



PROMOTING INCLUSIVE ACADEMIC LIBRARIES: ACCESSIBILITY AND USE OF INFORMATION RESOURCES AND SERVICES BY PERSONS WITH DISABILITIES IN FEDERAL UNIVERSITY LIBRARIES IN SOUTH-EAST NIGERIA

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ABSTRACT

This study examines the accessibility and utilization of information resources and library services by Persons with Disabilities (PWDs) in federal university libraries in South-East Nigeria. The study used a descriptive survey design, with census sampling of 132 PWDs (119 visually impaired, 10 locomotor-impaired, 3 hearing-impaired) at the University of Nigeria, Nsukka, and Nnamdi Azikiwe University, Awka, and collected data through validated observation checklists and structured questionnaires. Findings reveal critically deficient resource accessibility (UNN 44%, NAU 24%) and service accessibility (UNN 55%, NAU 18%), with visual impairment accommodations the most inadequate. Utilization mirrored these gaps: 73-76% of resources and services were rarely used, and none reached moderate or frequent use. Accessibility correlated significantly with utilization ($r = 0.68-0.71$, $p < .001$), though even accessible provisions achieved only occasional use. The study offers baseline empirical evidence to inform accessibility policy, assistive technology investment, infrastructure planning, and staff training in Nigerian academic libraries.

Keywords: Accessibility, Persons with disabilities, Information resources, Library services, University libraries, Nigeria

Introduction

University libraries serve as critical knowledge gateways, supporting teaching, learning, and research across academic disciplines (Ifijeh & Yusuf, 2020). Their fundamental role extends beyond traditional information provision to encompass equitable access for all community members, including Persons with Disabilities (PWDs) who constitute a significant yet often marginalized student population segment (World Health Organization, 2011). Despite international conventions affirming PWDs' rights to equal educational opportunities and accessible information resources and services (United Nations Convention on the Rights of Persons with Disabilities, 2006), significant disparities persist in disability inclusive library service provision, particularly in developing country contexts.

Accessibility, defined as the degree to which information resources and services can be effectively utilized by individuals with diverse abilities, encompasses physical, technological, and attitudinal dimensions (Irvall & Nielsen, 2005; Burgstahler, 2015). For PWDs, accessibility transcends mere



resource existence to encompass usability: the extent to which information materials and services can be meaningfully employed to meet information needs and support academic success. The critical distinction between availability (resource existence in library collections) and accessibility (usability by individuals with specific disabilities) is frequently conflated in library assessment literature, creating measurement challenges and policy implementation gaps (Mates, 2000; Kavanagh & Sköld, 2005).

Furthermore, it can be argued that actual utilization patterns provide essential insights into the effectiveness of accessibility interventions, revealing the extent to which theoretical accessibility translates into practical information access. High accessibility without corresponding utilization suggests barriers beyond physical access, including inadequate user awareness, insufficient training, or culturally inappropriate service models. Conversely, low utilization despite reported accessibility suggests implementation failures or limitations in the assessment methodology.

In Nigerian higher education contexts, PWDs face compounded disadvantages, including infrastructural deficits, limited assistive technology availability, inadequate specialized personnel, unreliable power supply, and sociocultural stigmatization (Sambo et al., 2017; Agbanu et al., 2019). These contextual factors create unique challenges distinct from developed country accessibility experiences, necessitating localized empirical investigation. While recent Nigerian library literature has examined resource availability for PWDs (Ekwelem, 2013; Ambali et al., 2018), comprehensive empirical assessment simultaneously documenting accessibility levels and utilization patterns across multiple disability categories remains notably sparse, which creates knowledge gaps that impede evidence-based policy development and targeted intervention design. This study addresses this critical gap by systematically investigating accessibility and utilization of information resources and library services by PWDs in federal university libraries in South-East Nigeria, examining how current provisions serve students with visual, hearing, and locomotor disabilities. By empirically linking accessibility levels with actual utilization patterns, the research provides a nuanced understanding of the relationship between resource provision and usage, informing strategic planning for inclusive library service development in resource-constrained African academic contexts.

Statement of the Problem

Federal university libraries in South-East Nigeria operate under constitutional and legislative mandates to provide equitable services to all students, including those with disabilities, as stipulated in Nigeria's Discrimination Against Persons with Disabilities (Prohibition) Act 2018 and reinforced by institutional equal opportunity policies. These institutions have made varying investments in disability accommodations, including specialized resource acquisition, assistive technology procurement, and infrastructure modifications. However, systematic empirical evidence regarding the actual accessibility and utilization of these provisions across different disability categories remains critically limited.



Anecdotal evidence and limited preliminary studies suggest substantial gaps between policy intentions and implementation realities. Students with visual impairments reportedly encounter inadequate alternative format materials, insufficient assistive technologies, and limited staff expertise in accessibility support (Ekwelem, 2013). Students with mobility limitations seem to face persistent physical access barriers, including a lack of ramps, narrow doorways, inaccessible shelving, and the absence of adjustable workstations (Sambo et al., 2017). Hearing-impaired students experience communication challenges due to a lack of sign language services, absence of visual alert systems, and limited captioned multimedia resources (Ambali et al., 2018). However, comprehensive empirical assessment quantifying accessibility levels across disability categories, documenting actual resource and service utilization patterns, and establishing relationships between accessibility and usage remains absent from the literature. This knowledge deficit creates multiple problematic consequences:

First, it prevents evidence-based resource allocation. Library administrators lack empirical data identifying which accessibility interventions yield the highest utilization returns, leading to potentially inefficient resource deployment. Second, it obscures priority needs across disability categories. Without systematic assessment, libraries cannot determine whether visual, hearing, or locomotor impairment accommodations require the greatest attention. Third, it limits accountability mechanisms. Absence of baseline accessibility and utilization data prevents meaningful progress measurement over time. Fourth, it undermines funding justification. Without documented evidence of accessibility gaps and utilization patterns, library administrators cannot effectively advocate for increased disability accommodation budgets.

This study, therefore, addresses four critical questions: (1) To what extent are information resources accessible to PWDs with different disability types in federal university libraries in South-East Nigeria? (2) To what extent are library services accessible to PWDs across disability categories? (3) How frequently do PWDs actually utilize accessible information resources? (4) How frequently do PWDs utilize accessible library services? Answering these questions provides the empirical foundation necessary for developing targeted, disability-specific interventions that enhance both accessibility and actual usage, ultimately advancing educational equity for PWDs in Nigerian higher education in South-East Nigeria.

Research Objectives

This study examines accessibility and utilization of information resources and library services by Persons with Disabilities in federal university libraries in South-East Nigeria. Specifically, the study sought to:

1. Ascertain the accessibility of information resources to PWDs (visual, hearing, and locomotor impairments) in federal university libraries in South-East Nigeria.
2. Ascertain the accessibility of library services to PWDs (visual, hearing, and locomotor impairments) in federal university libraries in South-East Nigeria.
3. Determine the frequency of use of information resources by PWDs in federal university libraries in South-East Nigeria;



4. Determine the frequency of use of library services by PWDs in federal university libraries in South-East Nigeria.

Research Questions

The following research questions guided this investigation:

RQ1: How accessible are information resources to PWDs in federal university libraries in South-East Nigeria?

RQ2: How accessible are library services to PWDs in federal university libraries in South-East Nigeria?

RQ3: What is the frequency of use of information resources by PWDs in federal university libraries in South-East Nigeria?

RQ4: What is the frequency of use of library services by PWDs in federal university libraries in South-East Nigeria?

Research Hypotheses

The following null hypotheses were formulated and tested at $\alpha = 0.05$ significance level:

H₀₁: There is no significant difference in the accessibility of information resources across the three disability categories (visual, hearing, and locomotor impairments).

H₀₂: There is no significant difference in the accessibility of library services across the three disability categories (visual, hearing, and locomotor impairments).

H₀₃: There is no significant relationship between accessibility levels and utilization frequency of information resources by PWDs.

H₀₄: There is no significant relationship between accessibility levels and utilization frequency of library services by PWDs.

Literature Review

Conceptual Framework: Accessibility in Library Contexts

Accessibility in academic library contexts encompasses multiple interconnected dimensions extending beyond mere physical access to library buildings. Irvall and Nielsen (2005) conceptualize library accessibility as comprising three essential components: physical accessibility (building design, furniture arrangement, wayfinding systems), informational accessibility (alternative formats, assistive technologies, accessible digital interfaces), and service accessibility (staff attitudes, communication methods, service delivery models). This multidimensional framework recognizes that comprehensive accessibility requires systematically addressing barriers at all points of interaction between users and library systems.

For PWDs, accessibility transcends resource availability to encompass usability, the extent to which information, materials, and services can be effectively used to meet information needs (Burgstahler, 2015; Mates, 2000). A resource may be 'available' (existing in library collections and appearing in bibliographic records) yet remain 'inaccessible' (unusable by individuals with specific disabilities) due to format incompatibilities, technological barriers, inadequate assistive devices, or service delivery inadequacies. This critical distinction between availability and



accessibility is frequently conflated in library assessment literature, leading to overestimation of actual information access for PWDs (Kavanagh & Sköld, 2005).

Universal Design for Learning (UDL) principles provide theoretical grounding for comprehensive accessibility approaches (Rose & Meyer, 2002). UDL advocates for flexible, inclusive design accommodating diverse user needs from inception rather than retrofitting accommodations post-hoc. Applied to library contexts, UDL suggests information resources and services should be inherently accessible, minimizing specialized accommodation needs while maintaining effectiveness for all users. This proactive design philosophy contrasts with reactive accommodation models that treat accessibility as an afterthought, typically resulting in incomplete solutions and perpetuating exclusion.

Information Resource Accessibility for PWDs

Information resources for PWDs encompass specialized formats, assistive technologies, and adapted materials designed to circumvent disability-related barriers. For visually impaired users, accessible resources include Braille materials, audiobooks (talking books), screen readers, text-to-speech software, tactile graphics, large print materials, and accessible electronic texts compatible with magnification software (Kavanagh & Sköld, 2005; Adetoro, 2012). Web-based resources designed according to Web Content Accessibility Guidelines (WCAG) standards extend the accessible resource spectrum by ensuring screen reader compatibility, keyboard navigation, and adequate color contrast.

Mobility-impaired users require different accommodation strategies, including height-adjustable workstations, accessible catalogue interfaces, document retrieval services compensating for physical access limitations, and electronic resources eliminating physical material handling needs (Mates, 2000; Agbanu et al., 2019). Assistive technologies such as adaptive keyboards, page turners, book holders, and voice recognition software address specific manipulation challenges. Physical infrastructure modifications, including ramps, elevators, widened doorways, and accessible restrooms, represent foundational accessibility requirements.

For hearing-impaired students, accessible resources include captioned videos, signed language dictionaries, visual alarm systems, written communication alternatives, and real-time captioning services (Jaeger & Bowman, 2005; Yusuf, 2015). Text-based reference services, video relay systems, and alternative notification methods address communication barriers inherent in traditional library service models. The deaf community's linguistic diversity—ranging from users preferring signed languages to those relying on lip-reading and amplification—necessitates multiple communication accommodation options.

The rapid digitization of academic information presents both opportunities and challenges for accessibility. While electronic resources offer inherent advantages (searchability, assistive technology compatibility, format flexibility), many digital materials remain inaccessible due to poor design, proprietary formats, inadequate metadata, or lack of alternative text for images



(Craven & Brophy, 2003). Ensuring born-digital and digitized resources meet accessibility standards requires institutional commitment, technical expertise, vendor accountability, and ongoing quality assurance mechanisms.

Library Service Accessibility for PWDs

Library services for PWDs extend beyond resource provision to encompass personalized assistance, adaptive service delivery, and barrier removal across all service points. Core accessible services include readers' advisory services providing guidance on accessible format availability, current awareness services delivering targeted information alerts, selective dissemination of information (SDI) customized to individual needs, and document delivery services compensating for physical access limitations (Sambo et al., 2017).

Reference and information services require accessibility accommodations including alternative communication methods (sign language interpretation, real-time text, email reference), extended consultation times, and staff training in disability etiquette and assistive technology support (Jaeger & Bowman, 2005). Circulation services adaptations include extended loan periods, borrowing by proxy arrangements, and flexible renewal policies accommodating disability-related challenges in timely material return.

Technological services accessibility encompasses assistive technology provision and support, accessible online public access catalogs (OPACs), accessible library websites and discovery systems, and technology training tailored to PWD needs (Ekwelem, 2013). Many libraries provide specialized equipment including screen readers with Braille displays, screen magnification software, ergonomic input devices, and accessible workstations in designated quiet areas.

Physical service accessibility requires architectural modifications (ramps, elevators, automatic doors, accessible restrooms), furniture accommodations (height-adjustable tables, accessible carrels), wayfinding improvements (tactile signage, high-contrast visual cues, audio navigation assistance), and designated accessible parking proximate to library entrances (Ambali et al., 2018).

Utilization Patterns and Accessibility-Usage Relationships

Resource and service utilization represents the ultimate accessibility measure, as unused provisions fail to advance educational equity regardless of theoretical accessibility (Lawal-Solarin, 2012). Utilization patterns reveal whether accessibility interventions effectively translate into actual information access or whether additional barriers awareness deficits, training inadequacies, cultural inappropriateness impede usage.

Research demonstrates complex relationships between accessibility and utilization. Akolade et al. (2015) found that while 55.3% of physically challenged Nigerian undergraduates accessed textbooks, specialized resources (Braille 4.3%, audiobooks 2.1%, assistive reading devices 2.1%) showed markedly lower utilization despite reported availability. This suggests availability-accessibility-utilization disconnects requiring investigation.



Salaududin (2022) documented that 58.33% of differently abled users at an Indian rehabilitation university lacked consistent access to needed library resources, with only 32% finding required materials. This accessibility deficit directly correlated with low utilization: most users rarely accessed library resources due to format unavailability, physical barriers to shelf access, and inadequate signage.

Lawal-Solarin (2012) found that 87.5% of mobility-impaired Nigerian students used libraries only occasionally despite theoretical resource availability, attributing low utilization to poor accessibility implementation. Similarly, Sambo et al. (2017) documented that inadequate assistive technology, staff knowledge deficits, and architectural barriers significantly limited library utilization by PWDs even when resources existed. These studies collectively demonstrate that accessibility alone insufficiently ensures utilization. Rather, comprehensive approaches addressing awareness, training, cultural attitudes, and sustained support mechanisms are necessary for translating accessibility into actual usage and educational benefit.

Theoretical Framework

This study is anchored in Ranganathan's Five Laws of Library Science (1931), particularly the Second and Third Laws, which emphasize universal access to library resources and services regardless of user characteristics.

Ranganathan's Laws and PWD Accessibility

First Law: "Books are for use" emphasizes that library resources exist to be actively utilized, not merely preserved. Applied to PWD contexts, this law mandates that libraries ensure resources are usable by all patrons, requiring alternative formats and assistive technologies to make materials genuinely accessible rather than theoretically available.

Second Law: "Every reader his or her book" asserts that appropriate resources must be available for every library user regardless of individual characteristics. For PWDs, this necessitates diverse format provision (Braille, audio, large print, digital) ensuring each user can access materials matching their needs and abilities.

Third Law: "Every book its reader" emphasizes connecting available resources with appropriate users through effective organization, promotion, and service delivery. For PWDs, this requires staff expertise in alternative formats, proactive outreach to disability communities, and removal of barriers impeding resource discovery and access.

These laws collectively mandate that libraries must not only acquire accessible resources but also ensure their actual usability and promote their utilization through targeted services. They establish a theoretical justification for investigating both accessibility (Second and Third Laws' implementation) and utilization (First Law's actualization).

Universal Design for Learning (UDL)

Universal Design for Learning principles (Rose & Meyer, 2002) complement Ranganathan's laws by providing practical frameworks for implementing inclusive access. UDL's three core principles



multiple means of representation, multiple means of action and expression, and multiple means of engagement translate directly to library accessibility:

Multiple means of representation suggest information should be presented in various formats (text, audio, visual, tactile), accommodating diverse learning preferences and accessibility needs. In library contexts, these mandates simultaneous provision of print, electronic, Braille, and audio formats.

Multiple means of action and expression recognize diverse interaction capabilities, suggesting libraries must provide multiple access modes (keyboard navigation, voice commands, touchscreen interfaces, assistive devices), enabling all users to interact with resources regardless of physical abilities.

Multiple means of engagement acknowledge varying motivation and interest patterns, suggesting libraries must employ diverse outreach, instruction, and support strategies engaging PWDs as active library users rather than passive accommodation recipients.

These theoretical frameworks provide lenses for interpreting accessibility and utilization findings, establishing normative standards against which current provisions can be evaluated.

Gaps in Existing Literature

While existing research provides valuable insights into PWD library accessibility in various contexts, several critical gaps remain:

First, most Nigerian studies examine either availability or accessibility in isolation, rarely linking these with actual utilization patterns. This prevents understanding of whether accessibility improvements translate into increased usage.

Second, studies typically focus on single disability categories (often visual impairment), providing limited comparative evidence across disability types. Differential accessibility and utilization across visual, hearing, and locomotor impairments remain underexplored.

Third, existing literature predominantly employs qualitative or mixed methods, with limited quantitative assessment of accessibility levels and utilization frequencies. This restricts statistical analysis of relationships between variables.

Fourth, federal university libraries in South-East Nigeria remain understudied despite this region's concentration of established institutions and disability support centers.

This study addresses these gaps by providing a comprehensive quantitative assessment of both accessibility and utilization across three disability categories in federal university contexts, establishing empirical foundations for evidence-based policy development.

Methodology

Research Design

This study employed a descriptive survey research design investigating current accessibility and utilization patterns without experimental manipulation. The descriptive survey approach enabled systematic data collection regarding existing conditions while accommodating the study's census sampling approach and diverse measurement needs (Nworgu, 2015).



Study Population and Sample

The study population comprised all PWDs enrolled in two federal universities in South-East Nigeria during the 2024/2025 academic session: University of Nigeria, Nsukka (UNN) and Nnamdi Azikiwe University, Awka (NAU). These institutions were purposively selected as the only federal universities in the region maintaining dedicated disability support centers with enrollment records enabling complete population identification.

The total population consisted of 132 PWDs: 119 visually impaired (UNN=95, NAU=24), 10 locomotor impaired (UNN=6, NAU=4), and 3 hearing impaired (UNN=2, NAU=1). Given this small, manageable population size, the study employed census sampling, surveying the entire population rather than selecting a subset (Nworgu, 2015). This approach eliminated sampling error and provided complete population data, particularly valuable given the small hearing-impaired subpopulation.

Instrumentation

Data collection employed two researcher-developed instruments:

Questionnaire on Accessibility and Use of Information Resources and Services by Persons with Disabilities (QAUIRSPWDs): Administered to PWDs assessing resource/service accessibility and utilization frequency. Section A collected demographic information. Section B items addressing RQ1 and RQ2 (accessibility) employed dichotomous scales (Accessible/Not Accessible). Items addressing RQ3 and RQ4 (utilization frequency) employed 4-point Likert scales: 4= Frequently Used, 3= Moderately Used, 2= Occasionally Used, 1= Rarely Used.

Validity and Reliability

Content and face validity were established through expert review by three experienced faculty: two Library and Information Science specialists and one Measurement and Evaluation expert from Nnamdi Azikiwe University. Experts assessed item appropriateness, wording clarity, construct validity, content coverage, and alignment with research objectives. Expert recommendations were incorporated into instrument refinement. Reliability was established through pilot testing with 30 PWDs (10 each disability category) at the University of Lagos, South-West Nigeria located outside the study area. Questionnaire reliability employed Kuder-Richardson Formula 21 (KR-21) for accessibility items (dichotomous) and Cronbach's Alpha for utilization items (Likert scale).

Reliability coefficients demonstrated acceptable to excellent internal consistency:

- **RQ1 (Resource Accessibility):** Visual=0.78, Hearing=0.83, Locomotor=0.75
- **RQ2 (Service Accessibility):** Visual=0.82, Hearing=0.82, Locomotor=0.86
- **RQ3 (Resource Utilization):** Visual=0.97, Hearing=0.95, Locomotor=0.89
- **RQ4 (Service Utilization):** Visual=0.97, Hearing=0.97, Locomotor=0.89

All coefficients exceeded the 0.70 threshold for acceptable reliability, with utilization scales showing particularly high internal consistency ($\alpha > 0.89$).



Data Collection Procedures

Data collection occurred over three weeks during the 2024/2025 academic session following ethical approval. The researcher personally administered instruments with assistance from four research assistants (two per university).

Questionnaires were administered directly to PWDs at their respective disability support centers with researcher/assistant support for completion as needed. Response rate was 100% (132/132) due to direct administration and researcher persistence.

Data Analysis

Descriptive statistics analyzed all research questions:

RQ1 and RQ2 (Accessibility): Analyzed using frequencies and percentages. Decision rule: $\geq 50\%$ = Accessible, $< 50\%$ = Not Accessible. This threshold reflects the principle that majority accessibility indicates functional provision.

RQ3 and RQ4 (Utilization Frequency): Analyzed using arithmetic mean and standard deviation. Decision rule based on real limits: - 1.00-1.99 = Rarely Used - 2.00-2.99 = Occasionally Used - 3.00-3.49 = Moderately Used - 3.50-4.00 = Frequently Used

Hypotheses Testing: Chi-square tests examined categorical accessibility differences across disability types (H_{01} , H_{02}). Pearson correlation assessed accessibility-utilization relationships (H_{03} , H_{04}). Significance level set at $\alpha = 0.05$.

Ethical Considerations

Ethical approval was obtained from institutional research ethics committees at both universities. Participants provided informed consent after receiving detailed study information including purpose, procedures, confidentiality assurances, and withdrawal rights. Anonymity was maintained through numeric coding. Data storage employed secure, password-protected systems accessible only to the research team. Finding's presentation aggregates data, preventing individual identification.

Results

Results are presented following research question sequence, with tables displaying disaggregated data by disability category and institution.

RQ1: Accessibility of Information Resources to PWDs

Table 1 presents information resource accessibility percentages for each disability category across both institutions.

Table 1: Information Resources Accessible to PWDs (N=132)

S/N	Resource	UNN	NAU	UNN	NAU	UNN	NAU
		Visual (n=95)	Visual (n=24)	Locomotor (n=6)	Locomotor (n=4)	Hearing (n=2)	Hearing (n=1)
		ACC (%)	ACC (%)	ACC (%)	ACC (%)	ACC (%)	ACC (%)



S/N	Resource	UNN Visual (n=95)	NAU Visual (n=24)	UNN Locomotor (n=6)	NAU Locomotor (n=4)	UNN Hearing (n=2)	NAU Hearing (n=1)
Visually Impaired Resources							
1	Braille books	44% NAC	0% NAC	-	-	-	-
2	Talking books	37% NAC	0% NAC	-	-	-	-
3	Tactile picture books	7% NAC	0% NAC	-	-	-	-
4	Large prints	15% NAC	0% NAC	-	-	-	-
5	Easy-to-read-text	65% ACC	4% NAC	-	-	-	-
6	Audio-tapes	51% ACC	4% NAC	-	-	-	-
7	Voice recognition software	51% ACC	0% NAC	-	-	-	-
8	CDs	32% NAC	17% NAC	-	-	-	-
9	Accessible website	43% NAC	21% NAC	-	-	-	-
10	Braille printer	40% NAC	0% NAC	-	-	-	-
11	Twin vision books	16% NAC	0% NAC	-	-	-	-
12	Screen magnifier	40% NAC	0% NAC	-	-	-	-
13	Braille translator software	40% NAC	0% NAC	-	-	-	-
Locomotor Impaired Resources							
14	Page turner	-	-	67% ACC	0% NAC	-	-
15	Book holder	-	-	67% ACC	0% NAC	-	-
16	Height adjustable work area	-	-	67% ACC	0% NAC	-	-
17	Adaptive keyboard	-	-	17% NAC	0% NAC	-	-
18	Microform projector	-	-	0% NAC	0% NAC	-	-
19	Reference materials	-	-	100% ACC	50% ACC	-	-
20	Journals	-	-	83% ACC	100% ACC	-	-



S/N	Resource	UNN Visual (n=95)	NAU Visual (n=24)	UNN Locomotor (n=6)	NAU Locomotor (n=4)	UNN Hearing (n=2)	NAU Hearing (n=1)
21	Government documents	-	-	67% ACC	75% ACC	-	-
22	Height adjustable catalogue	-	-	17% NAC	0% NAC	-	-
23	CDs	-	-	0% NAC	75% ACC	-	-
Hearing Impaired Resources							
24	Sign language video	-	-	-	-	0% NAC	0% NAC
25	Dictionary of sign	-	-	-	-	0% NAC	0% NAC
26	Audio induction loop	-	-	-	-	50% ACC	0% NAC
27	DVDs with subtitles	-	-	-	-	0% NAC	100% ACC
28	OPAC	-	-	-	-	0% NAC	0% NAC
29	Microforms	-	-	-	-	0% NAC	0% NAC
30	Teletext	-	-	-	-	50% ACC	0% NAC
31	Reference materials	-	-	-	-	50% ACC	100% ACC
32	Journals	-	-	-	-	50% ACC	100% ACC
33	Government publications	-	-	-	-	50% ACC	100% ACC
34	Sign post	-	-	-	-	50% ACC	0% NAC

KEY: ACC = Accessible ($\geq 50\%$), NAC = Not Accessible ($< 50\%$)

Analysis: Overall accessibility across 34 resources: - **UNN:** 15/34 resources (44%) accessible - **NAU:** 8/34 resources (24%) accessible

By disability category: - **Visual impairment:** UNN 3/13 accessible (23%), NAU 0/13 accessible (0%) - **Locomotor impairment:** UNN 6/10 accessible (60%), NAU 4/10 accessible (40%) - **Hearing impairment:** UNN 6/11 accessible (55%), NAU 4/11 accessible (36%)

Most accessible resources: Reference materials (100% locomotor/hearing), Journals (83-100%), Government documents/publications (67-100%), Easy-to-read text (65% visual), Height adjustable work areas (67% locomotor).

Least accessible: Tactile books (7%), Large prints (15%), Twin vision books (16%), Sign language videos (0%), OPACs for hearing impaired (0%), Microform projectors (0%).

RQ2: Accessibility of Library Services to PWDs

Table 2 presents library service accessibility across disability categories.

Table 2: Library Services Accessible to PWDs (N=132)



S/N	Service	UNN Visual ACC (%)	NAU Visual ACC (%)	UNN Locomotor ACC (%)	NAU Locomotor ACC (%)	UNN Hearing ACC (%)	NAU Hearing ACC (%)
Visually Impaired Services							
1	Braille services	43% NAC	0% NAC	-	-	-	-
2	Reader's advisory	56% ACC	4% NAC	-	-	-	-
3	Automatic doors	5% NAC	0% NAC	-	-	-	-
4	Kurzweil reader	35% NAC	0% NAC	-	-	-	-
5	Online service	84% ACC	42% NAC	-	-	-	-
6	SDI service	57% ACC	17% NAC	-	-	-	-
7	Current awareness	56% ACC	13% NAC	-	-	-	-
8	Document delivery	35% NAC	0% NAC	-	-	-	-
9	Borrowing by proxy	32% NAC	0% NAC	-	-	-	-
10	CD-ROM service	32% NAC	8% NAC	-	-	-	-
11	Designated parking	42% NAC	8% NAC	-	-	-	-
12	Document reservation	56% ACC	42% NAC	-	-	-	-
Locomotor Impaired Services							
13	Ramp service	-	-	17% NAC	100% ACC	-	-
14	Elevator service	-	-	0% NAC	0% NAC	-	-
15	Designated parking	-	-	0% NAC	0% NAC	-	-
16	Reader advisory	-	-	33% NAC	0% NAC	-	-
17	Automatic doors	-	-	0% NAC	0% NAC	-	-
18	Search assistance	-	-	67% ACC	25% NAC	-	-
19	Online service	-	-	67% ACC	50% ACC	-	-
20	SDI service	-	-	67% ACC	0% NAC	-	-
21	Current awareness	-	-	50% ACC	0% NAC	-	-



S/N	Service	UNN Visual	NAU Visual	UNN Locomotor	NAU Locomotor	UNN Hearing	NAU Hearing
22	Document delivery	-	-	0% NAC	0% NAC	-	-
23	Borrowing by proxy	-	-	17% NAC	0% NAC	-	-
24	CD-ROM service	-	-	0% NAC	50% ACC	-	-
25	Book retrieval	-	-	50% ACC	50% ACC	-	-
26	Document reservation	-	-	83% ACC	25% NAC	-	-
Hearing Impaired Services							
27	Assistive listening	-	-	-	-	50% ACC	0% NAC
28	Sign language services	-	-	-	-	50% ACC	0% NAC
29	Teletext information	-	-	-	-	50% ACC	0% NAC
30	Search assistance	-	-	-	-	50% ACC	0% NAC
31	Online service	-	-	-	-	100% ACC	100% ACC
32	SDI service	-	-	-	-	50% ACC	0% NAC
33	Current awareness	-	-	-	-	50% ACC	0% NAC
34	Document delivery	-	-	-	-	0% NAC	0% NAC
35	Borrowing by proxy	-	-	-	-	0% NAC	0% NAC
36	CD-ROM service	-	-	-	-	50% ACC	0% NAC
37	Book retrieval	-	-	-	-	50% ACC	100% ACC
38	Document reservation	-	-	-	-	50% ACC	100% ACC

Analysis: Overall service accessibility across 38 services: - **UNN:** 21/38 services (55%) accessible
- **NAU:** 7/38 services (18%) accessible

By disability category: - **Visual impairment:** UNN 5/12 accessible (42%), NAU 0/12 accessible (0%) - **Locomotor impairment:** UNN 6/14 accessible (43%), NAU 4/14 accessible (29%) - **Hearing impairment:** UNN 10/12 accessible (83%), NAU 3/12 accessible (25%)

Most accessible services: Online services (67-100%), Document reservation (50-100%), Book retrieval (50-100%), Search assistance (50-67%), Reader's advisory (56%).

Least accessible: Automatic doors (0-5%), Elevators (0%), Designated parking (0-42%), Document delivery (0%), Borrowing by proxy (0-32%).



RQ3: Frequency of Use of Information Resources

Table 3 presents mean utilization frequencies for information resources.

Table 3: Utilization Frequency of Information Resources (N=132)

S/N	Resource	Mean	SD	Category
Visually Impaired (n=119)				
1	Braille books	2.05	1.07	OU
2	Talking books	1.88	1.14	RU
3	Tactile picture books	1.55	0.78	RU
4	Large prints	1.84	1.07	RU
5	Easy-to-read-text	2.41	1.25	OU
6	Audio-tapes	2.21	1.26	OU
7	Voice recognition software	2.23	1.33	OU
8	CDs	1.92	1.04	RU
9	Accessible website	2.60	1.08	OU
10	Braille printer	1.92	1.05	RU
11	Twin vision books	1.66	1.02	RU
12	Screen magnifier	1.80	1.36	RU
13	Braille translator software	1.74	1.06	RU
Locomotor Impaired (n=10)				
14	Page turner	1.30	0.67	RU
15	Book holder	1.30	0.67	RU
16	Height adjustable work area	1.20	0.42	RU
17	Adaptive keyboard	1.20	0.42	RU
18	Microform projector	1.20	0.42	RU
19	Journals	2.40	1.17	OU
20	Government documents	1.20	0.63	RU
21	Height adjustable catalogue	1.30	0.48	RU
22	CDs	1.20	0.42	RU
Hearing Impaired (n=3)				
23	Sign language video	1.00	0.00	RU
24	Dictionary of sign	1.00	0.00	RU
25	Audio induction loop	1.33	0.58	RU
26	DVDs with subtitles	1.33	0.58	RU
27	OPAC	1.33	0.58	RU
28	Microforms	1.00	0.00	RU
29	Teletext	1.33	0.58	RU
30	Journals	2.00	1.00	OU
31	Government publications	2.00	1.00	OU
32	Sign post	1.67	1.15	RU

KEY: RU=Rarely Used (1.00-1.99), OU=Occasionally Used (2.00-2.99), MU=Moderately Used (3.00-3.49), FU=Frequently Used (3.50-4.00)

Analysis: Across 33 resources: - **Rarely Used:** 25 resources (76%) - **Occasionally Used:** 8 resources (24%) - **Moderately/Frequently Used:** 0 resources (0%)

By disability category: - **Visual:** 5/13 occasionally used (38%), 8/13 rarely used (62%) - **Locomotor:** 1/9 occasionally used (11%), 8/9 rarely used (89%) - **Hearing:** 2/11 occasionally used (18%), 9/11 rarely used (82%)



Most utilized resources: Accessible websites (M=2.60), Easy-to-read text (M=2.41), Journals (M=2.40 locomotor, M=2.00 hearing), Voice recognition software (M=2.23), Audio-tapes (M=2.21), Braille books (M=2.05), Government publications (M=2.00 hearing). All utilization means fell below 3.00, indicating no resources achieved moderate or frequent use levels.

RQ4: Frequency of Use of Library Services

Table 4 presents mean utilization frequencies for library services.

Table 4: Utilization Frequency of Library Services (N=132)

S/N	Service	Mean	SD	Category
Visually Impaired (n=119)				
1	Braille services	2.16	1.05	OU
2	Reader's advisory	2.24	1.17	OU
3	Automatic doors	1.12	0.44	RU
4	Kurzweil reader	1.30	0.75	RU
5	Online service	2.31	1.14	OU
6	SDI service	2.20	1.03	OU
7	Current awareness	1.96	1.06	RU
8	Document delivery	1.64	0.80	RU
9	Borrowing by proxy	1.70	1.05	RU
10	CD-ROM service	1.99	1.12	RU
11	Designated parking	1.71	1.06	RU
12	Document reservation	2.02	1.16	OU
Locomotor Impaired (n=10)				
13	Ramp service	1.60	0.84	RU
14	Elevator service	1.20	0.42	RU
15	Designated parking	1.00	0.00	RU
16	Reader advisory	1.60	1.26	RU
17	Automatic doors	1.00	0.00	RU
18	Search assistance	1.60	0.52	RU
19	Online service	2.20	1.23	OU
20	SDI service	1.80	1.03	RU
21	Current awareness	1.20	0.42	RU
22	Document delivery	1.40	0.52	RU
23	Borrowing by proxy	2.00	1.15	OU
24	CD-ROM service	1.40	0.70	RU
25	Book retrieval	1.80	0.79	RU
26	Document reservation	2.10	1.10	OU
Hearing Impaired (n=3)				
27	Assistive listening	1.00	0.00	RU
28	Sign language services	1.33	0.58	RU
29	Teletext information	1.00	0.00	RU
30	Search assistance	1.67	1.15	RU
31	Online service	2.00	1.00	OU
32	SDI service	2.00	1.00	OU
33	Current awareness	1.67	1.15	RU
34	Document delivery	1.00	0.00	RU
35	Borrowing by proxy	1.00	0.00	RU



S/N	Service	Mean	SD	Category
36	CD-ROM service	1.67	1.15	RU
37	Book retrieval	2.00	1.00	OU
38	Document reservation	2.00	1.00	OU

Analysis: Across 38 services: - **Rarely Used:** 28 services (74%) - **Occasionally Used:** 10 services (26%) - **Moderately/Frequently Used:** 0 services (0%)

By disability category: - **Visual:** 5/12 occasionally used (42%), 7/12 rarely used (58%) - **Locomotor:** 3/14 occasionally used (21%), 11/14 rarely used (79%) - **Hearing:** 4/12 occasionally used (33%), 8/12 rarely used (67%)

Most utilized services: Online services (M=2.20-2.31), Reader's advisory (M=2.24), SDI (M=2.00-2.20), Braille services (M=2.16), Document reservation (M=2.00-2.10), Borrowing by proxy (M=2.00 locomotor), Book retrieval (M=2.00 hearing).

Similar to resources, all service utilization means remained below 3.00, with none achieving moderate or frequent use.

Discussion

Information Resource Accessibility

Findings reveal critically deficient information resource accessibility across both institutions and all disability categories. UNN's 44% overall accessibility and NAU's 24% accessibility fall substantially below acceptable standards, indicating that the majority of specialized resources remain inaccessible to PWDs. This aligns with Salauddin's (2022) finding that 58.33% of Indian university PWDs lacked consistent resource access, suggesting systemic accessibility challenges transcend individual institutional contexts. Visual impairment accommodations proved particularly inadequate, with NAU achieving zero accessible resources for visually impaired students and UNN managing only 23% accessibility. Essential resources including Braille materials, tactile books, and screen magnifiers remained largely inaccessible despite being fundamental to visual impairment accommodation. This contradicts Ranganathan's Second Law ("Every reader his or her book"), as visually impaired students cannot access appropriate materials matching their needs.

Locomotor and hearing impairment accommodations showed relatively better accessibility (UNN 55-60%), though still falling short of universal access standards. This differential accessibility across disability types confirms H₀₁ rejection: significant accessibility differences exist across disability categories, with visual impairment accommodations receiving the least attention. The finding that basic resources (reference materials, journals, government documents) achieved highest accessibility (50-100%) while specialized assistive technologies remained largely inaccessible suggests libraries prioritize general-purpose materials over disability-specific accommodations. This reflects resource allocation toward universal provisions rather than targeted accessibility enhancements. Institutional differences (UNN 44% vs. NAU 24%) likely reflect UNN's longer operational history, larger student population providing economies of scale, and



more established disability support infrastructure. However, neither institution approaches comprehensive accessibility standards recommended by international guidelines (IFLA, 2005).

Library Service Accessibility

Library service accessibility mirrors resource accessibility patterns, with overall levels (UNN 55%, NAU 18%) indicating substantial service gaps. Online services showed highest accessibility (67-100% across categories), reflecting ongoing digitization trends and electronic service expansion. However, fundamental physical accessibility services (elevators 0%, automatic doors 0-17%, designated parking 0-42%) remained critically deficient. The finding that hearing-impaired students at UNN experienced the highest service accessibility (83%) while NAU hearing-impaired students received the lowest (25%) suggests institutional variability in disability-specific service provision. UNN's relatively higher hearing impairment service accessibility may reflect staff training in alternative communication methods or availability of sign language support, though empirical verification requires further investigation.

Information services (SDI, current awareness, reader's advisory) showed moderate accessibility (50-67% at UNN), indicating awareness of PWD information needs. However, physical services requiring infrastructure modifications (ramps, elevators, automatic doors) demonstrated persistent deficiencies, confirming that architectural accessibility lags behind informational accessibility. Service accessibility differences across disability categories (H₀₂) proved significant, with hearing-impaired services most accessible, followed by locomotor, then visual impairment services. This pattern suggests differential resource allocation across disability types, potentially reflecting relative ease and cost of different accommodation types.

Information Resource Utilization

Utilization findings reveal that critically low accessibility translates directly into minimal usage. With 76% of resources rarely used and zero resources achieving moderate/frequent use, actual information access remains severely constrained despite theoretical resource availability. The strong correlation between accessibility levels and utilization frequencies ($r=0.68$, $p<0.001$) confirms H₀₃ rejection: significant positive relationships exist between accessibility and utilization.

Among occasionally-used resources, accessible websites ($M=2.60$) achieved the highest utilization, reflecting global digital information access trends and inherent electronic resource accessibility advantages. Easy-to-read text ($M=2.41$), voice recognition software ($M=2.23$), and audio-tapes ($M=2.21$) also showed occasional use, suggesting that when accessible resources exist, PWDs utilize them despite overall provision inadequacy. The finding that even accessible resources ($\geq 50\%$ accessibility) achieved only occasional use ($M=2.00-2.60$) rather than frequent use suggests accessibility alone insufficiently ensures utilization. Additional barriers—awareness deficits, inadequate training, cultural stigma, service quality concerns—likely impede usage even when resources technically exist. This aligns with Akolade et al.'s (2015) finding that specialized resource utilization (4.3% Braille, 2.1% audiobooks) remained minimal despite reported availability. Differential utilization across disability categories reflects accessibility patterns, with



visual impairment resources showing lowest average utilization ($M=1.92$) and hearing impairment resources slightly higher ($M=1.55$). However, all categories remained firmly in rare-use ranges, indicating universal utilization inadequacy across disability types.

Library Service Utilization

Service utilization mirrored resource utilization patterns, with 74% of services rarely used and zero achieving moderate/frequent use levels. Online services demonstrated highest utilization ($M=2.20-2.31$), consistent with resource utilization patterns favoring electronic provisions. Traditional services requiring in-person interaction (document delivery $M=1.00-1.64$, borrowing by proxy $M=1.00-2.00$) showed minimal utilization, potentially reflecting both low accessibility and PWD preferences for independent access enabled by digital resources.

The positive correlation between service accessibility and utilization ($r=0.71$, $p<0.001$) confirms H_04 rejection, demonstrating that accessibility enhancements directly translate into increased usage. However, the moderate correlation coefficient ($r=0.71$) rather than perfect correlation ($r=1.00$) indicates that factors beyond accessibility influence utilization, including service quality, staff attitudes, user awareness, and cultural appropriateness.

Reader's advisory services ($M=2.24$ visual) and SDI services ($M=2.00-2.20$) achieved the highest utilization among personalized services, suggesting PWDs value customized assistance when available. This aligns with Universal Design for Learning principles emphasizing multiple means of engagement through personalized support.

The consistent pattern of rare-to-occasional usage across both resources and services indicates systemic barriers preventing meaningful library utilization by PWDs. Addressing these requires comprehensive interventions addressing accessibility, awareness, training, attitudes, and sustained support mechanisms.

Implications for Practice and Policy

Findings demonstrate urgent need for systematic accessibility enhancement across both institutions. Priority interventions include:

Resource Development: Substantial investment in assistive technologies (screen readers, Braille displays, adjustable workstations), alternative format materials (Braille, audio, large print), and accessible electronic resources meeting WCAG standards.

Infrastructure Modification: Installation of ramps, elevators, automatic doors, accessible restrooms, designated parking, and accessible furniture addressing physical access barriers.

Service Enhancement: Development of specialized services including document delivery, borrowing by proxy, extended loan periods, and personalized assistance compensating for accessibility limitations.

Staff Development: Comprehensive training in disability awareness, assistive technology support, alternative communication methods, and inclusive service delivery models.



Policy Formulation: Development and implementation of formal accessibility policies specifying resource provision standards, service delivery expectations, budget allocations, accountability mechanisms, and continuous improvement processes.

Awareness Enhancement: Proactive outreach informing PWDs of available accessible resources and services, reducing awareness barriers impeding utilization.

These interventions must address differential needs across disability categories, prioritizing severely underserved visual impairment accommodations while maintaining locomotor and hearing impairment provisions.

Recommendations

Based on findings, the following recommendations are proposed:

For Library Administrators

1. **Prioritize Accessibility Investment:** Allocate dedicated budgets for assistive technology procurement, alternative format acquisition, and infrastructure modifications, with specific emphasis on severely underserved visual impairment accommodations.
2. **Implement Universal Design Principles:** Adopt proactive universal design approaches ensuring inherent resource and service accessibility rather than reactive accommodation retrofitting.
3. **Enhance Electronic Resource Accessibility:** Prioritize accessible electronic resource acquisition, enforce vendor WCAG compliance, and ensure institutional digital resources meet accessibility standards.
4. **Develop Specialized Services:** Establish document delivery, borrowing by proxy, extended loan, and personalized assistance services compensating for physical access limitations.
5. **Strengthen Awareness Programs:** Implement proactive outreach informing PWDs of available accessible resources and services through disability support centers, orientations, and targeted communications.

For University Management

1. **Mandate Accessibility Policies:** Require libraries to develop and implement formal accessibility policies specifying provision standards, service expectations, budget allocations, and accountability mechanisms.
2. **Increase Infrastructure Investment:** Fund essential accessibility infrastructure including ramps, elevators, automatic doors, accessible restrooms, and designated parking.
3. **Support Staff Development:** Provide resources for comprehensive staff training in disability awareness, assistive technology support, and inclusive service delivery.
4. **Establish Accountability Mechanisms:** Implement regular accessibility audits with published results, creating transparency and incentivizing continuous improvement.

For Policymakers



1. **Enforce Legal Compliance:** Strengthen enforcement of Nigeria's Discrimination Against Persons with Disabilities (Prohibition) Act 2018 through regular institutional assessments and compliance penalties.
2. **Provide Targeted Funding:** Establish dedicated government funding streams supporting academic library accessibility enhancements, particularly for under-resourced institutions.
3. **Develop National Standards:** Create national academic library accessibility standards specifying minimum resource provision, service delivery, and infrastructure requirements adapted to Nigerian contexts.

For Future Research

1. **Expand Geographic Scope:** Conduct similar assessments across additional Nigerian regions and university types, enabling national accessibility landscape mapping.
2. **Employ Longitudinal Designs:** Implement longitudinal studies tracking accessibility and utilization improvements over time, assessing intervention effectiveness.
3. **Investigate Barrier Mechanisms:** Conduct qualitative research examining specific barriers preventing utilization even when resources are accessible, including awareness, training, attitudes, and service quality factors.
4. **Compare Disability-Specific Needs:** Conduct detailed disability-specific investigations examining unique accessibility and utilization patterns, informing targeted intervention design.
5. **Assess Intervention Effectiveness:** Implement experimental or quasi-experimental studies evaluating specific accessibility intervention impacts on utilization, informing evidence-based practice.

Conflict of Interest Statement

The author declares that there is no potential conflict of interest with respect to the research, authorship, and/or publication of this article. No financial, professional, or personal relationships influenced the design, conduct, analysis, or reporting of this study.

Ethics Approval Statement

This study was conducted in accordance with the ethical standards of the institutional research ethics committees at the University of Nigeria, Nsukka, and Nnamdi Azikiwe University, Awka, both of which granted ethical approval before data collection. All participants provided informed consent after receiving detailed information regarding the study's purpose, procedures, confidentiality safeguards, and right to withdraw at any stage without penalty. Participant anonymity was preserved through numeric coding, and all data were stored on secure, password-protected systems accessible only to the research team. Findings are reported in aggregate form to prevent identification of individual participants.

This manuscript is original, has not been published elsewhere, and is not currently under review by another journal.

Conclusion



This study provides a comprehensive empirical assessment of information resource and service accessibility and utilization by PWDs in federal university libraries in South-East Nigeria. Findings reveal critically deficient accessibility (UNN 44-55%, NAU 18-24%) and correspondingly minimal utilization (76% rare use, 24% occasional use, 0% moderate/frequent use), indicating substantial gaps between international accessibility standards and Nigerian implementation realities.

Visual impairment accommodations prove particularly inadequate (0-23% accessibility), while locomotor and hearing impairment provisions show relatively better, though still insufficient accessibility (40-83%). Online services and electronic resources demonstrate highest accessibility and utilization, reflecting digital information trends and electronic resource advantages for accessibility.

Strong positive correlations between accessibility and utilization ($r=0.68-0.71$) confirm that accessibility enhancements directly translate into increased usage, providing empirical justification for accessibility investment. However, even accessible resources achieve only occasional rather than frequent use, indicating that accessibility alone insufficiently ensures meaningful library utilization. Additional barriers, including awareness deficits, training inadequacies, attitudinal obstacles, and service quality concerns, require simultaneous attention. The study establishes baseline empirical data enabling longitudinal progress measurement, informs evidence-based policy development, and provides comparative benchmarks for other Nigerian academic libraries. Findings contribute to broader understanding of accessibility implementation in resource-constrained developing country contexts, highlighting unique challenges distinct from developed-country experiences.

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