



**CHALLENGES OF TECHNOLOGY-DRIVEN ADULT EDUCATION DELIVERY IN
ADULT LITERACY CENTRES IN AKAMKPA LOCAL GOVERNMENT AREA,
CROSS RIVER STATE: AN EMPIRICAL SURVEY STUDY**

Okora Elucate Ekom (Ph.D.)

Department of Adult and Continuing Education
University of Calabar
Calabar-Nigeria

E-mail: e.okora@gmail.com / okoraekom@unical.edu.ng

&

Offem, Christopher Okoi (Ph.D)

Department of Library and Information Studies
University of Calabar,
Calabar – Nigeria
Email: christoffem@gmail.com

ABSTRACT

Digital technology is often presented as a means of extending literacy, vocational learning and lifelong education in Nigeria, but its value in adult literacy centres depends on whether centres, facilitators and learners can use it under everyday local conditions. This study investigated the challenges surrounding technology-driven adult education delivery in adult literacy centres in Akamkpa Local Government Area of Cross River State. Using a descriptive cross-sectional survey design, questionnaire data were obtained from 362 respondents made up of adult learners and literacy facilitators in selected centres. Participants assessed both the support needed for effective technology-supported delivery and what was presently available across nine domains: digital devices, internet connectivity, electricity supply, funding and maintenance, facilitator competence, learner digital readiness, local-language content, inclusive access and monitoring. Analysis relied on frequencies, percentages, means, standard deviations, gap scores, tables and graphical summaries. Marked shortfalls were identified in digital devices, internet connectivity, electricity supply, funding and maintenance. High data costs, weak network access, low learner confidence and limited facilitator digital pedagogy also featured prominently among the constraints reported. Respondents gave priority to community digital learning hubs, mobile-first/offline literacy content, solar charging support and continuous facilitator training. The evidence suggests that technology can strengthen adult literacy delivery in Akamkpa when it is used as an inclusive, context-sensitive support for teaching rather than as a substitute for human facilitation. Accordingly, blended delivery, shared devices, low-data platforms, solar power support, regular facilitator training and simple monitoring of literacy and digital skill outcomes are recommended.

Keywords: Adult education; adult literacy centres; technology-driven delivery; empirical survey; digital literacy; Akamkpa; Cross River State; digital divide; lifelong learning.



Introduction

The growing presence of technology in education has changed how learners encounter information, practise new skills and receive feedback. Its relevance is especially apparent in adult education, where participation must often fit around work, trading, farming, domestic responsibilities, childcare, community obligations and age-related constraints (Odo & Nwizu, 2024). For this group of learners, flexibility matters as much as access. Mobile phones, projectors, recorded audio, WhatsApp groups, offline videos, digital libraries and learning applications can extend literacy activities beyond a conventional lesson and connect them to daily routines, provided their use is deliberately planned (UNESCO Institute for Lifelong Learning [UIL], 2023; National Information Technology Development Agency [NITDA], 2023). The work of an adult literacy centre is no longer confined to teaching people to recognise printed words, write short sentences or perform basic calculations. Reading a mobile message, navigating an electronic payment platform, finding reliable information, completing an online form, communicating with a public agency, checking market prices and recognising digital risks have become part of ordinary social and economic participation. These tasks place digital readiness alongside reading, writing, numeracy, communication, livelihood and civic skills within the practical meaning of adult literacy (Ugwu & Umezuruike, 2023; World Bank, 2025). Helen et al (2025) asserts that literacy education is a key component for economic development.

Policy attention to digital literacy has increased in Nigeria, but access and meaningful use remain uneven. Available evidence points to differences in computer access, internet reliability and digital competence across location, income, gender and educational background (National Bureau of Statistics [NBS] & UNICEF, 2022; Banyan Global, 2023; World Bank, 2025). This matters in rural and semi-urban adult literacy settings because wider phone ownership does not necessarily mean that learners are ready for technology-supported instruction. A phone may be used only for calls or social interaction; it may be shared within a household, lack affordable data, operate in an area with weak coverage, or be owned by someone who is uneasy about using digital tools for learning (GSMA Intelligence, 2024; Babanzara, 2025).

Akamkpa Local Government Area offers a useful setting in which to examine these tensions. Its rural and semi-urban communities include learners from farming, trading, artisanal work, quarry-related occupations, home management, recent school leaving and older adulthood. In such settings, well-chosen digital tools can assist with local-language explanation, audio-visual demonstrations, reminders, simple record keeping, occupational information and guided digital practice. The same tools can also deepen exclusion when access to devices, electricity, network services, confidence or facilitator support is limited (Igwe et al., 2024; UIL, 2023). The educational value of technology is therefore inseparable from the conditions under which learners are expected to use it.

Against this background, the study examines technology-driven adult education from the point of view of actual centre-level delivery. The concern is not whether digital learning is desirable in principle, but whether the support that effective delivery requires is present in selected Akamkpa



adult literacy centres. The empirical survey compares required conditions with current availability and draws on the experiences of respondents who encounter these constraints in practice, thereby shifting the discussion from broad digital-learning claims to the operational realities of adult literacy provision.

Statement of the Problem

Technology is frequently proposed as a response to limited access, weak participation and poor learning outcomes in adult literacy programmes. That promise is difficult to realise, however, when the centres expected to deliver digitally supported learning operate with few devices, irregular electricity, unstable internet services, costly data, limited funding, insufficient facilitator preparation, low learner confidence, inadequate local-language materials and weak monitoring arrangements (NITDA, 2023; World Bank, 2025; Igwe et al., 2024). Under such conditions, a digital initiative can exist on paper while remaining difficult to sustain in day-to-day instruction.

A further difficulty lies in the assumption that access to technology implies readiness to learn with it. Adult learners in community programmes may still be consolidating basic reading and writing, while some facilitators have had little preparation for integrating digital resources into adult pedagogy. Introducing technology without recognising these differences can make participation more intimidating, reinforce existing inequalities, weaken necessary human support and add new demands to already under-resourced centres (Banyan Global, 2023; GSMA Intelligence, 2024). The issue is therefore one of fit between the technology, the learner and the delivery environment, rather than the simple presence or absence of digital tools.

These concerns are particularly relevant in Akamkpa Local Government Area. Adult literacy centres are expected to combine foundational literacy with livelihood relevance and social participation, yet the infrastructure needed for regular digital use may be limited. Much of the Nigerian discussion has concentrated on formal schooling, youth-oriented digital skills or national policy indicators. Less attention has been directed to what adult learners and facilitators actually encounter within local government literacy centres. The present survey responds to that omission by examining perceived delivery gaps, the constraints most strongly experienced and the interventions respondents consider workable for technology-driven adult education in Akamkpa.

Objectives of the Study

1. To examine the technology-related delivery conditions required for effective adult education in adult literacy centres in Akamkpa Local Government Area.
2. To assess the gap between required delivery conditions and the current level of availability in adult literacy centres.
3. To identify the major challenges affecting technology-driven adult education delivery in the study area.
4. To determine the preferred intervention pathways for improving technology-supported adult literacy delivery.
5. To propose a practical response model for inclusive and sustainable technology-driven adult education in Akamkpa.



Research Questions

1. What technology-related delivery conditions are required for effective adult education in adult literacy centres in Akamkpa?
2. What is the magnitude of the gap between required delivery conditions and the level currently available in the centres?
3. What major challenges affect technology-driven adult education delivery in the study area?
4. Which intervention pathways do respondents prefer for improving technology-supported adult literacy delivery?
5. What practical model can support inclusive and sustainable technology-driven adult education in Akamkpa?

Conceptual Review

Technology-Driven Adult Education Delivery

Within adult education, technology-driven delivery can be understood as the purposeful use of digital and electronic resources in programme planning, instruction, learning, assessment, communication and management (Igwe et al, 2024). The category is broad: mobile phones, radios, projectors, computers, tablets, learning applications, social media, online video, digital libraries, messaging services and offline storage can all serve instructional functions. Their educational value does not lie in the novelty of the equipment itself. It lies in whether the tools help adults gain access to useful information, practise literacy, solve everyday problems and participate more effectively in social and economic life (NITDA, 2023; UIL, 2023). Ubana et al (2025) sees youth participation in socio-economic activities as instrument for community development.

In a literacy centre, this use of technology need not begin with complex platforms. A phone can carry an audio lesson; a projector can combine words with images; WhatsApp can support reminders; radio can reach learners who are distant from a centre; and downloaded video can demonstrate health, farming or business practices without continuous internet access. Such applications fit adult learning when they respond to immediate, recognisable needs rather than creating an additional layer of technical difficulty. Helen et al (2025) observed that evaluating the effectiveness of digital learning platforms enhance adult literacy skills acquisition. Their usefulness therefore depends on cost, simplicity, relevance to the local setting and the continuing guidance of the facilitator (Ugwu & Umezuruike, 2023; Babanzara, 2025). Andong et al (2025) opined that incorporating digital technology improve adult literacy education programmes. Ubana et al (2024) opined that Artificial Intelligence (AI) is a tool for combating unethical practices. Harnessing security approach and artificial intelligence (AI) as tools to combat unethical practices promotes quality assurance (Ubana et al 2025).

Adult Literacy Centres and Learner Realities

Adult literacy centres provide community-based opportunities for adults and out-of-school youths to develop literacy, numeracy, communication and practical life skills. Their importance in Nigeria extends beyond basic instruction because they create a second route into learning for people whose formal schooling was interrupted, missed entirely or no longer meets the demands of work,



household welfare and community participation (NBS & UNICEF, 2022; UIL, 2023). The centre is therefore both an instructional space and a point of re-entry into educational participation.

Adult learners do not enter that space as a uniform group. They bring prior experience, social responsibilities, expectations about usefulness and, in some cases, anxiety created by earlier educational experiences. Age, gender, income, schooling, occupation, language, confidence and access to devices can all shape willingness and ability to engage with technology (Almeida & Morais, 2025). For that reason, digital readiness cannot be inferred from ownership of a phone alone. It also involves being able to operate the device, move through menus, type simple text, use audio or video materials, search for information, protect personal data and apply digital skills to practical needs (World Bank, 2025; NCC, 2024).

Digital Divide and Local Access

The digital divide is better understood as a difference in meaningful digital opportunity than as a simple division between people who own devices and those who do not. It includes unequal access to equipment, connectivity, skills and online opportunities. In Nigeria, these inequalities cut across rural and urban residence, income, gender and educational background. They are particularly relevant to adult literacy provision because people seeking second-chance education may also be among those with the least consistent access to digital resources (Banyan Global, 2023; GSMA Intelligence, 2024).

In Akamkpa, such inequality may be experienced through weak network coverage, long travel distances to learning centres, unreliable electricity, limited smartphone access, difficulty paying for data or hesitation when using unfamiliar platforms. An instruction to download a video or join an online class may appear straightforward from the programme side while being impossible for a learner who lacks a suitable device, electricity or affordable connectivity. Planning for technology-driven adult education must therefore begin with the conditions learners actually face rather than with assumptions about ideal digital access (World Bank, 2025; NITDA, 2023).

Facilitator Competence and Institutional Support

Human facilitation remains the organising element of technology-supported adult learning. Devices can extend access to content, but they do not reproduce the patience, explanation, encouragement and local knowledge that an adult educator brings to a mixed-ability group. Facilitators consequently need more than basic ICT familiarity. They require digital-pedagogy skills that allow them to choose manageable tools, work with learners at different levels, use offline resources, safeguard privacy, solve minor technical problems and keep digital activities tied to literacy objectives (UIL, 2023; Igwe et al., 2024).

The effectiveness of those facilitators also depends on what the institution makes possible. Regular technology use requires provision for devices, charging, connectivity, secure storage, maintenance, technical support and appropriate teaching materials. Centres also need simple ways of determining whether digital activity is contributing to reading, writing, numeracy and basic digital competence. When these supports are absent, technology use is easily reduced to the enthusiasm



and personal resources of individual facilitators, producing uneven opportunities between centres (NCC, 2024; World Bank, 2025).

Review of Related Empirical Literature

Table 1: Summary of Related Empirical Literature

Author(s)	Design/Focus	Sample/Scope	Key finding	Relevance to present study
Ugwu & Umezuruike (2023)	Conceptual review of adult education and digital literacy in Nigeria	Adult learners in Nigeria	Adult education programmes can promote digital literacy when technology is integrated with practical literacy needs.	Supports inclusion of digital literacy as part of adult education delivery.
Igwe et al. (2024)	Study of digital tools in adult information literacy programmes	Nsukka Urban literacy centres	Poor funding, weak ICT infrastructure, limited trained personnel and weak internet affected digital tool use.	Justifies measuring infrastructure, funding and facilitator competence.
NITDA (2023)	National Digital Literacy Framework	Nigeria	Digital literacy was framed as a national life skill requiring structured competencies and implementation support.	Supports digital skill domains and monitoring indicators.
UIL (2023)	Digital skills support for literacy educators	Nigeria	Digitalising literacy begins with educator capacity and continuous professional development.	Justifies focus on facilitator training.
NBS & UNICEF (2022)	National household survey evidence	Nigeria	Household and demographic inequalities influence access to education and technology-related opportunities.	Supports attention to inclusion and learner background.
Banyan Global (2023)	Gender digital divide assessment	Nigeria	Affordability, literacy, social norms and awareness shape women's digital access.	Justifies gender-sensitive planning.
GSMA Intelligence (2024)	Mobile economy report	Sub-Saharan Africa	Mobile coverage growth does not automatically produce meaningful use due to usage gaps, affordability and skills barriers.	Supports mobile-first but low-data delivery.
NCC (2024)	Baseline digital skills study	Nigeria	Digital skills are increasingly needed for work, government interaction and daily services.	Supports linking adult literacy to digital participation.



World Bank (2025)S	Policy note on digital skills in Nigeria	Nigeria	Digital infrastructure and equipment access remain uneven, affecting digital skill acquisition.	Supports measuring access and readiness gaps.
Babanzara (2025)	Smartphone technology and adult literacy	Nigeria	Smartphones can support adult literacy, but barriers include affordability, connectivity and limited digital skills.	Supports preferred mobile-first intervention pathway.

Source: Author's synthesis of literature, 2026.

Across the reviewed evidence, a consistent distinction emerges between access to technology and meaningful educational use. Digital literacy is increasingly necessary for everyday participation, yet the presence of a device or mobile coverage does not by itself create an effective learning experience. Learner access, facilitator competence, institutional backing and the local setting interact to determine whether technology is usable in adult education (GSMA Intelligence, 2024; World Bank, 2025). This shared pattern is more important than any single tool because it locates the challenge within the delivery system rather than within the learner alone.

A second pattern concerns inclusion. Affordability, gender, language and confidence influence who can benefit from digitally supported learning and who may be left behind. National frameworks help define broad priorities, but they cannot show how these pressures are combined within a particular literacy centre. Centre-level evidence is therefore necessary for programme decisions. By focusing on Akamkpa, the present survey adds a local account of the gaps encountered by adult learners and facilitators instead of relying only on national indicators or general arguments about digital learning.

Gap in Literature

The literature points in two related directions. On one hand, technology can widen access, support flexible participation and strengthen digital literacy within adult education (UIL, 2023; Ugwu & Umezuruike, 2023; Owede, 2023). On the other, Nigerian evidence identifies infrastructure deficits, inadequate funding, poor internet access, limited digital competence and facilitator-related constraints as recurring obstacles (Bala & Ladan, 2023; Igwe et al., 2024; Odo & Nwizu, 2024). What remains less developed is evidence from adult literacy centres at the local-government level. Much of the existing work is conceptual, national in scope or situated in formal education, and relatively few studies draw simultaneously on adult learners and facilitators to quantify the delivery conditions that are missing in a specific community setting. The present study addresses that empirical and contextual gap through survey evidence from Akamkpa Local Government Area.



Theoretical and Analytical Framework

Two complementary perspectives organise the interpretation of the study: adult learning and digital inclusion. From an adult-learning standpoint, usefulness is central. Adults are more likely to engage with learning that respects prior experience, accommodates competing responsibilities and connects directly with problems encountered in work, family and community life. Technology is therefore relevant here only to the extent that it helps learners practise literacy in such contexts rather than diverting attention toward the technology itself. This interpretation is consistent with contemporary lifelong-learning arguments that treat digital competence as part of effective participation in modern society (UIL, 2023; Ugwu & Umezuruike, 2023).

Digital inclusion adds a necessary structural dimension to that learner-centred view. A device may be available while meaningful participation remains constrained by cost, connectivity, skill, gender, confidence, safety or the irrelevance of available content. Inclusion, in this sense, concerns the quality and usability of access, not merely ownership. The Akamkpa analysis therefore considers technology-driven delivery as the product of four interdependent conditions: local access, facilitator readiness, learner readiness and institutional support (Banyan Global, 2023; NITDA, 2023; World Bank, 2025). The perspective is particularly suitable because it explains why the same technology may be useful in one centre and difficult to use in another.

The analytical model translates these perspectives into nine delivery domains: digital devices, internet connectivity, electricity, funding and maintenance, facilitator competence, learner readiness, local content, inclusive access and monitoring. Effective technology-supported delivery presupposes adequate support across these areas. A delivery gap occurs when current availability falls below the level regarded as necessary, and the size of that difference provides an indication of where intervention is most urgent. Figure 1 summarises the relationships that guided the empirical analysis.

Empirical Model for Technology-Driven Adult Education Delivery

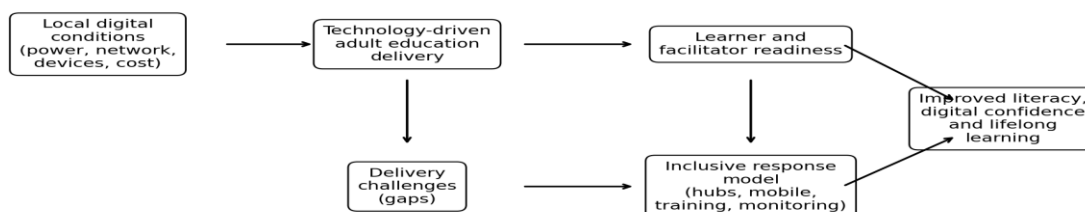


Figure 1. Empirical model for technology-driven adult education delivery.

Methodology

Research Design

A descriptive cross-sectional survey design was used to capture respondents' assessments at a single period. This design permitted a direct comparison between the support considered necessary



for effective technology-driven adult education and the support currently available in the participating literacy centres. Structured responses could then be summarised with frequencies, percentages, means and graphical displays. Importantly for the purpose of the article, the same design also made it possible to calculate delivery gap scores for each technology-related condition without changing the essentially descriptive character of the investigation.

Population and Sample

The study population consisted of adult learners and literacy facilitators in adult literacy centres within Akamkpa Local Government Area of Cross River State. From selected rural and semi-urban centres, 362 respondents participated: 318 adult learners and 44 literacy facilitators. Selection was intended to capture variation in gender, age, occupational background, educational exposure, device ownership and experience of internet use. With more than 300 respondents, the achieved sample provided sufficient breadth for the descriptive comparisons, mean ratings and gap-score presentation used in the article.

Instrumentation

Information was obtained through a structured questionnaire organised into three sections. Section A recorded demographic and access characteristics, including gender, age, respondent category, occupation, educational exposure, device ownership, internet use and electricity access. Section B covered the nine technology-driven delivery conditions used in the analysis: digital devices and learning equipment, internet connectivity and data affordability, electricity supply and charging support, funding and maintenance capacity, facilitator digital competence, learner digital readiness and confidence, local-language and relevant digital content, gender-sensitive and inclusive access, and monitoring of literacy and digital outcomes. For each condition, respondents used a five-point scale to rate both what effective delivery required and what was currently available in their centres. Section C focused on major delivery challenges and preferred intervention pathways.

Face and content validity were assessed by specialists in adult education and educational technology. Their review was used to clarify items, remove unnecessary repetition and keep the instrument aligned with the circumstances of adult literacy centres. Before the main survey, the questionnaire was piloted with 30 respondents in a neighbouring adult learning setting excluded from the final sample. The reliability assessment yielded an internal consistency coefficient of 0.84. This value was considered acceptable for proceeding with the main data collection.

Method of Data Analysis

Analysis was descriptive and followed the structure of the research questions. Frequencies and percentages summarised demographic characteristics, access patterns and preferred interventions, while means and standard deviations described ratings of the major challenges. For each technology-related condition, the delivery gap score was obtained by subtracting the current availability mean from the required adequacy mean. A larger positive difference therefore represented a wider perceived shortfall and a stronger intervention need. Tables and figures were retained to make the distribution and ranking of results easier to examine.

Ethical Consideration

The survey did not require respondents to disclose personally identifying information. Participation was voluntary, and respondents were informed that their answers would be analysed



academically and reported in aggregate form. Names, addresses, phone numbers and other sensitive identifiers were not requested. Because the questions concerned perceptions of learning conditions rather than highly sensitive personal matters, the anticipated ethical risk was minimal. Even so, confidentiality, voluntary participation and respectful treatment of adult learners were maintained throughout the survey process.

Results

The results are presented in a sequence that moves from the characteristics of the respondents to the delivery conditions under investigation. Demographic information is followed by device, internet and electricity access, the required-versus-current gap analysis, ratings of the principal challenges and respondents' preferred intervention pathways. The accompanying tables and figures make it possible to read the constraints alongside the responses considered most practical.

Table 2: Demographic Distribution of Respondents (n = 362)

Variable	Category	Frequency	Percentage (%)
Gender	Male	154	42.5
Gender	Female	208	57.5
Age bracket	18-25 years	59	16.3
Age bracket	26-35 years	103	28.5
Age bracket	36-45 years	114	31.5
Age bracket	Above 45 years	86	23.7
Respondent category	Adult learners	318	87.8
Respondent category	Literacy facilitators	44	12.2
Occupation/background	Farming/agro-related work	90	24.9
Occupation/background	Trading/business	84	23.2
Occupation/background	Artisan/quarry/service work	61	16.9
Occupation/background	Home/care work	58	16.0
Occupation/background	Other/unspecified	69	19.1
Highest education exposure	No formal/primary incomplete	126	34.8
Highest education exposure	Primary completed	115	31.8
Highest education exposure	Secondary incomplete/completed	96	26.5
Highest education exposure	Post-secondary/vocational	25	6.9

Source: Field survey, 2026.

Table 2 shows that women constituted the larger share of respondents and that most participants were older than 26 years. The age pattern is consistent with a sample drawn largely from adults managing work, family and community responsibilities rather than from a conventional school population. Adult learners formed the clear majority, with literacy facilitators included to represent the delivery side of the programme. Occupationally, the sample cut across farming, trading, artisanal and quarry-related work, home-care activities and other livelihoods, reflecting the varied backgrounds served by adult literacy centres in Akamkpa.



Table 3: Respondents Device, Internet and Electricity Access Profile (n = 362)

Access Indicator	Frequency	Percentage (%)
Owens a smartphone	194	53.6
Owens basic phone only	113	31.2
No personal phone/shared device	55	15.2
Uses internet daily	83	22.9
Uses internet weekly	98	27.1
Uses internet occasionally	107	29.6
Rarely/never uses internet	74	20.4
Reports regular electricity access	48	13.3
Reports irregular electricity access	203	56.1
Reports very poor electricity access	111	30.7

Source: Field survey, 2026.

Access patterns in Table 3 show why ownership alone is an incomplete measure of digital readiness. Smartphones were the most common personal device, yet a sizeable group depended on basic phones or shared access. Daily internet use was reported by only a minority, while occasional or rare use was common. Electricity was similarly unreliable, with most respondents describing access as irregular or very poor. Taken together, these conditions make a continuously online model difficult to justify for Akamkpa. Delivery built around mobile devices, low data consumption and offline support is more consistent with the access profile reported by respondents (GSMA Intelligence, 2024; World Bank, 2025).

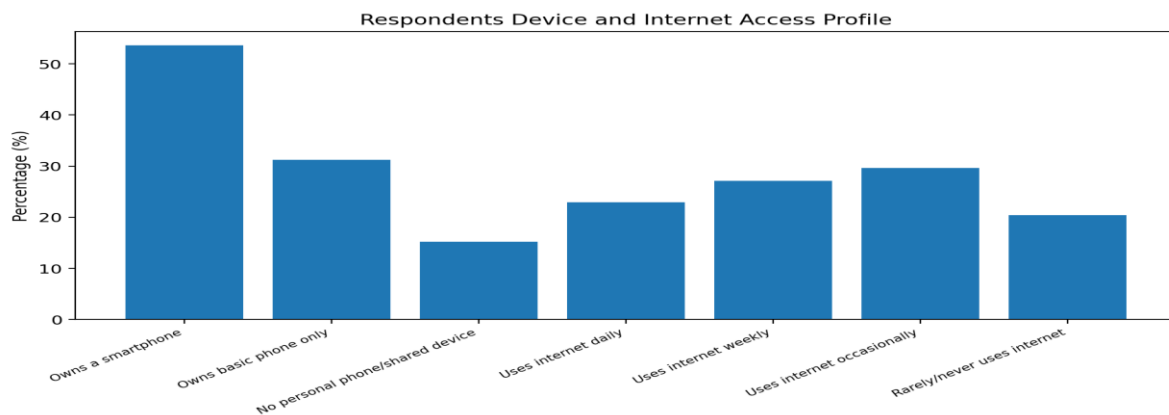


Figure 2. Respondents' device and internet access profile.



Table 4: Required and Current Conditions for Technology-Driven Adult Education Delivery

Delivery condition	Required mean	Current mean	Gap score	Gap rank
Digital devices and learning equipment	4.57	2.08	2.49	1
Internet connectivity and data affordability	4.44	2.01	2.43	2
Electricity supply and charging support	4.52	2.13	2.39	3
Funding and maintenance capacity	4.41	2.17	2.24	4
Facilitator digital competence	4.39	2.42	1.97	5
Learner digital readiness and confidence	4.33	2.48	1.85	6
Local-language and relevant digital content	4.18	2.55	1.63	7
Monitoring of literacy and digital outcomes	4.05	2.49	1.56	8
Gender-sensitive and inclusive access	4.10	2.62	1.48	9

Source: Field survey, 2026. Note: Gap score = required mean - current mean.

A clear required-versus-current deficit appears across all nine conditions in Table 4. The largest differences concern digital devices and learning equipment, internet connectivity and data affordability, electricity supply and charging support, and funding and maintenance capacity. The pattern places the main constraint in the environment that is expected to sustain technology use, rather than in a presumed lack of interest among learners. Digital content, however well designed, has limited instructional value when centres cannot provide dependable devices, power, connectivity or the resources needed to keep equipment functional.

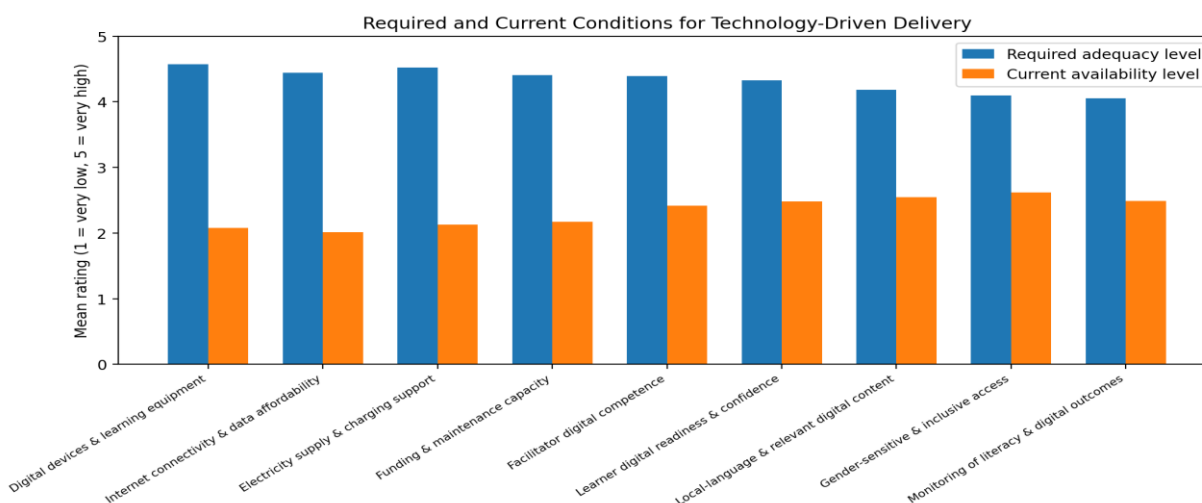


Figure 3. Required and current conditions for technology-driven delivery.

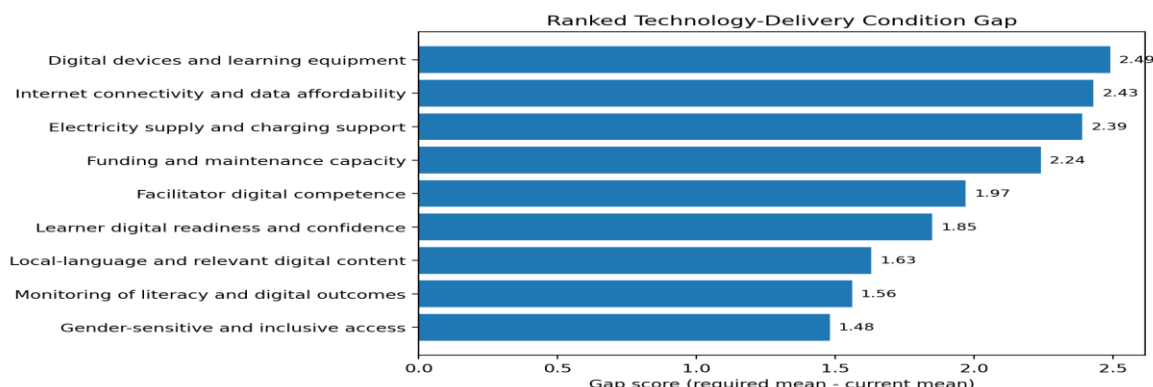


Figure 4. Ranked technology-delivery condition gap among respondents.

Table 5: Mean Rating of Major Challenges Affecting Technology-Driven Adult Education Delivery

Challenge	Mean	SD	Decision
Irregular electricity supply	4.56	0.64	Very high
Inadequate digital devices in centres	4.53	0.67	Very high
High cost of data and device maintenance	4.47	0.71	Very high
Weak/unstable internet connectivity	4.45	0.73	Very high
Inadequate programme funding	4.42	0.76	Very high
Low learner digital confidence	4.21	0.82	High
Limited facilitator digital pedagogy skills	4.18	0.86	High
Language and local-content barriers	3.97	0.91	High
Gendered access and shared-device constraints	3.87	0.95	High
Weak monitoring and feedback system	3.72	0.88	High

Source: Field survey, 2026. Decision rule: 1.00-1.80 = very low; 1.81-2.60 = low; 2.61-3.40 = moderate; 3.41-4.20 = high; 4.21-5.00 = very high.

Table 5 reinforces the gap analysis. Irregular electricity, inadequate digital devices, data and maintenance costs, unstable connectivity and insufficient programme funding fell within the very high category. Low learner confidence, limited facilitator digital-pedagogy skills, language and local-content barriers, gendered access and weak monitoring were also rated high. The constraints therefore cluster across infrastructure, affordability, human capacity and programme support rather than around a single technological problem. This interpretation is consistent with evidence that adult literacy technology use depends on the wider conditions that make regular and supported participation possible (NITDA, 2023; UIL, 2023; Igwe et al., 2024).



Table 6: Preferred Intervention Pathways for Improving Technology-Driven Delivery

Intervention pathway	Frequency	Percentage (%)
Community digital learning hub/shared devices	94	26.0
Mobile-first/offline literacy content	78	21.5
Solar chargers and power-bank support	66	18.2
Continuous facilitator digital-pedagogy training	57	15.7
Subsidised data/device support	44	12.2
Monitoring, mentorship and feedback system	23	6.4

Source: Field survey, 2026.

Table 6 shows that respondents preferred notably practical interventions. Community digital learning hubs and shared devices ranked first, followed by mobile-first/offline literacy content and solar charging support. These choices reduce reliance on personal computers, uninterrupted electricity and continuous data access, all of which are limited for many learners in the sample. Continuous facilitator digital-pedagogy training also attracted substantial support, indicating that respondents did not treat equipment as sufficient on its own. Their preferences combine access measures with the human capacity required to turn those resources into learning opportunities.

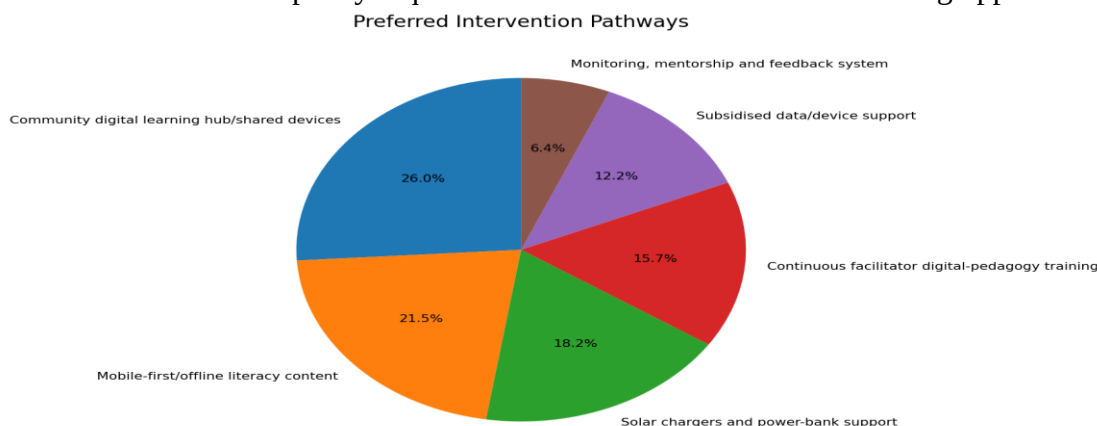


Figure 5. Preferred intervention pathways reported by respondents.

Table 7: Skill and Delivery-Gap Response Matrix for Akamkpa Adult Literacy Centres

Delivery domain	Evidence from results	Technology-driven response	Responsible actors
Digital devices and learning equipment	Widest gap; few functional devices for learner practice	Shared tablets/phones, projector sets, secure device storage and centre-based practice sessions	State adult education agency, LGA education unit, NGOs, community groups
Internet connectivity and data affordability	Weak network and high data cost reduce online participation	Offline lessons, downloaded videos, low-data WhatsApp tasks and community Wi-Fi where feasible	Network partners, centre managers, facilitators
Electricity supply and charging support	Irregular power interrupts lessons and charging	Solar chargers, power banks, charging timetable and device-use rotation	Government, development partners, community leadership
Facilitator digital competence	Some facilitators lack confidence in digital pedagogy	Hands-on training on audio lessons, mobile teaching, digital	Adult education departments, teacher trainers, ICT partners



		safety and simple troubleshooting	
Learner digital readiness	Adult learners may fear devices or lack basic navigation skills	Gradual digital orientation using familiar tasks such as reading SMS, typing names and using calculators	Facilitators, peer mentors, centre supervisors
Local-language and relevant content	Digital content may not reflect learners' daily lives	Local examples, audio explanations, occupational literacy and bilingual support	Content developers, facilitators, community resource persons
Gender-sensitive and inclusive access	Women, older adults and low-income learners may be disadvantaged	Flexible scheduling, shared devices, women's peer groups and safe learning spaces	Centre managers, women groups, community leaders
Monitoring and feedback	Attendance may be tracked but digital skill gains ignored	Simple progress checklist for literacy and digital confidence outcomes	Supervisors, facilitators, programme evaluators

Source: Author's field survey and analytical synthesis, 2026.

The response matrix in Table 7 brings the separate findings together as an implementation sequence. Its early actions are deliberately basic: shared devices, offline materials, solar charging, facilitator training and straightforward monitoring. None depends on a highly sophisticated platform. This matters in an adult literacy setting because confidence and familiarity are themselves part of readiness. A gradual pathway gives learners opportunities to practise with support before more demanding online activities are introduced.

Discussion of Findings

The central pattern in the findings is the distance between what respondents consider necessary for technology-driven adult education and what their centres currently provide. Required levels for devices, internet access, electricity, funding and facilitator competence were consistently high, whereas current availability was much lower. In practical terms, the result shifts attention away from enthusiasm for digital education and toward the conditions that make repeated use possible. Digital inclusion in adult learning requires material access and institutional support, not policy intention alone (NITDA, 2023; World Bank, 2025).

Digital devices and learning equipment produced the widest gap. For adult literacy, this shortage has consequences beyond simple access to hardware: learners build confidence through repeated, guided interaction, yet centres with few functional phones, tablets, computers or projectors have little opportunity to provide such practice. The result is consistent with the infrastructure and personnel constraints reported by Igwe et al. (2024) in adult literacy settings. It also accords with UIL (2023), which places educator capacity and appropriate learning resources at the beginning of literacy digitalisation. In Akamkpa, hardware provision and facilitator capability therefore need to develop together rather than as separate interventions.

Connectivity presents a related but distinct constraint. Online learning models commonly assume that learners can stream, download, use platforms and communicate interactively whenever



required. Anthony et al (2026) affirmed that using town hall meetings and folk media communication as community education strategies help to creating awareness. The Akamkpa responses show why that assumption is fragile in a local adult literacy context: data can be unaffordable and network service unreliable even where mobile coverage exists. GSMA Intelligence (2024) describes this wider Sub-Saharan African problem as a usage gap, in which coverage does not translate automatically into meaningful mobile internet use because affordability, skills and relevance remain barriers. The survey findings locate Akamkpa within that broader pattern and strengthen the case for low-data and offline alternatives.

Power supply creates a further bottleneck because access to a device does not guarantee that it can be kept usable. Respondents rated irregular electricity as a very high challenge, with direct implications for phone charging, projector use, audio-visual lessons, printing, record keeping and evening classes. Their preference for solar chargers and power banks is therefore closely tied to the problem identified in the ratings rather than being an unrelated infrastructure suggestion. In centres where grid supply is unreliable, small-scale alternative charging arrangements become part of the instructional infrastructure needed to keep digital activities running.

The human-capacity findings are equally important. Willingness to learn does not remove the anxiety that some adults may feel when they are asked to operate unfamiliar devices, particularly when mistakes are visible to others or earlier experiences with technology have been discouraging. Facilitators must therefore be able to scaffold digital activity in the same way they scaffold literacy: slowly, practically and without embarrassment. Digital-pedagogy preparation should help them connect device use to reading and numeracy tasks, draw on familiar local examples and protect learners from avoidable digital risks (UIL, 2023; Ugwu & Umezuruike, 2023). Basic ICT competence alone does not address these pedagogical demands.

Although gender-sensitive and inclusive access did not produce the largest gap, its high challenge rating remains consequential. A programme organised around personal device ownership, fixed attendance times or independent online tasks can disadvantage women, older adults and low-income learners even when a digital service technically exists. Banyan Global (2023) similarly identifies affordability, literacy, social norms and awareness as influences on women's digital access in Nigeria. For Akamkpa, inclusion therefore has to be built into delivery through shared equipment, flexible and women-friendly scheduling, peer support and safe opportunities for centre-based practice.

The strong preference for community digital learning hubs reflects this need to reduce individual barriers. Rather than selecting sophisticated systems as the immediate solution, respondents favoured shared facilities where equipment, charging, downloaded materials and facilitator assistance can be concentrated. A hub allows learners to practise in groups, receive help when difficulties arise and use devices without bearing the full cost of ownership and data. This preference fits the digital-inclusion position that meaningful use depends on support, confidence and relevance as much as on the physical presence of a network (NCC, 2024; World Bank, 2025).



Mobile-first and offline literacy content formed another highly ranked response. The preference is consistent with a setting in which smartphones are more attainable than computers but internet access remains uneven. Babanzara (2025) notes the potential of smartphones for audio instruction, reading practice and flexible adult learning while also recognising the constraints created by connectivity, affordability and limited digital skills. The Akamkpa evidence points to the same balance: mobile technology is useful when it supplements, rather than displaces, facilitator-led instruction and when learners can continue practising without continuous connectivity.

Taken together, the results favour a blended model rather than a fully automated or online programme. Adult literacy learners may require repetition, explanation, encouragement and social interaction at the same time that they are building basic digital confidence. Removing the facilitator from that process would overlook a central condition of adult learning in the centres studied. A workable Akamkpa model therefore combines face-to-face guidance with shared devices, low-data and offline resources, solar charging support and simple progress monitoring, using technology to extend human facilitation rather than to replace it.

Implications for Adult Education Delivery

For adult education planning in Cross River State, the findings point toward staged implementation rather than a single large technology rollout. An initial phase would concentrate on access: shared devices, facilitator preparation and simple digital tasks that learners can practise with support. A second phase could add offline audio-visual resources, low-data communication and regular centre-based practice. More structured digital literacy modules, online resources and learner-progress tracking would become appropriate only after these foundations are functioning. Such sequencing links the pace of technological expansion to the readiness of centres and learners.

Facilitators are central to that sequence because they translate access into usable learning. Supplying devices without building instructional competence is unlikely to produce durable change. Professional development should therefore cover digital lesson planning, mobile learning, adult motivation, inclusion, privacy and routine troubleshooting, with emphasis on how these skills work inside literacy teaching rather than as a separate ICT activity. This implication is consistent with UIL's (2023) emphasis on strengthening the digital skills of literacy educators.

Monitoring also needs a broader focus than attendance records. Useful indicators would show whether learners can read digital messages, type simple words, search for information, use calculators, complete basic forms and behave safely in digital environments. Tracking these practical competencies alongside conventional literacy progress would give programme managers a clearer basis for judging whether technology is improving capability rather than merely increasing exposure to devices.

Contribution to Knowledge

The study adds an empirical, centre-level dimension to a discussion that is often framed conceptually. By measuring delivery gaps within adult literacy centres, it shows technology adoption as an interaction among infrastructure, electricity, connectivity, affordability, facilitator



competence, learner confidence, gender inclusion, local content and monitoring. This integrated view matters because weaknesses in any one area can reduce the usefulness of resources available in another.

A second contribution is the gap-score approach, which places required conditions beside current availability rather than describing either in isolation. The comparison gives planners a practical way to rank deficits before committing resources to a digital learning initiative. In the Akamkpa results, the method directs immediate attention to devices, internet access, electricity, funding and facilitator training, allowing intervention priorities to be tied directly to the pattern reported by respondents.

The response matrix extends that contribution from diagnosis to action. Each identified delivery problem is connected with a feasible intervention and a group of responsible actors, creating a bridge between survey evidence and programme planning. The framework can therefore inform local government education authorities, adult education agencies, community leaders, NGOs, development partners and literacy facilitators working toward more inclusive digital literacy provision.

Conclusion

Technology can make adult literacy provision in Akamkpa Local Government Area more flexible, visual and closely connected to everyday activity, but its contribution depends on how it is embedded in existing learning relationships. Mobile phones, audio lessons, offline videos, digital forms, messaging platforms and shared devices can create additional opportunities to practise literacy for business, farming, family care, civic participation and lifelong learning. These benefits are most plausible when the tools respond to practical needs rather than becoming ends in themselves.

The survey nevertheless shows that the foundations for such use are uneven. The largest delivery gaps concern digital devices, internet connectivity, electricity supply, funding and maintenance, while learner confidence, facilitator digital-pedagogy skills, language, gendered access and monitoring also present difficulties. These constraints are interconnected. Ignoring them can turn a technology initiative into another source of exclusion, particularly for learners who already have limited educational and digital access.

The most workable pathway indicated by the evidence is therefore blended, inclusive and community supported. Face-to-face adult education remains the core of delivery, with technology used to reinforce practice, communication, motivation and access to useful information. Shared devices, low-data and offline materials, solar charging, trained facilitators, gender-sensitive planning and continuous monitoring of literacy and digital skill outcomes provide the practical conditions for that model to function in Akamkpa.



Recommendations

On the basis of the findings, the following recommendations are proposed:

1. Adult literacy centres in Akamkpa should use blended delivery in which face-to-face instruction is reinforced by mobile reminders, audio lessons, offline video and supervised phone-based practice.
2. Government and development partners should prioritise basic centre-level digital infrastructure, including shared smartphones or tablets, projectors, power banks, solar chargers and secure facilities for storing equipment.
3. Regular facilitator development should concentrate on digital pedagogy: using technology to teach reading, writing, numeracy, livelihood skills and digital safety, rather than limiting training to general ICT operation.
4. Technology-supported delivery should be designed around mobile, low-data use because smartphones are more realistic than computers for many adult learners. Centres serving communities with weak connectivity should maintain offline learning materials.
5. Learners should encounter digital tools gradually through familiar activities such as reading text messages, typing names, using phone calculators, checking prices, sending simple messages and accessing public information.
6. Additional support should be built in for women, older adults, low-income learners and people with limited digital confidence through flexible schedules, peer groups, shared devices and safe centre-based practice.
7. Technology should remain an aid to adult educators rather than a substitute for the patience, explanation, encouragement and human guidance that adult literacy learners require.

REFERENCES

- Almeida, F., & Morais, J. (2025). Non-formal education as a response to social problems in developing countries. *E-Learning and Digital Media*, 22(2), 122–138. DOI: 10.1177/20427530241231843.
- Andong, H. A., Ubana M. U., Igboke, S.B. & Arikpo, S. O. (2025). Incorporating digital technology to adult literacy education programmes in Cross River State. *Unizik Journal of Educational Research, Science and Vocational Studies (UJERSVOCS)* Vol. 2 (1); Pp. 321-338.
- Anthony, G. B., Ushie, G. B. & Ubana, U. M. (2026). Using town hall meetings and folk media communication as community education strategies for creating awareness on forest resource conservation in Northern Cross River State, Nigeria. *African Journal of Educational Management, Teaching and Entrepreneurship Studies*, 18(1). <https://doi.org/10.65360/ajemates.v18i1.1003>



- Babanzara, U. H. (2025). The potential of smartphone technology for adult literacy development in Nigeria: Opportunities, challenges, and strategies. *Sokoto Educational Review*, 24(2), 129–139. DOI: 10.10318/SER.2025120090.
- Banyan Global. (2023). Understanding the gender digital divide in Nigeria. https://banyanglobal.com/wp-content/uploads/2023/08/Nigeria-GDD-Brief_Final-508-May-2023.pdf
- De Simone, M., & Manolio, F. (2025). *Digital skills in Nigeria: A summary of the population's status and perspectives*. World Bank.
- Federal Ministry of Education. (2023). *National digital learning policy*. Federal Republic of Nigeria.
- GSMA Intelligence. (2024). The mobile economy Sub-Saharan Africa 2024. <https://www.gsmainelligence.com/research/the-mobile-economy-sub-saharan-africa-2024>
- Helen A. A., Ubana M. U. & Grace B. B. A. (2025). Building digital literacy through social work education for sustainable development. *Scientific Journal of Educational Management, Research and law*. Vol. 3 (1). Pp. 420-425.
- Helen, A. A., Catherine, N. T. & Ubana, U. M. (2025). Evaluating the effectiveness of digital learning platforms in enhancing adult literacy skills acquisition in rural communities in Cross River State, Nigeria. *Scientific Journal of Educational Research and Law (SJERAL)*. 3,(1). 185-196. <https://journals.aemapp.org>
- Igwe, N. J., Ekere, O. R., & Agbo, D. A. (2024). Use of digital tools in adult information literacy programmes in Nigeria: A case study of Nsukka Urban. *Ikenga: International Journal of Institute of African Studies*, 25(4), 150–176. DOI: 10.53836/ijia/2024/25/4/007.
- International Training Centre of the International Labour Organization. (2021). Digital inclusion in adult learning: Practices and recommendations. https://www.itcilo.org/sites/default/files/2021-04/Digital%20Inclusion%20publication_Final_0.pdf
- National Bureau of Statistics & United Nations Children's Fund. (2022). 2021 Multiple Indicator Cluster Survey/National Immunization Coverage Survey: Survey findings report. <https://www.unicef.org/nigeria/reports/2021-multiple-indicator-cluster-survey-national-immunization-coverage-survey-report>
- National Communications Commission. (2024). Baseline study on the level of digital skills in Nigeria: Women, youth and the physically challenged. <https://ncc.gov.ng/sites/default/files/2024-11/Baseline-Study-on-Level-of-Digital-Skills-on-Nigeria-%28Women%2C-Youth-and-the-Physically-Challenged---RD1.pdf>
- National Information Technology Development Agency. (2023). National Digital Literacy Framework. <https://nitda.gov.ng/wp-content/uploads/2023/07/Digital-Literacy-Framework.pdf>
- Odo, R. S., & Nwizu, S. (2024). Digital literacy for professional development of adult and non-formal educators: Opportunities and challenges. *Journal of Centre for Distance & e-Learning*, 4(1), 60–71.



- Ojo, D. F. O. (2024). Challenges of adult and non-formal education for sustainable development in the digital divide. SSRN. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=5331343
- Owede, K. E. (2023). Enhancing the frontiers of adult and non-formal education practice through digital learning in Nigeria. *Journal of Continuing and Development Education*, 3(2), 10–18.
- Ubana M. U., Awah, G. O., Emmanuel A. A., Igboke, S. B., Abuokwen, A. A., Patrick, E. O. & Arikpo, S. O. (2025). Youth participation in socio-economic activities and community development in Central Cross River State, Nigeria. *Unizik Journal of Educational Research and Policy Studies* VOL.19 (4); Pp. 135 – 153.
- Ubana, M. U., Glory E. E., Undie, R. A. & Elizabeth O. P. (2024). Artificial Intelligence (AI) A tool for combating unethical practices in Social Works Education. *Journal of Environmental and Tourism Education*, Vol. 7. (3) 12 -28. ISSN: 2659-0794
- Ubana M. U., Obeten, O. O., Musa, Z. & Eloma, A. S. (2025). Harnessing security approach and artificial intelligence (AI) as tools to combat corrupt/unethical practices in Social Work Education: A Paradigm Shift. *African Journal of Educational Management, Teaching and Entrepreneurship Studies*, Vol. 15 (2), 318 – 334. <https://ajemates.org>
- Ugwu, C. U., & Umezuruike, N. A. (2023). Adult education programmes as a tool for promoting digital literacy among adult learners in Nigeria. *Journal of Continuing and Development Education*, 3(1), 88–95.
- UNESCO Institute for Lifelong Learning. (2023). Literacy educators in Nigeria enhance their digital skills for instruction. <https://www.uil.unesco.org/en/articles/literacy-educators-nigeria-enhance-their-digital-skills-instruction>
- World Bank. (2025). Digital skills in Nigeria: A summary of the population's digital skills. <https://documents.worldbank.org/pt/publication/documents-reports/documentdetail/099954107182514013>