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IMPACT OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) ON SERVICES DELIVERY IN ACADEMIC LIBRARIES IN ADAMAWA STATE, NIGERIA

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Abstract

This study investigates the impact of Information and Communication Technology (ICT) on service delivery in academic libraries in Adamawa State, Nigeria. Using a descriptive survey design, data were collected from 147 librarians across four institutions: Modibbo Adamawa University Yola, Federal Polytechnic Mubi, Federal College of Education Yola, and Adamawa State Polytechnic Yola. The study addressed five key objectives: identifying available ICT tools, assessing librarians' ICT literacy, determining the impact of ICT use on service delivery, examining challenges associated with ICT implementation, and proposing strategies for improvement. Findings reveal the availability of various ICT infrastructures, including internet connectivity, library management systems such as Koha, RFID technology, digital databases, and computer networks. Librarians' ICT literacy was found to positively influence service delivery by improving access to scholarly resources, enhancing cataloguing processes, supporting digital preservation, and facilitating more effective reference and interlibrary loan services. Despite these benefits, inadequate funding emerged as the major constraint, limiting the acquisition, maintenance, and upgrade of ICT resources. The study recommends strengthening ICT deployment through the provision of alternative power sources, improved internet bandwidth, and personal computing devices for librarians. It concludes that although ICT adoption substantially enhances library services, sustained investment and robust infrastructural support are essential for its long-term effectiveness.

Keywords: Information and Communication Technology; Service Delivery, Academic Librarians, Nigeria

Introduction

This paper examines the imperative for academic libraries to transform their service paradigms in response to the digital age, a shift driven by the rapid evolution of Information and Communication Technology (ICT). As user expectations increasingly prioritize online, flexible, and on-demand access to information, libraries must transition from conventional, manual systems to digital service models reliant on robust ICT infrastructure (Affum & Dwoomoh, 2023). This transformation involves the deployment of core digital services such as Online Public Access Catalogs (OPACs), digital repositories, e-lending platforms, and virtual reference assistance.

ICT serves as the independent variable fundamentally reconfiguring library operations, enabling remote access, resource sharing, and automated workflows that enhance efficiency and user satisfaction (Wilken, 2021). The effective integration of ICT, however, is contingent upon several critical sub-variables: the adequacy of ICT infrastructure (hardware, software, and connectivity), the ICT literacy of library personnel and users, and the strategic utilization of available technologies. Among these, infrastructure forms the foundational backbone, while staff competency is paramount for implementing and sustaining innovative services (Adeniran, 2020; Cox & Janti, 2022).

Despite recognized benefits including streamlined processes, personalized user services, and expanded access the potential of ICT in many Nigerian academic libraries remains unrealized. Persistent challenges such as inconsistent power supply, inadequate funding, obsolete equipment, and insufficient digital literacy training undermine service delivery (Rowley & Hartley, 2018). Furthermore, a lack of targeted national ICT policies for libraries and underutilization of existing digital resources by users exacerbate these issues (Okore, 2019; Thachill, 2018). Consequently, a significant gap persists between technological investment and tangible service outcomes, compelling users to seek alternative information sources and diminishing the library's academic relevance.

This study, therefore, aims to critically investigate the impact of ICT on service delivery within academic libraries in Adamawa State, Nigeria. It seeks to identify the specific constraints hindering effective ICT integration and to propose contextually relevant strategies for improvement.

The findings are intended to provide evidence-based guidance for library administrators, policymakers, and stakeholders in optimizing ICT deployment to meet the evolving needs of the academic community.

Statement of the Problem

Despite the growing integration of Information and Communication Technology (ICT) into academic libraries in Nigeria, many of these institutions still struggle with delivering efficient and user-centered services. Service delivery, which encompasses timely access to information, user satisfaction, and the availability of relevant academic resources, remains poor in numerous tertiary institutions. This poor service delivery is evident in persistent user complaints about delays in accessing digital materials, unresponsive catalog systems, and a lack of online reference services, despite significant investments in ICT infrastructure.

The root of this problem lies primarily in ICT and its related components. Several sub-components, including inadequate ICT infrastructure, poor digital literacy among library staff and users, low levels of ICT utilization, and a lack of tailored ICT services, have contributed to the inefficiency in service delivery. Furthermore, these challenges are exacerbated by systemic issues such as erratic power supply, obsolete technological equipment, poor funding, and inadequate staff training, which prevent libraries from effectively leveraging ICT tools.

Efforts have been made by government bodies, institutions, and development partners to bridge this gap by providing ICT resources, conducting training workshops, and setting up e-libraries. However, these interventions have largely fallen short due to the absence of sustainability strategies, lack of follow-up mechanisms, and minimal policy direction specifically targeted at academic libraries. As a result, the gap between ICT availability and its practical utility for improved service delivery continues to widen. Education stakeholders have repeatedly voiced concerns over this situation, noting that without functional libraries, research quality diminishes, learning outcomes are negatively affected, and the overall academic experience is compromised. Thus, there is a pressing need to examine how the components of ICT affect library operations and to propose practical and context-specific solutions.

This study, therefore, becomes necessary to explore the actual impact of ICT on service delivery in academic libraries, identify the barriers to effective implementation, and recommend strategies that will bridge the gap between technology deployment and optimal library service outcomes.

Purpose of the Study

The purpose of this study are to:

1. Ascertain the impact tools of ICTs on service delivery in academic libraries in Adamawa State, Nigeria
2. Evaluate the impact of librarian's literacy of ICT tools on service delivery in academic libraries in Adamawa State, Nigeria
3. Determine the impact of Utilization of ICTs tools on service delivery in academic libraries in Adamawa State, Nigeria

Research Questions

1. What is the impact of ICTs tools on service delivery in academic libraries in Adamawa state?
2. What is the impact of librarian's literacy of ICT tools on service delivery in academic libraries in Adamawa state?
3. What is impact of utilization of ICT tools on service delivery in academic libraries in Adamawa state?

Literature Review

A key advantage of Information and Communication Technology (ICT) in education is its capacity to enhance instructional efficiency and pedagogical delivery. Digital tools, including animations, simulations, and interactive presentations, facilitate the comprehension of complex and abstract concepts, particularly within science and mathematics, thereby improving content retention (Akpan & Afolabi, 2024). Furthermore, ICT enables pedagogical innovations such as the flipped classroom model, where students independently review preparatory materials online, freeing classroom time for interactive, collaborative problem-solving. This integration fosters the development of essential 21st-century competencies—digital literacy, critical thinking, and collaborative skills by

promoting active, project-based learning environments (Rizwan et al., 2023).

ICT also facilitates personalized and inclusive learning. Adaptive learning technologies utilize analytics to tailor instructional content to individual learner profiles and pacing, optimizing educational outcomes (Fahad & Alenezi, 2022). Simultaneously, assistive technologies, such as text-to-speech software and screen readers, democratize access for learners with special needs, supporting the principles of inclusive education. The resultant impact on academic performance is well-documented, with technology-enhanced instruction consistently correlating with superior assessment outcomes compared to conventional methods, attributable to increased engagement and deeper cognitive processing (Nguyen & Le, 2023). Moreover, ICT mitigates geographical and socioeconomic barriers, granting remote or underserved populations access to high-quality educational resources and expertise, thereby promoting educational equity (Eze & Ugwueze, 2023).

Successful implementation, however, faces significant challenges. In many contexts, particularly developing regions, infrastructure deficits encompassing unreliable electricity, insufficient hardware, and limited internet connectivity impede effective integration (Adewale & Ogunbanwo, 2023). Compounding this is a frequent lack of adequate digital pedagogical training among educators, leading to the suboptimal utilization of available technologies, which underscores the critical need for sustained professional development (Okonkwo et al., 2024).

Within academic libraries, the Internet has become integral to service delivery, fundamentally reshaping the organization, management, and dissemination of information. Core functions—including cataloging, circulation, interlibrary loan, reference services, and digital resource access—are now predominantly facilitated through online systems, enhancing both operational efficiency and user access. Internet tools enable libraries to extend their reach beyond physical confines, serving both on-campus and remote users effectively. As Faboyinde (2021) notes, the conscious adoption of Internet technologies in Nigerian libraries reflects an acknowledgment of their pivotal role in modern service provision. Patrons benefit from the ability to remotely browse and access

materials from global repositories, significantly expanding the available scholarly corpus.

Effective service delivery, defined as the provision of services that meet established standards of quality, timeliness, and efficiency, is a cornerstone of institutional performance and user satisfaction (Osei & Armah, 2021). In library contexts, this is guided by principles of accessibility, responsiveness, and accountability (Nkanga & Moyo, 2022). The digital transformation of services, through platforms like integrated library systems and online research portals, has been instrumental in reducing bureaucratic delays and expanding access.

Ultimately, the core mission of academic libraries is to support research, teaching, and learning by providing timely access to curated information resources (Adewumi, 2021). These resources encompassing both print and non-print formats are indispensable for fulfilling user information needs (Adomi, 2017; Popoola, 2018). Consequently, the strategic integration of ICT is not merely an operational enhancement but a fundamental requirement for academic libraries to deliver effective, user-centered services that underpin institutional academic objectives.

Methods

The study employed a quantitative method to collect and analyze data from four academic institutions in Adamawa State, Nigeria. Descriptive statistics, specifically the mean and standard deviation, were used to answer the research questions, while Chi-Square statistics were used to test the study's hypotheses. The study population comprised all professional librarians selected from four academic libraries in

Adamawa State, Nigeria, namely: Modibbo Adama University (MAU), Federal College of Education Yola (FCE), Adamawa State Polytechnic Yola (SPY), and Federal Polytechnic Mubi. All librarians in these four institutions constituted the population, with a total of 147 librarians (MAU: 54, SPY: 29, Federal Polytechnic Mubi: 31, FCE Yola: 33).

The total population was 147, the researcher employed a census sampling approach, utilizing the entire population for data generation. Oche (2021) contends that a researcher can study the entire population if it is manageable. For this reason, the researcher used a probability sampling technique to ensure every element in the population had an equal chance of selection, also known as random sampling.

The instruments for data collection were a questionnaire and an observation checklist. The questionnaire was self-designed by the researcher based on the formulated research questions and was titled "Impact of Information and Communication Technology on Service Delivery in Academic Libraries in Adamawa State, Nigeria Questionnaire (IICTSDALQ)." The questionnaire, intended for librarians, was divided into two sections (A and B). Section A sought to elicit biographical data from the respondents, while Section B was organized into clusters aligned with the research questions, with cluster 1 structured as a checklist and the subsequent four clusters containing subdivided items.

Results

Presentation and Interpretation of Results

Table.1 Questionnaire Return Rate

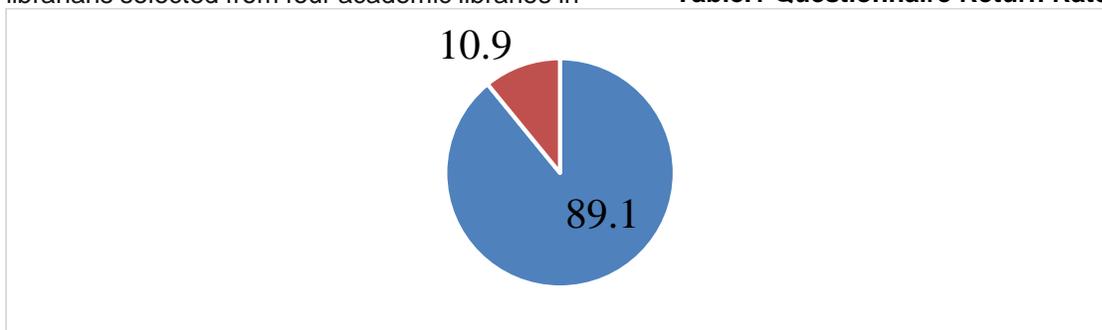


Figure 1: Questionnaire Return Rate
Source: Survey 2025

From the information in figure 1 it is clear that out of the 147-questionnaire distributed to the 147 respondents it is clear that 131 questionnaires representing 89.1% were well filled and returned while the remaining 16 questionnaires representing 10.9% were either not returned or not well filled.

Table 2 Distribution of Valid Questionnaire for Analysis

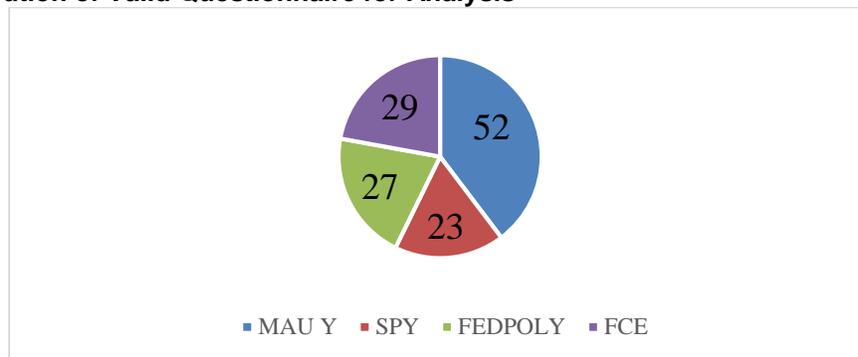


Figure 2: Distribution of Valid Questionnaire for Analysis

Source: Survey 2025

Yola, 23 representing 17.6% are from State Poly Yola, 27 representing 20.6% are from Fed Poly Mubi while 29 representing 22.1% are from FCE, Yola.

The information in figure 2 shows that out of the 131 questionnaire that were well filled and returned. 52 representing 39.7 % are from MAU,

Research Question One: What is the impact ICTs tools on service delivery in academic libraries in Adamawa state

Table 1: the impact of ICTs tools on service delivery in academic libraries in Adamawa state

S/N	ITEM	X	SD
1	Internet Connectivity	1.5	0.96
2	Our library has Radio Frequency Identification (RFID)	1.6	0.77
3	E-mail Services	1.9	0.98
4	Printer	1.8	0.97
5	Databases	1.6	1.01
6	The library has library management systems (e. Koha, evergreen, etc.	1.6	0.91
7	Computers	1.7	1.03
8	LAN	1.8	1.13
9	Cyber Café	1.8	0.96
10	Websites	1.6	0.77
11	WAN	1.5	0.98
12	UPS	1.8	0.97
13	Scanner	1.5	1.02
14	Satellite Dish	1.5	0.93
15	Antenna Mast	1.8	0.96
16	CD-ROM	1.6	0.76
17	VSAT Server	1.7	0.97
	CLUSTER MEAN	1.7	0.95

Source: Survey 2025

From the summary of analysis in table 1 it is clear that the following ICT facilities Internet Connectivity, our library has Radio Frequency Identification (RFID), E-mail Services, Printer, Databases, The library has library management systems (e. Koha, evergreen, etc.), Computers,

LAN, Cyber Café, Websites, WAN, UPS, Scanner, Satellite Dish, Antenna Mast, CD-ROM and VSAT Server are available in the library of the sampled institutions. This assertion is supported with calculated cluster mean scores of 1.7 and standard deviation of 0.95 for all the four

selected academic libraries institutions which is above the decision mean of 1.5.

Research Question Two: What is the impact of usage of ICT tools on service delivery in academic libraries in Adamawa State?

Table 2: impact of librarian's literacy of ICT tools on service delivery in academic libraries in Adamawa state

S/N	ITEM	X	SD
18	Utilization of internet services improve my profession	3.1	1.06
19	Wider access to various scholarly articles	3.2	1.17
20	Access to current information resources	3.0	1.29
21	Compilation of bibliography	2.9	1.32
22	Helps ton update knowledge in my field	2.7	1.25
23	Catalogue access and management	3.0	1.30
24	ICT enable me to send information at the right time	2.8	1.25
25	Community engagement and outreach	3.9	1.24
26	Digital preservation and access	3.4	1.23
27	Users' services and engagement	3.2	1.06
28	Instruction and training of staff and users	3.8	1.17
29	Reference and research and support	3.3	1.29
30	Resource sharing and interlibrary loans	2.6	1.32
31	Electronic resource management	2.7	1.25
	CLUSTER MEAN	3.11	1.23

Source: Survey 2025

The summary of analysis in table 2 shows that the impact of usage of ICT on service delivery in library in the sampled institutions are: Utilization of internet services improve my profession, Wider access to various scholarly articles, Access to current information resources, Compilation of bibliography, Helps ton update knowledge in my field, Catalogue access and management, ICT enable me to send information at the right time, Community engagement and outreach, Digital preservation and access, Users services and engagement, Instruction and training of staff and users, Reference and research and support, Resource sharing and interlibrary loans and

Electronic resource management. This assertion is supported with cluster mean score of 3.11 and standard deviation of 1.73 for the sampled populations. These cumulative means are all above the decision mean of 2.5.

Research Question Three: what is impact of utilization ICT tools on service delivery in academic libraries in Adamawa State?

Table 3: Impact of utilization ICT tools on service delivery in academic libraries in Adamawa State

S/N	ITEM	X	SD
32	I make use of the internet connectivity to deliver my task	3.6	1.22
33	I utilize the library management systems (e. Koha, evergreen, CDS/ISIS, etc.)	3.1	1.11
34	I make use of email services in our library	3.2	1.07
35	I make use of the Online Public Access Catalogue (OPAC) in our library	3.4	1.09
36	I make use of the Institutional repository of our library	3.0	1.11
37	I utilize the Radio Frequency Identification (RFID) gates system of our library	3.9	1.10
28	I utilisez the Library portal to Access e-ressources and data bases of Our Library	2.9	1.20
39	I utilize the integrated educational platforms like Moodle, Canvas, etc. for my learning practical	2.7	1.29

40	I make use of the virtual learning environment to host and attend online classes and workshops	3.7	1.15
41	I utilize the video conferencing platforms like zoom, google meet for virtual meetings and webinars	3.6	1.22
42	I make use of the QR codes to link to additional information or resources within the library	3.1	1.11
43	I make use of the social media and communication tools for information circulation and dissemination	3.2	1.07
44	I utilize the self-service technologies for borrowing and returning materials tasks	3.4	1.09
45	I utilize the digital displays and screen throughout the library for announcements	3.0	1.11
	CLUSTER MEAN	3.3	1.14

Source: Survey 2025

From the analysis in table 3 it is clear that the extent of utilization of ICTs for effective service delivery in library in the sampled institutions are in the areas of: Internet Connectivity, our library has Radio Frequency Identification (RFID), E-mail Services, Printer, Databases, The library has library management systems (e. Koha, evergreen, etc), Computers, LAN, Cyber Café, Websites, WAN, UPS, Scanner, Satellite Dish, Antenna Mast, CD-ROM and VSAT Server are available in the library of the sampled institutions. This assertion is supported with calculated cumulative mean scores of 3.3, and standard deviation.

Discussion of the Findings

From the summary of analysis in table 1 it is clear that the following ICT facilities Internet Connectivity, our library has Radio Frequency Identification (RFID), E-mail Services, Printer, Databases, The library has library management systems (e. Koha, evergreen, etc), Computers, LAN, Cyber Café, Websites, WAN, UPS, Scanner, Satellite Dish, Antenna Mast, CD-ROM and VSAT Server are available in the library of the sampled institutions. This finding agreed with the findings of Omehia (2021), Oso and Adesua (2017), Hamidu and Hauwa (2015)

The summary of analysis in table 2 shows that the impact of usage of ICT on service delivery in library in the sampled institutions are: Utilization of internet services improve my profession, Wider access to various scholarly articles, Access to current information resources, Compilation of bibliography, Helps ton update knowledge in my field, Catalogue access and management, ICT enable me to send information at the right time,

Community engagement and outreach, Digital preservation and access, Users services and engagement, Instruction and training of staff and users, Reference and research and support, Resource sharing and interlibrary loans and Electronic resource management. This finding agreed with the findings of Essien et al. (2022), Ekeng and Inyang (2023), Babayi et al. (2022), Amakac (2022), Orahachi and Sadiq (2022), Onyekaba (2020), Oso and Adesua (2017), Hamidu and Hauwa (2015)

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Conclusion and Recommendations

In conclusion, this study confirms the transformative potential of Information and Communication Technology (ICT) for service delivery within academic libraries in Adamawa State, Nigeria, while simultaneously highlighting the significant gap that persists between technological availability and its optimal utilization. The findings substantiate that a foundational array of ICT infrastructure including internet connectivity, library management systems, digital repositories, and communication

tools is present across the sampled institutions. Furthermore, librarians recognize the positive impact of these tools, acknowledging their role in enhancing professional practice, expanding access to scholarly resources, improving catalog management, and facilitating user services.

However, the research reveals a critical dissonance. Despite the availability of ICT assets and a cognizance of their benefits, the level of strategic utilization for comprehensive service delivery remains moderate. This indicates that the mere presence of technology is an insufficient condition for transformation. The gap between infrastructure and impactful application is exacerbated by entrenched systemic barriers, most notably inadequate funding, inconsistent power supply, and a pressing need for continuous professional development to elevate digital literacy among library personnel.

Therefore, the effective modernization of academic libraries in this context is contingent upon a dual approach. First, it requires sustained investment in upgrading and maintaining core ICT infrastructure. Second, and equally imperative, is the need for a concerted capacity-building strategy that moves beyond basic awareness to foster deep competency and innovative application of digital tools among library staff. Stakeholders, including university administrations, library management, and educational policymakers, must prioritize these intertwined dimensions to bridge the current implementation gap. By doing so, the libraries can fully actualize their mandate, evolving from traditional repositories into dynamic, user-centered hubs that effectively support the research, teaching, and learning objectives of the academic community in the digital age.

Based on the above conclusion, the following recommendation was made:

1. Academic institutions should prioritize funding for modern ICT infrastructure, including high-speed internet access, updated hardware, and software solutions that facilitate efficient library operations.
2. Continuous professional development programmes should be implemented for library staff to ensure they are proficient in using new technologies. Training should focus on both technical skills

related to specific ICT tools and soft skills necessary for effective user interaction.

3. Libraries should develop information literacy programmes aimed at educating users on how to effectively utilize digital resources. These programmes can empower users to navigate online databases, e-books, and other electronic resources confidently.

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