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Perception Of Students On Mobile Technology Based Library Services

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ABSTRACT

Introduction: Emerging trends in library and information space especially in the academic environment requires remote and boundary less access to library services. Mobile technology has been recognised as the single most embraced technology in the world. Implementing this technological innovation will bring a lot of relief to students in University of Cape Coast and the University community in general.

The study attempts to investigate the perception of students of University of Cape Coast on mobile technology-based library service. The pilot study involved six management members from the library and fifteen students comprising ten undergraduate and five postgraduate students.

Method: The tool adopted for the study was an interview guide for the data collection. The interview guide was grouped under four headings: perception of mobile library service on campus, students' proficiency and strategies for successful implementation and imminent challenges. The data collected was qualitative in nature.

Results: The study shows;

1. Almost every student had at least one mobile device which is a smartphone and can be used to access library service.
2. students and management expressed their willingness to patronise such services. They also showed positive perception regarding mobile phone based library services.

Conclusion: The recommendation made after the study was that students should be educated to know the benefits that come with the use of mobile device to access library services while library

personnel should be adequately trained for such services. Management should allocate more resources for successful implementation the resources.

Introduction

Current trends in libraries especially in the academic library require remote and boundary less access to library services. Mobile technology has been recognised as the single most embraced technology in the world. Implementing this technological innovation will bring a lot of relief to students in University of Cape Coast and the University community in general.

The increasing availability and affordability of internet-enabled handheld devices have affected people's mode of searching, receiving and interacting with information. Barriers which hitherto made it impossible for information to be shared freely have been mediated by the rapid development of information and communication technology, leading to inter-cultural and interdisciplinary information sharing (Coyle & Thorson, 2001). Due to the convergence of swift technological improvements with cheaper connectivity and faster data transmission, there has been an increase in the adoption and use of mobile devices and mobile technologies (Villoldo & Salom, 2012; Pope *et al.,* 2011).

Mobile devices such as smartphones, iPod, PDA's, netbook, tablet computers, gaming devices and e-readers have affected the lives of people by changing the manner in which communication is done. CILIP (2015) recalls that in 2014, the use of mobile devices to access the internet overtook the use of desktop for the same purpose. Smartphones that are examples of mobile devices have now become the first preferred choice for people to communicate and share information. With less than a billion in 2000, global cellular subscriptions have increased to seven billion in 2015. Mobile technologies facilitate and provide the platform for information dissemination and retrieval by the use of mobile devices such as smartphones, tablets, netbooks and laptops (Liu & Briggs, 2015; Little, 2011). Since they do not use wires or cables but radio waves instead, they are very portable and thus, preferred by lots of people (Homby, 2001).

These emerging technologies have transcended the fields of social and financial engagements, and have now influenced the operations in many academic environments. Pope *et al.,* (2011) observed that the adoption of mobile technology has been rapid in many tertiary education campuses. Also confirming this observation, Dahlstrom, Walker and Dziuban (2013) posit that ownership of mobile internet devices between 2011 and 2013 increased steadily by 25%, whereas the use of smartphones for academic purposes has doubled. In the wake of these developments, library users have also resorted to the use of mobile devices to access the internet; forcing many libraries to introduce mobile communication technologies into their services. This confirms the assertion that any move by libraries to enhance the quality of their services and closely connect with patrons cannot be complete without considering the use of mobile technologies (Mills, 2009; Kumar, 2014).

Kumbhar and Pawar (2014) recount the digital journey of libraries as having transitioned from traditional libraries to hybrid libraries, and then to automated libraries, mediated by digital archiving, library 2.0 and mobile phone services. Prior to the emergence of ICTs, the kind of information provision done in libraries was through newspapers, microforms and slides among others. However, with the increase in scientific knowledge, telephones and computers for internet connectivity and the global system for mobile communication have modified the operations of libraries (Edison, 2002; Seymour, Ritz & Cloghessy 1987; Homby, 2001; Iwhiwhu, Ruteyan, & Eghwubare, 2010; Vishwakarma, 2013). But if librarians are to continue to make substantial contributions as information disseminators, they will have to understand and exploit current ICT infrastructure and emerging technologies in delivering services to their clientele (Ikhemuemhe, 2005).

Kumbhar and Pawar (2014) assert that mobile technologies have introduced a "Libraries in hand" trend. They suggested that since libraries are currently creating digital contents accessible on computers, such digital collections could be made available on mobile platforms.

The consideration of how to make library services available on mobile platforms has gained recognition both in literature and in practice by virtue of the benefits it brings. The mobile initiative brings with it the interactive capabilities, easy access to information, time saving, personalised services, user participation as well as limitless access. On the whole, mobile

technology-based library services include SMS alert service, instant messaging for reference service, the possibility of suggesting a purchase, library instructions and virtual tours, OPAC on mobile phones, in-house search, research consultation and instruction, journal finder applications, news and events, reference service, new title preview and institutional repositories (Speight, 2009; Connolly, Cosgrave, & Kosturski, 2011). These services can be expanded with the addition of social media tools such as Twitter feed, WhatsApp, Facebook, and the use of augmented reality and QR codes which can be used to access subject pages. Apart from these services, libraries around the world have introduced mobile technology to be integrated into information literacy instruction. The service based technology such as Skype and Face Time according to Walsh (2012:105) is a "window to another world" offer of a lot of opportunities to distance students.

1.1 Problem statement

The popularity of mobile technologies, coupled with the advantages it brings, is encouraging many academic libraries to adopt these technologies (Speight, 2009; Connolly, Cosgrave, & Kosturski, 2011). Academic and research libraries the world over are adopting technology in their operations since client satisfaction is greatly enhanced by the removal of the barrier of physical location (Tess, 2013). Many libraries are adopting innovative ways of providing mobile interfaces and their applications so as to be effective in terms of delivery of service to patrons. The ever increasing availability of mobile devices has led to the conversion of some of these services into smartphone-adaptable features. Lippincott (2010) believes that these technologies will only be useful when much emphasis is placed on contents and services.

Not much has been done to capitalise on the increasing penetration of smartphones on university campuses in Ghana (Internet Society, 2014; Surrey, 2015; Dutta, & Bilbao-Osorio, 2016). In a study to ascertain the usage of mobile technologies for social media based library services in a Ghanaian university, Akeriwa, Penzhorn and Holmner (2014) discovered that not only do respondents have a favourable attitude towards mobile phone-based library services, but also, with the right infrastructure and technical know-how of personnel, this service can be offered unhindered.

Established in 1962, and with an initial population of 155, the University of Cape Coast (UCC) continues to be Ghana's preferred institution for training of personnel for the education sector. In response to the changing phase of contemporary human resource needs of Ghana, UCC is now a leader in Health, Agriculture, Law and Business education with current population shown as follows:

	Library staff	Undergraduates	Postgraduates	**Total**
Population	230	18913	1,068	**20, 211**

The sources of these figures were obtained from the (UCC Library Guide, 2012) and (UCC-SRIMS, Record Book 2016).

University of Cape Coast Library has a library system which comprises the main university library (Sam Jonah Library), departmental libraries as well as libraries in halls of residence.

A study by Dadzie (2009) pegged the proportion of University of Cape Coast students with internet-enabled mobile phones at 92%. With the continuous reduction in the prices of smartphones, it is safe to conclude that many more students possess such handsets. Despite this huge potential for libraries to consider rendering library services via mobile phones, this phenomenon is yet to receive attention.

It is in view of this situation that the study seeks to find out the perception of students and staff on mobile based library services for its users.

Research question

1. What are the perception of students and library staff on mobile based library services in the University of Cape Coast.

Literature Review

The role of mobile phones in improving access to education

According to UNESCO (2012) the popularity of mobile phones across the world indicate a potential to support education through teaching and learning that will bring about education system transformation. Ferry (2009) observes that mobile phones such as smartphone can facilitate the access of web based contents, remix, share and collaborate with others in order to access rich media for global consumption. In the United Kingdom (UK), mobile phones according to Cui and Wang (2008) are used for storing and retrieving of academic information such as e-books and instructional materials, bringing effectiveness to teaching and learning. Other benefits higher education can have through use of mobile phones include, but are not limited to, due date for assignment, venue for lectures and information about time table (Liaw, Halala & Huang, 2010). In China according to Cui and Wang (2008), web pages of teachers are made available for students. Again online English learning resources are made accessible with the use of mobile phone. The use of mobile phone contributes to the improvement of teaching, Utulu (2012) revealed that in Nigeria, most students use mobile phones to engage lecturers on academic issues, sharing knowledge among students in various faculties and accessing the library online public access catalogue OPAC. A study done in Makerere University by Kajumbula (2006) showed that students normally used mobile phones for academic purposes such as tutorials date, venue for lectures among other information. According to Kafyulilo (2012), mobile phones are recognised to be the most common and most accessible technological tools in colleges and universities in Tanzania, though much has not yet been achieved in terms of their use for academic purposes.

 The handiness and portability of mobile phones ensures learning at all times irrespective of one's geographical location. The ubiquity of these devices makes it possible for those within the low income bracket to access educational services and their resources, thereby closing the gap between the poor and rich in society (Van Weert, 2005).

Most developing countries are now giving much attention to mobile infrastructure than to very expensive landline infrastructure (Motlik, 2008; Sharpels, Taylor & Vavoula, 2007: 224; Traxler & Dearden, 2005). This could be attributed to the fact that applications for mobile phone are easily accessible user friendly and cheaper (Motlik, 2008).

According to Davis (2012:6-8), 'Mobile phones are much more common and are increasingly starting to resemble computers.' Some developments regarding mobile phones in education are provision of published books with the use MXit which is facilitated by instant messaging platforms, the use of solar powered interactive white board and cell phones and tutorials through text messages. "Commenting on the popular Dr. Math tutoring service, which won the Technology in Government in Africa (TIGA) award in 2011, eLearning Africa notes, 'The TIGA Awards are an initiative of the United Nations Economic Commission for Africa (UNECA) and the Government of Finland. They recognised African governments and institutions which are using ICTs effectively in public service delivery in fulfilling UNECA's African Information Society Initiative (AISI)' (eLearning Africa, 2012)". Nokia, a leading mobile phone company came up with an innovation that allows teachers the ability to access content for lesson whiles individual learning is made possible. This innovation demonstrated that in 2010 grade 10 pupils had shown 14% math skills improvement (Nokia, 2010). Nokia successfully developed a module known as Entrepreneurial Programming and Research on Mobiles (EPROM) programme in Sub-Saharan Africa, this was made possible by Massachusetts Institute of Technology (MIT). The EPROM programme was experimented in three East African countries namely Kenya, Uganda and Rwanda. The objective of EPROM was to ensure that programming for mobile phone curriculum is made available through mobile technology which will foster both research and entrepreneurship.

2.2.1 The role of mobile phones in promoting new learning

For the purpose of this discussion, mobile learning (mLearning) will be defined as accessing education through mobile technology with the use of a mobile device.

Mobile phones in education have led to a new paradigm of evolution known as mobile learning (Muyinda, Mugisa & Lynch, 2007).

According to Mottiwalla (2007:592), mobile learning "combines individualised learning with anytime and anywhere learning." Mobile learning is described as the use of portable electronic devices such as smartphone and tablets in accessing and sharing information; it is shaping the way learning takes place as well as how curriculum instruction is given or delivered (Geist,

2011; Miller, 2012). Rossing et al., (2012) opined that mobile learning offer unique opportunities for users in accessing readymade information irrespective of their location.

The application of m-Learning apart from facilitating students learning can also support and foster collaboration among students and lecture (Huang, Hwang, & Chang, 2010).

Regarding mobile learning projects in South Africa, a study done by UNESCO (2012) observed that mobile phones were used to support the teaching of biology subjects.

There are a lot of conveniences in accessing education through mLearning; learners are able to pursue their studies through their own schedule of time.

Mobile learning has gained the validation of many researchers as it has the potential to facilitate engagement and support discussion in classroom setting (Rossing et al., 2012). As an example of mobile learning devices e-readers are considered to be effective in the consumption of information, and researchers are exploring the depth of e-readers usages. E-reader is described as an electronic device that is used as a learning technology in the field of education which provide or make it possible to access or open books digitally (Multimedia & Internet at School, 2010). The popularity of e-readers according to Sari, Lanham and Pan (2015) among students of higher institutions of learning are due to its flexibility, convenience and portability.

Schuler, Hutchins and Lashell (2012) observe that mobile learning device such as tablet PC helps students to understand key concepts and to support their personalised learning experience. They emphasise again that mobile technology creates a cooperative learning environment for students. It also gives students the needed platform to share information in the most efficient manner and increases the sense of accountability.

According to Visser and West (2005:123), mLearning makes it possible for those who see cost of education as a barrier to access education for the betterment of their lives. This is so especially for those in the rural areas where educational infrastructure is poorly-developed or not in existence. Mobile technologies have been regarded as the cheapest technologies as compared to

Keegan (2002:7) stresses that mLearning create a huge impact on educational outcomes by facilitating access and making distance learning much more convenient through utility and

applicability. Quality educational materials are made easily accessible with decrease in cost while ensuring efficiency and effectiveness of education.

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A survey conducted by Educause Centre for Applied Research, ECAR (2012) on mobile technology in higher education shows that adoption of mobile technology in higher institutions of learning is driven by students. According to the survey, 67% of the students indicated that mobile phones play a major role in academic success.

The ubiquitous nature of mobile technology among students of high institutional learning presents a unique opportunity for academic institutions to explore its potentials. Pew Research Centre (2015) shows that 83% of adults that fall within the ages of 18 to 29 own smartphones. According to the report, ownership among college students is even higher. Dahlstrom and Bichsel (2014) observe that 86% of undergraduate students owned smartphone since last year and almost half (47%) owned tablets. Mobile technology which is considered as an integral part of students' daily lives has transformed their way of seeking information, communication and to a large extent, how they learn. Its unique features and capabilities such as connectivity, cameras and GPS among other things provide great potential for academic experience (Berking, Birtwhistle & Gallagher, 2013).

Through mobile technology platforms, learners are not restricted whatsoever in terms of geographical locations or boundaries. According to Chen et al., (2013), the growing interest of mobile technology presents new opportunities for learners that are found either within or outside the classroom.

Proponents of new learning which is facilitated by mobile phone argue that these gadgets facilitate personalised learning. Thus, they are responsible for both difference and diversity through which learning occurs. They support situated learning during ongoing course of learning activity. According to Kukulska- Hulme and Traxler (2007:184-186) and Traxler (2007:7), mLearning facilitates and champions authentic learning; it focuses on real world situation and considers projects that are of real concern and interest to the learner. Mccontha and Praul (2008) observe that mLearning though a relative new tool supports both teachers and students to be able to explore and navigate the concept of distance learning. MLearning affords an opportunity where learning is viewed in a small manageable formats and can be accessed anywhere. According to Wagner and Kozma (2005), the enormous possibility of mLearning has direct effect on learning, since technology enhances and strengthens students' motivations and consolidates the importance of learning to performance.

MLearning through mobile technology facilitates lifelong learning. The possibility of mLearning occurs across time and place where learners have the opportunity to apply what they learn in one area to develop another area or another environment (Sharples, Taylor & Vavoula, 2005:2-4; 2007:222-223). MLearning as opined by Dela Pena-Bandalaria (2007) is totally different from a traditional education setting; there is greater knowledge transfer from teacher to student. MLearning gives wider platform to students for active participation, thereby ensuring that the learning process becomes constructive rather than instructive. According to Traxler (2007:5), mLearning through mobile technology describes learning that is not "just-in-case"; that focuses on the production of a knowledge bank but rather, "just-in-time", "just enough" or "just-for-me". Brown (2003:2) is of the view that mLearning that seeks to support new learning goes beyond the mere possession of information. It rather seeks to enable learners to locate, exploit and evaluate already existing information. Mobile devices also facilitate and deepens knowledge-centered learning, giving full understanding to a specific subject matter than just recalling or memorising a large body of information and using it as a form of new learning for integration and interconnection. Again, through mobile device, assessment-centered learning is made possible. This allows solid feedback in the learning process giving learners an idea as to what needs to be improved or learned next. According to Geddes (2004), mLearning facilitates quick feedback, maintains a learning appeal and provides the necessary and required motivation that is not present in the traditional education setting. Mobile devices have been at the forefront to

support community-centred learning; learning that is recognised to be of value and relevance to social perspective. Through mLearning, achievement of socio-economic goals that hitherto confronts communities has been successfully achieved (Sharples, Taylor & Vavoula, 2007:223; Wagner & Kozma, 2005:83-85).

As it has been established by theories of new learning that social interaction deepens effective learning, mobile devices should be seen and recognised as a conduit for collaborative learning irrespective of one's geographical location. Mobile technology allows learners to build and establish conversation line, resolve impeding issues and differences, create a platform that seeks common interpretation and understanding (Nyiri, 2002; Sharples, Taylor & Vavoula, 2007:225-226). MLearning encourages learners to improve both literacy and numeracy skills and bring existing abilities to the fore. Again, through mLearning, learners are able to identify easily where they need assistance and support, encouraging independent and collaborative learning experience. It also combats resistance to ICT, bridging the gap between mobile phone literacy and ICT literacy, engaging reluctant learners to be focused in much longer periods and lastly raising self-confidence and self-esteem of learners (Balasundaram & Ramadoss, 2007; Abozeid, 2011).

2.2.2 Mobile devices, students and learning

Mobile devices are recognised as tools that facilitate information access. These include laptops, tablets, computers, both net and note book computers and smatphones (Walsh, 2012; Vandi & Djebbari, 2010:15). According to Lippincott (2010: 206), mobile device include MP3 players and cameras as well as e-book readers. They are described as internet enabled devices used for "storing, identifying and carrying information on the user" (Vandi & Djebbari, 2010:16).

Interaction between librarian and students takes place in various places such as information literacy classes, desk services and in some cases cyberspace. Students view mobile device as an instrument that creates digital contents rather than as device to access content. Thus, students are able to use smartphones to respond to a "tweet" question posed by a lecturer, make short videos, take photo shots and make class audio recording. These devices as opined by Hey et al., (2007:447) can help students on field trip research to "capture authentic educational multimedia

data, in context, that have previously been unavailable. Data captured in context permit sharing and remembering experiences upon return to the classroom.

. . . using multiple forms of data capture, for example, supporting photographs with audio recordings and student notes can assist students and teachers in seeing the whole picture of

a learning experience."

Through outreach to faculty, librarians will have the innovative skills coupled with the necessary technological skills to teach students about so many ways smartphones can be used to access information for assignment and research. They will also be able to teach them about various software tools for the organisation of information on their devices and the application that is required of them. An application such as Lecture Tools will offer more functionality where a lecturer can ask students engaging questions that will require the use of images and other complex approach. According to McCrea (2009), an application such as Hotseat allows or welcomes comments or questions with the use of laptops or mobile devices during class hour. Faculty members have now realised that this application encourages participation when a topical issue is discussed among students. Students from Purdue University who uses these facilities can share information, create enabling environment for interaction between themselves and lecturer as well as study group members. This facility can only thrive in an academic environment where mobile devices are used extensively for academic instructions.

It is believed that as smartphone prices fall, students will find more streamlined ways to locate and access information. These devices offer a lot of opportunities for students to be active in learning and encourages the social nature of learning. Academic librarians can engage students in competitions or contests for app development so as to make services more useful for their patrons.

2.3 Accessing library services

When accessing library resources remotely via their library websites, undergraduates and faculty generally reported utilising many of the same services: searching the home catalogue, searching

databases for articles, and learning about library hours of operation (Don Dickenson & Denver Colorado State Library, 2006).

Postgraduate students access other facilities like the Ghana-Korea Information Access Centre and WiFi hotspot at selected places on campus for internet access where students can use their laptops and mobile phones to access these databases (Kwadzo, 2015).

Seeholzer and Salem (2011) also add that students expressed more interest in using their mobile devices to interact with library sources and services than expected. They wanted to use their smartphones for searching databases and the library catalogue, as well as staying informed by the library staff.

California Digital Library (2010) found out that mobile users use the library services to find known materials or quick pieces of information and they were already using online databases and catalogues on their mobile devices. Respondents were in favour of accessing the library catalogue from mobile phones. This was in addition to accessing information such as library opening hours, location, contact information and borrowing record. Such mobile library services were therefore recommended for implementation.

Mobile apps and responsive web design to the library user has its pros and cons. Current findings revealed that in some generic contexts, apps are growing more popular than mobile Web systems (Arthur, 2014). Gedye (2013) argued that apps are stand-alone and good for viewing some journals on mobile devices. However, their drawbacks have been identified as the difficulty in downloading the app, partial compatibility only with some devices, usually designed for browsing not searching and many apps working effectively only with single sites. Some students expressed more interest in using their mobile web device to interact with library resources and services than anticipated. Results showed interest in using research databases, the library catalogue and reference services on the mobile Web as well as contacting and being contacted by the library using text messaging (Seeholzer and Salem, 2011).

While using vendor-developed applications as an important strategy, most libraries will find that `developing a mobile-compatible library website is necessary (Dresselhaus & Shrode 2012).

2.3.1 Mobile library service

Mobile devices which include smartphones, iPads and the likes of tablet computers and other smart devices are gaining grounds and increasingly proliferating in society in general and the academic environment in particular, contributing immensely in the way information is handled; thus, organised, received and disseminated. It is for this reason that academic libraries must adopt mobile services which will leverage significant innovation with regards to technological changes.

Kumbhar and Pawar (2014) recount the digital journey of libraries as having transformed from traditional libraries to hybrid libraries, and then to automated libraries, which have also developed further due to digital archiving, Library 2.0 and mobile technology services.

Kumbhar and Pawar (2014) assert that mobile technologies have introduced a "Libraries in hand" trend. They suggest that since libraries are currently creating digital contents accessible on computers, such digital collections could be made available on mobile platforms. According to them Short Message Services or text facilities have often been relied upon by academic libraries to publicise their products and services such as new arrivals, due dates and renewals among others. The consideration to make library services available on mobile platforms has gained recognition both in literature and in practice by virtue of the benefits it brings. The mobile initiative comes along with its interactive capabilities, easy access to information, time saving, personalised services, user participation as well as limitless access.

Though the concept of mobile library is not new, according to Smith and Jacobs (2010), mobile library referred to a vehicle purposely designed for library use. The aim of this type of library was to provide library service and other information needs to those in rural areas that lacked a library building. Needham and Ally (2008) are of the opinion that with the advent of mobile technology, mobile library has been coined to refer to all the information services that mobile devices offer. These include access to online catalogues, user suggested apps downloadable e-books, audio materials, access to databases, text notification and text references (Kroski, 2008).

In Ghana, the mobile library service is yet to gain prominence since mobile technology is not pervasive as compared to the developed world. Furthermore, the fact still remains that new technology always come along with some difficulties, of with which mobile technology is no exception.

According to Aharony (2013), these hindrances include but are not limited to slow speed of the Internet, expensive technology requirement, staffs with low skills and expertise and network congestion faced by a limited number of service providers. In buttressing the point above, Adetero (2010:40) observed that infrastructure is recognised as the main problem for new technology implementation. Effective information management will, to a large extent, depend on information and communication technology. Most African countries lack the basic information on infrastructure required to support development.

A study conducted by Kamba (2011:67-68) in Africa "shows that 85 per cent of the libraries provide less than one computer for every 100 students and 36 per cent provide less than one computer for every 500 students whilst 15 per cent of the libraries are not connected at all". Armah (2009:87) opined that most technology that exists in academic environments is not explored to its full potentials. He noticed that internet usage in most libraries in Ghanaian Universities shows that most students and faculty members only use it for sending and receiving personal e-mails without any academic and intellectual activities such as research or collaboration in information sharing. Mobile library services that are familiar in the Ghanaian context are text, QR code and other social media tools (Palumbo, 2014).

Library services must quickly and flexibly adapt to mobile culture (Goggin, 2006). The value of smartphone as tool has been recognised and advocated by Starkweather and Stowers, (2009); Little, (2011) and Jensen, (2010) to enable users of the library to access library services. One example of these library services has to do with text-a-Librarian services which is seen as a very effective means and ways of satisfying client needs quickly and in a more convenient way.

Lombardo, Morrow and Le Ber (2012) have investigated the advantages of the use of QR codes in communicating or relaying important messages to library patrons. Treasure hunts for library users with the use of QR codes have also been developed by (Cummings, 2013). The presence of social media in libraries especially in academic libraries is gradually gaining grounds since these tools are regarded as a convenient way of delivering a wide range of resources and services (Penzhorn and Pienaar, 2009; Mahmood and Richardson, 2011). Some of these tools that are familiar in the library environment include; instant message for reference, blogs, podcast and social networking sites.

- **Instant message for reference**: These are applications which allow effective communication. Through this application information on directories, both synonyms and anonyms and others such as meaning and definitions can be accessed from digital libraries. According to Chua and Goh (2010); Harinaarayana and Raju (2010), instant messaging offer enhancement of reference services to library clients since enquiries are immediately responded to.

- **Blogs**: Many academic libraries rely mostly on blogs, blogs mainly contain scholarly opinion or academic point of view that are recent and not out of date. Alexander (2008) opined that blogs are used by academic staff and researchers as an information source of a particular subject area that are relevant to their academic endeavour. Academic libraries can therefore rely on blogs to create specific subject area. These blogs can serve as a platform for the dissemination and broadcasting of news and other important information in the library (Chua & Gog, 2010; Harinarayana & Raju, 2010). According to Mahmood and Richardson (2011) these blogs ensures the facilitation, promotion and marketing of library services.

- **Podcasts:** These are applications that allows and support information dissemination. It enhances the delivery of library services and can also support tutorials on how to make effective use of library resources and services such as OPAC, the use of search engine and the rest (Harinarayana and Raju, 2010).

- **Social Networking Sites (SNS):** Social media and social networking sites such as Facebook, Twitter among others are extensively used in sharing and marketing library services. Again they also facilitate the sharing of videos and photos through the creation of databases that are image based (Harinarayana & Raju, 2010; Mahmood & Richardson 2011).

Mobile phones have affected the lives of people by changing the manner in which communication is done. Since they do not use wires or cables but radio waves instead, they are very portable and thus, preferred by lots of people (Homby, 2001).

2.5.2 Mobile technology in academic library

Mobile communication is said to be the only technology that has been embraced and received massive acceptance in the developed and the developing countries within a short spate of time (Castells, 2007; UNDP, 2012). According to Choy (2010), these devices have become an integral part of students study activities in most universities and other higher learning institutions. Libraries especially academic libraries are coming up with strategies for designing mobile technology-based services so as to meet the ever changing sophistication that characterises their information needs and requirements of their patrons (Lippincott, 2010; Vila, Galvez and Campos, 2010). The following are some of the strategies embarked by some academic libraries.

2.5.2.1 Mobile interfaces and online public catalogue: Libraries in their quest to offer tailor-made services are developing and providing access to mobile versions of their OPAC to their clients in other to render timely and without barrier services and resources to their patrons. These services include collections and e-journals as well as time for opening the library (Murray, 2010; Vila, Galvez and Campos, 2010).

According to Vila, Galvez and Campos (2010:327), mobile OPAC (MOPAC) ensures fast and quick retrieval of an item. Paterson and Low (2011:418) confirmed that 60% of students interviewed opined that it is convenient to search the catalogue anytime and anywhere.

2.5.2.2 Mobile collections and databases: According to Lippincott (2010), database publishers are using innovative strategies for mobile version of their databases for their clients to access both e-books and e-journals via their mobile devices. These databases are said to be mobile friendly as they easily interface with mobile devices (Murray, 2010:241; Bucznski, 2008). These publishers include social science research networks and music online services that provide access to both video and audio recording (McKiernan, 2010). Ebscohost provides a mobile interface for Ebsco products which according Hadro (2009) is considered to be very useful for mobile library platform. Murray (2010:242) states that e-books readers make it possible to access these databases irrespective of their geographical location.

2.5.2.3 Mobile instructions and mobile tours of the library: Fresh students who embark on their academic journey each year are introduced to instruction services in the academic library. These services such as library orientation and information literacy are the services libraries provide through mobile devices. Kroski (2008:35) observed that Youtube can be a best example

for library tour videos. Another tool for making mobile instruction services possible is the use of podcast. Murray (2010) and Choy (2010) stated that the content of podcast provides immense benefits to both distance students and those studying abroad. Awareness services such as "Guide by call" and "self-service" library instruction services also contribute to adding value to the services that are already available (Murray, 2010; Kroski, 2008).

2.5.2.4 Short message system reference: SMS reference is widely known among mobile technology in academic library services. Paterson and Low (2011) opined that this service seeks to provide services to patrons from any location. It allows a library patron to send a text to a librarian with the use of their mobile phones. The librarian can also send a text to patrons by way of alerting them of the availability of new arrivals, reserved books and any other library news (Pearce, Collard & Whatley, 2010:250). SMS appeals to both librarians and students. In order not to invade the privacy of students, Vila, Galvez and Campos (2010:331) advise that students be made aware by librarians before a message is sent. Again, they observe that some reference queries go beyond SMS. However, such mobile reference services facilitate and ensure that synchronous reference transaction is performed in the quickest and convenient way.

2.5.3 App usage versus smartphone web browse

A study done by Tally (2012) comparing the preferences of apps and smartphone browser indicated that anytime students want to check the outcome of the weather, they use the application (apps) for the weather rather than the web browser. It came out that students find the apps more convenient than the browser. Another study revealed that 85% of the students will go for the apps for the weather rather than use the smartphone browser. Bowen (2012:5) also stated that students prefer to spend a lot of time on mobile applications rather than using a web browser. He opined, "overall, students reported spending more time using mobile apps, and as students become more advanced in their use of smartphones, the gap widens-the amount of time spent using mobile apps increases, while the amount of time spent using a smartphone browser remains relatively consistent".

The widespread usage of apps led eMarketer's (2012) to carry out research on the type of apps most college students find interesting, convenient and receive high patronage. The study showed that most students use apps for communication and social media. According to the study, 21% of

the college students use smartphone for communication while 19% of them engage in use of social networking apps, especially Facebook which is the most used.

Challenges

A very significant factor for the success of mobile technology-based library services is the technology which drives the service. Technology tends to influence the type and amount of content displayed. Currently, most mobile devices are limited by their speed and storage capacities.

Another issue has to do with the design of the format. Not all contents on a desktop computer can be replicated on mobile platforms. A lot of reorganisation of texts, images, graphics, tables and other features would have to be done in order for a document to be fit for access on mobile devices.

Also, problems arise in the bid to separate the content of the library service from the format of the mobile device. Ideally, a mobile library should be device independent and should work on diverse mobile devices. It has also been realised that libraries often fail to distinguish the differences between designing to host services on a normal website and that of a smartphone interface leading to failure to yield the desired impact (Travis & Tay, 2011). It has however been established that in the mobile environment, what may be compatible or convenient in one library might not necessarily be the case in another library since the information needs of users differ.

A survey by Thomas (2010) on mobile sites and libraries indicate a positive attitude and readiness to have mobile web presence. Nevertheless, only a few had mobile sites available owing to reasons such as low budgetary allocations, lack of prioritisation, low skills, confusing architecture and negative perceptions of users about the service.

Privacy is also another worry for mobile technology in the library. This is because client personal information could be exploited by third parties such as law enforcement agencies and those who commit identity theft. Mobile technology in creating more services, tend to expose the user to potential invasion of privacy.

A study conducted by Chisenga (2015) on library users, ICTs and libraries in Sub-Saharan Africa shows that most libraries lack funds to purchase library systems; those who have succeeded in acquiring commercial library systems or managed to automate some or all functions lack the required funds needed for upgrade and maintenance of such library systems. Anytime libraries fail or are unable to pay for either maintenance or license fees regarding software systems, they forfeit the opportunity to access technical support and the necessary updates from their vendors. This difficulty leads most libraries to stop subscribing or abandon the software system completely and shop for a less expensive software system instead. These less expensive software systems include Open Source systems with a larger user base so that expertise can be shared.

Methodology

The study was underpinned by the Qualitative School of Thought. This is a research philosophy in which a complex, holistic picture is built about a phenomenon whereby the researcher analyses words, reports detailed views of informants in a natural setting (Creswell, 1998). The perception of students and liberally staff on mobile devices in a library such as the UCC Library requires a deep understanding of the views of both students and staff. In the bid to understand the diverse perception on mobile library services, a qualitative approach is considered appropriate. This study employed the case study research design which provides for the construction of an in-depth description of the features or attributes of a particular phenomenon (Hamel, Dufour & Fortin, 1993; Sarantakos, 2005). Since it is flexible, case studies introduce new and unexpected results during an empirical inquiry thus widening the scope of the study (Creswell, 2009). It has been observed that responses from case studies provide more realistic responses than a purely statistical survey (Stake, 1995; Flyvbjerg, 2001b & Creswell, 2009). Case studies are primarily associated with the fields of anthropology and sociology and could either be single or multiple-case designs.

In this study, library staff and students of the University of Cape Coast are relied upon to provide information. The library staff, who are largely of management status have been included due to their depth of knowledge on mobile-based library services. The study engaged resident undergraduate and post-graduate students as respondents. It is believed that both categories of

students are technologically-aware, and their perception could be helpful in any attempt to study the implementation of mobile based library services in the University. Again, students are the main users of the mobile-based library services, hence, it is appropriate to assess their level of proficiency and how a service of this nature will affect their patronage of the library services in general.

Purposive sampling was relied upon to select the key library officials which included the University Librarian, the Deputy Librarian, the Client's Service Librarian, the Digital Librarian and two principal assistants of the Digital section of the Library. This brought the number to six in all. Ten undergraduate students were randomly selected from among students studying at the undergraduate section of the Library and same method was relied upon for postgraduate students who study at the Post Graduate Section, the Research Commons. The use of two non-probability methods made it practically possible for respondents to be selected and included in the study.

The library staff purposively selected were six in all. For the students' category, 10 undergraduate and 5 postgraduates were used in the case study respectively. These altogether sum up as shown in the table below:

	Library staff	Undergraduates	Postgraduates	Total
Population	230	18913	1,068	20, 211
Sample	6	10	5	21

The sources of these figures were obtained from the UCC Library Guide, (2011) and the UCC-SRIMS, Record Guide (2016).

Boyce and Neale (2006) are of the opinion that in qualitative interviews, a smaller sample size gives enough evidence that goes beyond a very small number of people without imposing the hardship of endless data gathering, especially when researchers are constrained with time and other factors. It often works well when it is supplemented with participant observation.

Green & Thorogood (2009:120) observed that "the experience of most qualitative researchers is that in interview studies little that is 'new' comes out of transcripts after you have interviewed 20 or so people".

According to Powell and Connaway (2004), in qualitative research, sample sizes are relatively small compared to quantitative studies as the aim of a qualitative study is to obtain depth, complexity, rich and understanding rather than to generalise.

Semi-structured interviews were used to elicit primary information from respondents. This type of interview ensures that respondents are asked the same range of questions in other to allow any form of elaboration which may arise in the context-specific situation. In the view of Sarantakos (2005), interviewing, as a form of questioning, uses verbal inquiry as the core technique for collecting data. Also, Patton (2003) argues that the interview process gives an avenue for a researcher to probe and ask questions to elaborate on the topic whilst remaining conversational and situational.

RESEARCH AND DISCUSSION

Perception of Students regarding mobile phone-based library services

This section was to investigate students' perception on mobile phone based library services at the university of Cape Coast. A tabular summary of the interview guide can be found in Table 2, Appendix 2.

The respondents were asked whether they have ever accessed library services from the University of Cape Coast from their laptop? It showed that ten students out of the 15 students interviewed access library services from their laptop. This shows that most respondents undergraduate and postgraduate students at University of Cape Coast do access library services to search for information to do their assignments, write articles and write-ups related to their subject areas. Some of the respondents said they used their laptops to access "digitized thesis and journals" from the University of Cape Coast library web page.

Furthermore, students at University of Cape Coast were asked whether they were aware that some library services could be accessed through mobile devices. Most of the respondents were not aware about accessing library databases, and that searching for information and journals could be done by use of their mobile phones. They said they have theoretical knowledge through the information literacy class and have practical experience. However, most of the respondents revealed that they were not aware that library services could be accessed through mobile devices. They were of the view that more publicity should be distributed about the services the library wants to offer.

In response to the question about the kind of services respondents wished the library made accessible through mobile devices, they wish to be able to access databases, journals, digitized thesis and relevant books related to their subject area without necessarily going to the library building. Providing this could potentially save respondents time and also make it easy to move around with study material on their mobile devices.

Also, respondents at the University of Cape Coast were questioned about their preference with respect to mobile apps and mobile accessible websites. Their replies revealed that most of the respondents preferred a mobile accessible website. It is easy to access and not limited to a smartphone: an internet-enabled phone can be used to access library resources. However, only a few of the respondents agreed that a mobile app should be used in the delivery of library services.

Students were questioned on the benefits they will derive from mobile phone-based library services. It revealed that students from the University of Cape Coast knew the benefits they will derive if mobile phone-based library services were implemented. They explained that it would be easier to search and access information anywhere and it would save them time from moving from one location to the other in a search of learning or research materials and also getting access to many materials on one device was beneficial.

RECOMMENDATIONS

Based on the findings from the interviews, the following recommendations for the implementation of mobile-based library services at the University of Cape Coast are suggested:

1. Student at University of Cape Coast should be educated about the benefits of using mobile-based library services for relevant information.
2. Continuous training should be given to library staff in the implementation of mobile based- library services.
3. The Management of University of Cape Coast should budget or allocate significant amount of money for the implementation of mobile based-library services.
4. The library management should also develop a mobile-based website that meets the specific needs of the users.
5. Management should also develop strategy for the marketing of the mobile-based library services.

Conclusion

The phenomenon of mobile technology has a potential to contribute to the way information is accessed. Ownership of these device is very popular among college students since they express considerable interest in accessing library resources. Bell (2012), in trying to suggest the future, indicates that libraries should be "working to shape their vision of a preferred future" for themselves Many academic libraries are taking advantage of what these technologies present, and University of Cape Coast Library will have no option other than to embrace this novelty so as to better provide enhanced information needs and services to its stakeholders. The full potentials of these technologies has not yet been explored in Africa due to the fact that, in the view of Makori (2012), IT infrastructure budget allocated to libraries and information centres in Africa is not yet adequate.

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