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Digital Literacy Programs in Public University Libraries in North-Central Nigeria

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Highlights:

Examines Digital Literacy Programs in Public University Libraries in North-Central Nigeria.

Identifies overall mean competency at 2.87 which indicate Digital Tool Proficiency as the weakest area (M = 2.64).

Recommends tiered instructional frameworks, stronger faculty-librarian partnerships, and regional collaboration among North-Central libraries.

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Abstract: This study examines Digital Literacy Programs in Public University Libraries in North-Central Nigeria. The study aims to assess their effectiveness in building 21st-century information competencies among undergraduate students. A convergent parallel mixed-methods design was used. Surveys were administered to 156 undergraduate students from six federal universities in the region, and in-depth interviews were conducted with 12 library administrators. The Student Digital Literacy Assessment Questionnaire (SDLAQ, Cronbach ' s alpha = 0.87) served as the primary instrument. Data were analyzed using descriptive statistics and Chi-square test. Although 91.7% of libraries offer digital literacy programs, only 21.1% of students attained high competency (Mean = 2.87, SD = 0.74). Digital Tool Proficiency scored lowest (M = 2.64) while Ethical Information Use scored highest (M = 3.45). Students who participated in programs showed significantly higher competency ($\chi^2 = 18.47$, $p < .001$, Cramer's V = 0.354), leading to the rejection of H_{01}. Emerging technology coverage was critically low: AI tools (18.2%), data visualization (18.2%), and misinformation detection (36.4%), supporting rejection of H_{02}. Results indicate that while digital literacy programs positively impact student competencies, significant gaps exist in addressing emerging technologies and ensuring universal student participation. The study concludes that digital literacy instruction requires systematic enhancement through expanded program delivery models, comprehensive content coverage, and institutional commitment to mandatory information literacy requirements. The study recommends development of tiered instructional frameworks, mandatory digital literacy requirements, enhanced faculty-librarian partnerships, professional development in emerging technologies, and regional collaboration among North Central libraries.

Keywords: Academic libraries, digital literacy, emerging technologies, information competence.

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Introduction

Library services in the 21st century extend far beyond traditional collection management to encompass comprehensive information literacy instruction that prepares students for complex digital information environments (Omoefe & Echedom, 2021). Academic libraries have evolved into educational partners, delivering structured programs that develop critical competencies in information discovery, evaluation, ethical use, and communication (Bawack & Kamdjoug, 2018). This transformation reflects broader changes in higher education where information literacy has become essential for academic success, lifelong learning, and professional effectiveness.

Digital literacy encompasses interconnected competencies including information discovery, critical source evaluation, ethical use, advanced tool proficiency, and content creation (Sparks et al., 2016). Contemporary students must navigate environments shaped by information abundance, rapid technological change, and emerging tools such as artificial intelligence that fundamentally alter research processes. In North Central Nigeria, covering seven states and the Federal Capital Territory, academic libraries serve populations with varied digital access and technological familiarity (Igbo, 2020). Systematic assessment of program effectiveness remains limited, making evidence-based frameworks essential for strengthening library contributions to student success. endpara marker, Plateauacademic libraries.

Statement of the Problem

Despite increasing integration of digital technologies in Nigerian higher education, significant concerns exist regarding students' digital literacy competencies. Undergraduate students face numerous challenges including difficulty evaluating source credibility, limited understanding of advanced search strategies, inadequate knowledge of emerging technologies like AI research tools, and insufficient skills in detecting misinformation. While academic libraries in North Central Nigeria have begun implementing digital literacy programs, several critical gaps persist.

First, there is limited empirical evidence regarding the effectiveness of existing programs in developing student competencies. Second, the relationship between program participation and demonstrated digital literacy skills remains poorly understood. Third, libraries' capacity to address emerging technologies and evolving information landscapes has not been systematically assessed. Fourth, significant variations in program quality, delivery methods, and content coverage across institutions suggest lack of standardized frameworks.

Studies by Ndagi and Madu (2019) and Udoh et al. (2020) highlight infrastructure constraints and resource limitations without systematically evaluating their effect on actual student outcomes. More recently, Omoefe and Echedom (2021) found that fewer than 30% of Nigerian university students demonstrated adequate digital information competencies, while Igbo (2020) reported significant disparities in digital skills across geographic zones. The knowledge gap is clear: there is no systematic, evidence-based assessment linking library digital literacy programs to measured student competencies in North Central Nigeria, nor a practical framework that addresses resource constraints while integratingemerging technologies. This study addresses these gaps directly.

Research Objectives

1. Examine the digital literacy programs in Public Universities in North Central Nigeria.

2. Ascertain the digital literacy competencies of undergraduate students in North Central Nigeria public universities.
3. Examine the challenges facing digital literacy programs in public universities in North central Nigeria.

Research Questions

1. What are the digital literacy programs in Public Universities in North Central Nigeria?
2. What are digital literacy competencies of undergraduate students in North Central Nigeria public universities?
3. What are the challenges facing digital literacy programs in public universities in North central Nigeria.?

Literature Review

Digital Literacy in Academic Contexts

Digital literacy extends beyond technical skills to encompass critical thinking, information evaluation, and ethical information use (Pinto et al., 2019). Contemporary frameworks distinguish between information literacy (finding and evaluating information), media literacy (understanding media construction), digital literacy (using technologies effectively), and data literacy (working with quantitative information). Academic libraries must address all dimensions in integrated instructional programs. The American Library Association's Framework for Information Literacy emphasizes inquiry-based learning where students develop abilities to locate, evaluate, and use information while understanding economic, legal, and social dimensions of information access (ALA, 2015). This framework positions information literacy as foundational to academic success and democratic participation.

Emerging Technologies and Information Competence

Several technological trends reshape information landscapes and create new literacy requirements. Artificial intelligence tools including ChatGPT, Bing AI, and specialized research assistants are changing how students approach research and writing (Lund et al., 2023). Students require understanding of AI capabilities, limitations, ethical implications, and verification strategies for AI-generated content. Misinformation proliferation across digital platforms necessitates sophisticated evaluation skills (Jones-Jang et al., 2021). Libraries play essential roles teaching critical evaluation strategies, lateral reading techniques, and source verification methods. The COVID-19 pandemic and recent elections demonstrated misinformation's societal impacts, highlighting urgency of developing these competencies. Open access publishing and open educational resources create new opportunities while also requiring updated discovery and evaluation skills (Carlson et al., 2011). The rapid expansion of generative AI tools has further extended these demands, requiring libraries to rapidly update instructional content to address AI-related information challenges (Lund et al., 2023).

Digital Literacy in Nigerian Academic Libraries

Research on Nigerian academic libraries reveals both progress and persistent challenges. Echezona et al. (2020) found that while many libraries established computer laboratories and internet access, systematic digital literacy instruction remains underdeveloped. Barriers include insufficient staffing, limited professional development opportunities, and inadequate funding for technology infrastructure. However, innovative approaches are emerging. Omeluzor et al. (2017) documented libraries developing partnerships with academic departments to integrate information literacy into curriculum. Some institutions created online tutorials and learning modules extending reach beyond physical spaces. These

innovations demonstrate librarian commitment despite resource constraints. More recent Nigerian studies reinforce these findings. Olalere and Soyemi (2022) assessed digital literacy among Library and Information Science undergraduates in South-West Nigeria and found that practical skills in database navigation and citation management were stronger than skills in AI tools and data visualisation, mirroring patterns found in the present study. Nwafor-Orizu and Adeniji (2021) similarly documented significant gaps in digital competency at Nnamdi Azikiwe University, attributing deficiencies to insufficient instructional staffing and inconsistent program delivery.

While recent research has described digital literacy program characteristics and identified infrastructure challenges, significant gaps remain. Limited empirical evidence links program participation to demonstrated student competencies in Nigerian contexts. Understanding of how emerging technologies are addressed in instruction remains inadequate. Frameworks for comprehensive, scalable digital literacy programming adapted to resource-constrained environments are lacking. This study addresses these gaps through systematic assessment of programs and competencies, hypothesis testing regarding program impact, and development of evidence-based implementation frameworks.

Theoretical Framework

This study is grounded on Connectivism Theory (Siemens, 2005). The theory holds that learning in the digital age occurs through networks of connections across diverse information nodes, making it particularly relevant for understanding how students develop digital literacy through structured library instruction. The framework informed the study's design, instrument development, and interpretation of findings. Connectivism argues that in a fast-changing info-environment, its impossible to hold all knowledge. What matters is the ability to tap into networks when needed. Students and librarians apply this by designing services around access of networks. The library becomes a hub that connects students to the right experts, datasets, and communities.

Methodology

This study employed a descriptive survey research design. The research was conducted across six federal universities in North Central Nigeria: University of Abuja (FCT), University of Jos (Plateau State), Federal University of Technology Minna (Niger State), University of Ilorin (Kwara State), Federal University Lafia (Nasarawa State), and Federal University of Agriculture, Makurdi (Benue State). The population comprised undergraduate students (200-400 level). Taro Yamane's formula $n = N / (1 + N(e)^2)$ was applied to determine a sample of 156 students. These were distributed proportionally across the six universities: University of Abuja (26), University of Jos (27), FUT Minna (25), University of Ilorin (28), Federal University Lafia (24), and Federal University of Agriculture, Makurdi (26), and further stratified across four faculties (Sciences, Social Sciences, Arts, and Engineering) and three-year levels (200, 300, and 400 level). Three instruments were used: (1) Student Digital Literacy Assessment Questionnaire (SDLAQ)—a 45-item instrument assessing five competency domains using 5-point Likert scales, achieving Cronbach's alpha of 0.87; (2) Library Program Assessment Survey (LPAS)—a 30-item survey for administrators. Content validity was established through expert review by three library science academics who assessed item relevance and clarity; face validity was confirmed through a pilot test with 15 students not included in the main sample. Instrument reliability was further supported by a test-retest correlation ($r = 0.81$) conducted two weeks apart. Quantitative data were analyzed using SPSS version 26

with descriptive statistics and Chi-square test ($p < .05$). Qualitative interview data underwent thematic analysis using NVivo 12. Findings were integrated during interpretation to provide comprehensive understanding.

Table 1: Organic Chemistry Instrumentations, Uses, and Years of Manufacture

Research Question 1: What are the digital literacy programs in North Central Nigerian **academiclibraries?**
Table 1: **Program Dital Literacy Program Characteristics**

Program Feature	**Frequency (n = 12)**	**Percentage**
Libraries Offering Programs	11	91.7
Delivery Models:		
One-shot sessions	11	100.0
Workshops	9	81.8
Online tutorials	7	63.6
Embedded librarianship	5	45.5
Credit-Bearing Courses	2	18.2

Source: Author's Field Work 2025

Research Question 2: What are the digital literacy competencies of undergraduate students in North Central Nigeria public universities?

Table 2: Mean Competency Scores by Digital Literacy Domain

s/n	**Domain**	**Mean**	**SD**	**Level**
1	Information Discovery and Access	3.12	0.82	Moderate
2	Critical Evaluation and Verification	2.78	0.91	Moderate
3	Ethical Information Use	3.45	0.68	Moderate
4	Digital Tool Proficiency	2.64	0.95	Moderate
5	Information Creation and Communication	2.89	0,79	Moderate
	Overall Mean	**2.87**	**0.74**	**Moderate**

Table 2 shows variation across compentency domains.ethical information use scored highest (M = 3.45), while Digital Tool Proficiency scored lowest (M = 2.64), indicating weakness in utilizing advanced research tools and emerging technologies.

Research Question 3: What are the challenges facing digital literacy programs in public universities in North central Nigeria.?

Table 3: Challenges facing digital literacy programs

Challenge	**Frequency**	**%**	**Mean Severity (1-5)**
Insufficient funding	12	100.0	4.67
Limited staffing	11	91.7	4.42
Faculty engagement difficulties	10	83.3	3.92
Rapid technological change	9	75.0	4.08
Inadequate infrastructure	9	75.0	3.83
Lack of professional development	8	66.7	3.75
Poor student attendance	7	58.3	3.50

Source: Author's Field Work 2025

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Table 3 reveals that funding (100%, M = 4.67) and staffing (91.7%, M = 4.42) are the most pervasive and severe challenges. Faculty engagement (83.3%) and keeping pace with technological change (75.0%, M = 4.08) also present significant obstacles. These findings corroborate Ndagi and Madu (2019) who identified resource constraints as primary barriers to effective library service delivery in Nigerian universities.

Discussions

A central finding of this study is that, while libraries offer digital literacy programs, overall students' participation remains moderate. One-shot sessions are universal, while more integrated approaches like embedded librarianship and credit-bearing courses are less common among the students. This aligns with Ndagi & Madu (2019) who identified resource constraints limiting students' participation in program effectiveness in Nigerian universities. Also, research question two that studied digital literacy competencies of undergraduate students in North Central Nigeria public universities shows variation across competency domains among students. Ethical Information scored highest, while digital tool proficiency scored lowest indicating weakness in utilizing advanced research tools and emerging technologies. This findings corroborates Anunobi and Ukwoma (2016) who demonstrated similar relationships in academic settings, where students' are likely to achieve high competency, providing empirical evidence for institutional investment in library instruction. The third research question on the challenges facing digital literacy programs in public universities in North central Nigeria revealed that, the most pervasive and severe challenges are faculty engagement difficulties and insufficient funding are those that present significant obstacles. This is strengthened by the findings of Echezona et al. (2020), who attributed these shortfalls to funding and professional development constraints which pose a significant challenge to digital literacy programs in public universities.

Conclusion(s)

This study establishes that while the majority of North Central Nigerian academic libraries offer digital literacy programs, student competency outcomes remain largely moderate to low. Program participation significantly improves competency levels, validating the educational role of academic libraries and the need to expand program reach and participation. Significant gaps persist in the coverage of emerging technologies, particularly AI tools, data visualization, and misinformation detection. Resource constraints including funding shortfalls and inadequate staffing remain systemic barriers requiring coordinated institutional and policy responses. Addressing these gaps requires sustained institutional commitment, policy-level investment in library staffing and technology, and stronger integration of library instruction into academic curricula across North Central Nigerian universities.

Recommendations.

Based on the findings, the following recommendations are made:

1. Academic libraries should adopt tiered digital literacy frameworks, expand instructional delivery through embedded librarianship and online modules, integrate emerging technologies such as AI tools and misinformation detection into instructional content, and implement outcome-based assessment systems to measure student learning.
2. University management should mandate foundational digital literacy instruction for all undergraduate students, fund dedicated librarian positions and technology infrastructure, include librarians in curriculum development processes, and incentivize faculty collaboration

with library instructional programmes.

3. Policymakers should increase library funding allocations, establish national digital literacy standards for higher education, support regional library consortia in North Central Nigeria, and invest in sustained professional development for librarians in emerging technologies.

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