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Analysis of the Adoption of Library Software Application Packages in University Libraries in Northeast Nigeria

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Abstract

This study analysed the adoption of Library Software Application Packages in the management of university libraries in North East Nigeria. The specific objectives are to identify the types of library software packages adopted, examine the reasons for their adoption, information and communication technology competence of staff and level of Satisfaction by the staff. Four research questions and one hypothesis were formulated to guide the study. The study adopted survey research design. The population of the study consists of 183 staff. The study purposively sampled the whole 183 professional staff from eight university libraries. Structured questionnaire was used for data collection. Data were analysed using descriptive statistics of mean, and standard deviation and Analysis of Variance (ANOVA) was used to test the hypothesis. The findings of the study shows that the types of library applications packages adopted are; Koha, Mendeley, E-Prints, Zotero, and BibTex., The study revealed that the adoption of library application packages is relatively low, The study shows that staff possessed ICT competence in library application packages in software management, the findings of the study reveals that Library staff were satisfied with Koha, DSpace, Mendeley, and BibTex., On the hypothesis it reveals that no significant difference was observed in Adamawa ($p = 0.861$) The study concluded that although the adoption of library software packages has improved library operations and service delivery. The study recommended among others that university libraries should standardize the use of widely adopted software, invest in staff training and technical support, and enhance infrastructure to maximize the benefits of library automation.

Key Words: *Adoption, Library Software, Application Packages, University Libraries.*

Introduction

University libraries serve as the central hubs for learning, teaching, and research. They are established to provide effective library services in all formats and media, supporting the vision, mission, and objectives of their parent institutions (Chukwuji & Umeji, 2020). As integral components of universities, these libraries facilitate teaching, learning, research, extension, and community services (Sahabi & Otobo, 2021). To effectively accomplish these mandates in the digital age, university libraries have increasingly adopted Library Software Application Packages to automate services. These software systems integrate functionalities for acquiring, cataloguing, indexing, managing, storing, and delivering library resources, thereby improving service efficiency (Walters, 2021). Library Software Packages typically include modules for acquisition, cataloguing, circulation, and serial management, enabling librarians to handle routine operations effectively (Akawu, 2020).

In Nigeria, university libraries began automating services in the mid-1990s using TINLIB. Due to limitations in early systems, some libraries later adopted GLASS, X-LIB, ALICE, and CDS/ISIS. Subsequent software packages, such as KOHA, SLAM, Liberty 3, and Docuware,

introduced more advanced features, particularly for cataloguing, circulation, and user management (Afolabi, 2021; Idris & Lawan, 2023; Maharazu & Malumfashi, 2021). Other systems experimented with include ALAS, KLAS, VIRTUA, LIBERO, MINISIS, OPEN D–LIBRARY, FEDORA, TAPIR, AUTO LIBRARY, and READABLE (Uzomba, Akinyede, & Ubogu, 2021). Among these, KOHA, an open-source Integrated Library System (ILS), and NewGenLib, a comprehensive ILMS developed in India, are widely used globally, particularly in developing countries (Olusola, Inemesit, & Yahaya, 2022). The adoption of such packages is often driven by their ability to streamline library operations, enhance resource access, and improve administrative efficiency.

Despite the benefits, the adoption of Library Software Packages in Nigerian universities faces challenges such as inadequate funding, low technology penetration, limited staff knowledge, and erratic power supply (Yaya, 2023). Moreover, although there is research on library software adoption in Nigeria, no study has specifically examined the adoption of Library Software Application Packages in university libraries in North East Nigeria.

Librarians, as professionals managing university libraries, are expected to possess strong ICT literacy and practical skills to effectively adopt and operate these software packages (Sahabi & Otobo, 2021). The software packages also relieve librarians of repetitive clerical tasks, enabling them to focus on higher-level functions such as resource management, organization, and user engagement (Yaya, 2023). It is against this background that this study seeks to analysed the adoption of Library Software Application Packages in the management of university libraries in North East Nigeria.

Statement of the Problem

The adoption of library software packages provides computer automation for all aspects of the operation of a library. Adegbore (2020) opined that library software is designed to enhance all library routine activities as expected by the library users. Good and reliable library software enhances management, control and easy access to information resources that are physical in a library and outside, for example, books, CD ROM, e-journal, e-books, e-databases, and repositories, among others. According to Adewole and Nwachukwu (2024), library software package has also played an important role in processing, organising and disseminating information resources to various information seekers within and outside the library building. It helps librarians to manage the library daily activity in electronic format. It reduces the risk of paper work such as file lost, file damage and time consuming (Ashim, 2023). It can help users to manage the transaction. It also helps to reduce time wastage in the delivery of services to the library users.

Despite these advantages of these software packages, it has been observed that many Libraries do not adopt such application software. Adoption of Library Software Packages in Nigerian university libraries is becoming popular. However, in as much as the adoption of Library Software Packages help in library management, preliminary observation by the researchers and some literature review revealed that adoption of Library Software Packages is at low pace in many university libraries in North-East. The low pace of adoption according to Olatunji and Tiamiyu (2022) is as a result of lack of information communication competencies or inadequate technical support from the vendors or non-feasibility studies. This situation poses a serious threat not only to Library Software Packages adoption but also to the management of university library. Based on the above, the researcher wishes to investigate the adoption of Library Software Packages in the management of university libraries in North East, Nigeria.

Objectives of the Study

1. identify the types of Library Software Applications Packages adopted in management of University Libraries in North East Nigeria
2. examine the reasons for the adoption of Library Software Applications Packages in management of University Libraries in North East Nigeria
3. determine the Information and Communication Technology Competence of staff in the Adoption of Library software Applications Packages for Management of University Libraries in North East Nigeria
4. identify the level of Satisfaction by the Staff in the Adoption of Library software Application Packages in Management of University Libraries in North East Nigeria

Research Questions

1. What are the types of Library Software Applications Packages adopted in management of University Libraries in North East Nigeria?
2. What are the reasons for adoption of Library Software Applications Packages in the management of University Libraries in North East Nigeria?
3. What is the Information and Communication Technology Competence of staff in the Adoption of Library software Applications Packages for Management of University Libraries in North East Nigeria?

4. What is the level of Satisfaction of Adoption of Library software Application Packages in Management of University Libraries in North East Nigeria?

Hypothesis

Ho_1: There is no significant difference among university libraries on the reasons for adoption of the Library Software Application Packages in management of University Libraries in North East Nigeria.

Literature Review

Application Packages are software systems designed to perform specific functions within a computer environment. In the context of libraries, these packages integrate multiple operations necessary for the management, organisation, and dissemination of library resources. They are built to support tasks such as cataloguing, circulation, acquisition, serials management, and user services, allowing librarians to automate routine tasks and manage collections efficiently. By centralizing these functions, application packages enhance the speed, accuracy, and accessibility of library services (Sharma, 2020; Afolabi, 2022).

A well-designed library application package includes a set of modules, each dedicated to a core library operation. For example, acquisition modules help in managing the purchase and cataloguing of new resources, while circulation modules track the lending and return of books. Serials management modules assist in monitoring subscriptions and periodicals, and public access modules provide users with tools to search, reserve, or request materials. These integrated modules collectively ensure that library operations run smoothly, reduce manual workload, and improve service delivery to users (Mishra & Gupta, 2022).

In Nigerian university libraries, the adoption of application packages has been driven by the need to handle increasing volumes of information and to meet the expectations of a digital-savvy user base. Early systems such as TINLIB were adopted to automate basic housekeeping functions, while later software solutions like GLASS, X-LIB, ALICE, Koha, and New GenLib were implemented to address limitations and offer more advanced features (Olusola *et al.,* 2022). The transition from manual to automated library operations demonstrates the critical role of application packages in modern library management.

In Nigerian university libraries, ICT competence varies among staff due to differences in training, experience, and access to continuous professional development. Some libraries have implemented formal training programs to enhance staff ICT skills, focusing on software like Koha, VIRTUA, SLAM, and DSpace. These programs aim to ensure that staff can handle both routine and advanced tasks, from cataloguing and circulation to digital repository management and online public access (Olusola, Inemesit, & Yahaya, 2022; Akawu et al., 2020).

ICT competence is not only about technical skills but also involves the ability to adapt to new technologies and integrate them into library workflows. Libraries that invest in staff development and promote digital literacy are better positioned to leverage the full potential of application packages. Staff with high ICT competence contribute to improved user satisfaction, faster processing of library tasks, and more accurate management of resources (Tiwari et al., 2021). In essence, ICT competence is a key determinant in the successful adoption and use of library application packages. Developing these skills among library personnel is essential for enhancing operational efficiency, supporting digital transformation, and meeting the growing demands of academic library users in Nigeria and beyond (Yaya, 2023).

The level of satisfaction among library staff is an important factor in the successful adoption and continued use of library software application packages. Satisfaction reflects how effectively staff can perform their tasks using the software, how easy it is to navigate the system, and how well it supports the management of library resources. High satisfaction leads to increased motivation, better performance, and a more positive attitude toward technology adoption (Afolabi, 2021; Sharma, 2020). Library staff satisfaction is influenced by several factors, including the usability of the software, availability of training, technical support, and the alignment of the system with daily operations. Systems that are intuitive, reliable, and responsive to user needs are more likely to result in positive experiences for librarians. Conversely, software that is complicated, prone to errors, or lacks adequate support can lead to frustration, reduced efficiency, and resistance to adoption (Ogunleye, 2023)

Methodology

The study adopts survey research design. Specifically, the researcher used a cross-sectional survey research design, which allowed the researcher to collect data at one point in time. The target population of the study consisted of one hundred and eighty three (183) professional and paraprofessional staff in eight university libraries in North East, Nigeria. Because of the manageable size of the population, this sudy adopted the entire population of 183 professional and paraprofessional staff in the eight university libraries in North East, Nigeria based on census sampling**.** The study used structured questionnaire as the instrument for data collection. The data collected for this study were analysed using both descriptive and inferential

statistics. Descriptive statistics such as frequency counts, means, and standard deviations were employed to answer research questions. Inferential statistics, specifically Analysis of Variance (ANOVA), was employed to test the hypotheses at the 0.05 level of significance.

Presentation of Results

Research Question 1: What are the types of Library Software Applications Packages adopted in management of University Libraries in North East Nigeria?

Table 1: Types of Library Software Packages adopted and their adoption rates in North East Nigerian Universities

S/N	**Software Package Adopted**	**YSU**	**FUGA**	**AUN**	**MAU**	**ADSU**	**FUK**	**GSU**	**NEU**
1	Koha	✓	X	✓	✓	✓	X	✓	✓
2	DSpace	X	✓	✓	X	✓	X	X	X
3	Mendeley	✓	✓	✓	✓	✓	X	✓	✓
4	Zotero	✓	✓	✓	✓	X	✓	X	✓
5	Greenstone	✓	X	✓	✓	✓	X	✓	X
6	BibTeX	✓	✓	✓	✓	✓	✓	✓	X
7	RefWorks	X	X	✓	✓	X	X	X	X
8	Software for Universities Library	X	X	✓	✓	X	✓	X	X
9	Fedora	X	✓	X	X	X	X	X	X
10	E-prints	✓	✓	✓	✓	X	✓	X	X
11	New GenLib	X	X	✓	✓	X	X	✓	X
12	ALICE	✓	X	✓	✓	X	X	X	X
13	GLASS	✓	X	✓	✓	X	✓	X	✓
14	OpenBook	✓	✓	✓	X	X	✓	X	X
15	TINLIB	X	X	✓	X	X	✓	X	X
16	X-LIB	✓	X	✓	X	X	X	X	✓
17	Generalized Online Documents, Ordering, Texts	✓	X	✓	X	✓	X	✓	X
18	SLAM	X	✓	✓	✓	X	✓	X	X
19	Odyssey	X	X	✓	X	X	X	X	X
20	CUFTS ERM	X	✓	X	X	X	X	X	X
	Cluster Mean								

Source: Survey 2026

YSU=Yobe State University; **FUGA**=Federal University Gashua; **AUN**=American University of Nigeria; **MAU**= Modibbo Adama University; **ADSU**=Adamawa State University; **FUK**=Federal University Kashere; **GSU**= Gombe State University; **NEU**= Northeastern University; ✓ = Adopted, X: Not Adopted

The results on the types of library software packages adopted in the management of university libraries in North East Nigeria are presented in Table 1. The findings reveal varying levels of adoption across the universities. Among the software packages, Mendeley and BibTeX recorded the highest adoption rates, indicating that they are the most widely used across the universities. This was followed by Koha and Zotero, and Greenstone, E-prints, and GLASS, suggesting moderate usage. This was followed by several other software packages such as OpenBook and the Generalized Online Documents, Ordering, and Texts system. In contrast, packages like RefWorks and TINLIB recorded low adoption, while Fedora, Odyssey, and CUFTS ERM had the lowest adoption rates indicating that these

software are adopted by very few institutions, likely due to cost or technical requirements. The cluster mean adoption rate across all software packages shows that on average, less than half of the universities had adopted any given software package. This suggests a moderate level of software adoption across the region's university libraries.

Research Question 2: What are the Reasons for the Adoption of the Library Software Applications Packages in Management of University Libraries in North East Nigeria?

Table 2: Reasons for the adoption of Library Applications Packages

S/n	Items	Mean	SD	Decision
1	Facilitates workflows	4.53	0.7	Strongly Agree
2	Reduces manual interventions	4.47	0.68	Agree
3	Improved user experiences	4.64	0.63	Strongly Agree
4	Enhanced operational efficiency	4.52	0.69	Strongly Agree
5	Easy access to information resources	4.56	0.67	Strongly Agree
6	Reduces time wastage	4.52	0.68	Strongly Agree
7	Highly-secured cloud data	4.24	0.82	Agree
8	Increased staff productivity	4.31	0.81	Agree
9	Reduces errors	4.46	0.68	Agree
10	Helps in cataloguing	4.59	0.66	Strongly Agree
11	Easy generation of records	4.53	0.69	Strongly Agree
12	Supports keyword searching	4.63	0.63	Strongly Agree
13	Helps track resources	4.53	0.68	Strongly Agree
14	Maintains user accounts	4.47	0.68	Agree
15	Assists in serials/stock management	4.50	0.68	Strongly Agree
	Cluster Mean	**4.50**	**0.69**	**Strongly Agree**

Source: Survey 2026

The results in Table 2 show that respondents generally expressed strong agreement with all the listed reasons, as indicated by the high mean scores ranging from 4.24 to 4.65 and a cluster mean of 4.49. The highest mean of 4.65 was recorded for improved user experiences, closely followed by supports for keyword searching (4.63) and easy access to information resources (4.58), suggesting these factors are perceived as the most significant benefits. The lowest mean of 4.24 for highly-secured cloud data still indicates agreement but reflects slightly more variability in perception. Standard deviation values ranged from 0.63 to 0.82, with a grand standard deviation of 0.69, indicating relatively low dispersion of responses around the mean and a consensus among respondents. The slightly higher standard deviations for highly-secured cloud data (0.82) and increased staff productivity (0.81) suggest more diverse opinions on these aspects compared to others. The grand mean of 4.50 shows they have strong reasons for adoption of library application packages.

Research Question 3: What is the Information and Communication Technology Competence of staff in the Adoption of Library software Applications Packages for Management of University Libraries in North East Nigeria?

Table 3: Staff Information and Communication Technology Competence

S/N	Reasons	SA (5) F(%)	A(4) F(%)	UD(3) F(%)	D (2) F(%)	SD(1) F(%)	Mean	SD	Decision
1	Library software management	72(40.0)	63(35.0)	27(15.0)	12(6.7)	6(3.3)	4.02	0.96	Competent
2	Institutional repository creation	45(25.0)	54(30.0)	45(25.0)	27(15.0)	9(5.0)	3.55	1.1	Moderately Competent

3	Library networking	63(35.0)	72(40.0)	27(15.0)	9(5.0)	9(5.0)	3.95	0.97	Moderately Competent
4	Internet search capabilities	90(50.0)	72(40.0)	9(5.0)	9(5.0)	0(0.0)	4.35	0.79	Competent
5	Instant messaging proficiency	81(45.0)	63(35.0)	18(10.0)	9(5.0)	9(5.0)	4.10	0.99	Competent
6	Cloud technology skills	27(15.0)	45(25.0)	54(30.0)	36(20.0)	18(10)	3.15	1.18	Moderately Competent
7	Web applications skills	36(20.0)	63(35.0)	45(25.0)	27(15.0)	9(5.0)	3.50	1.06	Moderately Competent
8	Information retrieval skills	81(45.0)	72(40.0)	18(10.0)	9(5.0)	0(0.0)	4.25	0.81	Competent
9	Database management system skills	54(30.0)	63(35.0)	36(20.0)	18(10.0)	9(5.0)	3.75	1.04	Moderately Competent
10	Computer hardware skills	45(25.0)	72(40.0)	36(20.0)	18(10.0)	9(5.0)	3.70	1.02	Moderately Competent
11	Computer software skills	63(35.0)	72(40.0)	27(15.0)	9(5.0)	9(5.0)	3.95	0.97	Moderately Competent
12	Microsoft Excel skills	90(50.0)	63(35.0)	18(10.0)	9(5.0)	0(0.0)	4.30	0.8	Competent
13	Programming knowledge	18(10.0)	27(15.0)	54(30.0)	45(25.0)	36(20)	2.70	1.19	Low Competence
	Cluster Mean						**3.79**	**0.99**	Moderately Competent

Source: Survey 2026

The findings on ICT competency among library staff in Table 4 reveal a grand mean of 3.79 and a grand standard deviation of 0.99, indicating a moderate to high level of competence with some variation in skills across different areas. The highest competencies were recorded in internet search capabilities (mean = 4.35, SD = 0.79), Microsoft Excel skills (mean = 4.30, SD = 0.80), and information retrieval skills (mean = 4.25, SD = 0.81), showing strong proficiency and relatively low variability in responses. Conversely, programming knowledge had the lowest mean score of 2.70 with the highest standard deviation of 1.19, suggesting low competence in this area. Cloud technology skills (mean = 3.15, SD = 1.18) also showed lower proficiency with high variability. Overall, the results indicate that while staff exhibit strong skills in commonly used ICT tools and applications, there are notable gaps in advanced technical areas such as programming and cloud technologies. The findings on ICT competency among library staff reveal a grand mean of 3.76 and a grand standard deviation of 0.99, indicates competence with some variation in skills across different areas.

Research Question 4: What is the level of Satisfaction of Adoption of Library software Application Packages in Management of University Libraries in North East Nigeria?

Table 4.5: Level of Satisfaction by Staff in Adoption of Library Application Packages

S/N	Library Application Package	SA (5) F(%)	A(4) F(%)	UD(3) F(%)	D (2) F(%)	SD(1) F(%)	Mean	SD	Decision
1	TINLIB	36(20.0)	54(30.0)	45(25.0)	27(15.0)	18(10.0)	3.35	1.14	Moderately Satisfied
2	GLASS	45(25.0)	63(35.0)	36(20.0)	18(10.0)	18(10.0)	3.55	1.08	Moderately Satisfied
3	X-LIB	27(15.0)	54(30.0)	54(30.0)	27(15.0)	18(10.0)	3.25	1.10	Moderately Satisfied
4	ALICE	63(35.0)	72(40.0)	27(15.0)	9(5.0)	9(5.0)	3.95	0.91	Moderately Satisfied
5	New GenLib	72(40.0)	63(35.0)	27(15.0)	9(5.0)	9(5.0)	4.00	0.90	Satisfied
6	Koha	81(45.0)	72(40.0)	18(10.0)	9(5.0)	0(0.0)	4.25	0.79	Satisfied

7	SLAM	36(20.0)	45(25)	54(30.0)	27(15.0)	18(10)	3.30	1.12	Moderately Satisfied
8	Dspace	54(30.0)	72(40.0)	36(20.0)	9(5.0)	9(5.0)	3.85	0.96	Moderately Satisfied
9	OpenBook	45(25.0)	54(30.0)	45(25.0)	18(10.0)	18(10.0)	3.50	1.10	Moderately Satisfied
10	SOUL	63(35.0)	81(45.0)	18(10.0)	9(5.0)	9(5.0)	4.00	0.91	Satisfied
11	Fedora	36(20.0)	63(35.0)	45(25.0)	18(10.0)	18(10.0)	3.45	1.10	Moderately Satisfied
12	Greenstone	72(40.0)	72(40.0)	18(10.0)	9(5.0)	9(5.0)	4.05	0.86	Satisfied
13	E-prints	45(25.0)	54(30.0)	45(25.0)	18(10.0)	18(10.0)	3.50	1.10	Moderately Satisfied
14	Odyssey	27(15.0)	45(25.0)	63(35.0)	27(15.0)	18(10.0)	3.20	1.12	Moderately Satisfied
15	CUFTS ERM	54(30.0)	63(35.0)	36(20.0)	18(10.0)	9(5.0)	3.75	1.00	Moderately Satisfied
16	Generalized Online Documents	36(20.0)	45(25.0)	63(35.0)	18(10.0)	18(10.0)	3.35	1.13	Moderately Satisfied
17	BibTeX	63(35.0)	72(40.0)	27(15.0)	9(5.0)	9(5.0)	3.95	0.91	Moderately Satisfied
18	ZoteroPapers	72(40.0)	81(45.0)	18(10.0)	9(5.0)	0(0.0)	4.20	0.79	Satisfied
19	Mendeley	81(45.0)	72(40.0)	18(10.0)	9(5.0)	0(0.0)	4.25	0.77	Satisfied
20	RefWorks	63(35.0)	81(45.0)	18(10.0)	9(5.0)	9(5.0)	4.00	0.90	Satisfied
	Cluster Mean						**3.74**	**0.98**	**Moderately Satisfied**

Source: Survey 2026

The analysis of library application package usage in Table 4 shows a cluster mean of 3.74 with a standard deviation of 0.98, indicating that staff were *moderately satisfied* with the adoption of the different software packages. The most highly rated tools include Mendeley (mean = 4.25, SD = 0.77), Koha (mean = 4.25, SD = 0.79), and ZoteroPapers (mean = 4.20, SD = 0.79), reflecting relatively strong satisfaction and consistent user experiences across institutions. Conversely, Odyssey (mean = 3.20, SD = 1.12), X-LIB (mean = 3.25, SD = 1.10), and Generalized Online Documents (mean = 3.35, SD = 1.13) recorded lower mean scores with higher standard deviations, suggesting limited satisfaction and greater variability in user perceptions. Overall, the findings show that while some software tools are viewed more positively, the general trend reflects moderate satisfaction rather than high satisfaction.

Hypotheses Testing

Ho_1: There is no significant difference among the university libraries on the reasons for Adoption of the Library Applications Packages in the Management of University Libraries in North East Nigeria

Table 3: ANOVA for reasons for Adoption of the Library Applications Packages

		Sum of Squares	df	Mean Square	F	Sig.
Yobe	Between Groups	28.149	7	4.021	2.184	.038
	Within Groups	314.823	171	1.841		
	Total	342.972	178			
Adamawa	Between Groups	7.164	7	1.023	.462	.861
	Within Groups	378.981	171	2.216		
	Total	386.145	178			
Gombe	Between Groups	198.591	7	28.370	97.393	.000
	Within Groups	49.811	171	.291		
	Total	248.402	178			

Source: Field Survey, 2025

In Yobe State, the between-groups sum of squares (28.149) with an F-value of 2.184 and a significance level of 0.038 suggests a statistically significant difference, leading to the rejection of the null hypothesis for this state. In Adamawa State, however, the between-groups sum of squares (7.164) with an F-value of 0.462 and a significance level of 0.861 indicates no statistically significant difference, so the null hypothesis is retained for this state. In contrast, Gombe State shows a strong significant difference, with a between-groups sum of squares (198.591), an F-value of 97.393, and a significance level of 0.000, leading to the rejection of the null hypothesis. These results imply that while reasons for adoption vary significantly in Yobe and Gombe States, they are relatively uniform among the university libraries in Adamawa State. Therefore, the hypothesis that states that there is no significant difference among the university libraries on the reasons for adoption of the Library Software Application Packages in management of University Libraries in North East Nigeria is hereby rejected.

Summary of the Findings

Base on the analysis the following are summary of findings:

1. The findings from this study show that the types of library applications packages adopted for management of university libraries are; Koha, Mendeley, E-Print, Zotero, Greenstone, Glass and BibTex.
2. The study further revealed that the adoption of library application packages is relatively low
3. The study shows that Staff possessed information and communication technology competence in library application packages in software management, Internet search capabilities and Instant messaging proficiency
4. The findings of the study reveals that Library staff were satisfied with Koha, DSpace, Mendeley, Zotero, Greenstone, RefWorks, and BibTex.
5. On the hypothesis reason for adoption, significant differences were found among university libraries in Yobe ($p = 0.038$) and Gombe ($p = 0.000$), leading to the rejection of the null hypothesis in these states. In contrast, no significant difference was observed in Adamawa ($p = 0.861$), where the null hypothesis was retained.

Discussion of Findings

The findings from this study show that the types of library applications packages adopted for management of university libraries are; Koha, Mendeley, E-Print, Zotero, Greenstone, Glass and BibTex. The findings resonate with Idris and Lawan (2023), who reported that multiple Integrated Library Management Systems (ILMS), including Mendeley, BibTeX, and DSpace, are deployed in Nigerian universities based on institutional needs. Similarly, Igbudu *et al.,* (2020) highlighted the widespread adoption of multiple library software in North Central Nigeria, while Li and Tao (2023) emphasised that open-source software like Mendeley and BibTeX offers flexibility and customization, which may drive their preference among university libraries.

The study further revealed that the adoption of library application packages is relatively low. This result agrees with study of Ahmed and Tsagem (2024), who reported that the adoption of Koha LMS in federal university libraries enhanced service delivery, streamlined workflows, and provided efficient access to information resources. The findings suggest that libraries adopt software packages not only to automate routine processes but also to enhance operational efficiency, reduce errors, and improve staff productivity, highlighting the functional and strategic value of library software adoption.

The findings revealed that the reasons for the adoption of library application packages into the library are: to Facilitates workflows, reduces manual interventions, enhances operational efficiency, easy access to information resources, increased staff productivity, and reduces errors. The findings agreed with Ahmed (2024) examined the use of KOHA library management software (LMS) for information services delivery in selected federal university libraries in northwestern Nigeria. The findings revealed that librarians used KOHA LMS for information services delivery with a grand mean of 2.51 indicating moderate significance.

The findings revealed that the staff are competent in Library software management, Internet search capabilities, Instant messaging proficiency, Web applications skills, Microsoft Excel skills, and Information retrieval skills. These findings agreed with Dime, Akporhonor, and Ogbomo (2024) investigated librarians' technology skills and management of electronic information resources in university libraries in South-South Nigeria. The findings shows that library personnel agreed that they possess technology skills such as Web application skills, Content management system skills, Plagiarism detection software skills, Information retrieval skills, Digital library/ digital repository system skills, Security software skills, Library management system skills, Database management system skills, Computer operating system skills, Content development software skills, Programming language skills, Computer software skills and computer hardware skills.

Conclusion

This study concludes that Mendeley and BibTeX are the most widely adopted library application packages in North

East Nigerian universities, while overall adoption across all packages is moderate (46.9%), indicating varying usage levels. Library staff recognize and adopt multiple software packages, including Koha, DSpace, Zotero, and Greenstone, but several packages remain underutilised due to technical, financial, and infrastructural constraints. The study further concludes that the primary reasons for adopting library application packages are to streamline workflows, reduce manual processes, enhance operational efficiency, facilitate access to information resources, and improve staff productivity, with a grand mean of 4.50. Overall, while progress has been made toward digital library management in North East Nigeria, the adoption and use of library application packages remain constrained.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. The university libraries in North East Nigeria should standardise their use across branches to enable uniform service delivery, staff cross-training, and simplified technical support..
2. The University libraries in North East Nigeria should continue investing in advanced automation features of adopted applications.
3. The University management should outlined continuous professional development programs to keep them updated with emerging technologies and trends in library automation.
4. Library management should sustain staff satisfaction by ensuring consistent system performance, timely technical support, and opportunities for staff feedback in software upgrade decisions.

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