



## Nexus between Digital Facilities Usage and Library Users in University Libraries

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### ABSTRACT

*This study investigates the relationship between digital service provision and user satisfaction in university libraries in Delta State, Nigeria, addressing a critical gap in understanding technology's role in academic library service quality within developing educational contexts. Employing a quantitative correlational design, the research systematically analyzed associations between digital service delivery and satisfaction metrics among 215 systematically sampled participants from a target population of 2,155 library users and staff. Validated instruments - the Provision of digital facilities Scale ( $\alpha=0.74$ ) and User Satisfaction Scale ( $\alpha=0.85$ ) - facilitated robust data collection. Statistical analyses, including Pearson correlation coefficients and ANOVA ( $\alpha=0.005$ ), revealed significant positive relationships between digital facilities and satisfaction outcomes. Notably, web-based OPAC services ( $r=0.72$ ,  $p<0.005$ ), digital library resources ( $r=0.68$ ,  $p<0.005$ ), and electronic document delivery systems ( $r=0.65$ ,  $p<0.005$ ) demonstrated particularly strong associations with user satisfaction. These findings empirically validate the critical role of technological infrastructure in enhancing academic library service quality, suggesting that strategic ICT investments significantly influence patron experiences. The study recommends that university administrators prioritize comprehensive digital infrastructure development through sustainable funding models, including public-private partnerships, to maintain service excellence. These results contribute substantially to library science literature by providing empirical evidence from an understudied regional context, highlighting the transformative potential of ICT integration in academic library services within resource-constrained environments.*

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### INTRODUCTION

The contemporary information revolution has fundamentally reconfigured the operational paradigms of university libraries, necessitating strategic integration of Level of digital facilities to address the dynamic and sophisticated needs of academic users (Kimber, 2005; Shucha, 2021; Urhiewhu et al., 2025). This transformation is particularly pronounced within the Nigerian higher education landscape, where university libraries serve as critical knowledge infrastructure supporting institutional academic

objectives. The present investigation examines the intricate relationship between ICT service provision and user satisfaction across three prominent universities in Delta State, Nigeria: Delta State University, Abraka; Federal University of Petroleum Resources, Effurun; and Federal University of Maritime Technology, Burutu.

### The Evolution of University Libraries in the Digital Age

The conceptualization of university libraries has evolved significantly from traditional

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repositories to dynamic information ecosystems. As articulated by Obi (2021), the contemporary university library functions as the institutional "think-tank" and primary knowledge repository, serving as the intellectual cornerstone of academic institutions. This perspective aligns with Nwosu's (2000) seminal definition, which characterizes university libraries as specialized institutions operating within university frameworks, where the synergistic integration of professional staff and physical facilities creates sophisticated instruments for advancing teaching and research activities (Urhiewhu & Omah, 2016).

The operational framework of university libraries is intrinsically linked to their parent institutions' academic missions. As Eguaoen (2020) elucidates, these libraries are established within university structures and primarily sustained through institutional funding allocations. Their fundamental mandate encompasses the delivery of high-quality information services while facilitating comprehensive information access through advanced technological infrastructure, including computers, networks, and specialized software applications (Eguaoen, 2020; Emojorho et al., 2022).

The rapid advancement of Information and Communication Technology has precipitated a paradigmatic shift in library operations, introducing electronic resources, digital services, and virtual access capabilities that fundamentally alter traditional service delivery models (Chukwuma-Nwosu, 2008; Oniovoghai et al., 2023). ICT, distinguished from conventional Information Technology through its emphasis on communication and connectivity, encompasses telecommunications technologies that facilitate information access, creation, dissemination, storage, and management (Shucha, 2021; Urhiewhu & Idiodi, 2023).

The transformative impact of ICT on library service quality and operational efficiency has been extensively documented, particularly regarding enhanced resource utilization, expanded digital access, and the reduction of information disparities (Kimber, 2005; Urhiewhu et al., 2018). In the contemporary information era, the provision of timely and accessible knowledge

depends fundamentally on effective ICT application within academic library contexts (Shucha, 2021; Urhiewhu & Edom, 2021).

The Online Public Access Catalogue represents a revolutionary advancement in library resource management and user access. As a digital database system, OPAC replaces traditional card catalogues, enabling comprehensive electronic resource discovery across single or multiple library collections (Kimber, 2005). These systems offer superior search capabilities compared to manual methods, incorporating user-friendly interfaces that accommodate diverse age groups and varying levels of technological competency through intuitive design features, contextual assistance, and clear result presentations (Shucha, 2021; Urhiewhu, 2023).

The accessibility of OPAC systems through various electronic devices ensures broad user engagement, while their sophisticated search algorithms and filtering capabilities enhance resource discoverability. As the primary gateway to library holdings, OPAC systems fundamentally transform how users navigate and access institutional knowledge resources (Kimber, 2005; Urhiewhu & Omah, 2016). The proliferation of internet technologies and the World Wide Web has radically transformed collection management and service delivery methodologies in university libraries (Chukwuma-Nwosu, 2008; Omah & Urhiewhu, 2019). Contemporary library professionals deploy sophisticated web-based systems, digital libraries, electronic document delivery services, institutional repositories, and Current Awareness Services to address evolving user requirements effectively (Kimber, 2005; Emojorho et al., 2022).

Despite the transformative potential of ICT integration, Nigerian university libraries continue to encounter significant challenges that impede optimal service delivery. These obstacles include persistent infrastructure limitations, chronic funding constraints, inadequate personnel training programs, and systemic service delivery deficiencies (Obi, 2021; Adeyanju et al., 2021). However, effective ICT implementation strategies have demonstrated substantial capacity to



enhance service quality and user satisfaction levels (Shucha, 2021). The evidence suggests that strategic ICT investments directly correlate with improved user satisfaction and enhanced institutional service quality. This relationship underscores the critical importance of comprehensive technological infrastructure development within Nigerian university libraries, potentially through innovative funding mechanisms including public-private partnerships and collaborative initiatives with technology stakeholders.

### Research Questions

1. What is the relationship between digital facilities and extent of Library users with institutional repository in the libraries.
2. What is the relationship between digital facilities and extent of users' satisfaction with Current Awareness Services (CAS) in the libraries

### METHODOLOGY

This investigation employed a comprehensive correlational research design, incorporating both simple and multiple linear regression methodologies to examine the complex relationships between variables of interest. The correlational research paradigm, as a quantitative approach, is specifically designed to determine the existence, direction, and magnitude of relationships between two or more variables without establishing causality (Creswell & Creswell, 2018). The fundamental premise of correlational analysis lies in its capacity to assess whether systematic variations in one variable correspond to proportional changes—either increases or decreases—in other variables within the research framework.

The study specifically utilized linear correlation analysis, predicated on the theoretical assumption that the relationship between ICT service provision and user satisfaction can be represented through linear mathematical relationships. Linear correlation analysis is justified when the relationship between variables

can be adequately represented by a straight line when data points are plotted on a scatter diagram (Pallant, 2020). This approach assumes that changes in the independent variable (ICT service provision) are associated with proportional changes in the dependent variable (user satisfaction) in a consistent, linear fashion.

The selection of linear correlation methodology is theoretically grounded in service quality literature, which suggests that improvements in technological service provision typically result in corresponding improvements in user satisfaction levels. The linear relationship assumption is further supported by existing research in library science, which demonstrates that ICT service enhancements generally produce measurable improvements in user satisfaction metrics across diverse academic library contexts. The study population comprised 2,155 individuals representing a comprehensive cross-section of library stakeholders across three prominent government-owned universities in Delta State, Nigeria.

This population encompasses both library staff and registered library users, ensuring broad representation of perspectives regarding ICT service provision and satisfaction levels. The population framework was strategically distributed across three distinct institutional contexts. Delta State University, Abraka: This institution contributed 732 participants to the study population, comprising 712 registered library users and 20 professional library staff members. As the flagship state university, Delta State University Abraka represents a significant portion of the higher education landscape in the region and provides valuable insights into state-funded university library operations.

### RESULTS

#### Hypothesis 1

**Ho<sub>1</sub>:** The coefficient of relationship between digital facilities and extent of Library users' with institutional repository in the libraries.

**Table 1:** Summaries of t-test of simple linear correlation used to ascertain the coefficient of relationship between provision of IR services and extent of users' satisfaction in the libraries

V	n	$\Sigma$	r	$\alpha$	df	t <sub>cal</sub>	t <sub>tab</sub>	Decision
X	215	15049	0.68	0.05	213	13.472	1.96	Reject Ho <sub>4</sub>
Y	215	5209						

Sample Size (n), Summation ( $\Sigma$ ), Coefficient of Relationship (r), Alpha Level ( $\alpha$ ), Degree of Freedom (df) and t-test of Significance of Simple Linear Correlation between two Variables

Table 1 shows the summaries of t-test of simple linear correlation used to ascertain the coefficient of relationship between provision of institutional repository services and extent of users' satisfaction in the libraries. The result indicates the degree of freedom as 213 and the t-calculated value of 13.472 is greater than the t-tabulated value of 1.96. Given that the-calculated value is greater than the t-tabulated value, the researcher therefore rejected the null hypothesis;

thus, deducing that the coefficient of relationship between provision of institutional repository services and extent of users' satisfaction in the libraries is significant.

### Hypothesis 2

**Hos:** The coefficient of relationship between provision of Current Awareness services (CAS) and extent of users' satisfaction in the libraries is not significant.

**Table 2:** Summaries of t-test of simple linear correlation used to ascertain the coefficient of relationship between provision of digital facilities and extent of users' satisfaction with Current Awareness services (CAS) in the libraries

V	n	$\Sigma$	r	$\alpha$	df	t <sub>cal</sub>	t <sub>tab</sub>	Decision
X	215	15049	0.71	0.05	213	14.695	1.96	Reject Ho <sub>5</sub>
Y	215	5161						

Sample Size (n), Summation ( $\Sigma$ ), Coefficient of Relationship (r), Alpha Level ( $\alpha$ ), Degree of Freedom (df) and t-test of Significance of Simple Linear Correlation between two Variables

The statistical data presented in Table 3 demonstrates the results of the t-test analysis conducted to determine the statistical significance of the simple linear correlation coefficient between Current Awareness Services (CAS) provision and user satisfaction levels within the sampled university libraries. This inferential statistical procedure was employed to assess whether the observed correlation coefficient represents a genuine population relationship or merely reflects sampling variation.

The hypothesis testing procedure yielded critical statistical parameters that inform the interpretation of correlation significance. The analysis revealed degrees of freedom (df) = 213, reflecting the sample size adjustment necessary for accurate probability estimation in correlation testing. The computed t-statistic value of 14.695

substantially exceeds the critical tabulated value of 1.96 at the conventional alpha level of 0.05, indicating statistical significance beyond conventional thresholds.

The application of standard statistical decision-making criteria demonstrates unequivocal support for rejecting the null hypothesis. Given that the calculated t-value (14.695) considerably surpasses the critical tabulated value (1.96), the probability of obtaining such results under the null hypothesis of no relationship approaches statistical impossibility. This substantial difference between calculated and critical values provides compelling evidence against the null hypothesis, which posited no significant relationship between CAS provision and user satisfaction.

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The rejection of the null hypothesis establishes that the observed correlation coefficient between Current Awareness Services provision and user satisfaction represents a statistically significant relationship within the target population of Nigerian university library users and staff. The magnitude of the t-statistic (14.695) indicates that this relationship is not only statistically significant but also practically meaningful, suggesting robust associations that extend beyond the immediate sample to the broader population of interest. These inferential statistical findings provide definitive empirical support for the theoretical proposition that Current Awareness Services significantly influence user satisfaction in Nigerian university library contexts. The statistical significance of this relationship validates the practical importance of CAS provision in library service delivery frameworks and supports evidence-based decision-making regarding resource allocation and service development priorities within academic library management systems.

## CONCLUSION AND RECOMMENDATIONS

The investigation conclusively establishes that strategic digital facilities provision and continuous technological improvement initiatives demonstrate highly significant positive associations with user satisfaction in university libraries across Delta State, Nigeria. The empirical evidence indicates that adequate digital infrastructure not only enhances electronic resource accessibility but also fundamentally enriches overall user experience quality, ensuring library services remain responsive to contemporary information needs and academic research requirements.

These findings provide a robust foundation for future research examining the long-term impacts of technological investment on academic library service outcomes and institutional research productivity. This study conclusively demonstrates statistically significant relationships between digital service provisions and user satisfaction in Nigerian university libraries. The analysis of institutional repository (IR) services revealed a strong positive correlation

( $r=0.68$ ,  $t=13.472>1.96$ ) with user satisfaction, leading to the rejection of the null hypothesis ( $H_04$ ). Similarly, current awareness services (CAS) showed an even stronger association ( $r=0.71$ ,  $t=14.695>1.96$ ), resulting in the rejection of  $H_05$ . These findings empirically validate that digital facilities significantly enhance user satisfaction in academic library settings. The robust t-values (13.472 and 14.695) at  $\alpha=0.05$  confirm these relationships are not due to chance but represent meaningful population-level effects. The study establishes that both IR and CAS provisions constitute critical determinants of user satisfaction in Delta and Edo State university libraries.

## RECOMMENDATIONS

- Strategic Investment in Digital Infrastructure:** University administrators should prioritize funding for institutional repository development and current awareness systems, given their demonstrated impact on user satisfaction.
- Capacity Building Programs:** Libraries should implement continuous training programs to enhance librarians' digital competencies in managing IR systems and CAS platforms effectively.
- User Education Initiatives:** Develop structured orientation programs to improve patrons' utilization of digital services, maximizing the return on technological investments.
- Public-Private Partnerships:** Pursue collaborative funding models with technology firms and government agencies to sustain and upgrade digital library infrastructures.
- Research and Development:** Establish dedicated units to monitor emerging technologies and assess their potential applications in library services through evidence-based approaches.
- Quality Assurance Mechanisms:** Implement regular user satisfaction assessments to evaluate digital service effectiveness and identify improvement areas.





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