
ASSESSMENT OF ACADEMIC LIBRARIES CAPACITY FOR RURAL DIGITAL INCLUSION: DEVELOPING AN INTERVENTION MODEL FOR KOGI STATE, NIGERIA

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ABSTRACT

This study assessed the capacity of academic libraries in twelve tertiary institutions across Kogi State, Nigeria, to serve as digital inclusion hubs for surrounding rural communities and developed an evidence-based intervention model to guide library-mediated digital inclusion initiatives. The study was anchored on the Four-Level Digital Divide Framework of Van Deursen and Van Dijk (2019) and employed a mixed-methods research design integrating quantitative survey and qualitative case study approaches. The population comprised librarians, library officers, ICT support personnel, students and community members across the twelve selected tertiary institutions, with a total of 1,446 respondents targeted and 1,129 (78%) returning usable questionnaires. Findings revealed that rural communities experience severe digital exclusion across all indicators of access; academic libraries possess moderate physical capacity but lack institutional policies, community programmes and reliable power and internet for community digital inclusion; free internet access, computer skills training and digital literacy programmes were the most strongly preferred intervention strategies; library-based interventions were perceived as having very high potential to improve educational, economic and health outcomes; and epileptic power supply, inadequate funding and absence of institutional policy are the dominant implementation barriers. A five-component Digital Inclusion Intervention Model was developed and validated. The study recommended institutional policy formulation, infrastructure investment, capacity building and phased model implementation.

KEYWORDS: Academic libraries, Library capacity, Information and communication technology (ICT), and Rural communities.

INTRODUCTION

The twenty-first century has given rise to several challenges. One of the more pressing challenges has to do with the phenomenon of digital exclusion, particularly on the continents that area still developing. There are structural disparities that intersect with and are worsened by the presence of technology when it comes to digital inclusion. The International Telecommunications Union (2023) estimates that about 2.6 billion individuals do not use the internet. They are further disenfranchised based on where they live (rural), their gender (female), their age (elderly), and their economic status (low income). This is particularly the case when one looks at sub-Saharan Africa. Digital divides are deeper here due to poor infrastructure, low income, limited ability to use the internet (digital literacy) and various language barriers.

In the opinion of the United Nations Development Programme (UNDP, 2021), digital inclusion is critical to achieving the Sustainable Development Goals specifically number 1 (No Poverty), number 4 (Quality Education), number 8 (Decent Work and Economic Growth), number 9 (Industry, Innovation and Infrastructure), number 10 (Reduced Inequalities) and number 11 (Sustainable Cities and Communities). Digital services and technologies have the ability to permanently reshape and improve the livelihoods of individuals and communities, as well as create new opportunities, if and when the digital divide is overcome. However, the absence of digital inclusion reinforces the inequities that prevail, and subsequently excludes and marginalizes the population from the positive impact of the information society.

Academic libraries, as described by Ifijeh and Yusuf (2020), are established in universities to serve the teaching, learning, and research activities of a university. However, with regard to sustainable development, academic libraries carry a greater responsibility of extending their services to the community and providing digital inclusion opportunities. According to Owolabi, Idowu and Okocha (2023), academic libraries in developing countries are critical infrastructure that can be used to close the digital divide and stimulate inclusive development. These libraries have technology, internet, space and information, and often have services that are lacking in the rural area.

The digital divide in Nigeria is one of the main barriers to equitable development. As reported by Nigerian Communications Commission (2024), internet coverage in rural Nigeria is a

mere 32% as compared to 74% in urban areas. Kogi State, which is in the North Central zone and represents this challenge well, has its tertiary schools situated in the middle of rural areas that are completely cut off from the digital world. Although academic libraries are situated to serve as digital inclusion spots, there is scant primary evidence on the capacity of libraries to serve digital inclusion for communities in Kogi State. It was the primary aim of the research to determine the capacity of academic libraries to include the rural communities within Kogi State. This study also sought to formulate a comprehensive and valuable intervention model that will help drive digital inclusion in Kogi State.

Statement of the problem

Deadly problems of digital exclusion affected rural Kogi state. Computers, internet, digital literacy, and digital tool access, along with poor digital infrastructure, were almost non-existent. This led to educational, economic, health, and social service information inequality. Though Kogi State's academic libraries had basic infrastructure of technology, internet, staff, and physical space, most offered no purposeful programs to extend digital access and literacy services to their surrounding rural communities. Library resources spent their resources on meeting the needs of the institution and were largely unused and a waste of the government's financial investment.

Additionally, there was a lack of viable models which were based on context and research to sustainably engage academic libraries to advance digital inclusion. Most institutions of higher learning lacked community engagement policies and supporting strategic plans and Library staff lacked the skills of assessing the needs of communities, providing digital literacy, creating and evaluating programs, and methods of community engagement. Given these conditions, the researcher sought to determine academic libraries' capacities for digital inclusion and create a digital inclusion model for sustainable community development in rural Kogi State.

Objectives of the Study

The purpose of this study was to examine the academic libraries' potential in Kogi State and formulate an efficient digital inclusion methodology. This study had the following goals:

- i. To know the extent of digital inclusion of rural communities in Kogi State surrounded by higher educational facilities in terms of the gap of technology, internet, digital literacy, digital services, and the obstacles to digital integration.

- ii. To assess the academic libraries in the higher education facilities situated in Kogi State and their potential to include digital integration and determine the available infrastructural technology, internet connectivity, service spaces, staff, and the policies of the institution, in addition to their ongoing community services and integration opportunities.
- iii. To formulate a digital inclusion integration plan by dedicatedly exploiting the resources of academic libraries for inclusion in digital services and literacy, and community services.
- iv. To examine the probable effects of digital inclusion in the academic libraries on the sustainable development of the community.
- v. To trace the obstacles to, and examine the success of, and sustain the digital inclusion initiatives from the academic libraries.

Research Questions

The study was designed to answer the following research questions:

- i. What is the current status of digital inclusion of the rural population around higher institutions in Kogi State?
- ii. To what extent can academic libraries in higher institutions offer digital inclusion services?
- iii. What should be the inclusion strategies in a digital inclusion model that uses the resources of academic libraries?
- iv. What is the anticipated result of the use of digital inclusion libraries on community development?
- v. What challenges are likely to characterize the use of digital inclusion libraries, and what is likely to sustain the idea?

Literature Review

The Four-Level Digital Divide Framework

This study is based on the Four-Level Digital Divide Framework by Van Deursen and Van Dijk (2019). This framework allows for the analysis and understanding of the different facets of digital exclusion and what is needed to enable meaningful digital inclusion. This framework outlines how digital divides occur across four levels: motivational access, material access, skill access, and usage access. Interventions to address only one level of access are generally not effective. Digital inclusion and full participation in the digital world is obstructed by exclusion in the other levels.

Motivational access articulates the psychological and situational factors that determine individuals' willingness to engage with digital technologies, such as cultural acceptance and

lack of digital technologies and prior negative encounters. Material access outlines the physical presence of digital technologies, the Internet, and the supporting infrastructure. Skill access outlines the digital skills to use, navigate and engage with digital technologies to achieve desired goals. Usage access refers to the opportunity and goal-directed use of digital technologies to accomplish objectives in the areas of education and employment, to access health information and to participate in governance and business. The Four-Level Digital Divide Framework is appropriate for this study since it corresponds with the five research questions, and evaluates the status of community digital inclusion across all levels and suggests a multi-level intervention framework.

Academic Libraries as Digital Inclusion Hubs

Academic libraries as digital inclusion hubs are based on several foundations. The first is the physical infrastructure of academic libraries. Academic libraries contain computers, internet, power supply, and staff. These components would need to be constructed at community technology centers. Reusing existing infrastructures is cost effective and sustainability based. It is important in especially poorer regions (Gbadamosi, 2022). Information professionals staff academic libraries and these workers have the ability to organize, retrieve, and disseminate information. These skills can easily be transferred to digital literacy and community information services. The third foundation is the trust and credibility that come from academic libraries being institutional members. This trust helps these libraries be the first, nonthreatening contact points when universities and the communities engage with each other.

Ogbonna and Nwabueze (2021) researched university libraries in Nigeria and found that the majority lacked systemic outreach programs due to a lack of policies, funding, staff shortages, and other priorities. Okorie and Agboola (2022) found that many university libraries provided instruction on literacy to students while providing community members with comparable instruction was rare. Nwachukwu and Onyeneke (2020) found that rural regions of Nigeria contained many barriers to digital inclusion due to lack of power, high costs of data, no devices, and low digital literacy. Atta-Obeng and Dadzie (2020) researched libraries and community engagement to better understand the role that libraries can play to achieve the UN SDGs. They found that while there is potential, libraries remain under-resourced and unrecognized.

Digital Inclusion and Community Development

The connection between digital inclusion and community development outcomes is evident. Real, Bertot and Jaeger (2022) stated that libraries showed great value as public access points for employment, educational and government online services, as well as virtual health services, for community members lacking home internet. Gomez, Pather and Dosono (2022) indicated that libraries lessen the digital divide through the provisions of free internet access and the availability of assistance and training in the use of digital technologies and social networks with positive impacts on the level and type of education and labor market participation. Chisita and Rusero (2021) indicated that community information initiatives in libraries rely on various forms of funding, participation of different institutions and community members, and employee training for sustainability. Antonio and Tuffley (2020) stated that women in rural communities encounter additional barriers that necessitate context-specific and gender-sensitive adaptations, which were factored in the intervention framework in this study.

METHODOLOGY

This study combines both quantitative and qualitative approaches using a mixed-methods research design. Twelve tertiary institutions across Kogi State were selected using a purposive approach to include all major districts and the main location of tertiary level education in Kogi State, including universities, polytechnics, colleges of education and specialised health training institutions. The selected institutions and their respective population are shown in Table 3.1.

Table 3.1: Population of the Study.

S/N	Institution	Type	Students	Librarians	Lib. Officers & ICT	Community Members
1	Prince Abubakar Audu University, Anyigba	State Univ.	8,943	18	12	450
2	Kogi State University, Kabba	State Univ.	6,234	6	10	400
3	Federal University Lokoja	Federal Univ.	7,856	17	11	420
4	College of Science & Technology, Osara	College	2,567	4	6	300
5	Salem University, Lokoja	Private Univ.	3,456	15	8	350
6	Kogi State	State	6,234	16	9	380

	Polytechnic, Lokoja	Poly.				
7	Federal Polytechnic, Idah	Federal Poly.	4,123	15	8	350
8	Federal College of Education, Okene	Fed. College	4,398	15	7	400
9	Fed. College of Education (Tech.), Kabba	Fed. College	3,012	4	6	320
10	College of Education, Ankpa	State College	2,789	14	5	300
11	School of Nursing, Obangede	Health Inst.	876	12	3	200
12	School of Health Technology, Idah	Health Inst.	945	12	3	200
	TOTAL		51,433	158	88	4,070

Source: Internal Records of the Institutions, 2025

Census methodology was employed for all 158 librarians and 88 library officers and ICT personnel to capture 246 participants who comprise the library staff. Stratified random sampling was used to select 50 students and 50 community members at every institution leading to a total of 600 for each of the groups. The total anticipated respondents was 1,446. Structured questionnaires were used to collect information from library staff, students and community members. Semi-structured interviews were conducted to the directors of libraries and community leaders. Assessment of the library infrastructure was done using a direct observation protocol. The data were validated by an expert review and a pilot-test was conducted with 20 respondents for every instrument. Cronbach's Alpha for library staff was 0.84, for students 0.81 and for community members 0.79. In data analysis, descriptive statistics and the chi-square test were used to analyze the quantitative data, while the qualitative data underwent thematic analysis.

DATA ANALYSIS / RESULTS

Table 4: Response Rate of Respondents.

Institution	Lib. Staff Admin.	Students Admin.	Community Admin.	Lib. Staff Returned	Students Returned	Community Returned	Total	%
Pr. Abubakar Audu Univ.	30	50	50	27(90%)	42(84%)	41(82%)	110	84
KSU, Kabba	16	50	50	14(88%)	40(80%)	39(78%)	93	80
Federal	28	50	50	24(86%)	42(84%)	40(80%)	106	81

Univ. Lokoja								
Col. of Sci. & Tech. Osara	10	50	50	9(90%)	38(76%)	37(74%)	84	77
Salem University, Lokoja	23	50	50	20(87%)	40(80%)	40(80%)	100	80
Kogi State Poly, Lokoja	25	50	50	22(88%)	42(84%)	41(82%)	105	84
Federal Poly, Idah	23	50	50	20(87%)	40(80%)	40(80%)	100	80
FCE, Okene	22	50	50	19(86%)	42(84%)	42(84%)	103	83
FCET, Kabba	10	50	50	9(90%)	38(76%)	36(72%)	83	76
College of Educ., Ankpa	19	50	50	16(84%)	40(80%)	38(76%)	94	79
School of Nursing, Obangede	15	50	50	13(87%)	30(60%)	32(64%)	75	67
School of Health Tech, Idah	15	50	50	13(87%)	33(66%)	30(60%)	76	68
TOTAL	246	600	600	206(84%)	467(78%)	456(76%)	1,129	78

Source: Field Survey, 2026

Table 5: Digital Inclusion Status Among Rural Community Respondents and Students.

Digital Inclusion Indicator	Comm. VH Freq(%)	Comm. H Freq(%)	Comm. MH Freq(%)	Comm. L Freq(%)	Stud. VH Freq(%)	Stud. H Freq(%)	Stud. MH Freq(%)	Stud. L Freq(%)
Access to computers/devices	5(1)	18(4)	65(14)	368(81)	12(3)	98(21)	228(49)	129(28)
Access to internet connectivity	3(1)	14(3)	57(13)	382(84)	18(4)	121(26)	201(43)	127(27)
Digital literacy/skills level	2(0)	23(5)	78(17)	353(77)	28(6)	145(31)	185(40)	109(23)
Utilisation of digital services	2(0)	11(2)	50(11)	393(86)	15(3)	94(20)	196(42)	162(35)
Barriers to digital participation	398(87)	42(9)	11(2)	5(1)	182(39)	156(33)	92(20)	37(8)

Source: Field Survey, 2026 Key: VH=Very High, H=High, MH=Moderately High, L=Low

Community Members n=456; Students n=467

Table 5 shows that there is severe digital exclusion for all indicators among rural respondents. Most respondents (81%) reported poor access to computers, poor connectivity to the internet (84%), poor digital literacy (77%) and good digital services (86%). Digital barriers were also rated as very high by 87% of the respondents. Students reported an institution level advantage as they recorded comparably lower levels across most indicators. These results corroborate Nwachukwu and Onyeneke (2020) that rural populations in Nigeria have multiple and mutually-reinforcing barriers to digital participation as evidenced by the lack of electricity, high cost of data, unavailability of devices and limited levels of digital literacy.

Table 6: Assessment of Academic Library Capacity to Serve as Digital Inclusion Hubs. (Library Staff, n=206)

Capacity Indicator	VH Freq(%)	H Freq(%)	MH Freq(%)	L Freq(%)	NR Freq(%)
Technology infrastructure (computers, servers)	8(4)	56(27)	87(42)	48(23)	7(3)
Internet connectivity quality and reliability	4(2)	39(19)	72(35)	82(40)	9(4)
Physical space for training and community access	25(12)	72(35)	68(33)	38(18)	3(1)
Staff digital competency for community training	12(6)	50(24)	85(41)	52(25)	7(3)
Institutional policy for community engagement	2(1)	14(7)	35(17)	145(70)	10(5)
Existing community digital programmes	0(0)	8(4)	25(12)	162(79)	11(5)
Alternative power supply for continuity	5(2)	22(11)	48(23)	121(59)	10(5)

Source: Field Survey, 2026 Key: VH=Very High, H=High, MH=Moderately High, L=Low, NR=No Response

Table 6 displays library capacity in a complex manner. Of the 11 factors reported, the most favorable rating was for physical space, with 47% at a high or very high level, demonstrating it is the least restrictive factor. With respect to the factors surveyed, 42% rated the technology infrastructure as adequate, while 41% rated the staff as adequate. Internet connectivity and alternative power supply, on the other hand, were rated as low by 40% and 59% respectively, confirming infrastructure deficits. Of greatest concern, 70% of the respondents rated institutional policy for community engagement as low, and 79% rated the community's digital programs as low. This demonstrates the absence of policy and programming frameworks to convert capacity to community impact.

Table 7: Preferences for Digital Inclusion Intervention Strategies. (Community Members and Students, n=923)

Intervention Strategy	SA Freq(%)	A Freq(%)	U Freq(%)	D Freq(%)	SD Freq(%)
Free internet access in library for community	840(91)	65(7)	10(1)	5(1)	3(0)
Basic computer skills training programmes	810(88)	85(9)	18(2)	7(1)	3(0)
Digital literacy training for adults	798(86)	92(10)	22(2)	8(1)	3(0)
Agricultural and entrepreneurship information services	742(80)	124(13)	38(4)	12(1)	7(1)
Health information and e-health service access	730(79)	132(14)	42(5)	12(1)	7(1)
Mobile outreach digital services to communities	654(71)	178(19)	55(6)	25(3)	11(1)
E-government services navigation support	618(67)	192(21)	72(8)	28(3)	13(1)
Evening and weekend community access programmes	592(64)	210(23)	78(8)	30(3)	13(1)

Source: Field Survey, 2026

Key: SA=Strongly Agree, A=Agree, U=Undecided,

D=Disagree, SD=Strongly Disagree

Table 7 indicates a very high level of approval for library-based digital inclusion initiatives. Free access to the internet earned the highest approval at 91%, followed by basic computer skills training (88%) and digital literacy training of adults (86%). Information services on agriculture and entrepreneurship and health information access получили strong approval and demonstrated the community's priority need for economic and health information. Included in this assertion are weekend and evening programs for community access. This received 87% approval and demonstrates that community outreach programming would be bolstered through greater access flexibility.

Table 8: Perceived Potential Impact of Library-Based Digital Inclusion Interventions. (All Respondents, n=1,129)

Community Development Outcome	VH Freq(%)	H Freq(%)	MH Freq(%)	L Freq(%)	NR Freq(%)
Improvement in educational attainment	763(68)	250(22)	87(8)	18(2)	11(1)
Expansion of economic opportunities and employment	695(62)	282(25)	107(9)	29(3)	16(1)
Improvement in health information access	792(70)	226(20)	81(7)	19(2)	11(1)
Enhancement of civic participation	501(44)	342(30)	205(18)	62(5)	19(2)

Improvement in overall quality of life	812(72)	207(18)	82(7)	17(2)	11(1)
Support for entrepreneurship and small business	721(64)	258(23)	110(10)	28(2)	12(1)

Source: Field Survey, 2026 Key: VH=Very High, H=High, MH=Moderately High, L=Low, NR=No Response

According to Table 8, participants in all groups believed library-based digital inclusion interventions held high to very high potential for virtually all community development outcomes. The greatest endorsement of very high potential for community development was given to the improvement of quality of life (72%), while health information access (70%) and educational attainment (68%) received the next highest endorsement. The very high potential for development of civic engagement was identified by only a little over one-half of the respondents (44%). This suggests that, when compared to other outcomes, digital inclusion for the purposes of livelihood and educational development is more urgent than digital inclusion for the purpose of civic engagement. These findings support the transformational potential as observed by Real et al., (2022) and Gomez et al. (2022).

Table 9: Implementation Challenges for Library-Based Digital Inclusion Initiatives.

Implementation Challenge	Library Staff Freq (n=206)	%	Community Members Freq (n=456)	%
Epileptic power supply	206	100	456	100
Inadequate institutional funding	206	100	456	100
Poor internet connectivity and bandwidth	202	98	452	99
Insufficient computers for community use	198	96	447	98
Absence of institutional policy for community engagement	189	92	348	76
Shortage of qualified ICT and library personnel	177	86	362	79
Limited community awareness of library services	143	69	410	90
Language and cultural barriers to engagement	98	48	212	46
Security concerns regarding community access	87	42	138	30

Source: Field Survey, 2026

Table 9 points to issues of implementation across all of the studied libraries. Epileptic power supply and insufficient funding of the institutions were cited as the most important problems by the staff at all libraries and respondents from the community. Shortages of both internet

and computers were cited by staff at all libraries. The lack of institutional policy on community engagement was cited by 92% of staff at all libraries, and this finding supports the RQ2 that frameworks of policy are clearly absent. Limited community awareness was reported by community members (90%) compared to staff (69%), revealing a gap in communication and outreach. These results clearly confirm Ossai-Ugbah (2010) and Chisita and Rusero (2021) who reported that in the African context, issues of power, funding, connectivity, and policy are the most problematic barriers to community-based digital inclusion in libraries.

In-Depth Interviews

Four types of institutions had senior staff conduct semi-structured interviews. Their interviews provided context to the data found in Tables 5 to 9.

Dr. Musa Ibrahim Attah, Chief Librarian at Prince Abubakar Audu University, Anyigba, highlighted the contradiction between institutional mandate and community aspiration. Attah stated, "Our library is the best in Kogi State, but it is the only library for our students and staff. The surrounding community has no access whatsoever. People from Anyigba town stand by the gate and ask if they can enter the library to use the internet. We keep them from accessing the library because there is no policy, budget, or structure to allow them access. The administration shut down a Saturday digital literacy session for market women that was initiated by one of our librarians. Without institutional permissibility, goodwill has no impact."

Hajiya Bilkisu Suleiman, the College Librarian at the Federal College of Education, Okene, spoke about the infrastructural challenges, "Everything in this library is PHCN. When we have power, we can offer something. During the times we do not have power, which is most of the time, nothing works. We have computers, but we cannot use them because the budget to power the generator was exhausted earlier in the year. How do you build community digital inclusion on this foundation? You cannot. Internet connectivity is worse. Sometimes we have to share a Wi-Fi connection that only supports twenty people at a time, and we have over four thousand students. Community members aren't even a consideration."

Mallam Isah Okpanachi, a community elder from a village adjacent to the Federal Polytechnic, Idah, encapsulated the community's focus, "We know there is a library beyond the gate. We do not know who can get us access to the library. Are we supposed to pass through the system we don't know? We have heard of one of our own who is working in the

library, but there is no system in place that positively incorporates the community. We see the library, but we do not feel the library."

We go by it every single day, but we have never been there to ask for help, because we've never had anyone from there, actually come to help us. We listen to the radio to hear about the digital things, the online way to open a business, to check the results of children, and to find the government support. But who is going to teach us? We can't even buy data for the Internet. No one shows up to teach us. If that library were to open, there would be so many people coming for the first time. It shows how people need these things the most. It's just a closed door."

These accounts provide further detail to the narratives that support the statistics. They provide insight to the community-library relationship, and show the lack of institutional vision and proposed policy that is needed for the library potential to close the gap to community impact. Library directors, based on restraining institutional limits, described a need for active engagement, while community members expressed motivation that was restricted by a lack of offered outreach. The Digital Inclusion Intervention Model further attempts to align the disparity that exists on both sides of this divide.

Discussion of Findings

Analyses of data collected from the field show that rural communities neighbouring tertiary institutions in Kogi State suffer from multiple, severe forms of digital exclusion. Combining the results of the quantitative survey and qualitative interviews reveal the following.

The first of these is the severe digital exclusion suffered by rural communities surrounding tertiary education institutions in Kogi State. Of the community respondents, 81% have low computer use, 84% have low Internet use, 77% have low digital literacy, and 86% have low use of online services. The constraints in all these areas are uniform and severe. Of the community respondents, 87% indicated that the constraints were primarily of a structural nature and not of a motivational nature. The interview with Mallam Okpanachi further verifies this, stating that in rural communities, the desire to participate in the digital economy is present, but the absence of access services, high data costs, and a lack of intermediary services is a major constraint. This finding is consistent with Van Deursen and Van Dijk (2019) who state that in the context of developing country situations, the major barrier and not the motivational barrier is the lack of access and the lack of skills.

The second result indicates that academic libraries in tertiary institutions in Kogi State have the physical base for community digital inclusion programs, but lack policy, power, and programmatic infrastructure. There is a sharp contrast between the relatively good ratings for the physical space (47% high or very high) and the nearly complete absence of community programs (79% low) and institutional policy (70% low). This indicates that the institutions lack the will and the enabling environment, resulting in an implementation gap. This is what Ogbonna and Nwabueze (2021) found and is evident in the account of Dr. Attah, who describes available infrastructure but an absence of mandate.

The final finding suggests that community members and students have clear and realistic preferences for intervention options. These include free internet (91%), basic computer training (88%), and adult digital literacy (86%). This preference stimulated the design of the Digital Inclusion Intervention Model, which places services that are demanded and of basic nature in the first phase of the Model. The very strong support for the agricultural, entrepreneurship, and health services, confirms that for digital inclusion to sustain community engagement beyond just the first and second phases, it must be designed to meet local and community needs.

The fourth finding concerns the perceived potential impact of library-based digital inclusion. It is perceived to be high across all dimensions of community development, with quality of life (72%), health information access (70%) and educational attainment (68%) the most positively endorsed. Respondents clearly perceive the potential of library-based digital inclusion to be transformational. This strong perception is grounded in international evidence from Real et al. (2022) and Gomez et al. (2022), who positively assessed the measurable impacts of library-based digital inclusion on educational attainment, economic participation, and health information access, among others. The positive impact of digital services in library-based inclusion is undeniable and members of the community and library users do not sit back and wait to receive a digital service, rather they understand the developmental consequence of their digital participation.

The fifth finding reveals that the challenge of implementation is difficult and systemic. The unanimous identification of power supply and funding as major constraints (both staff and community respondents) indicates that these constraints are not minor and that other interventions will not be functional until these major constraints are dealt with. An example of this situation is Hajiya Suleiman at FCE Okene. The facilities required are available, but the absence of a reliable power system means that not even the institutional digital services

are available, let alone community digital services. The partnership and sustainability component of the intervention model was developed to address this multi-barrier environment through multiple sources of funding, alternative forms of power, and a phased approach to implementation.

Summary of Findings

1. The rural settlements surrounding the 12 tertiary institutions in Kogi State suffered extreme digital exclusion with the majority of the community respondents reporting low access to computers, the internet, and digital skills. Structural constraints rooted in costs, inadequate infrastructure and exposure were cited as the major constraints.
2. The sampled academic libraries had moderate levels of physical and human capital, especially regarding physical space and the staff's command of the subject. However, internet connection, alternative power, institution-level policy, and existing community programs suffered from the most severe shortages. This confirmed that the physical resources have not been transformed into community digital inclusion programs.
3. Community members and students highly valued the provision of free access to the internet, the offering of basic computer skills, digital literacy for adults and health and agricultural information services. 87% of the respondents supported extended access during the evenings and weekends.
4. Library-based digital inclusion programs were seen as having high potential to improve educational opportunities, job creation, health information, entrepreneurship and improve the overall well-being of rural communities.
5. The major constraints to implementation included poor power supply, lack of resources, poor internet, inadequate computers, absence of policy, lack of staff and-community awareness. The qualitative interviews suggested the establishment of partnerships with telecoms and a student volunteer instructor program as feasible ways to sustain the program as well as applying for TETFund.

The Digital Inclusion Intervention Model

Developed from empirical data fragments of the five research questions, and backed by focus group interaction with library directors of the selected institutions, a Digital Inclusion Intervention Model with five distinct segments was constructed as:

1. Community Needs Assessment: the systematic mapping of community needs, barriers to digital inclusion, and aspirations through participatory surveys, community meetings and library advisory board meetings.
2. Library Capacity Audit: a standardized assessment tool to evaluate the readiness of the library to provide community digital inclusion services and to provide a basis for prioritizing the capacity of the library infrastructure, staff, policy, and program.
3. Service Delivery Framework: a set of library services for community digital inclusion on a free basis, such as access to the internet, digital literacy training, adult learners' digital literacy programs, health and agriculture information, e-government services, such as support for electronic transactions, outreach services, and health information. Services will be introduced on a gradual basis.
4. Partnership and Sustainability Mechanisms: integrated policies and mandates covering formal institutional planning for integrated policies and flexibly engaged community partnerships for funding, assistance from developmental partners, and CSR partnerships; as well as a volunteer program for digital literacy instruction for students.
5. Impact Monitoring and Evaluation: a designed impact assessment tool for documenting the impact of digital inclusion on community development regarding indicators of community engagement and the institution's records and the Sustainable Development Goals.

CONCLUSION

This study establishes that academic libraries in Kogi state Universities show signs of potential for promoting rural digital inclusion, though they remain largely undeveloped. This study showed that the rural communities adjacent to these schools experience digital exclusion across all levels of the Fourth-Level Digital Divide Framework, while at the same time, holding great expectations for library-based digital inclusion services, and being convinced of the great impact that these services would have on their communities. The gap between library potential and community need is not a gap of demand, but a gap of means, structure, policies and funding.

The Digital Inclusion Intervention Model developed in this study is an evidence-based, practical, and locally-derived approach to this gap. The extent to which this model is successful will depend on the readiness of university administrators to formalize community service as a critical functional area of the university, on funding agencies being willing to invest in library-based digital inclusion, and on the ability of library personnel to re-direct

their professional efforts to community development. For a long time, academic libraries in Kogi State have been under-utilized and are a huge loss of public funds. This study argues that these libraries could be transformed into active digital inclusion centers to support Kogi State government effort to guarantee digital access and equity, and help the State meet the Sustainable Development Goals.

Recommendations

1. Kogi State's tertiary institutions must create (or adopt) specific institutional policies to include community engagement and digital inclusion as a component of the library's strategic functions and create budgetary lines for community engagement programs.
2. TETFund, state government ministries, and development partners, UNDP and UNESCO, must create specific funding projects to bolster digital infrastructures of tertiary institutions libraries in Kogi State with sustainable internet access, alternative electricity, more computers, and network equipment.
3. Directors of libraries should design systematic digital literacy training to staff and deploy student volunteers as digital literacy trainers in community programs to create sustainable digital literacy.
4. Libraries must formalize partnerships with telecommunication firms, info-tech firms, and development organizations to create programs that significantly reduce their financial burdens toward obtaining quality and sustainable connections and services.
5. The Digital Inclusion Intervention Model should be adopted by the management of libraries to create user organization demand and financial sustainability by offering basic internet services and basic computer training services.
6. A top-down approach by both state and federal governments toward the creation of a formal library policy for community engagement of academic libraries must acknowledge and appreciate the role of academic libraries in rural digital inclusion.

Contributions to Knowledge

- This study creates the first formal, evidence-based digital inclusion intervention model for libraries in Kogi State. The model is both applicable and practical and is based on existing theories. The goal is to help meet the rural digital inclusion needs of the libraries within Kogi State using the infrastructure available at existing libraries.

- This study fills an important gap for North Central Nigeria by providing detailed empirical data on digital exclusion in rural communities surrounding twelve universities in Kogi State.
- This study provides the first systematic comparison of library capacity across four different types of institutions. This allows for the first policy-related analysis of which institutional types are the most and least prepared for community based digital inclusion.
- This study implements the Four-Level Digital Divide Framework within the rural libraries of the tertiary institutions of Nigeria, and therefore aligns existing literature on digital inclusion in developing countries.
- The study adds to implementation science for the most successful models of digital inclusion in libraries in Kogi State and sustainable partnerships to include other institutions of higher learning in the region. This provides a framework to help meet the same needs in the other sub-Saharan African region countries.

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