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Strategies for successful implementation of mobile phone library services

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ABSTRACT

The study attempts to investigate the preparedness of University of Cape Coast Library to implement mobile technology-based library service. The study involved six management members from the library and fifteen students comprising ten undergraduate and five postgraduate students. Interview guide was used as a tool for 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. The study shows that

1. Almost every student had at least one mobile device which is a smartphone and can be used to access library service.
2. Though proficiency level among students was high, there would still be the need for library management to train users to fully appreciate the use of these gadgets in accessing library services.
3. Students and management expressed their willingness to patronise such services. They also showed positive perception regarding mobile phone-based library services.

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

The need to meet life's basic challenges and responsibilities has informed the invention and the use of information technologies (Ademodi & Adepoju, 2009; CILIP, 2015). Owusu-Ansah (2015) defines ICT essentially as all equipment, processes, procedures and systems that are used to explore and exploit information systems, be it computerized or manual in an organization. Information and Communication Technologies (ICTs) have been the main drivers of the world's developmental agenda (ITU, 2015). According to Pyla (2012), ICT plays a major role in educational administration through effective use of resources and simplifying administrative task. He observes that ICT has what it takes to promote the links across the world in all disciplines and facilitate social networking. By this, huge academic resources such as journals, articles, ebooks just to mention a few are made available and accessible with ease.

ICTs have removed barriers and promoted fast communication and interactions across boundaries. Jackson, Ervin, Gardner, and Schmitt (2011) have observed that the internet has transcended the barriers of gender, race, income and socio-demographic characteristics. They then assert that the educational playing field has been levelled by this resource due to its availability anytime, everywhere and to anyone. Noor-UL-Amin (2013) maintains that ICT has to a large extent revolutionized the field of education which has undoubtedly affected teaching, learning and research. ICT integration in the classroom will afford students the opportunity to engage in a more interactive task with a wide range of information and knowledge at their disposal during leaning whiles teachers' attitude would to a large extend positively impact students to integrate ICT in their teaching practice (Barakabitze, Kitindi, Sanga, Kibirige, & Makwinya, 2015).

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. The use of mobile device to advance learning in the words of Kalinic, Arsovski, Stefanovic,

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Arsovski, and Rankovic (2011) ensures 'new opportunities and could improve the learning processes.' Hence, stakeholders especially educators should provide the necessary environment to facilitate learning with the use of mobile technology and integrate them with the best learning strategies for both teachers and students (Tsai, Shen, & Chiang, 2013). CILIP (2015) recalls that in 2014, the use of mobile devices to access the internet overtook the use of desktop for the same purpose. With the advent of smart phones and other mobile devices, mobile related activities have become household and gradually a newer term is emerging and gaining momentum within the education space: mobile learning, or m-learning. Similar to e-learning, m-learning refers to any learning that is facilitated or mediated through the use of a mobile device (Churchill, Lu, & Chiu, 2014).

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). 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.

Literature review

The world has witnessed a massive technological advancement in all spheres of endeavours, particularly in the education sector where the use of technology to mediate teaching and learning has taken a center stage to gain popularity (Mfaume, 2019; Onyema & Pokidko, 2017). In delving into the use of mobile technology to access library service, a number of concepts/topics need to be discussed in order to put the study into proper perspective. Topics to be considered are the role of mobile phones in improving access to education, the role of mobile phones in promoting new learning and broadband penetration in Africa and Ghana. The main thrust of the study was to find out how academic libraries can use mobile technology to access, utilise and improve service delivery to library patrons with the use of mobile devices. This will contribute to bridging the gap of the digital divide (Zickuhr & Smith, 2012). Mobile technologies are described as new communication tools that support and influence how information can be seamlessly searched, received and able to aid in interaction any day (Singh & Nikandia, 2017).

Mobile devices which includes personal digital assistant, laptops and mobile phones of all types such as both cellular and smartphones has been recorgnised as an effective learning tool with much potential in classrooms and outdoor learning activities (Sung, Chang, & Liu, 2016). Saxena and Yadav (2013) maintained that the use of mobile technology in academic libraries will greatly impact and strengthened the existing relationship between the library and users especially remote users who are mostly deprived of medium connection by providing them enhanced user-oriented services. High increase in mobile technology penetration as indicated by Dahlstrom, Walker, and Dziuban (2013) shows that mobile technology plays a vital role in enhancing the quality of services for academic purposes.

The role of mobile phones in improving access to education

The flexibility with which mobile education present teaching and learning in higher institutions of learning (Sandhu & Sankey, 2019), facilitate, enhance and promote exchange of educational resources such as teaching notes and assignments as well as making online resources accessible to both teachers and students in a most convenient way (Mtega, Bernard, Msungu, Sanare, & UbuntuNet Alliance, 2012; Mtebe & Kondoro, 2016). According to Yartey and Ha (2013) mobile devices such as smartphones and other hand held devices have become popular and ubiquitous parts of our existence and contributing so much in urban or industralised societies. Mobile devices are contributing immensely toward enriching educational system, with both teachers and student benefiting greatly (Lindsay, 2016).

Tomei (2011) recounts that a study conducted shows that the top technologies to incorporate in classroom recommendation given was to ensure greater inclusion of online and mobile technology by instructors (Fife, Nelson, & Clarke, 2014). Parr (2013) observed that the educational potential of mobile phone is hyped in recent times. According to him not too long ago, CNN TV channel based in US underscore the importance of mobile technology in Africa, it emphasized that the technology had "immense" potential to transform Africa's ailing and dysfunctional education system since mobile phone as compared to personal computer is cheaper and easier to lay hand or own one.

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.

Similarly, mobile applications, popularly known as mobile apps, installed on mobile devices enable access and sharing of information as well as products and services online (Pimmer & Pachler, 2014). Mobile apps afford users to share information packaged in many forms which greatly impact on the quality of online education in the higher education sector, especially in the developing countries with ailing education system (Sinha & Bagarukayo, 2019). With the increasingly popularity and ongoing development of ICTs, according to Sad and Goktas (2014) the world is rapidly becoming a "mobigital virtual space" providing opportunities for people to teach and learn digitally at their own convenience without restrictions whatsoever.

Lwoga and Komba (2015) reiterating the importance of mobile technology in higher education institutions observes that these technologies simplify access to educational-related content and enhances innovative teaching and learning. It is worth noting that the innovation mobile application brings to mobile education makes teaching and learning easier in an online environment. Ed Technology Tours (2017) opined that the ubiquitous nature of mobile device has the ability to provide access to students with course materials whiles on the go. Learners will therefore be required to study and read in "short, effective bursts" when they can, in other to leverage those moments and translate them into learning opportunities.

According to Mfaume (2019) mobile education tools are recorgnised as some examples of digital tools which focuses mainly on innovative way of enhancing teaching and learning, especially among both teachers and students in higher institution of learning who are the highest percentage of usage. It is worth noting that mobile education application (app) brings to bear the necessary innovation and efficiencies in delivering learning content when its integration is properly done with mobile technology (Khaddage, 2013).

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, Hatala, & 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; Sharples, Taylor, & Vavoula, 2007; 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), '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)". According to UNESCO (2017), the Dr. Math project connected over 30,000 high school students with undergraduate at the University of Pretoria, Faculty of Engineering for assignment assistance. For many children in South Africa, this is the most qualified tutor that they will have access to, says Steve Vosloo, a mobile learning specialist at UNESCO. 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. Azubuike and Madu (2017) stressed that though there are several advantages associated with the use of mobile technology for reference services in the academic library setting, there are practically little or no funds for academic libraries in Nigeria to exploit these technology, librarians can adopt and embrace mobile devices for effective delivery of services such as instant messaging for reference services, library instructions and virtual tours, mobile online public access catalogue (MOPAC) and other social media activities.

Haruna, Aisha, Yunusa, and Hadiza (2016); Jairus et al. (2017) and Kimura (2007) established that mobile phones improved the performance of learners when it is properly adopted, infused and integrated into methods of teaching and learning. Students at any point in time must be ready to embrace mobile learning (Chaka & Govendor, 2017). Mobile technology infrastructure built to support innovative teaching and learning in academic institution as recommended by Mwandosya, Suero, and Mbise (2019) should be analysed thoroughly to ascertain it strength.

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. There has been a tremendous increase on penetration and subscription of mobile devices in both developed and developing countries (Johnson et al., 2007). This is because it evidential in several higher institutions of learning that mobile learning that utilizes mobile device is recorgnised to be one of the approaches to increase access to tertiary education in most developing countries (Davidson & Lazoros 2015, Maleko Munguatosha, Muyinda & Lubega, 2011; Mansureh, 2010).

According to El-Hussein, Osman, & Cronje, 2017 the component of mobile learning constitutes mobility of technology, mobility of learning learners and mobility of learning taking place in a learning environment setting. Cook (2010) assets that the 21st century learning takes into account the introduction of new digital tools with its corresponding media being augmented and accelerated by mobile devices and network infrastructure, to which they connect people. Mobile phones in education have led to a new paradigm of evolution known as mobile learning (Muyinda, Mugisa, & Lynch, 2010). According to Caudill (2007) and David and Lazaros (2015) current research has proven ubiquitous nature of mobile technology and how it supports learner in many ways. The functionality of these technologies' ranges from the simple SMS to complex and advanced use of pedagogy. Their pedagogical functionality includes content delivery, task collaborating and virtual environment accessibility like discussion boards.

According to Mottiwalla (2007. p.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, Vogh, & Jennings, 2012). Miller 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.

Mobile learning is a relatively new field of study however some level of systematic review has been done in this area. A review by Crompton, Burke, Gregory, and Gräbe (2016) looked at how mobile learning is impacting science education. An observation made shows that mobile learning in science education were popular, especially areas such as life science and both informal and elementary settings. Additionally, it came out in the study that interest was in designing mobile learning systems, whiles others looked at or evaluated on the effect of mobile learning.

Domingo and Gargante (2016) did a study on the perception of teachers on leaning impact with mobile technologies in classrooms. The analysis revealed that specific items that scores higher were that mobile learning promote new ways of knowledge building, interest of learners are engaged and heightened for learning content and improvement of information searching skills. On the other hand, items with lower scores were fostering collaboration learning among students and promoting decision making processes among learners. The study concludes that the use of mobile learning in classrooms has been recorgnised by teachers as the most effective way to facilitate access to information and increase engagement of learning.

Another study on m-learning was conducted by Pullen, Swabey, Abadooz, and Ranjit Sing (2015). The study was based on student teacher's acceptance and use of mobile learning in Malaysia. All the pointers used such as performance expectancy, effort expectancy, social influence, attitude toward technology and self-efficiency showed a

positive and significant sign of behavioural intensions to use and embrace mobile device for leaning. 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 provides or makes it possible to access or open books digitally (Multimedia and Internet at School, 2010). The popularity of e-readers according to Sari, Lanham, and Pan (2015) among students of higher institutions of learning is due to its flexibility, convenience and portability.

Mobile penetration in Africa, Ghana and UCC

According to Adepetun's (2015) assertion on Africa's mobile penetration, it is estimated that 67% of Africa's population which represent 1113 billion people, now possess mobile phones. A report by *Ericsson mobility report: on the pulse of networked society* (2015) opined that the overall mobile subscription in Sub-Saharan Africa was approximately 80% in 2015. By 2021, mobile subscription is estimated to reach 100% (*Ericsson mobility report: on the pulse of networked society,* 2015). This estimation is mostly as a result of increasing level of urbanization and growing investment in terms of rural network coverage to be undertaken by mobile operators. The report indicates that the growth of smartphone ownership and the unavailability of fixed broadband have made mobile broadband the cheapest way to connect to the Internet.

A report by Pew Research Centre (2015) shows that in 2002, access to mobile phone in Africa was one in ten in Tanzania, Uganda, Kenya and Ghana. Ownership of mobile phones has grown exponentially. Mobile phones are now common in South Africa and Nigeria as they are in United State (US). Smartphones in Africa are however not widely used even though ownership of such phones in South Africa is about 34% and 27% in Nigeria. The report went further to indicate that smartphone ownership is still less common in countries such as Tanzania and Uganda as it is still in a single digit as a percentage compared to ownership in the US (64%) as at 2014.

Africa has one of the greatest increases in mobile data use and this is even expected to increase further (ITU, 2015). In 2002, only 8% of the Ghanaian population had access to mobile phones. Today, access to mobile phones has increased to 83% which is more than a tenfold increase over previous years. This growth is also replicated in Kenya, Tanzania and Uganda where the survey was conducted. The World Bank (2018) observes that an increasingly high penetration rate of mobile phone is an indication that, owing mobile phone in Ghana is easy and not expensive. The report also indicated that a SIM card in Ghana cost $0.25 whiles an ordinary phone will cost $ 7.5. The countries' GDP per capita in 2017 was $1641.5. Hence procuring mobile phone technology is relatively not expensive.

According to The African Report magazine by Laary (2016), “Ghana's mobile phone penetration rate increased to 127.63% after the country's voice subscriber base climbed to over 35 million in December 2015 from 34 million registered in the previous month.” Latest figures released by national communication authority (NCA), the regulatory body that oversees mobile technology infrastructure in Ghana indicate that there has been an increase of mobile subscriber base from 34,400,153 in 2015 to 35,008,387. Thus, there is a voice penetration rate of 127.63%. According to the regulator, both voice and mobile data market share trends from mobile data subscriber have also increased from 17.73 million to 18.03 million, increasing access rate to 65.74%. This has been attributed to the expansion of network coverage and increasing availability of affordable, cheap smartphones mostly from Asia and especially from China.

Even though mobile operators in Ghana often complain about the backdrop of high cost and operational pressure, they benefit immensely from the support of solid regulatory framework, together with a loose market. Lippincott (2010) observes that even though mobile services provided by libraries often involve access to information, it is still not lost on libraries to focus on the use of mobile devices to create digital content. In other words, libraries always have a choice to develop mobile friendly websites to their services or create mobile apps which offer similar services.

Gillwald, Milek, and Stork (2010) believe that although fixed broadband or internet access through desktop computers is declining, mobile phone ownership for the same purpose is increasing. Much as many people first ever accessed the internet at the workplace, schools and universities and public access facilities such as internet cafes, the situation currently is that many people in Africa now access internet through their mobile phones (Caperon, 2015). Mobile phones have therefore overtaken by the use of internet cafés in most places in Africa.

This interpretation of mobile is largely indicative of the activity currently underway at the Library. In most libraries which have mobile services, the focus has often been on broadcast-only website rather than two-way conversation between the library and users or among users. Hence, libraries are encouraged to embrace the new era of rendering service through mobile devices. Though mobile library service is a new concept in University of Cape Coast Library, mobile penetration in the University stood at 92% as far back as 2009 (Dadzie, 2009).

Objectives of the study

These objectives were set in order to meet the aim of the study:

1. To explore the library services being considered by UCC Library for implementation on mobile platforms;

Research question

2. What library services is the library considering implementing on mobile platforms?

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 case study design

Babbie and Mouton (2002) insists that empirical research requires a plan which outlines the various circumstances and procedures for collection and analysis of data. Through case studies various studies are conducted at each level of the research process. This helps researchers to develop ideas for extensive research. They also serve as channel for a range of research methods. Thus, they are non-prejudicial with regards to any other type of research (Murphy, 2014). 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, 2001; Creswell, 2009). Case studies are primarily associated with the fields of anthropology and sociology and could either be single or multiple-case designs.

The case study research design has been adopted in many inquiries

pertaining to the adoption of digital initiatives in libraries, digital archiving, institutional repositories and digital libraries.

Selection of research location

The University of Cape Coast Library System comprises the Sam Jonah Library (the main library), the college, faculty and departmental libraries as well as the libraries in the halls of residence. Much as all these libraries provide services for clients, this study of the implementation of mobile- based library services focus on the main library of the university. The choice of the setting of the study is apt because the Sam Jonah Library serves as the central node through which all policies for the other satellite libraries are run. Sam Jonah Library already drives the digital initiatives of the university including the Koha library management software, institutional repository, Online Public Access Catalogue and the electronic resources. It is envisaged that in serving the academic community, of which most are on the distance education programme, the implementation of mobile-based library services by the Sam Jonah Library will position the university to deliver its academic mandate.

Target population

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.

Sampling procedure

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.

Sample size

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:

Source: Library Guide, (2011) and the UCC- SRIMS, Record Guide (2016).

Description	Library staff	Undergraduates	Postgraduates	Total
Population	230	18,913	1068	20,211
Sample	6	10	5	21

Data collection methods

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. The interview, which was semi-structured were used to elicit primary information from the 21 respondents. According to Sarantakos (2005), semi-structured interview ensures uniformity, provides avenue for the uniqueness of the respondents, situations and the environment where information is gathered. Two separate interview guides were used; one section for students and the other section for the library management respectively.

Library staff and students (undergraduate and postgraduates) were engaged in the interview. With the library staff, they were approached earlier by the researcher to fix a convenient time and venue for the interview. This was necessary to enable both the researcher and the respondent to prepare for the actual day. Regarding students, since the process of inclusion was accidental sampling, those who agreed to be included in the study were engaged in the discussion as to how to get the best information from them for the study. Whereas a few agreed to be interviewed on the same day, eleven out of the fifteen proposed a later date. They duly turned up on the scheduled dates. On the whole, the interview with the selected library management and staff as well as the students occurred between 5th and 12th of August 2016. The interview guide for the library management and staff entailed the demographic data of respondents, perception regarding mobile technology-based library services, strategies for implementing mobile technology-based library services and challenges in implementing mobile technology-based library services. Apart from the background issues of the student respondents, their perception regarding mobile technology-based library services, proficiency of their use of mobile-based technologies, strategies for success as well as some possible challenges which will confront the implementation of mobile technology-based library services were also examined.

Together with two trained field assistants, the interviews were conducted with the responses recorded through note taking and audio recording. Interviews with the students occurred at an irregular time, unlike those of the library staff which often occurred during lunch break (1:00 p.m.) and after close of work (5:00 p.m.). After each interview session, the audio recordings as well as a photocopy of the notes were immediately sent as email attachment into my inbox. This was a precautionary measure against any permanent loss of the field data.

Data analysis and interpretation

Case analysis

Due to the fact that qualitative research results in large amounts of richly detailed data, which often times is contextually laden, research result must be reduced to represent the major themes or categories of the topic of study (Creswell, 2009). The data from the interview were recorded through note taking and audio recording. In order to harmonise and ensure validity, the notes were compared with the transcribed audio records. The transcribed interviews were read through and coded according to the respective themes to bring out the emerging patterns and categories which provided the basis of analysis. In doing this, the entire transcribed interviews were placed into a single MS Word document. After this, a simple table was created and populated with the following columns:

1. Unique ID (done to achieve a greater level of anonymity);
2. Transcribed data
3. Theme, categories and subcategories that the data record fit in;
4. Page and line number from the MS Word document.

Case report

Further clarification, when deemed appropriate, was sought from respondents to ensure that their views have not been misrepresented. Once satisfied, the themes, categories and sub-categories became the foundation for the development of the case study report. The report comprised direct quotation as well as indirect or general attribution.

Validity

A key factor for a research to be reliable is for the instrument to measure what it is supposed to measure (Creswell, 2009; Kumar, 2005). To achieve this, not only was enough explanation made to respondents to ensure clarity but also, their clarification was sought in areas where misrepresentation of facts or opinions was likely to occur.

Ethical considerations

The researcher agrees with Fraenkel and Wallen (2000) about the need to hold information acquired from respondents in confidence. In furtherance of this, study respondents were adequately informed and their permission sought before being included in the study and a letter of introduction shown to disclose the researcher's identity. Also, the instruments were duly assessed and reviewed by the Ethical Review Board of the Department of Information Science of the University of Pretoria before being administered. To add to high level confidentiality and trust, respondents were accorded the opportunity to comment on the draft report or transcribed interviews. Furthermore, all sources of literature used for this study were duly acknowledged in accordance with the tenets of academic honesty, copyright and fair use.

Results

Strategies for successful implementation of mobile phone library services

This section also looked at the strategies for successful implementation of mobile phone library services at the University of Cape Coast. The synopses of the views of the students are presented in Table 5, Appendix 2.

Respondents were asked what strategies the University Library should put in place to succeed in making services accessible on mobile devices. The disclosure revealed that educating students on the range of library services and also ensuring proper foundation for the mobile platform would help for successful implementation.

At the University of Cape Coast, students were questioned on the ways they can help in the successful implementation of library services on mobile device. The study revealed that during the implementation process their views should be sought on which services will appeal to them and also the kinds of services they intend to use on their mobile devices.

This section also looks at requirement for the mobile platform, creating an application or just a website, whether it will be internally done by library staff or outsourced, internally done, what is the level of training of personnel, if outsourced? How prepared is the library to finance, any stakeholders identified? Will the various stakeholders of the university be involved in doing this? A tabular summary of the views of the librarians is presented in Table 9, Appendix 2.

Librarians were asked whether the implementation of mobile phone library services requires conversion of existing services on the mobile platform or it will be entirely new services. The findings revealed the view of all the librarians that it will just be enhancing existing service; not entirely a new service.

When questioned whether their strategy involved creating an application or just a website? the study revealed that four of the librarians agreed that a website will be the best. One of the librarians said, “personally, as far as I'm concerned, if the library will want to streamline and control library services and also ensure visibility of its services and resources, it will be better for the person to log in to the library website and access from there.”

Librarians were questioned whether their strategy involved in implementing mobile services will be implemented internally by the library staff or outsourced. The librarians agreed that currently, it can be done internally but if there is the need for an expert service it will be outsourced. One librarian commented, “Where technical expertise becomes scarce, we will then have to outsource them”.

Respondents were questioned on their strategy involved in implementing mobile services. If it will be internally done, and what is the level of training of personnel required. All the six librarians agreed that their personnel were well able to handle the services if the need arises.

When questioned whether their strategy in implementing mobile services will be outsourced and how prepared the library was to finance, the findings show that most of the librarians were of the view that the management would finance when the need arises.

Librarians were questioned whether their strategy involved in implementing mobile services depends on particular stakeholders, the study showed that all the librarians were of the view that the first stakeholder is the Computer Science department. However, when the IT service required is beyond its abilities the relevant internet service provider is hired.

When questioned how to bring stakeholders on board, the librarians agreed that the various views of stakeholders are imperative when mobile services are to be implemented.

Librarians were questioned on how the initiative will be marketed to the University community and beyond: the findings revealed that the librarians agreed publicity of the services of the library should be done through the University's media, website, seminars and information literacy class among others.

Recommendation

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.

Conclusion

The objective of this paper was to find out the library services being considered by UCC Library for implementation on mobile platforms. A review of literature on strategies for implementation of mobile phone library services reveals the ubiquitous nature of mobile technology and how it supports learning in many ways. The paper attempted to explore the potential role of mobile phones in improving access to education, how mobile phones are promoting new learning and the level of penetration of mobile phone in Africa, Ghana and UCC. Among the potentials it was identified that the use of mobile technology in academic library will impact and strengthened the existing relationship between the library and user. Mobile devices are contributing immensely toward enriching educational system, with both teachers and student benefiting greatly (Lindsay, 2016). Mobile technology is also considered a top technology to incorporate in classroom and has led to a new paradigm of evolution known as mobile learning. Again, the increasing penetration and subscription of these technologies has brought urbanization and growing investment of rural network coverage. Bell (2012), in trying to suggest the future, indicates that libraries should be “working to shape their vision of a preferred future” for themselves.

The limitation of the study did not bring into accounts software and

other architectural designs of mobile platforms and their development. It only focused on the human interface issues on the application of mobile technologies. 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 it so as to better provide enhanced information needs and services to its stakeholders.

Appendix. Provision of Missing Item

Table 5 Appendix 2

Challenges

ID	LEVEL	What are some of the expected challenges you anticipate?	How could they be addressed?
1	Masters	I think one basic challenge will have to be the internet facility on campus that is data	The central management should make money available to address the network challenges
2	undergraduate	One challenge that I foresee will be distraction from paying attention	No response
3	PhD	Low network within the library	this issue of low network the library management has to take it up to address it
4	undergraduate	Finance will be the number one challenge	The university will have to collaborate with international partners, since they can not only secure adequate funds for such project.
5	undergraduate	Ok not all materials and library resources that are useful in the library can be put on the smartphone or mobile devices	they can start with student project work, making them online, before traditional books and other materials can b
6	undergraduate	Accessibility of internet, " lack of access to internet will render such project ineffective	Even though internet accessibility is being improved on campus much investment need to be done
7	Masters	Well am sure some student will say they don't have smartphones or laptops to be able to access these services	Proper structures in terms of implementations should be put in place to forestall problems students may encounter.
8	undergraduate	As I said earlier the internet will be the major the challenge, lack of preparation on the part of the library…	Investment from library management will be a key, library services should be made to conform on what is on the phone
9	undergraduate	A big challenge for me is the surface area of these mobile devices,	The library content or the format or text should be customized to fit surface of these mobile devices.
10	undergraduate	Most student are using mobile phones but not every individual who has it, though they may be few of them, this can pose a challenge	Personnel should be trained, bandwidth must be increased to increase wifi point of access
11	undergraduate	I fear for low patronage since there will be a level of apathy on the part of some students.	Internet connectivity must be increased because student pays for them …
12	undergraduate	My number one challenge will be for those who don't have smartphone	I suggest the library in collaboration with the university administration should provide each student with a smartphone, they can bill you with it.
13	undergraduate	Challenges such as untrained personnel, bad networks and the short battery life span of these smartphone can hinder smooth running of these services	I will advocate for hybrid services where some of the services can be run physically and other services can be run with the use of these gadget.
14	PhD	networking is major challenge,	I think they should increase the bandwidth on campus, subscribe to high impact factor journals, such as science direct, total environment
15	PhD	These mobile devices uses mainly on wifis, and here on campus these wifi's are not reliable.	it could be addressed by securing a more up to date wifi systems, internet architecture must be improved on campus.

Table 9 Appendix 2

Challenges

ID	Imminent challenges that would be envisaged for the implementation	Are there anticipated challenges emerging from other digital initiatives of the library?	What will be short, medium and long term strategy?
1	Commitment of staff	No, it has to do with those who will man this initiative. Lack of commitment will certainly disrupt its implementation	Get a lot of staff members on board, those who have exposure should be able to share their knowledge…
2	Finances can be major factor secondly the expertise of the technical team, capacity of the library staff themselves	Not entirely so	… running short in-house courses, The medium term will see to it that more IT staff will be hired to retrain The long term will be forming partnership….
3	finance, able to sell the idea to higher management for them to accept and how our clientele will be able to embrace such initiative	No I don't think so, because so far all the technology in place are been used well	…the library should be able to demonstrate how useful it will be for users and the university in general … and partner the library and help us.
4	People may not give it their backing, negative questions of can we be done?	No, anticipated challenges will not come from any digital initiatives	…short term the library liaise with computer science department, medium term get a team of student from the computer science department … train the core library staff …
5	Imminent challenge will be education, able to convince management about that so that there can be committed staff	No	in a nutshell I think the short, medium and long term should be a dedicated staff who will offer themselves to be trained for such initiative.
6	Definitely it will be connectivity and disruption of bandwidth or the wifi's	Yes, the library's internet disruption	… library's internet connectivity must be managed well and be given a boost. More investment of the library's IT infrastructure must be given a face-lift. …

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