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### **Article information:**

To cite this document:

Aubrey Harvey Chaputula, Stephen Mutula, (2018) "Provision of library and information services through mobile phones in public university libraries in Malawi", Global Knowledge, Memory and Communication, <https://doi.org/10.1108/GKMC-05-2017-0048>

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# Provision of library and information services through mobile phones in public university libraries in Malawi

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## Abstract

**Purpose** – The aim of this paper is present findings of a study conducted to find out the current state of providing and accessing library and information services in public university libraries in Malawi through mobile phones.

**Design/methodology/approach** – The researcher carried out in-depth semi-structured interviews with university/college librarians using interview guides. University/college librarians were purposefully selected for the interviews because they are overall managers of their libraries, hence in a better position to provide information that addressed the study objectives. Proceedings of the interviews were recorded using a tape recorder, whilst backup notes were recorded in a notebook. Data were transcribed and analysed using Nvivo software.

**Findings** – Findings revealed that only one library in this study had fully implemented the offering of library and information services through mobile phones, whilst the rest were moving towards the same. Both user and reference service offering through mobile phones included e-journals, Facebook, WhatsApp, Online Public Access Catalogue and SMS. The institutions in this study had institutional repositories, e-journals and e-books, among others, which they could offer through mobile phones. High cost of accessing services through mobile phone, vandalism of Information and Communications Technologies infrastructure, shortage of skills and network congestion are some of the factors that may affect the offering of library and information services through mobile phones.

**Research limitations/implications** – Malawi has four public universities. However, this article reports findings of a case study of three of the four constituent colleges of the University of Malawi (College of Medicine, Kamuzu College of Nursing and Polytechnic), Lilongwe University of Agriculture and Natural Resources and Mzuzu University. By virtue of being a case study, it means that the findings made are only applicable to the five institutions covered.

**Practical implications** – The study findings have practical implications in that they can be used as a model for planning the implementation of library and information services through mobile phones not only in public university libraries in Malawi but also other related institutions locally and internationally.

**Originality/value** – Use of mobile phones in the delivery of library and information services is receiving a lot of attention from researchers the world over. However, this is not the case in Malawi, as studies of this nature have not been conducted in the public university sector or in other related sectors. Findings of this study will, therefore, inform researchers intending to conduct similar or related studies not only in public universities in Malawi but other related institutions as well.

**Keywords** Malawi, factors, Electronic information services, Mobile phones, Library and information services, Public university libraries

**Paper type** Research paper



## Introduction

The potential of the mobile phone as a tool for the delivery of library and information services has been underscored by a number of scholars (Kubat, 2017; Madhusudhan and Dar, 2017; Hossain and Ahmed, 2016). Kubat (2017) observes that the mobile phone is the number one communication tool today. Moreover, today's smartphones (a more advanced type of mobile phone) provide cutting-edge computing capabilities and connectivity options in a manner similar to traditional computers (Hossain and Ahmed, 2016). These aspects, combined with the pervasiveness of the mobile phone amongst university students, implies that academic libraries can leverage the growing capabilities of mobile technology to provide information faster to their clients (Madhusudhan and Dar, 2017).

The delivery of library and information services through mobile phones is a relatively new phenomenon. An ECAR (2010) nation-wide study of undergraduate students' use of technology trends in the US higher educational institutions revealed a marked increase in the number of students who owned and accessed internet from a handheld device (most commonly smartphones) from 33.1 per cent in 2009 to 48.8 per cent in 2010. This development prompted Lippincott (2010), a renowned library and information science scholar, to predict in her 2010 article titled "A mobile future for academic libraries" that mobile phones will have a profound impact on library service delivery in the future considering that mobile phones had become part and parcel of people's lives. This has largely been realised, as many academic libraries in various parts of the globe have adopted the use of mobile phones in service delivery over the past few years, and the number keeps growing every year (Wei and Yang, 2017; Bomhold, 2014). A study conducted by Bomhold (2014) which focused on 73 public research universities under the Carnegie Corporation in the USA found that 52 (71.2 per cent) of the libraries had adopted the use of mobile phones in library service delivery. A previous study by Aldrich (2010) had shown that only 21 per cent of these libraries had adopted the use of mobile phones in service delivery at the time. Similar increases in usage of the mobile phone as a tool for the delivery of library and information services have been reported in China and the Southern African Region (Wei *et al.*, 2015; De Wee, 2013).

Attitudes of students who are the main client base of academic libraries to the use of mobile phones for providing and accessing library services have proven to be positive. For instance, findings of an earlier study by Paterson and Low (2011) involving 1,716 university students in the UK and more recently by Kumar (2014) at Jawaharlal Nehru University in India involving 180 students revealed that students had positive attitudes towards the delivery of library and information services through mobile phone. The positive attitudes of users have propelled the rapid adoption of the mobile phone for delivering and accessing library and information services.

Library service delivery through use of mobile phones has taken many forms. Some of them include use of mobile apps, mobile library websites, mobile catalogue (also referred to as MOPAC), short message service (SMS) notifications and reference service, instant messenger, mobile collections (e-journals and e-books), library instructions and even circulations (Madhusudhan and Dar, 2017; Wei and Yang, 2017; Luo, 2014). Much as the service offering is so broad, some services are widely offered by some libraries than others. For instance, a study conducted by Kubat (2017) that sampled 26 state and private universities in Turkey revealed that 15 university libraries offered MOPAC, 12 offered mobile apps, 9 provided mobile website, 8 provided quick response (QR) Codes, whilst only 2 offered the SMS reference service. Similarly, a study conducted by Bomhold (2015) that involved 53 Carnegie rated RU/VH universities indicated that the majority of the institutions (52; 98.1 per cent)

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provided catalogue access, 45 (84.9 per cent) offered database access, 39 (73.6 per cent) provided ask-a-librarian, 23 (43.4 per cent) offered subject guides and only 13 (24.5 per cent) provided course reserves.

Provision of  
library

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### **Problem statement**

Literature shows that university libraries in the USA, Europe and Asia are all embracing the use of mobile phones in the delivery of library and information services (Bomhold, 2015; Ballard and Blaine, 2013; Kumar, 2014). The use of mobile phones to provide library and information services helps to enhance access to library resources beyond the normal opening hours, hence can assist to overcome the obstacles of time and space (Malik and Mahmood, 2013), and bring convenience to library users (Ballard and Blaine, 2013). From the broader African perspective, literature shows that only a few university libraries have adopted the use of mobile phones in the delivery of library and information services. Some of the notable universities that are known to have adopted the use of mobile phones in the delivery of their services are the University of Swaziland, University of South Africa, University of Pretoria, University of KwaZulu-Natal and University of the Free State (De Wee, 2013; Anbu and Mavuso, 2012). Libraries that are using mobile phones to deliver their services use them mainly for providing MOPACs, mobile websites, SMS text messaging and accessing mobile library resources. In the context of Malawi, no studies on the use of mobile phone to provide library and information services are available. This study was, therefore, undertaken to study the provision of library and information services through mobile phones in public university libraries in Malawi. The study specifically addresses the following research questions:

- RQ1. What is the current status of providing and accessing library and information services through mobile phones in public university libraries in Malawi?
- RQ2. What electronic information resources and services are currently available in public universities in Malawi that can be deployed through mobile phones?
- RQ3. Which factors impact the delivery of library and information services through mobile phones in public university libraries in Malawi?

### **Literature review**

#### *Use of mobile phones in the delivery and access to library and information services*

Studies conducted in various parts of the world show that university libraries are making strides in embracing the use of mobile phone in the offering of library and information services. In the USA, Aldrich (2010) used a mixed-method study to evaluate progress made within the Association of Research Libraries (ARL) move to the mobile web at 111 English-speaking ARL libraries. Findings of this study revealed that only 39 of the 111 libraries had mobile websites for either the university or library, and 24 (21 per cent) had mobile web pages for the library. The study further indicated that library hours (75 per cent), staff directories (67 per cent) and library catalogues (67 per cent) were the common services offered on the mobile websites. A follow-up study conducted by Jackson (2013) involving 99 ARL libraries revealed that great progress had been made from the previous study. Findings of this study indicated that the total number of libraries that had mobile websites jumped from 21.6 per cent in 2009/2010 to 80 per cent in 2012. A more recent study conducted by Bomhold (2014) which focussed on 73 public research universities under the Carnegie Corporation found that 52 (71.2 per cent) of the libraries had some sort of mobile

accessibility to library services. Bomhold, however, noted that the type of access provided was mixed.

Some studies related to mobile phone use in libraries have also been done in Africa. One of such studies undertaken by Sekyere (2011) investigated virtual reference services offered by 79 academic libraries in ten West African countries. This study found that none of the libraries surveyed made use of mobile phones in service delivery. This implies that though libraries in various parts of the world were largely moving towards adopting the use of mobile phones in the delivery of library services, libraries in the West Africa Region had been left far behind. However, there are indications that some libraries are now making efforts to rectify the trend. A recent study conducted by Baro *et al.* (2014) involving 36 university libraries in Nigeria revealed that the majority of the libraries received reference services through mobile phones.

Literature further shows that some university libraries have adopted the use of mobile phones in the delivery of library services in the Southern Africa Region, and are using them mainly for MOPACs, mobile websites, SMS text messaging and accessing mobile library resources (De Wee, 2013; Anbu and Mavuso, 2012). A pilot SMS project conducted by Anbu and Mavuso (2012) at the University of Swaziland revealed that SMS could be used successfully to market library services. Similarly, a study by De Wee (2013) indicated that AirPac was successfully used as a tool for information access in an Open Distance Learning (ODL) environment at the University of South Africa Library. This study further showed that universities of Pretoria, the Free State and KwaZulu-Natal were providing library services to their clients through use of mobile phones. Mohamed (2014), on the other hand, conducted a pilot study on the use of QR Codes at the Brand van Zyl Law Library at the University of Cape Town. Findings of the study revealed that students were generally unfamiliar with QR Codes until they had participated in the needs assessment. The study concluded that this challenge would be overcome with time. In the context of Malawi, no studies on the use of mobile phones to provide library and information services are known to have been undertaken.

Although progress towards the adoption and use of mobile phones in libraries is being made, there is still a long way to go before they are fully integrated in library services because mobile phone use in libraries is at a very early stage of adoption. Literature clearly shows that although many academic libraries in the developed and developing world have adopted the use of mobile phones in service delivery, a good number of them are yet to adopt their use, whilst others have done so modestly (Kubat, 2017; Bomhold, 2014). Moreover, some projects that have been undertaken have not delivered the desired results. A typical example in this case is a project aimed at offering reference services through mobile phone text messages undertaken at San Jose State University in the USA that ended in failure, a development that was attributed to the lack of awareness (Luo, 2014).

#### *Factors impacting the delivery of library and information services through mobile phones*

The literature review revealed the existence of some factors that could impact the offering of library and information services by libraries and access to those services by users. One such factor is the network infrastructure. For instance, the ECAR (2015) study of undergraduate students' ownership and use of mobile devices in the USA indicated that students living on campus rated their network experiences considerably lower than students living off-campus, whereby only three in five students stated that they had reliable access to Wi-Fi throughout their campus (58 per cent) or in classrooms/instructional spaces (63 per cent) (Dahlstrom *et al.*, 2015). This challenge came about mainly because of a large number of mobile devices which students connected to the campus network. The US study revealed

that 61 per cent of students connected at least two devices to the campus network at the same time.

The literature has also shown that cost could be a factor in access to library and information service through mobile phone. For instance, a study conducted by [Song and Lee \(2012\)](#) of international students enrolled at the College of Business at the University of Illinois found that the high total cost of ownership (costs for handsets and monthly data plans) was the main reason why 39 per cent of the respondents did not own a tablet PC. In yet another study, [Walsh \(2010\)](#) conducted a series of focus groups in 2009 at the University of Huddersfield in the UK to investigate student attitudes towards the use of mobile phones in libraries. Although this study found student attitudes towards text messaging from the library to be positive, students had reservations about using the mobile web because of cost considerations. Another study conducted by [Luo \(2014\)](#) at San Jose State University revealed that some of the respondents to this study did not access the SMS library service because they did not have a texting plan.

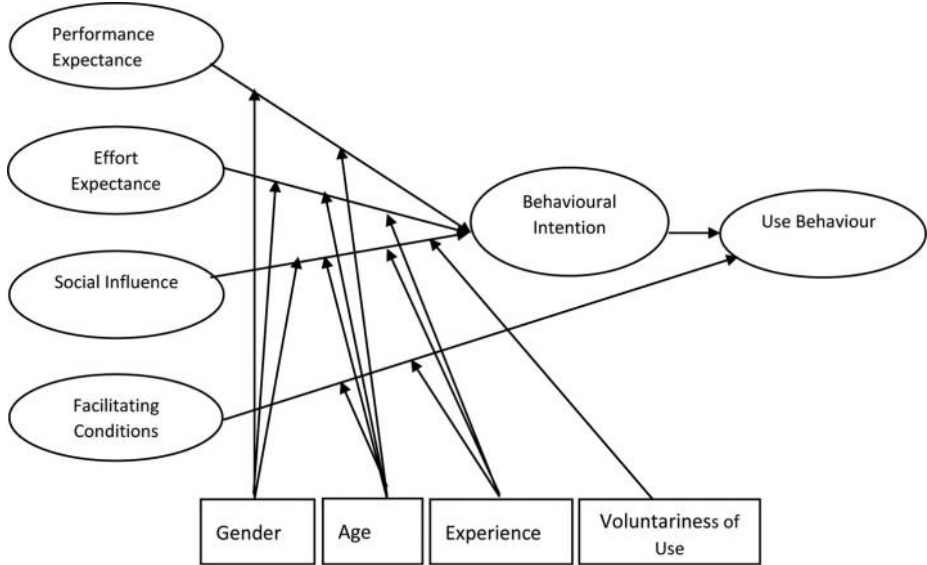
### Theoretical Framework

This study was underpinned by the Unified Theory of Acceptance and Use of Technology (UTAUT). UTAUT is a model that is often used in Information and Communications Technologies (ICT)-related studies. The model was developed and validated by [Venkatesh \*et al.\* \(2003\)](#) through the review, mapping and integration of eight dominant theories and models that originated from different theoretical disciplines such as psychology, sociology and information systems ([Williams \*et al.\*, 2012](#); [Kijasanayotin \*et al.\*, 2009](#)).

UTAUT was developed on the basis that constructs of existing theories were similar in nature; therefore, it was logical to map and integrate them to create a unified theoretical basis ([Venkatesh \*et al.\*, 2003](#)). The model identifies four key drivers of the adoption of information systems: performance expectancy (PE), effort expectancy (EE), social influence (SI) and facilitating conditions (FC) ([Martin and Herrero, 2012](#)). The model centres on two key issues, namely, behavioural intention (BI) and actual usage (AU). PE, EE and SI influence BI, which in turn influences AU. Empirical studies have shown that FC, on the other hand, do not have any influence on BI but directly influences AU ([Venkatesh \*et al.\*, 2003](#)). Besides the four main constructs of the model (PE, EE, SI and FC), UTAUT identifies the moderating effect of four other factors such as gender, age, experience and voluntariness of usage ([Keong \*et al.\*, 2012](#)) ([Figure 1](#)).

The strength of the UTAUT model is that it was founded on so many models, thus providing the researcher with a broader view of all existing models. Moreover, UTAUT is a much stronger model, as it accounts for an explanatory power of up to 70 per cent unlike the other previous models that account for only between 17 and 53 per cent of the variance in use intentions ([Venkatesh \*et al.\*, 2003](#)). UTAUT has its own weaknesses too. Scholars such as [Straub and Burton-Jones \(2007\)](#) have claimed that the ten constructs of UTAUT are not parsimonious. In spite of this weakness, use of UTAUT in this study is justified on the basis that its strengths far outweigh its weaknesses. Besides, the model has been used in other related studies such as the study of the adoption of mobile devices ([Carlsson \*et al.\*, 2006](#)), the use of “near field communication” adoption of mobile phone service ([Chen and Chang, 2013](#)) and the use of mobile internet ([Wang and Wang, 2010](#)). However, the researcher did not come across studies using this model in the study of mobile phone use in libraries.





**Figure 1.**  
UTAUT

**Source:** Venkatesh *et al.* (2003)

### Methodology

This study employed a multi-case study design to investigate the provision of library and information services in public university libraries in Malawi. Malawi has four public universities. They include University of Malawi (UNIMA), Mzuzu University (MZUNI), Lilongwe University of Agriculture and Natural Resources (LUANAR) and the Malawi University of Science and Technology (MUST). UNIMA has four constituent colleges, namely, Chancellor College (CHANCO), Kamuzu College of Nursing (KCN), Polytechnic and College of Medicine (COM), whilst the other universities only have one campus. Although potentially seven study institutions existed, this research covered only five of them: MZUNI, LUANAR, Polytechnic, COM and KCN. Libraries selected for this study are affiliated to older and well-established institutions except MUST, which was established in 2013, and did not have students in third, fourth and fifth years at the time of data collection. CHANCO was not included in the study despite being older and well-established because permission was not secured to access the respondents. The combined student population in the institutions studied exceed 10,000. The case study was deemed appropriate for this study because it enabled the researcher to examine the phenomena under investigation in-depth individually in the five institutions, and also draw conclusions collectively across the study sites.

Self-completed questionnaires were administered to a sample of 370 students in years 3, 4, 5 and postgraduates drawn using a sampling table provided by Israel (2013). A decision to limit the study to these categories of students was made because they are involved in more intensive research activities, hence capable of using their mobile phones for a wider range of academic-related purposes including library use. The researcher also conducted semi-structured interviews with a purposefully drawn out sample of five university/college librarians. The university/college librarians were seen as the most appropriate sample for

this study because they were in a position to provide information that helped to answer most of the study questions as heads of their institutional libraries (Sekaram and Dougie, 2010). Interview guides that contained open-ended questions were used in conducting semi-structured interviews, whilst tape recorders and notebooks were used to capture and record proceedings of the interview, respectively.

A number of methods were used to validate the data collection instruments. The interview guides were given out to some experienced researchers who commented on their appropriateness. Comments received from such experts together with observations and feedback received during pilot testing was used in amending the instruments to enhance their effectiveness. The researcher also used another technique called member checking to validate the research findings. This is a commonly used technique in qualitative studies, and has been described by Lincoln and Guba (1985, p. 314) as “the most critical technique for establishing credibility”. Member checking involves taking data, analyses, interpretations and conclusions back to the participants so that they can judge the accuracy of the account (Creswell, 2013). The aim is to enable participants check not only the accuracy of the findings but even the language used. In practice, the researcher sent the university/college librarians findings drawn from the interviews through email so that they could verify its accuracy. Reliability of some of the questionnaire items in this study were determined by calculating the Cronbach’s Alpha values of the variables in the questions. The Cronbach’s Alpha values were either closer to 0.7 or were over that mark. This shows that the items in the questionnaires used had high levels of internal consistency.

Research ethics was accomplished by, among others, getting gate keepers’ permission before entering the study sites, and soliciting the informed consent of the participants before administering the questionnaires and conducting the interviews. Qualitative data collected from the study were codified, and analysed using Nvivo software. Conversely, quantitative data were analysed using SPSS Version 23 to generate tables and graphs. Data for this study were collected between November 2015 and March 2016.

## Results and discussion

### *Current status of providing and accessing library and information services through mobile phones in public university libraries in Malawi*

Asked if the library was planning to start using mobile phones in providing services in the near future, the University Librarian (UL) for MZUNI answered in the affirmative. He indicated Facebook, digital library and Online Public Access Catalogue (OPAC) as some of the services they were planning to start with. He further indicated that the library was planning to prioritise electronic access to information, as the library did not have enough books following the fire incident that happened in December 2015 that gutted down the library, and the use of mobile phones to provide and access information was one of the areas they were planning to exploit.

The College Librarian (CL) for KCN indicated that the Library had not yet implemented the delivery of library and information services through mobile phones. In terms of service offering, he indicated that the library was planning to start with SMS service before extending it to OPAC. WhatsApp and Facebook were likely to be adopted at a much later stage. The CL further indicated that the SMS and OPAC services have their roots in the library management system they were using, hence easier to adopt. He elaborated that trials for the SMS service were done in 2014 but it was not pursued further because it faced implementation challenges, as both students and academic staff seemed not ready to use their mobile phones to access library services when the service was piloted. He indicated that usage costs might have contributed to low usage.



The study findings further revealed that The Polytechnic Library had not commenced the offering of library and information services through mobile phones at the time this study was being done. The CL for Polytechnic indicated that the library was planning to implement such services in the near future. With regard to service offering, the CL pointed out that the library was planning to start with Facebook and mobile apps of publishers such as Ebscohost because many of them were already mobile-optimised. OPAC was likely to be brought in at a much later stage because it would require consultation and collaboration with the ICT department.

The CL for COM stated that his institution had started the implementation of library and information services through mobile phones. He indicated Facebook, SMS and e-mails as the services that were being implemented on the mobile phone platform.

The UL for LUANAR stated that LUANAR Library started using phones (ground and mobile) mainly to respond to queries from farmers, extension workers, students, teachers and policy makers as far back as 2004. However, the library had not extended these services to LUANAR students and academic staff who were the main client base of the library. However, the UL indicated that the library was planning to extend these services to students and academic staff soon. He further indicated that the Library was planning to deliver some of its services via WhatsApp and Facebook because they were commonly used by their clients.

The findings presented in this section show that all the libraries in this study were moving towards the implementation of library and information services through mobile phones but varied greatly on the progress made from one institution to another. Whilst three out of the five libraries (COM, LUANAR and KCN) had taken steps towards realising their aspirations of offering library services through mobile phones, the remaining two (MZUNI and Polytechnic) only expressed interest to do so but were yet to take concrete steps towards achieving this goal. The COM Library was the only institution that indicated that it had fully embraced the offering of library and information services through mobile phones.

Findings of this study resemble those obtained in studies conducted in other parts of the world. A study conducted by Li (2013), for instance, reported that as of September 2011, only 14 of the 39 Chinese Universities (35.9 per cent) that were part of the 985 Project provided library and information services on the mobile phone platform. However, the number of libraries with some mobile presence had increased to 36 (92.3 per cent) by August 2014 (Wei *et al.*, 2015). This result suggested that Chinese libraries were making remarkable progress in their movement to the mobile web.

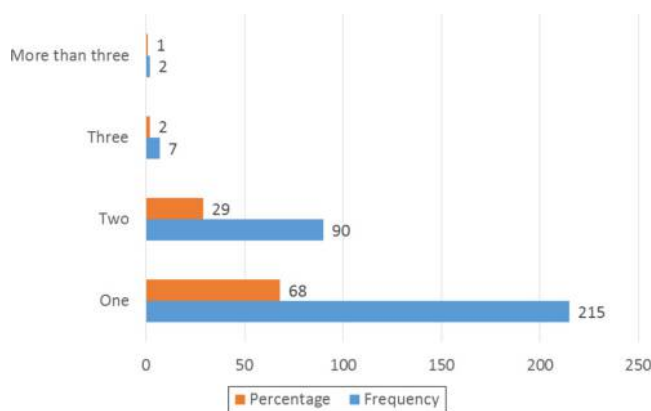
Related studies based on the wider African Region or Southern Africa in particular show that university libraries are moving at a pace similar to that observed in Malawi in adopting the use of mobile phones in service delivery. Most of the initiatives undertaken so far involve use of mobile websites, MOPACs and SMS text messaging as a means of delivering both user and reference services to their clients (De Wee, 2013; Anbu and Mavuso, 2012). Anbu and Mavuso (2012), for instance, carried out a pilot SMS project at the University of Swaziland that revealed that SMS could be used successfully to market library services. Likewise, a study by De Wee (2013) revealed that the University of South Africa used AirPac Library Management System as a platform for delivering information to ODL students. The study by De Wee (2013) further revealed that universities of Pretoria, KwaZulu-Natal and Free State were delivering some of their services such as OPAC and databases through mobile phones. Literature further shows that Mohamed (2014) conducted a pilot study on the use of QR Codes at the Brand van Zyl Law Library at the University of Cape Town. This study concluded that most students were generally unfamiliar with QR Codes until they had participated in the needs assessment. However, the significance of this

study was that most librarians in the region were willing to tap both the traditional and novel functionalities of mobile phones with the aim of serving their clients.

*Current status of accessing library and information services through mobile phone.* Before probing into mobile phone use in accessing library services, the researcher asked the student respondents to indicate whether they owned a mobile phone or not. Findings indicated that mobile phone ownership amongst students was very high with many of them owning one or more devices. Findings shown in Figure 2 indicate that 315 (99.7 per cent) students owned a mobile phone, whilst only 1 (0.3 per cent) indicated that he or she did not own a mobile phone. Whereas 215 (68.5 per cent) students indicated that they owned only one mobile phone, a significant part of the student body (90; 28.7 per cent) indicated that they owned two mobile phones. Further, seven (2.2 per cent) students indicated that they owned three mobile phones and only two (0.6 per cent) students pointed out that they owned more than three mobile phones. These findings imply that much as single ownership of mobile phone was prevalent, dual and multiple ownership was increasingly becoming a trend.

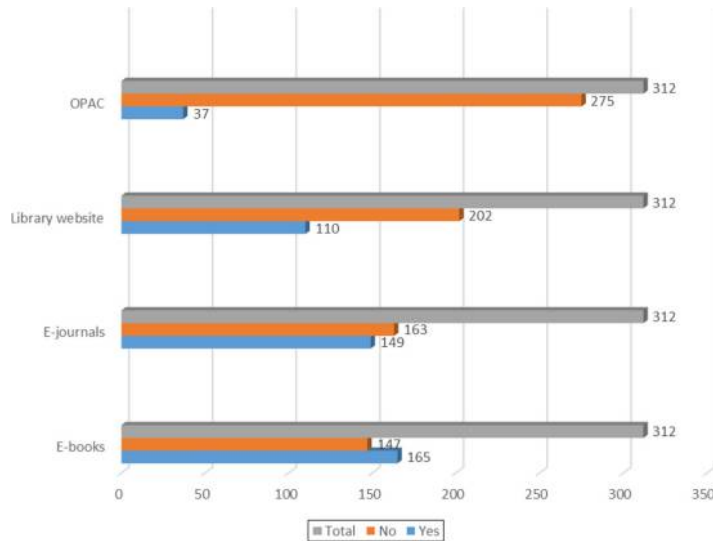
Students who owned more than one mobile phone were asked to indicate how many of them had internet capabilities. Forty-eight (49 per cent) students stated that two of their mobile phones had this capability, whilst 46 (46.9 per cent) indicated that only one of their phones had internet capabilities. Only four (4.1 per cent) had three or more mobile phones that had internet capabilities.

Students were asked to indicate if they ever accessed e-books, e-journals, library website or OPAC using their mobile phone. Findings of their responses are presented in Figure 3, and they show that majority of the students (165; 52.9 per cent) had ever used their mobile phone to access e-books, whilst an equally bigger percentage (149; 47.8 per cent) had ever used their mobile phone to access e-journals. A significant number of the students (110; 35.3 per cent) also reported using their mobile phones to access the library website, whilst only a few (37; 11.9 per cent) used their mobile phone to access the OPAC. However, some of the respondents did not seem to understand what OPAC was, and perhaps its actual use could be much higher than what was reported. These findings signify that although only COM Library indicated that it had fully implemented library and information services delivery



Source: Survey data, 2016

**Figure 2.** Mobile phone ownership among students ( $N = 314$ )



**Figure 3.**  
Access to information resources using mobile phone by students ( $N = 312$ )

**Source:** Survey data, 2016

through mobile phones, students were still using their mobile phones to access information resources which the library provided.

Students that were using mobile phones to access information resources from the library were asked to indicate reasons that prompted them to do so. Information captured in [Table I](#)

Reason for using mobile phone over other means, i.e. laptops	Strongly agree	Agree	No opinion	Disagree	Strongly disagree	Total
Mobile internet is available from anywhere, anytime, hence more convenient to use	143 63.0%	57 25.1%	14 6.2%	11 4.8%	2 0.9%	227 100.0%
Mobile internet is more reliable	66 29.1%	82 36.1%	47 20.7%	29 12.8%	3 1.3%	227 100.0%
PC shortage in computer labs	75 33.0%	63 27.8%	47 20.7%	32 14.1%	10 4.4%	227 100.0%
Frequent power outages in computer labs	35 15.4%	44 19.4%	53 23.3%	68 30.0%	27 11.9%	227 100.0%
Mobile internet is cheaper to use	96 42.3%	48 21.1%	31 13.7%	36 15.9%	16 7.0%	227 100.0%
Book shortage in the library	82 36.1%	71 31.3%	37 16.3%	27 11.9%	10 4.4%	227 100.0%
It is easier to access services using mobile phone	96 42.3%	89 39.2%	27 11.9%	12 5.3%	3 1.3%	227 100.0%
Influenced (copied) from a friend	17 7.5%	24 10.6%	59 26.0%	74 32.6%	53 23.3%	227 100.0%

**Table I.**  
Why students used mobile phones over other available means, i.e. laptop, computers ( $N = 227$ )

**Note:** Average Cronbach's Alpha value of the items in Table 5.15 was 0.665  
**Source:** Survey data, 2016

shows that most of them did this because mobile internet was available from anywhere, anytime, hence more convenient to use; it was easier to access services using mobile phone; PC shortage in the computer labs; mobile internet was more reliable and mobile internet was cheaper to use. On the other hand, influence of a friend and frequent power outages in computer labs were not mentioned as factors that compelled them to use mobile phones for this purpose. FC of the UTAUT model state that existence of the technical infrastructure to support the use of a particular system facilitates technology adoption and use (Venkatesh *et al.*, 2003). Availability of the mobile telecommunications infrastructure in the country implies that public university libraries in Malawi were in a position to provide library and information services through mobile phones, as users could easily access such services. UTAUT further states that performance expectance and EE are factors in technology adoption and use. It is, therefore, not surprising to note that reliability of mobile internet coupled with ease of use of mobile phone boosted their usage for information access.

Students were further asked to indicate if they had ever used their mobile phone to call, email or text the library to seek help or access any reference service. Findings show that only 60 (20 per cent) students had ever used their mobile phones to call, email or text the library to seek help or access any reference service either rarely or frequently, whilst the rest 240 (80 per cent) were either not sure or had never used it.

Further analysis of the findings revealed that students at LUANAR (14; 34.1 per cent) used their mobile phones to access reference services more than their colleagues in the other institutions, followed by their colleagues at KCN (4; 20 per cent), Polytechnic (23; 19.7 per cent) and MZUNI (15; 19.5 per cent). Surprisingly, students from COM used their mobile phones the least (4; 8.9 per cent) to call, email or text the library to seek help or access any reference service although the institution had fully adopted the use of mobile phones in service delivery. These findings are shown in Table II.

*Electronic information resources and services available in public university libraries in Malawi that can potentially be adopted and used through mobile phones*

The findings have shown that libraries in this study possessed a diversity of information resources which could potentially be accessed through mobile phones. Topping the list were e-journals, e-books, OPAC and institutional repositories of local content. These are resources that were common to all the institutions. The institutions also planned to acquire other

Have you ever used your mobile phone to call, email or text the library to seek help or access any reference service?

Name of institution	Yes, frequently	Yes, but rarely	Not sure	Hardly use	Never used	Total
MZUNI	5 6.5%	10 13.0%	5 6.5%	17 22.1%	40 51.9%	77 100.0%
KCN	0 0.0%	4 20.0%	0 0.0%	9 45.0%	7 35.0%	20 100.0%
Polytechnic	9 7.7%	14 12.0%	8 6.8%	38 32.5%	48 41.0%	117 100.0%
COM	1 2.2%	3 6.7%	2 4.4%	15 33.3%	24 53.3%	45 100.0%
LUANAR	6 14.6%	8 19.5%	1 2.4%	11 26.8%	15 36.6%	41 100.0%
Total	21 7.0%	39 13.0%	16 5.3%	90 30.0%	134 44.7%	300 100.0%

**Table II.**  
Students' responses to use of mobile phone to call, e-mail or text the library to seek help or access any reference service (N = 300)

information resources. Polytechnic, for instance, was planning to acquire a digital library and MZUNI was planning to get an e-granary, whilst LUANAR had the Essential Electronic Agriculture Library database, all of which could potentially be accessed on the mobile phone platform. The availability of e-resources which could potentially be hosted on the mobile phone platforms of the libraries in the current study could speed up the adoption and use of mobile phones in offering library and information services.

A recent study conducted by [Bomhold \(2014\)](#) which focused on 73 public research universities under the Carnegie Corporation found that most of the libraries offering library and information services through mobile phones based their services on the electronic resources similar to those that were available in the institutions that were surveyed in the current study. For instance, OPAC or catalogue access was available in 98.1 per cent of the libraries, whilst e-journals or database access was available in 69.2 per cent of the libraries. However, the libraries did not offer local institutional repositories content. Besides catalogue and databases, libraries in the [Bomhold \(2014\)](#) study were also offering library hours (80.8 per cent), maps (78.8 per cent), ask-a-librarian (76.9 per cent), contact information (73.1 per cent) and library account access (51.9 per cent) on their mobile platform.

Other studies focusing on mobile phone use in libraries on the African continent indicate that mobile phone usage has mainly concentrated on SMS text messaging on new acquisitions, overdue reminders and more ([Baro et al., 2014](#); [Anbu and Mavuso, 2012](#)). However, there are indications that other libraries are going beyond this by embracing a wider service range ([De Wee, 2013](#)). A recent study conducted by [Baro et al. \(2014\)](#) involving 36 university libraries in Nigeria revealed that the majority of the libraries received reference services through mobile phones. Likewise, a pilot SMS project conducted by [Anbu and Mavuso \(2012\)](#) at the University of Swaziland revealed that SMS could be used successfully to market library services.

*Factors impacting the delivery of library and information services through mobile phones in public university libraries in Malawi*

The UL for MZUNI pointed out some factors that would influence the use of mobile phones in the provision of library services. These include shortage of staff with the right skills to provide library and information services through mobile phones; high cost of providing the service (for the library) and accessing the service (for students and academic staff) and availability of staff at all times to respond to users' queries (in case of reference services). With regard to staff shortage, the UL indicated that the library would have to deploy more staff to the reference desk to ensure timely response to clients' queries, something that may overstretch the available staff.

The CL for KCN also acknowledged the existence of some factors that would influence the use of mobile phones in providing library and information services. He indicated that availability of Wi-Fi would be the main factor, as it was not accessible in many areas on campus. The CL further indicated that the Wi-Fi network could be overwhelmed due to increased usage brought about by the introduction of library and information services through mobile phones. With regard to how the institution planned to overcome this factor, the CL hinted that the bandwidth needed to be increased.

The CL for Polytechnic identified the increased workload that may come about due to the added service range and nature of the library and information services offered through mobile phones as a factor which they may have to contend with. The CL also pointed out that Wi-Fi hotspots on campus were few. She indicated that this could force users, especially students, to use their own data bundles to access the services offered which may prove very costly.

The CL for the COM indicated that there were a number of factors that were affecting the provision of library and information services through mobile phones. These included slow internet speed due to limited bandwidth, periodic disruption of internet services due to vandalism of fibre-optic cables, limited number of Wi-Fi hotspots, few tablets and limited skills to provide and access library and information services using mobile phones.

The UL for LUANAR identified the task of registering students' mobile phone numbers into the database as the major factor the library would likely face when they decide to embark on the project of providing library services through mobile phone. The library, therefore, hoped to carry out this exercise gradually starting with newly registered students and finishing with continuing students.

Students were also asked to indicate factors that would impact their access to library and information services delivered through mobile phones. Findings presented in Table III show that 255 (80.9 per cent) students either strongly agreed (128; 40.6 per cent) or agreed (127; 40.3 per cent) that poor network quality was a factor they would face in using mobile phones in accessing library services. The rest of the students (60; 19 per cent) neither agreed nor disagreed (35; 11.1 per cent), disagreed (23; 7.3 per cent) or strongly disagreed (2; 0.6 per cent) that poor network quality was a factor they would face in using mobile phones to access library and information services delivered through mobile phone. High service costs, delayed response and query not adequately addressed are some of the notable factors which students identified as likely to impact their use of mobile phones in accessing library services, with over 170 (50 per cent) of the respondents indicating that they either strongly agree or agree with the statement. A good number of the students (over 130, 40 per cent) also indicated that library policies that prohibited the use of mobile phones in the library and messages not delivered on time were some of the factors that could negatively impact usage of the mobile phones to access library and

Factors	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Total
High service costs	118 37.5%	97 30.8%	62 19.7%	34 10.8%	4 1.3%	315 100.0%
Poor network quality	128 40.6%	127 40.3%	35 11.1%	23 7.3%	2 0.6%	315 100.0%
Mobile phones (mobile devices) quickly get outdated	35 11.1%	51 16.2%	129 41.0%	88 27.9%	12 3.8%	315 100.0%
Lack of knowledge on usage	30 9.5%	91 28.9%	81 25.7%	92 29.2%	21 6.7%	315 100.0%
Received no response to queries	33 10.5%	81 25.7%	148 47.0%	49 15.6%	4 1.3%	315 100.0%
Library policies that prohibit use of mobile phones in the library	70 22.2%	77 24.4%	96 30.5%	56 17.8%	16 5.1%	315 100.0%
Delayed response	60 19.0%	117 37.1%	102 32.4%	32 10.2%	4 1.3%	315 100.0%
Reference query not adequately addressed	52 16.5%	121 38.4%	104 33.0%	36 11.4%	2 0.6%	315 100.0%
Messages not delivered	45 14.3%	91 28.9%	123 39.0%	50 15.9%	6 1.9%	315 100.0%

**Table III.**  
Factors that would impact students' access to library and information services offered through mobile phones  
(N = 315)

**Note:** Average Cronbach's Alpha value of the items in Table 5.24 was 0.762

**Source:** Survey data, 2016



information services offered through mobile phones. On the other hand, not many students indicated that mobile phones (mobile devices) quickly getting outdated and lack of knowledge on usage were factors that could negatively impact usage of library and information services offered through mobile phones.

A critical analysis of the study findings clearly show that poor network quality is a major challenge to the offering of library and information services through mobile phones in public university libraries in Malawi. Likewise, the UTAUT model states that PE of an information system could impact its adoption and usage (Venkatesh *et al.*, 2003). An ECAR (2015) study of undergraduate students' ownership and use of mobile devices in the USA revealed that students living on campus rated their network experiences considerably lower than students living off campus, whereby only three in five students stated that they had reliable access to Wi-Fi throughout their campus (58 per cent) or in classrooms/instructional spaces (63 per cent) (Dahlstrom *et al.*, 2015). This challenge came about mainly because of the huge number of mobile devices which students connected to the campus network as 61 per cent of the students connected at least two devices to the campus network at the same time. This implies that although a robust network is desirable, it is not easy to provide especially in an environment where multiple mobile device ownership has become a norm.

Findings of the current study have shown that high cost of mobile phone services is another threat to the provision of library and information services through mobile phones. All the librarians interviewed unanimously agreed that mobile phone services in Malawi were very costly. Although many highlighted mobile internet service as being the costliest, others also indicated that mobile voice calls and even SMS were very costly. The high cost of access was forcing most of the institutions to focus on investing in Wi-Fi infrastructure to enable students connect their mobile phones to the campus network so that they can access library and information services through mobile phones. MZUNI was also planning to preload information in tablets that it was planning to acquire as a means of overcoming the high cost of accessing library and information services through mobile phones it was planning to implement.

Findings obtained in the present study resemble those obtained in studies conducted by Clarke *et al.* (2003) and Research ICT Solutions (2015) that revealed that mobile phone services in Malawi were more expensive than those of neighbouring countries although tariffs had gone down over the years. A number of other studies have shown cost to be a factor in access to library and information services offered on the mobile phone platform. For instance, a study conducted by Luo (2014) in the USA that drew an online sample of 303 respondents revealed that some of the respondents failed to use the text reference service because they did not have a texting plan. In yet another study, Walsh (2010) conducted a series of focus groups in 2009 at the University of Huddersfield in the UK to investigate student attitudes towards the use of mobile phones in libraries. Although this study found student attitudes towards text messaging from the library to be positive, students had reservations about using the mobile web because of cost considerations.

Failure to receive a response to a query on time was another factor students mentioned as being a threat to the successful delivery of services through mobile phones. This could be linked to human resource shortages in the libraries studied as librarians interviewed highlighted the shortage of skilled staff and absence of staff in adequate numbers as a factor that could have a bearing in the offering of library and information services through mobile phones. Therefore, lack of adequate and skilled human resources could

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affect the quality of library and information services offered through mobile phones if not addressed.

Library policies that prohibit use of mobile phones in the library was another factor that students indicated as posing a danger to library service delivery through mobile phones. Academic libraries in Malawi have long viewed mobile phones as a threat to the existence of a quiet study environment because of noisy ringtones. Furthermore, some patrons make calls inside the library. For this reason, some libraries have formulated policies, rules and even put up posters discouraging patrons from using mobile phones inside libraries although experience has shown that these rules are largely ignored. The above statement, therefore, makes reference to these policies and practices.

### Conclusions and recommendations

The findings revealed that all the libraries in the current study were moving towards the implementation of library and information services on the mobile phone platform but were at varied levels in realising this objective. COM Library had fully implemented library and information services through mobile phones, whilst LUANAR had only done that modestly by offering such services to farmers, extension workers, policy makers and students but was yet to offer such type of services to its own students and academic staff. Conversely, KCN had piloted the SMS project in 2014 that did not attract much usage. Moreover, LUANAR, KCN, MZUNI and Polytechnic indicated that they would fully implement library and information services offered through mobile phones in the near future using Facebook, WhatsApp, OPAC and SMS.

The findings also revealed that students had mobile phones, many of which had internet capabilities, which they could use to access library and information services offered through mobile phones. However, only few of them were using their mobile phones to access information resources from the library such as e-journals, e-books, library website and some OPAC. Similarly, some of the students were using their mobile phones to call, email or text the library to seek help or access reference service although such services were not formalised.

The findings disclosed that libraries in this study possessed a diversity of information resources which could potentially be accessed through mobile phones. Topping the list were e-journals, e-books, OPAC and institutional repositories of local content. Besides this, some other libraries were planning to acquire digital libraries and e-granary.

Findings further revealed a number of factors that could influence the offering of library and information services through mobile phones. The major ones included network quality, high mobile telecommunications service costs and availability of skilled staff.

Based on the findings of this study, the following recommendations are made. It is pleasing to note that libraries in public universities in Malawi were planning to implement the provision of library and information services through mobile phones, although only COM had implemented such services. University/college librarians at MZUNI, KCN, Polytechnic and LUANAR are, therefore, encouraged to move with speed in the implementation of such services. This would make it possible for students, academic staff and other library users to access services offered from anywhere at any time. Besides being convenient, this could help improve on effectiveness and efficiency of library service delivery.

The study identified poor network quality and high mobile telecommunications service costs as obstacles to the implementation of library and information services through mobile phones. The Malawi Communications Regulatory Authority which is the regulatory body of telecommunication services in the country is urged to take steps to

address these issues. This will pave the way for greater uptake of services offered through this media.

The study findings indicated that the shortage of skilled human resources could negatively impact the delivery of library and information services through mobile phones. It is, therefore, recommended that university/college librarians should ensure that library staff are given the requisite training in the delivery of library and information services through mobile phones prior to the implementation of such services. University/college librarians should also implement continuous professional development programmes related to the delivery of library and information services through mobile phones to ensure that library staff continue to update their knowledge and skills as technology is very dynamic.

The findings had shown that libraries in this study had expressed the desire to adopt the use of mobile phones to deliver services to their clients. Moreover, the libraries faced similar challenges such as human resource constraints and ICT-related challenges, among others. It is, therefore, recommended that libraries should collaborate by forming working groups. This would facilitate joint training of staff and enable them learn from each other's strengths and weaknesses. This would ensure that services introduced should flourish.

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