

Exploring the Challenges of Mobile Phone Utilization for Library Service Delivery: The Librarians' Perspectives

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Abstract

This study explored the challenges of utilizing mobile phones for library service delivery from the perspectives of librarians. With the growing use of mobile devices, libraries increasingly integrate mobile technologies to enhance accessibility and service delivery. However, the implementation faces significant challenges that need to be addressed. The study employed a survey research design with a sample of 143 professional librarians across seven university libraries in North-Central Nigeria. A self-developed questionnaire was used to collect data, which was analyzed using descriptive statistics. The findings revealed that librarians can provide services such as self-help, selective dissemination of information, inter-library loans, current awareness services, library information services (news, opening hours changes, and notices of recent acquisitions), loan services (including book renewals and overdue reminders), making reservations, checking the availability of short-term borrowing items, and Online Public Access Catalogue (OPAC) access. However, several challenges were identified, including limited bandwidth, content ownership, licensing and digital rights management, privacy and security concerns, high costs of service provision, inadequate user education, restrictive library policies on mobile device usage, maintenance issues, and the need for better staff training on technology. The study concluded that addressing these challenges requires a multifaceted approach, including improving infrastructure, developing comprehensive policies, enhancing user education, and investing in staff training among librarians in university libraries in North-Central Nigeria. Recommendations included enhancing network infrastructure, establishing clear digital content policies, implementing robust security measures, developing cost-effective mobile services, providing user and staff education, updating policies to support mobile access, and ensuring routine maintenance and technical support.

Keywords: Challenges, Library Services, Mobile Phone Technology, Mobile Phones, University Libraries, Librarian Perspectives.

Introduction

University libraries serve as indispensable resources, facilitating their communities' academic pursuits, research, and information needs. Effective library service delivery requires a user-centered approach that prioritizes accessibility, inclusivity, and continuous improvement (Emezie & Nwaohiri, 2013; Nebeolise, 2013). With technological advancements, libraries

increasingly integrate mobile technologies to enhance service delivery, reflecting the shift towards digital resources and online accessibility (Tait, Martzoukou & Reid, 2016).

Recent trends indicate a growing use of mobile devices in accessing library services. Mobile phones, in particular, have become significant tools for information dissemination and retrieval (Acheampong, 2019; Paterson & Low, 2011). Libraries worldwide are adopting mobile technologies to meet their users' diverse and customized demands (Zha, Zhang, Li & Yang, 2015). Mobile technology offers numerous advantages, including increased accessibility, flexibility, and enhanced communication (Singh & Nikandia, 2017; Obinyan, 2021).

Despite the potential benefits, introducing mobile phone-based library services is not without its fair share of obstacles and hurdles that must be addressed. Infrastructure, training, and financial support are crucial in successfully integrating mobile technology (Kamenye, Chaputula & Mapulanga, 2022). Additionally, librarians' attitudes towards mobile technology and their perceived ease of use significantly impact the adoption and effectiveness of these services (Ramzan, Asif & Ahmad, 2021; Davis, 1989).

Librarians' attitudes towards using mobile phones for service delivery are critical. Positive attitudes and perceived ease of use can facilitate the successful integration of mobile technologies into library services (Karkee, 2015; Shonhe & Jain, 2017). Conversely, challenges such as limited training, lack of awareness, and usability issues can hinder the effective use of mobile phones in library service delivery (Luo, 2014; Ali, Alrasheedi, Ouda & Capretz, 2014). In North-central Nigeria, there is a significant gap in research on the use of mobile phone technology for library service delivery. Despite the potential benefits, the lack of utilization of mobile technology limits the ability of university libraries in this region to compete globally. This study aims to fill this knowledge gap by exploring the challenges of mobile phone utilization for library service delivery from the perspectives of librarians in North-central Nigeria. In corollary to this, the study seeks to:

1. Identify the types of library services that librarians can render through mobile phones; and
2. Establish the challenges that are likely to hinder librarians' use of mobile phones in providing library service.

Literature Review

Mobile phone-based Library Services

In recent years, mobile phone-based library services have garnered significant attention, reflecting the growing recognition of technology's pivotal role in enhancing reference services within academic libraries (Abata-Ebire, Okesanya, Oluwasogo & Kusoro, 2019). This trend emphasizes university librarians' need to embrace emerging technological trends with adaptability and agility, necessitating proficient information technology skills and a deep understanding of information literacy. The integration of mobile phone technology into library services offers substantial potential for enhancing service quality and improving resource accessibility. However, realizing this potential requires concerted efforts from library personnel, government bodies, and stakeholders to provide financial support, training, and adaptable policies (Ekeh, Makinde, Ogungbo & Dapo-Asaju, 2021). Government bodies and stakeholders are called upon to provide active financial support, investing in essential infrastructure and facilities such as stable electricity supply and backup power sources to ensure the seamless functioning of mobile technologies (Abata-Ebire et al., 2019).

Assessing the functional elements of library mobile applications from users' perspectives is crucial for creating more tailored and user-friendly apps (Mansouri & Asl, 2019). Leung and Chan (2012) found that library users exhibit strong preferences for services like book renewal, catalog search, and accessing e-books and journal articles via mobile platforms. Additionally, promoting services such as audio tours, podcasts, and online "ask a librarian" features, along with push notifications via text or SMS for reminders and updates, can further enhance mobile library offerings to meet users' expectations (Leung & Chan, 2012). The growing information needs of library users, driven by efficiency and accuracy expectations, necessitate libraries to embrace new technologies despite funding constraints and staff shortages (Yeates, 2014). Allocating adequate financial resources and training library personnel in new technologies is essential to fully utilize mobile phone-based library services (Siregar & Dewiyana, 2018).

Research conducted by Mansouri and Asl (2019) shows that modern-day library users have expressed a preference for accessing various offerings through their mobile devices. Among the desired mobile-based services highlighted in the research are the ability to browse and access digital collections and databases, functionality to borrow and renew library materials, mobile reference services that allow users to consult with librarians remotely, and virtual tours or instructional guides tailored for mobile platforms to assist users in navigating the library's resources effectively.

Renowned university libraries around the globe are implementing various strategies to provide mobile technology-based library services. For example, Manjula (2016) highlighted several university libraries that are implementing innovative techniques to provide mobile technology-based library services. Duke University Libraries, for instance, offer digitized image collections through the Duke Mobile iPhone app, which interacts with the library's collections via XML feeds from their digital collections' platform, allowing users to access over 32,000 images. The C/W MARS Library Network in Massachusetts provides access to eBooks, music, videos, and audiobooks via the OverDrive service, enabling patrons to borrow digital content directly through their mobile devices.

Furthermore, the University of Oregon Libraries and OSU Archives developed BeaverTracks, a mobile application that serves as a historical locations guide and walking tour, using geo-location features to provide users with directions and historical information about various locations on the OSU campus. Similarly, the Biblioteca Rector Gabriel Ferraté at Universitat Politècnica de Catalunya offers tips on using Foursquare to enhance library services, showcasing an innovative approach to integrating social media with library resources. The New York Public Library (NYPL) offers a mobile app that allows users to manage their library accounts on the go. Available for both iPhone and Android devices, the app provides access to eBooks and audiobooks via the OverDrive service. In Belgium, Ghent University Library offers a mobile app for accessing the Academic Bibliography, allowing users to easily search and browse academic publications (Manjula, 2016).

More so, the National Library of Health Sciences - Terkko in Finland provides a mobile article request service and mobile RSS feeds, enabling users to access health science resources conveniently. Ryerson University Library and Archives in Canada developed a mobile student room booking module, allowing students to reserve study spaces directly from their mobile devices. At the University of Texas at Arlington Library, the development of ShelfLister, a mobile device staff client designed for stacks maintenance and inventory, helps staff manage physical collections more efficiently. BI Norwegian Business School in Norway offers a mobile

app for students and faculty, enhancing access to academic resources and services. Finally, Vrije Universiteit Amsterdam in the Netherlands uses SMS during information literacy classes, allowing students to interact with real-time presentations, enhancing engagement and learning (Manjula, 2016).

These initiatives encompass features such as mobile-optimized online public access catalogs (MOPAC), enabling access to electronic journals and databases via mobile devices, facilitating reference services through SMS or messaging platforms, offering mobile-friendly collections of e-books and audio materials, digitizing and making these accessible on mobile platforms, and providing virtual library tours or instructional guides tailored for mobile users (Choy & Goh, 2016; Hung & Chanlin, 2015; Naeini, Moghaddam, Ziaei & Ghaebi, 2018). However, for libraries to effectively deliver services on mobile technology platforms, they must critically assess and understand the precise information needs of their patrons, as highlighted by Dukic, Chiu & Lo (2015). This crucial step ensures that the offered services align with their user base's specific requirements and preferences. Understanding these needs is vital for developing mobile services that are both effective and user-friendly, ensuring that libraries can meet the evolving demands of their users in an increasingly mobile world.

Prakash (2022) opined that mobile phones have become integral to our daily lives, revolutionizing how we access and share information. Libraries at the forefront of information dissemination have embraced this technology to enhance their services and reach a wider audience. Mobile phone-based library services offer users the flexibility to access library resources anytime, anywhere, from the comfort of their devices.

One of the key advantages of mobile library services is the ability to provide users with instant access to information. Through SMS reference services, users can quickly get answers to their queries and find the resources they need. Additionally, they can leverage multimedia messaging services (MMS) to share photos, videos, and audio content with patrons (Bhoj, 2020). Furthermore, Elahi (2016) stated that mobile-friendly library websites and catalogs (MOPACs) make searching for and accessing library materials on their phones easier.

Another important aspect of mobile library services is the ability to deliver content more engagingly and interactively. Bhoj (2020) noted that libraries can offer virtual and audio tours of their facilities, helping new users orient themselves and explore the available resources. QR codes can provide quick access to library information, such as hours, contact details, and event schedules. Moreover, mobile-based library instruction and orientation programs can reach a wider audience, including those who cannot attend in-person sessions.

However, implementing mobile library services is not without its challenges. Elahi (2016) stated that libraries must ensure that their content and services are optimized for mobile devices, focusing on user-friendly design and easy navigation. Additionally, Elahi asserted that libraries must stay up-to-date with the constantly evolving mobile technology landscape and adapt their services accordingly. Dongare and Magare (2020) emphasized that mobile phone-based library services have the potential to significantly enhance the user experience and increase engagement with library resources. By leveraging the ubiquity of mobile devices, libraries can provide their patrons with seamless access to information, supporting their learning and research needs in new and innovative ways.

Challenges in Using Mobile Phones for Library Services by Librarians in University Libraries

Introducing mobile phone-based services in university libraries poses numerous obstacles that can hamper their practical implementation and utilization. Chisenga's (2015) study highlights financial constraints as a significant barrier for libraries in Africa, where many struggle to acquire and maintain commercial library structures. Financial difficulties often lead to discontinuing subscriptions or abandoning existing software systems in favor of more affordable, open-source alternatives. Amuni, Niran and Sule (2014) identified additional factors impeding the delivery of information services via mobile technology, including network access, service provision costs, mobile web design complexity, resource scarcity, and personnel shortages. Network access, particularly in African contexts, emerged as a critical challenge.

Chaputula and Mutula (2018b) confirmed that technological aspects and associated costs significantly impact mobile phone usage for accessing library resources in Malawi. They noted a lack of awareness about mobile library services and the preference for alternative means like computers. Dei (2020) pointed out further challenges such as unreliable power supply, lack of policy frameworks, insufficient staff skills, and financial limitations. Nalluri and Gaddam (2016) underscored the potential of mobile phone technology for library services while noting significant limitations. These include content ownership and licensing issues, cost considerations, digital rights management, and privacy concerns.

Siregar and Dewiyana (2018) discussed the challenges faced by the Medan public library in applying mobile technology, such as device maintenance, content updating, and inadequate human resources. Buruga (2016) reported similar issues, noting user concerns regarding device durability, short battery lives, minimal memory capacity, and rapid technological obsolescence.

Integrating mobile technology into library services has been the subject of numerous studies, revealing a range of challenges librarians face. Nwafor-Orizu, Ezejiofor, Ibe & Okonkwo (2024) highlighted significant barriers to effectively leveraging mobile technology in academic libraries in Nigeria, including inadequate bandwidth, content ownership, and licensing. These obstacles hinder librarians from enhancing user experience and improving access to information resources. Similarly, Chaputula (2021) examined the impact of digital devices on noise levels in libraries. While mobile devices offer substantial benefits, they also introduce distractions that can disrupt the traditional quiet study environment, complicating the role of librarians in managing these technologies effectively.

A systematic literature review by Parhamnia (2022) discussed broader acceptance issues of mobile technology in academic libraries, pointing out persistent challenges such as privacy and security concerns and the high costs associated with mobile services. The review emphasized the need for user education and institutional policies to support the integration of mobile devices in library settings, aligning with findings about the necessity for training and policy adjustments. Hussain and Ismail (2025) show the challenges and barriers academic librarians face in Pakistan while adopting mobile services in their academic libraries are inadequate technology infrastructure, issues with network connectivity and hardware limitation, lack of training opportunities and skills gap, limited financial resources, resistance to change, concerns related to the security and privacy of user data, lack of institutional support and transparent policies and disparities in digital literacy.

Prakash (2022) similarly outlined challenges in implementing mobile-based library services, such as limited funding in developing countries, low public awareness, resistance to

innovation, unqualified staff, and issues with delivering high-quality services via smartphones. These issues are compounded by inadequate infrastructure and a lack of up-to-date technology knowledge. El-Yakub, Abdullahi, Idris, and Abdullahi (2022) found that librarians face technical issues, insufficient training on mobile applications, unreliable power supply, mobile network failures, and incompatibility between digital content and users' devices. Managing services for an increasing number of mobile users adds to these challenges.

Specific challenges associated with mobile devices include their small screens, which complicate information retrieval and cause eyestrain, especially among elderly users (Cummings, Merrill & Borrelli, 2010; Baggett & Williams, 2012; Song & Lee, 2012; De Wee, 2013; Akeriwa Penzhorn & Holmner, 2015). Some mobile devices are also unsuitable for certain environments, such as those with excessive dust and heat (Chuene, Lepota & Hans, 2014). Accessing content can be difficult due to a lack of optimized digital content and software compatibility issues (Akeriwa et al., 2015; Boruff & Storie, 2014; Philbeck, 2016). The high costs of integrating mobile technology in libraries also pose significant challenges, including acquiring mobile devices and accessing online information, which are prohibitively high in many African countries (Khan Al-Shihi, Al-Khanjari & Sarrab, 2015; Okello-Obura & Ssekitto, 2015). Limited broadband penetration in rural areas further exacerbates these issues (Muneja & Abungu, 2012).

Inadequate skills among librarians are another major obstacle. Baro, Efe, and Oyeniran (2014) found that many Nigerian librarians lack essential skills for effectively utilizing Web 2.0 tools. Retraining librarians in relevant emerging technologies is crucial for keeping them current and addressing knowledge and skills gaps (Muneja & Abungu, 2012; McCallum, 2015; Mosh, Holmner & Penzhorn, 2015). Resistance to change also affects the adoption of mobile technologies, with some viewing these technologies as disruptive or too technical for effective use in learning (Li, 2013; Khan et al., 2015). Regular workshops and seminars on change management and stakeholder sensitization are essential for fostering a positive attitude towards mobile technologies.

Also, sustainability concerns arise as some libraries struggle to maintain and update their digital platforms, leading to a decline in online user engagement (Muneja & Abungu, 2012; McCallum, 2015; Fourie, 2015). Effective strategies are needed to sustain user relationships and capitalize on the opportunities presented by mobile technologies (Buruga, 2016). Tackling the challenges of implementing mobile phone-based services in university libraries requires a comprehensive strategy involving financial support, infrastructure upgrades, staff skill enhancement, and promoting positive perceptions of mobile technologies among users and staff.

Smith (2019) discussed the broader implications of mobile technology on public libraries, noting that while smartphones can enhance access to information, they also introduce challenges related to user distraction and a decline in deep reading skills. This perspective underscores the dual nature of mobile technology as both a tool for improvement and a source of new challenges for library services.

Materials and Methods

This study employed a survey research design well-suited for exploring and examining relationships among a substantial number of participants or a widely dispersed target population. The population for this study consisted of 143 professional librarians employed across seven selected university libraries in the North-Central region of Nigeria. The total

enumeration sampling technique included all 143 professional librarians from the participating universities. This non-probabilistic method was chosen due to the manageable size of the target population and the researcher's aim to achieve high precision and comprehensive statistical coverage.

The primary research instrument utilized for data collection was a self-developed questionnaire titled "Challenges of Mobile Phone Utilization for Library Service Delivery: The Librarian Perspective (CMPULSDLP) Questionnaire." This questionnaire was carefully designed by drawing upon previously validated elements from related studies while incorporating input and validation from library and information science research experts. The instrument comprises two sections, each designed to capture vital aspects such as the types of library services that librarians can render through mobile phones and the challenges likely to militate against librarians' use of mobile phones in providing library services. The questionnaire included eleven and thirteen items on a four-point Likert scale ranging from Strongly Agree (SA= 4), Agree (A= 3), Disagree (D= 2), and Strongly Disagree (SD= 1) to measure the degree of agreement with each item.

A thorough process was undertaken to ensure the validity and reliability of the research instrument. Content and construct validity were established through expert evaluation by three seasoned Library and Information Science (LIS) professionals, who provided invaluable feedback and recommendations for refinement. Subsequently, a pilot test was conducted using the questionnaire, administered to 15 librarians outside the study scope, followed by a test-retest method with a two-week interval. The resulting responses were subjected to Cronbach's alpha analysis, yielding highly satisfactory reliability coefficients ($\alpha = 0.88$) for the measurement scales.

The study involved the distribution of 143 questionnaires, of which 132 were successfully retrieved, yielding an impressive response rate of 92.3%. The gathered data underwent analysis utilizing IBM SPSS Statistical Product and Service Solution version 26.0. The researchers employed descriptive statistical techniques to gain insights from the collected information, encompassing frequency counts, percentages, means, and standard deviations.

Throughout the research process, ethical considerations were given the utmost priority. The participants were explicitly informed that their involvement in the study was entirely voluntary. Furthermore, stringent measures were implemented to ensure the anonymity and confidentiality of the respondents, safeguarding their privacy and identities throughout the research process. The researcher also obtained ethical clearance from the appropriate authorities before administering the research instruments. Additionally, efforts were made to adhere to the copyright act in the reviewed literature, ensuring the integrity and ethical conduct of the study.

Result

This section analyzes the data collected from the field study. It starts by identifying types of library services that librarians can render through mobile phones. Following this, it explores the challenges likely to militate against librarians' use of mobile phones in providing library services. Finally, the section concludes and provides recommendations to facilitate the successful utilization of mobile phones in providing library services in university libraries. Table 1 shows the Types of Library Services that Librarians can render through Mobile Phones.

Table 1

Types of library services that librarians can render through Mobile Phones

S/N	Statement	SA	A	D	SD	Mean	SD
1	Self-help service	94(71.2)	33(25.0)	5(3.8)	0(0)	3.67	0.54
2	Reference services	41(31.1)	89(67.4)	2(1.5)	0(0)	3.30	0.49
3	Selective Dissemination of Information	80(60.6)	52(39.4)	0(0)	0(0)	3.61	0.49
4	Text messaging	54(40.9)	73(55.3)	5(3.8)	0(0)	3.37	0.56
5	Inter-library loans	75(56.8)	57(43.2)	0(0)	0(0)	3.57	0.50
6	Current awareness services	101(76.5)	29(22.0)	2(1.5)	0(0)	3.75	0.47
7	Library information services (news, opening hours changes, and notice of recent acquisitions)	84(63.6)	46(34.8)	2(1.5)	0(0)	3.62	0.52
8	Loan services (including book renewals and overdue reminders)	83(62.9)	44(33.3)	5(3.8)	0(0)	3.59	0.56
9	Making reservations and checking the availability of short-term borrowing items	79(59.8)	48(36.4)	5(3.8)	0(0)	3.56	0.57
10	Information literacy or user awareness offerings	71(53.8)	56(42.4)	5(3.8)	0(0)	3.50	0.57
11	Online Public Access Catalogue (OPAC)	77(58.3)	47(35.6)	6(4.5)	2(1.5)	3.51	0.66
Criterion Mean = 3.51							

Table 1 reveals that the types of library services that librarians can render through mobile phones, are: self-help service ($\bar{x} = 3.67$, $SD = 0.54$); selective dissemination of information ($\bar{x} = 3.61$, $SD = 0.49$); inter-library loans ($\bar{x} = 3.57$, $SD = 0.50$); and current awareness services ($\bar{x} = 3.75$, $SD = 0.47$); library information services (news, opening hours changes, and notice of recent acquisitions) ($\bar{x} = 3.62$, $SD = 0.52$); loan services (including book renewals and overdue reminders) ($\bar{x} = 3.59$, $SD = 0.56$); making reservations and checking the availability of short-term borrowing items ($\bar{x} = 3.56$, $SD = 0.57$); and Online Public Access Catalogue (OPAC) ($\bar{x} = 3.51$, $SD = 0.66$). The findings implies that librarians can effectively utilize mobile phones to provide a wide range of essential library services, including self-help, selective dissemination of information, inter-library loans, current awareness, library information updates, loan management, reservation systems, and online catalog access, thereby enhancing accessibility, convenience, and user engagement in modern library environments.

Table 2 shows the challenges that are likely to militate against the use of mobile phones by librarians in providing library services

Table 2

Challenges encountered with the use of mobile phones by librarians in providing library services

S/N	Statement	SA	A	D	SD	Mean	SD
1	Lack of personnel	53(40.2)	59(44.7)	15(11.4)	5(3.8)	3.21	0.79
2	Less bandwidth speed	64(48.5)	62(47.0)	6(4.5)	0(0)	3.44	0.58
3	Content ownership, licensing, and digital rights management	53(40.2)	72(54.5)	7(5.3)	0(0)	3.35	0.58
4	Privacy & security	55(41.7)	71(53.8)	6(4.5)	0(0)	3.37	0.57
5	Cost of provision of services	60(45.5)	56(42.4)	10(7.6)	6(4.5)	3.29	0.79
6	User education	47(35.6)	67(50.8)	18(13.6)	0(0)	3.22	0.67
7	Policies at libraries that forbid using a mobile device to access information services	69(52.3)	52(39.4)	5(3.8)	6(4.5)	3.39	0.77
8	Complexity of mobile web design	25(18.9)	79(59.8)	28(21.2)	0(0)	2.98	0.63
9	Scarcity of materials and resources	49(37.1)	42(31.8)	33 (25.0)	8(6.1)	3.00	0.93
10	Maintenance problems	54(40.9)	63(47.7)	15(11.4)	0(0)	3.30	0.66
11	Educating library employees on how to use technology	70(53.0)	52(39.4)	10(7.6)	0(0)	3.45	0.63
12	Lack of planning in the library	49(37.1)	59(44.7)	22(16.7)	2(1.5)	3.17	0.75
13	Power outage	62(47.0)	51(38.6)	7(5.3)	12(9.1)	3.23	0.91
Criterion Mean = 3.26							

The results in Table 2 show that some of the challenges that are likely to militate against the use

of mobile phones by librarians in providing library services is: less bandwidth speed ($\bar{x} = 3.44$,

SD = 0.58); content ownership, licensing, and digital rights management ($\bar{x} = 3.55$, SD = 0.58); privacy & security ($\bar{x} = 3.37$, SD = 0.57); cost of provision of services ($\bar{x} = 3.29$, SD = 0.79); user education ($\bar{x} = 1.78$, SD = 0.67); policies at libraries that forbid using a mobile device to access information services ($\bar{x} = 3.39$, SD = 0.77); maintenance problems ($\bar{x} = 3.30$, SD = 0.66); and educating library employees on how to use technology ($\bar{x} = 3.45$, SD = 0.66). The findings imply that while mobile phones have the potential to enhance library services, significant challenges such as limited bandwidth, concerns over content ownership, privacy, high service costs, inadequate user education, restrictive library policies, maintenance issues, and the need for staff training must be addressed to realize this potential fully.

Discussion

The findings of this study reveal that librarians can render various types of library services through mobile phones in North-central Nigerian universities. The study shows that the significant kinds of library services that librarians can render through mobile phones include: self-help service, selective dissemination of information, inter-library loans, current awareness

services, library information services (news, opening hours changes, and notice of recent acquisitions), loan services (including book renewals and overdue reminders), making reservations and checking the availability of short-term borrowing items and Online Public Access Catalogue (OPAC) respectively. The results align with Acheampong (2019) and Dei (2020), who highlight that mobile technology facilitates a range of library services, including mobile reference services, access to digital content, online public access catalogues (MOPAC), academic databases, and SMS notifications for new arrivals. Bhoj (2020) supports this by emphasizing self-help services and inter-library loans via mobile platforms. Odu and Omini (2017) also note that library information services, such as updates on news, changes in opening hours, and recent acquisitions, are effectively communicated through mobile devices. Prakash (2022) further demonstrates the effectiveness of SMS and app notifications in enhancing user engagement, managing loan services, and enabling reservations and availability checks. These studies underscore the significant benefits of mobile technology in making library services more accessible, user-friendly, and efficient.

In this study, some of the challenges that are likely to militate against the use of mobile phones by librarians in providing library services are less bandwidth speed, content ownership, licensing, and digital rights management, privacy & security, cost of provision of services, user education, policies at libraries that forbid using a mobile device to access information services, maintenance problems, and educating library employees on how to use technology. The findings align with several studies highlighting key challenges in using mobile phones for library services. Chaputula and Mutula (2018a) emphasize technological issues and costs, which support concerns about bandwidth speed and service provision costs. Dei (2020) and Acheampong and Dei (2020) address challenges such as erratic power sources, financial constraints, and insufficient staff skills, which align with content ownership, licensing, privacy, and security issues. Nwafor-Orizu et al. (2024) identify inadequate bandwidth and content management as barriers, while Parhamnia (2022) discusses privacy, security, and the need for user education and supportive policies. Tamunoene and Barth-Nengia (2022) and El-Yakub et al. (2022) highlight bandwidth, content rights, privacy, and training problems, confirming the need for better user education and technology management in libraries.

Conclusion

The study explored the challenges of utilizing mobile phones for library service delivery from the perspectives of librarians in North-central Nigeria. The findings revealed that librarians can provide various services through mobile phones, including self-help services, selective dissemination of information, inter-library loans, current awareness services, library information updates (such as news, changes in opening hours, and notices of recent acquisitions), loan services (including book renewals and overdue reminders), making reservations, checking the availability of short-term borrowing items, and accessing the Online Public Access Catalogue (OPAC). However, several challenges were identified that may hinder the effective use of mobile phones for library services. These include inadequate bandwidth, content ownership, licensing and digital rights management issues, privacy and security concerns, high costs of service provision, restrictive library policies, maintenance problems, and the need for better user education and staff training. These challenges align with previous studies, highlighting the need for concerted efforts to address the various obstacles faced in utilizing mobile phones for library services. Key issues include inadequate bandwidth, which

impedes efficient service delivery; content ownership, licensing, and digital rights management, which complicate the management of digital resources; and privacy and security concerns, which raise significant risks.

Additionally, high costs of service provision, restrictive library policies, and insufficient user education and staff training further hinder the effective use of mobile technology. Addressing these challenges requires a multifaceted approach, including improving infrastructure, developing comprehensive policies, enhancing user education, and investing in staff training. Such measures are essential to fully leverage the potential of mobile technology and improve library services in a modern, digital environment. By mitigating these obstacles, university libraries in North-central Nigeria can harness the potential of mobile technologies to enhance service accessibility, convenience, and overall effectiveness in meeting the evolving needs of their user communities.

Recommendations

Based on the challenges identified in the study, here are recommendations to address them and facilitate the effective utilization of mobile phones in providing library services in university libraries:

- To address the limited bandwidth speed, libraries should invest in upgrading network infrastructure to enhance bandwidth and ensure stable internet connectivity across library facilities. They should also collaborate with local internet service providers to improve network speed and reliability.

- To address content ownership, licensing, and digital rights management, university libraries should develop clear policies for digital content management that include licensing agreements and digital rights management. They should also work with content providers to establish favorable terms for digital resources used on mobile platforms.

- To address privacy and security, libraries should implement robust security protocols and privacy measures to protect users' data and ensure secure access to library resources. They should also regularly update security systems and train staff on data protection practices.

- To address the cost of service provision, libraries should develop cost-effective strategies for providing mobile services, including leveraging open-source solutions and exploring funding opportunities. They should also conduct cost-benefit analyses to optimize resource allocation.

- To address user education, libraries should implement comprehensive user education programs to train library users on effectively using mobile technology to access library services. Provide tutorials, workshops, and online resources.

- To address library policies that forbid using a mobile device to access information services, libraries should review and update their policies to support this use. Ensure policies are aligned with current technological advancements and user needs.

- To address the maintenance problems, university libraries should establish a routine maintenance schedule for mobile technology infrastructure and provide technical support to address issues promptly. They should also develop a system for reporting and resolving technical problems.

- To address educating library employees on how to use technology, libraries should invest in ongoing professional development for library staff to enhance their technical skills and knowledge related to mobile technology. Offer training programs and workshops on mobile

applications and services.

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