allows library patrons to have access to their personal information/accounts. This includes the ability to place items on hold, check-in and out of library materials. Some libraries with equipment loan programmes could assist users with Internet enabled handheld devices to check the availability of equipments like e-readers, Global Positioning System (GPS), laptops, iPad, etc and place such materials on reserve (Seeler, 2011).
- ***Library Short Message Services (SMS)/SMS Reference service***– Libraries use SMS for various reasons; this includes notification to clients on available items for pickup, due date reminders, information on availability of materials, and so on. These services could be provided through various platforms such as Google and so on.
- ***Marketing***– Seeler, (2011) noted that almost 60 percent of undergraduate students use networking websites (Facebook, Twitter, Foursquare, LinkedIn) on a daily basis, for posting status updates or locations. Libraries can employ the concept of such interactive and multimedia technologies to showcase library services and collections. This could be achieved by taking advantage of these social media platforms to render classic services to users in an automated world. For example:

    - RSS feed: Libraries can make their users subscribe to RSS feed to access updates on new items in a collection, new services, and new contents from subscribed databases.
    - Podcast: Libraries can capture audio digital media files (for example, library orientation) that can be distributed over the Internet using RSS feeds for playing-back on portable media players or computer systems for students.
    - Myspace and Facebook: Libraries could share informative resources with users and with one another through these media.
    - Mashup: This is a web application that combines data from more than one source into a single integrated tool that helps a user when they log in to a website. It allows the user to edit OPAC data and metadata, saves the user's tags, and IM conversations with librarians.
    - Wiki entries with other users (and catalogues all of these for others to use), and the user is able to make all or part of their profile public (Champeswar, M. 2010).
    - Instant Messaging / Chat with a Librarian
    - QR codes – A matrix barcode readable by smart phones and mobile phones with cameras.

Seeler, (2011) noted that there are fewer academic libraries with mobile catalogues, or OPACs, than those with mobile websites. She attributed itto the result of the added expense from implementing a vendor-supplied version or the know-how to create a mobile OPAC in-house. Examples of some of the libraries in developed countries that have started deploying these services are as follows:

- Aalborg Libraries, Denmark
- American University Library
- Boston University Medical Center Mobile Library
- Brigham Young University, Harold B. Lee Library
- Cal Poly Pomona University Library
- College of DuPage Library
- Duke University

Findings from Seeler's (2011) study revealed that Internet activities of research performed from handheld devices among students indicates as follows:

- Check information (news, weather, specific facts) 85.0%
- E-mail 81.0%
- Social networking websites (Facebook, LinkedIn) 76.9%
- Use maps 68.6%
- Instant message 38.3%
- Conduct personal business (banking, shopping) 38.1%
- Download/stream music 34.5%
- Download or watch videos 30.2%
- Download or play games 25.5%
- Follow or update micro-blogs (Twitter) 21.0%
- Use photo-sharing websites (Flikr, Instagram) 18.1%
- Read or contribute to blogs 15.0%
- Watch mobile TV 11.7%

**Mobile technologies: Implications for Nigeria**

The implication of these developments for academic libraries in Nigeria therefore, is that theywould need to take more pro-active steps in responding to current challenges in the educational context. Among the areas of consideration in this regard are:

- ***Replacement of traditional lectures with a more interactive learning environment***- Teaching and learning now involve the utilization of Online Learning Management Systems that enables students to move from the realm of passive learning to active learning (Bailin, 2011).
- ***Learning Space:*** In order to meet information needs of today's students and to accommodate their various learning styles, academic libraries should provide spaces that promote learning, social networking, and both collaborative and independent research (Bailin, K. 2011; Booth *et al.*, 2012; Cribb& Schmidt, 2011). Specific design concepts include spacious learning environments with configurable seating, areas for individual quiet study, a service desk in a learning commons, food and drink facilities, extended library hours, exhibition areas andcollaborative partnerships with other

services on campus (Bailin, K. 2011; Booth *et al.*, 2012; Carpenter, 2011; Cribb& Schmidt, 2011; Schmidt, 2011).

a) ***A change of attitude by librarians toward incorporating mobile services in the library*** - The increasing proliferation of mobile technologies indicates that academic librarians must develop greater interest in creating mobile-friendly versions of their traditional websites and developing new service initiatives that meet the needs of diverse user populations. The term "librarian" is no longer covering the responsibilities of a professional librarian, currently, people are beginning to adopt more versatile names like Cybrarian, digital media specialist, metadata and information architect, and so on (Johnson, M. 2010). Since their roles are currently being re-defined by emerging technologies, librarians will also need to provide better services in this regard.

- ***Improving student skills in the use of mobile technologies*** – Students are central to the learning process; the responsibility of academic libraries in ensuring that opportunities are created for students to acquire the needed competences is germane to developing lifelong learning abilities. Mobile technologies therefore provide the opportunity for academic libraries to influence the process of teaching and learning in higher education through Information Literacy Instruction in the use and application of these technologies for research. An understanding of students' information seeking behaviour in the mobile environment will enable academic libraries help students to know how to develop more effective search strategies in their activities using mobile applications (Walsh, 2012: 56-57). Information literacy offers a broad approach by which students can be educated to understand the importance of information and to have the competence to locate, evaluate and manage such information in a way that contributes towards a higher level of literacy and lifelong learning (Somi& De Jager, 2005: 260).
- ***Greater focus on how mobile technologies can be integrated to the curricula to improve student learning processes*** - The concept of mobile learning (m-learning) provides more exciting opportunities for "learning on the move" across space and time through interactive technological processes (Solvberg&Rismark, 2012: 23). The implication is that HEIs in Nigeria would need to review their academic curricula and pedagogical processes in view of the changing nature of students' behavioural practices in various learning spaces. The provision of relevant institutional infrastructure to support this is also very important to facilitate the implementation of this process.

- Other services within the university may include career services, academic support which provides free tutoring, and e-learning. By bringing these services inside or in close collaboration with the library, the library becomes the place that connects students to a wider campus community and the place where students come to seek assistance (Bailin, 2011; Booth *et al.*, 2012).

**Conclusion and recommendations**

The challenges of globalisation and other technological advances demands that students are empowered with the essential information skills that will enable them function in a knowledge driven economy. The goal of library services in an academic institution is the continual effort to ensure accessibility to resources as well as the development of relevant skills for students to be able to manipulate, analyze and critically evaluate information sources. Within the context of the changing learning environment, challenges to academic library services in HEIs in Nigeria suggest a greater instructional role for librarians particularly in the area of user education programmes with respect to mobile learning (m-learning).

Based on review of the literature, it is noted that not too many academic libraries in Nigeria have adopted mobile technology to their client services. From the fore-going discussions on the topic, this paper has been able to raise some important issues for consideration with respect to mobile technologies and the role that academic libraries in Nigeria can play in accommodating current technological changes such as using QR codes to announce new arrivals, RSS feeds to access updates on new items in collection or new services and so on. It has also suggestedareas of further enquiry that may provide a better understanding of the topic. It is therefore recommended that more in-depth studies that provide current data on the use and application of mobile technologies to library services and the expectation of users as to the role librarians can play in supporting its implementation be conducted. Findings from such studies could then be used to inform policy decisions aimed at reviewing or formulating guidelines for user education programmes in HEIs in Nigeria.

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