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**MOBILE APPLICATION AS A PREDICTOR OF EFFECTIVE REFERENCE SERVICES
DELIVERY IN FEDERAL UNIVERSITY LIBRARIES IN SOUTH-SOUTH, NIGERIA.**

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Abstract

The study investigated mobile applications as predictors of effective reference service delivery in Federal University Libraries in South-South Nigeria. Three objectives and three research questions guided the study, and three null hypotheses were tested at a 0.05 level of significance. The research adopted a correlational research design. The population of the study comprised 115 librarians from the eight federal university libraries in South-South Nigeria. The entire population was studied, Questionnaire titled Mobile Application and Effective Reference Service Delivery Questionnaire was the instrument used for data collection. Data collected was analyzed using Statistical Package for Pearson Product Moment Correlation (PPMC). Pearson Product Moment Correlation was used to test the three null hypotheses at 0.05 level of significance, The instrument was tested using pilot test using Cronbach Alpha method and it yielded an average coefficient of 0.80. The findings revealed there is positive relationship between mobile applications and reference services delivery in the libraries. Conclusively, mobile application is a strong predictor for effective service delivery in the library. The study recommended among others that the universities should train and retrain the librarians on how to use short messages (SMS) in rendering reference services, there should be a workshop for librarians in the universities regularly on how to use Quick Response codes and the universities should carry out enlightenment programme to the academic community and the librarians on the importance of Libby and how it can be used to improve service delivery.

Keywords mobile application, reference service, Universities

Introduction

Federal university libraries in 21st century increasingly rely on mobile technologies to remain relevant, responsive, and user-centered. The ubiquity of smartphones among students and faculty has opened new pathway for library communication, resource access, and institutional support.

Mobile-based applications particularly SMS alerts, QR codes, and digital lending apps such as Libby offer scalable, cost-effective means of enhancing library operations and user experience. Understanding

these tools as predictors of service effectiveness is vital for strategic planning and evidence-based library management.

Mobile applications software designed for smartphones and tablets have emerged as potent platforms for delivering academic library services, particularly reference support (Matumba & Rajkoomar, 2024). These apps facilitate real-time chat reference, resource discovery, and access to digital collections, enabling librarians and users to interact beyond the physical confines of the library (Umeozor, 2022). In view of this, university libraries are adopting the use of mobile applications to render reference services. In view of this, university libraries are adopting the use of mobile applications to render reference services delivery in the university libraries.

Quick Respond codes (QR codes) enabled services directly correlate with reduced service bottlenecks, more efficient discovery processes, and a modernized user experience, key indicators of effective library service delivery.

QR codes have emerged as lightweight, versatile tools for bridging physical and digital library services. They are applied in linking OPAC entries to physical shelves, providing virtual guides or floor maps, granting instant access to e-books, repositories, or subject guides and supporting contactless services (a post-pandemic innovation).

Short messaging services (SMS) app remains one of the most accessible mobile communication tools, especially in regions where data connectivity may fluctuate. In many federal university environments, SMS is used for due date reminders and overdue notices, registration and circulation confirmations, emergency communication (e.g., changes in operating hours), and dissemination of information literacy or event updates.

Libby is a digital reading app developed by overdrive that enables users particularly library patrons to access and borrow a wide range of electronic resources such as ebooks, audiobooks, magazines, and other digital media.

Over the past few years, the interplay between mobile applications and reference services has gained increasing prominence in academic library research. Empirical studies have shown that academic librarians perceive mobile tools as valuable assets for delivering e-book access, OPAC inquiries, and reference consultations—even though full adoption is often hampered by readiness challenges such as infrastructure and training (Matumba & Rajkoomar, 2024). In Nigeria, a 2022 study among federal university librarians showed high willingness to adopt mobile apps for reference delivery, but also highlighted the absence of guiding policies (Umeozor, 2022). These findings underscore both the promise and the gaps: mobile applications can significantly enhance reference efficiency and accessibility, yet practical implementation remains uneven. Therefore, this study becomes a necessary investigation into how mobile applications can serve as effective tools for reference service delivery in federal university libraries in South-South Nigeria.

Aim and Objectives of the Study

This aim of the study is to explore mobile apps as predictor for effective reference service delivery in the federal university libraries in South-South, Nigeria. The specific objectives sought to:

- I. determine the relationship between quick response codes (QR codes) applications and reference service delivery in the university libraries.
- II. find out the relationship between short messaging services (SMS), and reference service delivery in the university libraries.
- III. examine the relationship between Libby and reference services delivery in the university libraries.

Research Questions

- i What is the relationship between quick response codes (QR codes) applications and reference services delivery in the university's libraries?
- ii What is the relationship between short messaging services (SMS) and reference services delivery in the university libraries?
- iii What is the relationship between Libby and reference services delivery in the universities libraries?

Literature review

A Short Messaging Service (SMS) application refers to a software-based platform designed to send, receive, manage, and automate text messages transmitted over mobile communication networks. In digital reference frameworks, SMS functions as a rapid, synchronous/asynchronous communication channel that can (a) provide short factual answers, deliver transactional notifications (holds, recalls, fines), and serve as an entry-point to richer virtual reference (chat, email, appointment booking (Parhamnia, 2022). Recent systematic reviews of mobile applications in libraries show that while richer smartphone apps and chatbots attract attention, low-bandwidth channels like SMS remain important for reach and equity (Rivo, 2022).

A **Quick response (QR) code application** refers to the deployment and integration of QR code technology within an academic environment to facilitate digital access, information retrieval, and seamless interaction between users and institutional services. A QR code is a two-dimensional, machine-readable optical image that contains alphanumeric information, which can be decoded using smartphones or other scanning devices.(Esoswo 2025) In university settings, QR code applications involve embedding these codes into library resources, signage, course materials, departmental communications, repository platforms, reference tools, and administrative interfaces to provide faculty, students, and researchers with instant connection to digital content and services. In universities, QR code applications serve as *mobile-responsive gateways* for academic engagement (Singh & Madhusudhan 2023).

Libby (one drive) apps enable direct access to e-books, scholarly articles, journals, and other reference materials. Users can view and read these resources directly within the app, eliminating the need to switch to external applications or platforms. The convenience of accessing reference materials directly from their mobile devices empowers users to engage in research or reference activities on the go, making the most of their available time (Adetayo, 2021). This personalized approach enhances user engagement and promotes the utilization of reference services that align with users' specific

In summary, mobile applications provide libraries with the means to collect comprehensive usage statistics and analytics. By analyzing user behaviors, preferences, and feedback, libraries can gain valuable insights that inform decision-making, resource allocation, and service improvement. The data-driven approach enables libraries to adapt their reference services to align with user needs, ensuring a more effective and user-centric approach to service delivery

Methodology

This study investigated mobile applications as predictor of effective reference service delivery in federal university libraries in South South Nigeria. Correlational research design was adopted for this study. The population of the study comprises of 115 librarians working in the eight federal university libraries in South-South Nigeria. Total enumeration sampling was used to capture the entire librarians due to its small population. Self-structured questionnaire titled Mobile Application and Reference Service Questionnaire was the instrument used for data collection. Data collected was analyzed using Statistical

Package for Pearson Product Moment Correlation (PPMC). Pearson Product Moment Correlation was used to test the three null hypotheses at 0.05 level of significance, The instrument was tested using pilot test and Crombach Alpha method and it yielded an average coefficient of 0.80. The sig.-value was used in testing the null hypotheses at 0.05.

Results

The results of the study are presented question by question and hypothesis by hypothesis in tables and the interpretations are also given underneath the tables to reveal the findings of the study.

Research questions

Question One: What is the relationship between Quick Response Codes (QR codes) and reference service delivery in the Federal university libraries in South-South Nigeria?

Table 1.

quick response codes (QR codes) and reference service delivery in the Federal university libraries in South South

Variable		Quick codes	Response	Reference service delivery
quick response codes (QR codes)	Pearson Correlation		1	.685**
	Sig. (2-tailed)			.001
	N	112		112
Reference service delivery	Pearson Correlation	.685**		1
	Sig. (2-tailed)	.001		
	N	112		108

Table 1.1 above showed that the relationship between quick response codes (QR codes) and reference service delivery in the federal university libraries in South-South Nigeria obtained a correlation

coefficient of $r = 0.69$, indicating a high positive relationship between the two constructs. Hence, quick response codes relate positively high to reference service delivery in the federal university libraries in South-South Nigeria.

Question Two: What is the relationship between short messaging services (SMS) and reference service delivery in the Federal University libraries in South-South Nigeria?

Table 2.

Short messaging services (SMS) and reference service delivery in federal university libraries in South South.

Variable		Short messaging services	Reference service delivery
short messaging services (SMS)	Pearson Correlation	1	.586**
	Sig. (2-tailed)		.000
	N	112	112
Reference service delivery	Pearson Correlation	.586**	1
	Sig. (2-tailed)	.000	
	N	112	112

**. Correlation is significant at the 0.05 level (2-tailed).

Table 2.1 shows that the relationship between short messaging services (SMS) and reference service delivery in the federal university libraries in South-South Nigeria obtained a correlation coefficient of $r = 0.59$, indicating a high positive relationship between the two constructs.

Question Three: What is the relationship between Libby and reference service delivery in the Federal university libraries in South-South Nigeria?

Table 3.

Libby and reference service delivery in federal university libraries in South South.

Variable		Libby	Reference service delivery
Libby	Pearson Correlation	1	.780**
	Sig. (2-tailed)		.000
	N	112	112
Reference service delivery	Pearson Correlation	.780**	1
	Sig. (2-tailend)	.000	
	N	112	112

**. Correlation is significant at the 0.015 level (2-tailed).

Table 3. above showed that the relationship between Libby and reference service delivery in the federal university libraries in South-South Nigeria obtained a correlation coefficient of $r = 0.78$, indicating a positively high relationship between the two constructs.

Hypotheses testing

Hypothesis 1: There is no significant relationship between quick response codes (QR codes) and reference service delivery in the federal university libraries in South-South Nigeria.

Table 4: Quick response codes (QR codes) and reference service delivery in the Federal University libraries.

Variable		Quick response codes (QR codes)	Reference service delivery
Quick response	Pearson Correlation	1	.685**
	Sig. (2-tailed)		.001
	N	112	112
Reference service	Pearson Correlation	.685**	1
delivery	Sig. (2-tailed)	.001	
	N	112	108

**. Correlation is significant at the 0.05 level (2-tailed).

Sig = 0.001

N = 112

Table 4 shows the testing of the hypothesis that there is no relationship between quick response codes (QR codes) and reference service delivery in the federal university libraries in South-South Nigeria. The relationship obtained a correlation coefficient of $r = 0.78$, indicating a positive high relationship between the two constructs. Therefore, the null hypothesis is rejected.

Hypothesis 2: There is no significant relationship between short messaging services and reference service delivery in the federal university libraries in South-South Nigeria.

Table 5 Short messaging services and reference service delivery in the Federal university libraries.

Variable		short messaging services	Reference service delivery
short messaging	Pearson Correlation	1	.586**
services	Sig. (2-tailed)		.000
	N	112	112
Reference service	Pearson Correlation	.586**	1
delivery	Sig. (2-tailed)	.000	
	N	112	112

**. Correlation is significant at the 0.05 level (2-tailed).

Table 5 shows the testing of the hypothesis that there is no significant relationship between short messaging services and service delivery in Federal Universities in south-south, Nigeria, the r value of 0.586 was obtained indicating a positive high relationship coefficient between the two constructs, therefore, the null hypothesis is rejected.

Hypothesis 3: There is no significant relationship between Libby services and reference service delivery in the federal university libraries in South-South Nigeria.

Table 6 Libby services and reference service delivery in the Federal university libraries.

Variable		Libby	Reference service delivery
Libby	Pearson Correlation	1	.780**
	Sig. (2-tailed)		.000
	N	112	112
Reference service	Pearson Correlation	.780**	1
delivery	Sig. (2-tailed)	.000	

**. Correlation is significant at the 0.015 level (2-tailed).

Table 6 shows the testing of the hypothesis that there is no relationship between Libby and reference service delivery in the federal university libraries in South-South Nigeria. The relationship obtained a correlation coefficient of $r = 0.78$, indicating a positive high relationship between the two constructs, therefore, the null hypothesis is rejected.

Discussion of the findings

The research question one revealed that there is significant relationship between quick response codes (QR codes) and reference service delivery in the universities investigated. The findings show that quick response codes (QR codes) provide libraries with the ability to send notifications directly to users' mobile devices, which enhances user engagement and promotes the utilization of library services that align with users' specific needs. This finding is in agreement with the finding of Esoswo 2025 who found that quick response codes keep users informed and encourages them to explore and engage with the newly acquired resources, informs them about any changes or updates to reference services, such as modified operating hours, temporary closures or service enhancements. The research question two revealed that there is significant relationship between short messaging services and reference service delivery in the universities investigated. The findings are in agreement with the finding of Parhamnia (2022) who found that SMS enables users to engage in direct conversations with librarians, through the application's messaging or chat functionality, users can have real-time text-based conversations with librarians, seeking immediate clarification, guidance, or recommendations.

The research question three revealed that there is significant relationship between Libby and reference service delivery in the universities investigated. The findings also agree with the findings of Singh, B.P (2023) that Libby keep track of the user's search queries, allowing them to revisit and review past searches. With the use of Libby librarians can easily refer back to relevant resources, saving time and effort in future research endeavors.

The result is expected as mobile applications offer intuitive and user-friendly interfaces designed specifically for smaller screens, optimizing the search and retrieval experience for mobile device users. It also enables users to easily revisit and access important resources without having to perform repeated searches or navigate through multiple pages

Conclusion

The study on mobile applications as predictors of effective service delivery in federal university libraries in South-South Nigeria establishes that the integration and utilization of mobile apps significantly enhance the quality, accessibility, and efficiency of library services. Evidence from the findings shows that mobile applications improve access to library resources regardless of time or location, support real-time communication between users and librarians, and streamline essential functions such as reference services, and electronic resource retrieval.

The research further demonstrates that mobile applications encourage higher user engagement, increases satisfaction, and strengthens information dissemination within academic environments. However, effective service delivery is strongly influenced by factors such as user awareness, digital literacy, availability of adequate ICT infrastructure, stable internet connectivity, and sustained technical support. Where these enabling conditions are present, mobile applications become strong predictors of improved service outcomes.

Recommendations

To maximize their potential, the following are hereby recommended;

1. The university libraries must implement continuous user training on how to use quick response codes in rendering reference services.
2. The universities should invest in robust technological infrastructure to encourage staff capacity development, and maintain regular updates of their mobile applications in rendering reference services.
3. There should be enlightenment programme to the academic community on mobile applications efficiency, accessibility, user satisfaction, and overall reference service effectiveness across university libraries in the r

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