

THE ADOPTION OF ICT RESOURCES AND LIBRARY SERVICE DELIVERY IN ACADEMIC LIBRARIES IN CROSS RIVER STATE, NIGERIA

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ABSTRACT

This study examined the relationship between the adoption of ICT resources and library service delivery in academic libraries in Cross River State, Nigeria. Two objectives guided the study: to examine the relationship between web-based communication tools and library service delivery, and between mobile communication tools and library service delivery. A correlational research design was adopted. The population comprised 208 professional and para-professional library staff from five academic libraries, and the entire population was used as a census. Data were collected using the “Adoption of ICT Resources and Library Service Delivery Questionnaire” (AICTRLSDQ). The instrument was validated by experts, while reliability was established using Cronbach’s alpha, with coefficients ranging from 0.80 to 0.85. Data were analysed using simple linear regression at the 0.05 level of significance. Findings revealed significant positive relationships between web-based communication tools and library service delivery ($R = .452$, $R^2 = .205$, $p < .05$), and mobile communication tools and library service delivery ($R = .544$, $R^2 = .296$, $p < .05$). The study concluded that ICT communication tools enhance library service delivery. It recommended that academic libraries maintain functional web-based communication platforms and integrate mobile tools such as WhatsApp, SMS services and mobile applications into routine service delivery.

Keywords: ICT resources; library service delivery; web-based communication tools; mobile communication tools; academic libraries.

Introduction

Academic libraries constitute an important part of tertiary education because they support teaching, learning, research and the intellectual development of students and staff. Their effectiveness, however, depends not only on the quantity of information resources available but also on how successfully such resources and related services are delivered to users. Library service delivery refers to the processes through which academic libraries provide users with access to information resources, reference assistance, circulation services, current awareness services, selective dissemination of information, user education and other forms of information support. In contemporary academic environments, users increasingly expect library services to be timely, accessible and available beyond the physical library. Consequently, the ability of academic libraries to provide satisfactory services has become an important concern, particularly as students and researchers increasingly rely on digital platforms for communication and information retrieval.

Globally, library service delivery has undergone considerable changes as universities adopt digital technologies for teaching, research and communication. Students and researchers increasingly search electronic databases, communicate through online platforms and access academic resources through mobile devices. These developments have placed pressure on academic libraries to extend their services beyond traditional face-to-face interactions. Academic libraries that depend largely on physical access may therefore experience difficulties in meeting the information needs of users who expect remote and immediate services. Acheampong and Agyemang (2021) found that mobile technologies have considerable potential for extending academic library services to users in distance-learning environments. Their findings indicate that mobile technologies can improve the accessibility of library services to users who may not be physically present within the library.

The growing demand for technology-supported library services is also evident in developing countries, where academic libraries are expected to respond to changing patterns of information seeking despite limitations in infrastructure and institutional resources. Library users now require faster communication, easier access to information and opportunities to interact with librarians without necessarily visiting the library (Ita et al., 2025; Ogba et al. 2025). Where these expectations are not met, users may depend on alternative information sources that are easier to access, even when such sources may not adequately meet their academic needs. This creates a service-delivery concern because the usefulness of a library is partly determined by its capacity to connect users with relevant resources and professional assistance at the point of need. Rafique et al. (2021) reported that perceived usefulness, ease of use, service quality and satisfaction were important to students' continued use of mobile library applications. This suggests that library technologies become valuable when they improve the actual experience and accessibility of services rather than merely existing as technological facilities (Otu et al., 2025; Otu et al., 2026).

In Nigeria, the challenge of effective library service delivery remains significant as academic institutions attempt to respond to the increasing use of digital technologies among students and researchers (Eze et al., 2026; Ndarake, et al., 2026). Users now communicate, search for information, exchange documents and undertake academic activities through internet-enabled devices. Academic libraries are therefore expected to provide services through communication channels that correspond with these changing practices (Ubi et al., 2026; Adie et al., 2026). However, evidence suggests that the adoption and use of digital technologies within Nigerian academic libraries are still uneven. Akwang (2021) found that although librarians in academic libraries in Akwa Ibom State had positive perceptions of Web 2.0 technologies, the level of adoption was low. Such limited adoption may restrict the ability of

libraries to communicate effectively with users and provide services through platforms that users commonly access.

The problem of library service delivery may be reflected in delayed responses to users' enquiries, inadequate dissemination of information, restricted access to library services outside opening hours, poor awareness of available resources and limited interaction between librarians and users. When library users are unaware of newly acquired materials, electronic resources, changes in opening hours, current services or other useful information, the resources available in the library may remain underutilised. Similarly, where users must physically visit the library before receiving assistance, those who are off campus or otherwise unable to visit may encounter difficulties accessing needed services. These conditions raise questions about the communication channels through which academic libraries provide their services.

One ICT resource that may contribute to addressing these difficulties is the use of web-based communication tools. Web-based communication tools are internet-supported platforms used for interaction, information dissemination and communication between organisations and their users. Within academic libraries, such tools may include websites, electronic mail, blogs, social networking platforms, online messaging facilities and other web-based services. Their adoption may enable librarians to communicate new developments, provide reference assistance, disseminate information on available resources, respond to users' enquiries and create awareness of library programmes without requiring users to visit the library physically. Akwang (2021) established that Web 2.0 technologies provide opportunities for communication and information sharing in academic libraries, although their level of adoption among the libraries studied remained low.

Web-based communication tools may therefore have particular relevance to library service delivery because they can reduce some of the limitations associated with time and physical location. Through online platforms, users can receive notices, ask questions, obtain

information about library resources and interact with librarians from different locations.

Olubiyo (2024) noted that social networking tools can be used in academic libraries for reference enquiries, current awareness services, selective dissemination of information, notification of new arrivals and reminders concerning overdue materials. These functions correspond directly with important aspects of library service delivery. Effective use of web-based communication tools may consequently strengthen communication between academic libraries and their users and increase awareness and utilisation of available services.

Mobile communication tools constitute another ICT resource that may be associated with library service delivery. These tools include smartphones, tablets, mobile applications, short message services and mobile-enabled communication platforms such as WhatsApp. Unlike communication systems that require users to remain at a fixed location, mobile tools provide opportunities for information and services to be accessed from different locations. In academic libraries, mobile communication tools may be used to send service notifications, respond to users' enquiries, communicate circulation information, provide links to digital resources and maintain contact with library users. Acheampong and Agyemang (2021) found that mobile technologies could support the provision of academic library services to distance learners, demonstrating their potential to extend services beyond the physical boundaries of the library.

The effectiveness of such technologies, however, depends on their actual adoption and use by library personnel. The presence of mobile phones, internet facilities or web platforms does not automatically translate into improved library services where librarians do not possess the required skills or where the tools are not incorporated into routine service delivery. Busayo et al. (2025) found differences in ICT skills and technology-related concerns among librarians in Nigerian higher educational institutions and recommended continuous ICT training. Their findings draw attention to the human capacity required for academic libraries to make productive use of ICT facilities for their professional activities.

Within Cross River State, academic libraries are expected to provide services to students, lecturers and researchers whose information behaviour is increasingly influenced by digital communication technologies. Yet challenges relating to service accessibility, communication with users, dissemination of information and timely responses may continue where library services remain heavily dependent on conventional approaches. Although studies in Nigeria have examined Web 2.0 technologies, mobile technologies, social networking and ICT usage among librarians, the available evidence is concentrated largely in other geographical locations or considers the technologies separately. There is therefore insufficient empirical evidence establishing how specific communication-oriented ICT resources relate to library service delivery in academic libraries in Cross River State.

This gap creates the need to determine whether the adoption of communication technologies is associated with improved library service delivery within the State. If limitations in communication, accessibility, dissemination of information and user interaction constitute part of the service-delivery problem, web-based and mobile communication tools may provide practical channels for addressing these limitations. It is against this background that the present study seeks to examine the relationship between the adoption of ICT resources and library service delivery in academic libraries in Cross River State, Nigeria, with particular emphasis on web-based communication tools and mobile communication tools.

Aim and objectives of the study

The main aim of this study is to examine the relationship between the adoption of ICT resources and library service delivery in academic libraries in Cross River State, Nigeria. Specifically, the study seeks to:

1. Examine the relationship between web-based communication tools and library service delivery in academic libraries in Cross River State, Nigeria.

2. Examine the relationship between mobile communication tools and library service delivery in academic libraries in Cross River State, Nigeria.

Research questions

The following research questions were formulated to guide the study:

1. What relationship exists between web-based communication tools and library service delivery in academic libraries in Cross River State, Nigeria?
2. What relationship exists between mobile communication tools and library service delivery in academic libraries in Cross River State, Nigeria?

Research hypotheses

The following null hypotheses were formulated to guide the study and tested at the 0.05 level of significance:

1. There is no significant relationship between web-based communication tools and library service delivery in academic libraries in Cross River State, Nigeria.
2. There is no significant relationship between mobile communication tools and library service delivery in academic libraries in Cross River State, Nigeria.

Methodology

The study adopted a correlational research design to examine the relationship between the adoption of ICT resources and library service delivery in academic libraries in Cross River State, Nigeria. The adoption of ICT resources constituted the independent variable and was measured in terms of web-based communication tools and mobile communication tools, while library service delivery constituted the dependent variable. The population of the study comprised 208 professional and para-professional library staff drawn from five academic libraries in Cross River State, Nigeria. These included the University of Calabar, University of Cross River State, University of Education and Entrepreneurship, Akamkpa, Federal College of Education, Obudu, and College of Health Technology, Calabar. Since the population was

manageable, the entire 208 respondents were used for the study, thereby making the study a census. A purposive sampling technique was adopted because the study specifically focused on professional and para-professional library staff who are directly involved in the adoption and use of ICT resources for library service delivery.

Data were collected using a structured questionnaire titled “Adoption of ICT Resources and Library Service Delivery Questionnaire (AICTRLSDQ).” The instrument was divided into sections covering respondents’ web-based communication tools, mobile communication tools, and library service delivery. The questionnaire was structured on a modified four-point Likert scale of Strongly Agree (SA = 4), Agree (A = 3), Disagree (D = 2), and Strongly Disagree (SD = 1). The instrument was subjected to face and content validation by experts in relevant areas to ensure that the items adequately measured the variables under investigation. A trial test was conducted using 30 librarians from the University of Uyo who were not part of the study population, and the reliability of the instrument was determined using the Cronbach’s alpha method with a reliability coefficient ranging from 0.80 to 0.85. data were analysed using simple linear regression The two null hypotheses were tested at the 0.05 level of significance. A null hypothesis was rejected where the p-value was less than 0.05 and retained where the p-value was greater than or equal to 0.05.

Presentation of results

Hypothesis one

There is no significant relationship between web-based communication tool and library service delivery in academic libraries in Cross River State, Nigeria. The independent variable in this hypothesis is web-based communication tools, while the dependent variable is library service delivery in academic libraries. Simple linear regression analysis was employed to test the hypothesis. The result of the analysis is presented in Table 1. To test this hypothesis, a simple linear regression analysis was carried out with web-based communication tools as the

independent variable and library service delivery in academic libraries as the dependent variable. The results, as presented in Table 1, revealed a correlation coefficient of ($R = .452$), indicating a moderate positive relationship between web-based communication tools and library service delivery in academic libraries. This suggests that as the use of web-based communication tools increases, library service delivery in academic libraries in Cross River State, Nigeria also improves. The coefficient of determination ($R^2 = .205$) and adjusted R^2 (.203) indicate that approximately 20.3% of the variance in library service delivery can be explained by web-based communication tools. Further examination of the ANOVA results revealed that ($F = 111.365^*$, $p = .000$), which is significant at the 0.05 level. Since the p-value (.000) is less than .05, the null hypothesis is rejected. This shows that web-based communication tools have a significant relationship with library service delivery in academic libraries in Cross River State, Nigeria. The identified equation explaining this relationship indicates that library service delivery in academic libraries is equal to $14.252 + .966$ (web-based communication tools).

Table 1 Simple regression result of the relationship between web-based communication tools and library service delivery in academic libraries

Model	Sum of Squares	df	Mean Square	F	p-value
Regression	873.638	1	873.638	111.365*	.000
Residual	3396.808	206	7.845		
Total	4270.446	207			
Variables	Unstandardized B	Std. Error	Beta	t	p-value
Constant	14.252	1.879		7.583	.000
Web-based communication tools	.966	.090	.706	10.725	.000

* Significant at .05 level, $R = .452$, $R^2 = .205$, Adjusted $R^2 = .203$

Hypothesis two

There is no significant relationship between mobile communication tools and library service delivery in academic libraries in Cross River State, Nigeria. The independent variable in this hypothesis is mobile communication tools, while the dependent variable is library service delivery in academic libraries. Simple linear regression analysis was employed to test

the hypothesis. The result of the analysis is presented in Table 2. To test this hypothesis, a simple linear regression analysis was carried out with mobile communication tools as the independent variable and library service delivery in academic libraries as the dependent variable. The results, as presented in Table 2, revealed a correlation coefficient of ($R = .544$), indicating a moderate positive relationship between mobile communication tools and library service delivery in academic libraries. This suggests that as the use of mobile communication tools increases, library service delivery in academic libraries in Cross River State, Nigeria also improves. The coefficient of determination ($R^2 = .296$) and adjusted R^2 (.294) indicate that approximately 29.4% of the variance in library service delivery can be explained by mobile communication tools. Further examination of the ANOVA results revealed that ($F = 182.005^*$, $p = .000$), which is significant at the 0.05 level. Since the p-value (.000) is less than .05, the null hypothesis is rejected. This shows that mobile communication tools have a significant relationship with library service delivery in academic libraries in Cross River State, Nigeria. The identified equation explaining this relationship indicates that library service delivery in academic libraries is equal to $14.252 + .966$ (mobile communication tools).

Table 2 Simple regression result of the relationship between mobile communication tools and library service delivery in academic libraries

Model	Sum of Squares	df	Mean Square	F	p-value
Regression	1263.799	1	1263.799	182.005*	.000
Residual	3006.647	206	6.944		
Total	4270.446	207			
Variables	Unstandardized B	Std. Error	Beta	t	p-value
Constant	14.252	1.879		7.583	.000
Mobile communication tools	.966	.090	.544	10.725	.000

* Significant at .05 level, $R = .544$, $R^2 = .296$, Adjusted $R^2 = .294$

Discussion of results

The finding of the first hypothesis revealed that web-based communication tools had a significant positive relationship with library service delivery in academic libraries in Cross River State, Nigeria. This implies that increased adoption and use of web-based communication tools are associated with improved library service delivery. Web-based communication tools

such as library websites, electronic mail, social media platforms, web chat and other internet-based communication channels enable librarians to interact with users, respond to enquiries, disseminate information about available resources and provide reference and current awareness services without requiring users to visit the library physically. Their use can therefore improve the accessibility, timeliness and responsiveness of library services by creating additional channels through which librarians can maintain regular contact with students, lecturers and researchers.

The finding agrees with Akwang (2021), who found that librarians perceived Web 2.0 technologies as useful tools for communication, information dissemination and the provision of academic library services, although the level of adoption varied among the libraries studied. Similarly, Sahabi and Ootobo (2022) established that social media platforms were used by professional librarians to support information dissemination and different aspects of library service delivery. The finding is also consistent with Chiparousha et al. (2022), who reported that academic librarians considered social media useful for library service provision and that its adoption was influenced by facilitating conditions and institutional support. In addition, Sahabi and Ootobo (2022) observed that technological limitations constitute important challenges to effective academic library service delivery in Nigerian universities, indicating that the availability and effective use of web-based technologies are important to contemporary library services. These findings collectively support the present result that web-based communication tools can strengthen interaction with users and improve the accessibility and responsiveness of services provided by academic libraries.

The finding of the second hypothesis revealed that mobile communication tools had a significant positive relationship with library service delivery in academic libraries in Cross River State, Nigeria. This implies that greater adoption and use of mobile communication tools are associated with improved service delivery in academic libraries. Mobile communication

tools such as smartphones, tablets, SMS services, WhatsApp and mobile library applications provide flexible channels through which users can communicate with librarians and obtain information regardless of their physical location. These tools can be used to provide reference assistance, send reminders and circulation notices, announce newly acquired resources, share links to electronic materials and communicate changes in library programmes. Their portability and ease of access may therefore reduce geographical and time-related barriers to library service delivery.

The finding agrees with Udem and Ogungbeni (2023), who found a positive relationship between the use of mobile technology-based library services and the satisfaction of information needs among university undergraduates in South-West Nigeria. Similarly, Acheampong and Agyemang (2021) found that mobile technologies provided considerable opportunities for extending academic library services to distance learners and improving access to information outside the physical library. The finding is also supported by Chaputula et al. (2020), who established that WhatsApp could be effectively used to provide reference and other library services to students and staff, particularly where users required services beyond the physical library environment. Furthermore, Rafique et al. (2021) found that service quality, perceived usefulness, ease of use and satisfaction influenced students continued use of mobile library applications. These studies support the present finding by demonstrating that mobile communication technologies can improve access, interaction, responsiveness and users' experience of academic library services.

Conclusion

The study concluded that the adoption of ICT resources has a significant positive relationship with library service delivery in academic libraries in Cross River State, Nigeria. Specifically, web-based communication tools and mobile communication tools were found to enhance the accessibility, timeliness, responsiveness, and effectiveness of library services.

Their effective use enables librarians to communicate with users, respond to enquiries, disseminate information, provide virtual reference support, and extend library services beyond the physical library environment. Therefore, academic libraries should strengthen their digital communication infrastructure, staff competence, internet access, and institutional support to maximise the contribution of web-based and mobile communication tools to effective library service delivery.

Recommendations

1. Library management should provide and maintain functional web-based communication platforms such as library websites, institutional email, social media platforms, web chat, and virtual reference services to improve communication and service delivery to library users.
2. Academic libraries should integrate mobile communication tools such as WhatsApp, SMS services, mobile applications, and mobile-friendly library platforms into routine service delivery to enhance users' access to information and communication with librarians.

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