Unizik Journal of Educational Research, Science and Vocational Studies (UJERSVOCS) Volume 2 (1); May-August, 2025; https://unilaws.org/ujervs
E-ISSN (Online): 1595-6199 ISSN (Print): 1595-6202

INCORPORATING DIGITAL TECHNOLOGY TO ADULT LITERACY EDUCATION PROGRAMMES IN CROSS RIVER STATE

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ABSTRACT

This study is on the incorporation of digital technology in adult literacy education programmes in Cross River State. Three objectives and three research questions guided the study. It adopted a descriptive survey. Three hundred adult learners participating in literacy programs across the state made up the population. Out of these, 150 adult learners and 50 facilitators were selected for the study. The researcher adopted a multistage sampling procedure to select the sample size. A four-point modified Likert scale questionnaire titled "Incorporating Digital Technology to Adult Literacy Education Programmes Questionnaire (IDTALEPQ)" was used for data collection. Collected data was analyzed with descriptive statistics (mean, standard deviation, frequency). Findings revealed that the integration of digital technology to enhance adult literacy instruction in adult literacy in Cross River State remains low due to insufficient facilitator training, limited infrastructure, and inconsistent usage across centers; adult learners possess low digital literacy skills and lack confidence in using digital tools, and that the effective integration of digital technology into adult literacy education is hindered by systemic challenges such as high data costs, poor infrastructure, lack of technical support and skills, irrelevant content, and resistance to change among both facilitators and learners. Based on the findings, the study concluded that despite recognition of the benefits of digital technologies in adult literacy education, their integration remains very limited due to infrastructural, pedagogical, and competency-related challenges, highlighting the urgent need for comprehensive interventions in training, infrastructure, content development, and change management. However, the study recommended comprehensive digital literacy training for adult literacy facilitators and learners, context-specific instructional support, and a strong capacity-building framework to integrate digital technologies into adult education programs effectively.

Keywords: Digital Technology, Adult Literacy Education, Adult Literacy Education Programme.

Introduction

Literacy remains a foundational element for individual and societal development. It empowers individuals to function effectively in society, participate in economic activities, and make informed decisions. In Nigeria, literacy among adults has historically lagged behind national goals due to a combination of economic, cultural, and infrastructural challenges. The situation is even more pronounced in some states like Cross River, where rural communities often face limited

access to quality education, particularly for adults. Adult literacy education programmes have long been positioned as a corrective tool to bridge the knowledge and skills gap in such underserved populations. However, these programmes are often hampered by traditional, outdated teaching methods, limited resources, and lack of innovation in content delivery. In today's global society, digital technology has emerged as a powerful enabler of educational access and quality. Digital tools ranging from mobile learning apps, educational videos, e-books, and learning management systems to more advanced platforms like Artificial Intelligence and Virtual Reality have significantly transformed formal education systems around the world. Yet, in the non-formal education sector, particularly adult literacy education, the integration of digital technology remains uneven and underutilized (Ubana, Glory, Undie and Elizabeth 2024). Many adult literacy centres in Nigeria continue to rely on chalk-and-board methods, rote memorization, and inflexible lesson structures that do not reflect the dynamic realities of learners' lives or leverage modern digital tools that could improve engagement and comprehension.

Cross River State presents a unique case for studying this integration due to its mixed urban-rural population, varying levels of infrastructure, and a state policy environment that has made occasional attempts to incorporate ICT in education. While there is anecdotal evidence of mobile phone usage and informal digital learning among adults in urban areas, the extent to which structured adult literacy programmes have formally embraced digital technologies remains largely undocumented. Furthermore, the adult learner demographic often comprising individuals with low foundational literacy and limited digital experience poses unique challenges that call for context-specific strategies in technology adoption. The transformative potential of digital technology in adult education as emphasised in UNESCO (2020) is providing flexible, individualized learning pathways for adult learners. Studies has shown that digital platforms can enhance learner engagement, improve literacy outcomes, and even boost programme retention rates when implemented effectively but such positive outcomes are contingent on several factors such as availability of digital infrastructure, digital literacy skills among facilitators and learners, relevance of content, and institutional support.

Nigerian National Policy on Education (2013) recognizes the role of Information and Communication Technology (ICT) in all tiers of education, including adult and non-formal education. Yet, the practical implementation of this policy has been largely limited to primary and secondary school contexts. Adult education centres are often left out of digital innovations, creating a gap between national aspirations and local realities. Furthermore, adult learners in Cross River State particularly in rural and semi-urban communities often lack access to digital tools, electricity, and internet connectivity, compounding the challenges of digital integration. Another concern is the digital divide that exists not only between urban and rural learners but also among adult education facilitators. Many facilitators in adult literacy programmes were trained in traditional methods and may themselves lack the digital skills necessary to effectively integrate technology into the classroom. As such, even where devices or digital materials are provided, they are often underutilized or used ineffectively. This underscores the importance of capacity building and institutional support as critical factors for sustainable digital adoption in adult education.

The urgency of incorporating digital technology in adult literacy programmes is further underscored by the evolving knowledge economy, where digital competence is increasingly

necessary for participation in the workforce, civic engagement, and lifelong learning. In this context, literacy is no longer merely the ability to read and write, but includes digital literacy defined as the capacity to access, evaluate, and use information through digital tools. Therefore, a modern adult literacy programme must go beyond traditional content to equip learners with the skills they need to navigate and thrive in a digital world. Despite the growing interest in ICT for education, it usage on adult literacy programmes in Cross River State has been considerably low and even fewer studies are contextually grounded in states, thereby leaving a significant gap in the understanding of how digital tools can be integrated into adult literacy settings in rural and semi-urban communities in Cross River State. Given this backdrop, the present study seeks to explore the integration of digital technology in adult literacy education programmes in Cross River State.

Statement of the Problem

Despite various governmental and non-governmental efforts to eradicate illiteracy among adults in Nigeria, a significant portion of the adult population in Cross River State continues to experience challenges in accessing and benefiting from literacy education programmes. Adult education programmes in Cross River State still struggle with low enrolment, high dropout rates, and poor learning outcomes. Many adult literacy centers are still utilizing outdated teaching methodologies. Traditional methods of adult literacy instruction, often reliant on outdated teaching materials and manual delivery approaches, have proven insufficient in meeting the learning needs and preferences of 21st-century adult learners. With the growing global shift toward digital learning and the increasing availability of digital tools, there is a rising expectation that adult literacy programmes should incorporate technology to enhance access, engagement, and learning outcomes. However, in Cross River State, the integration of digital technology into adult literacy education remains limited and poorly coordinated.

The failure to effectively incorporate digital technology into adult literacy programmes undermines the potential to modernize adult education, bridge learning gaps, and empower adults with relevant skills for the digital economy. This raises critical questions about the current state of digital inclusion in adult education, the readiness of facilitators and learners to engage with digital tools, and the systemic strategies needed to transform literacy education through technology. In view of the above gap, this study is aimed to investigate the extent of incorporation of digital technology in adult literacy education programmes in Cross River State in other to ensure that adult literacy programmes in Cross River State are responsive, inclusive, and future-oriented.

Aim of this Study

This aim of this study is to examine extent of incorporation of digital technology in adult literacy education programmes in Cross River State. Specifically, the study objectives are to:

1. Examine the extent of digital technology integration in adult literacy education programmes in Cross River State.
2. Assess the level of digital literacy among adult learners and facilitators in Cross River State.
3. Identify the challenges hindering the incorporation of digital technology into adult literacy education programmes.

Research Questions

1. To what extent is digital technology integrated in adult literacy education programmes in Cross River State?
2. What are digital literacy level of adult learners and facilitators in Cross River State.?
3. What are the challenges hindering the incorporation of digital technology into adult literacy education programmes?

Conceptual Review

Concept of Digital Technology

One of the most revolutionary forces influencing human contact, communication, education, industry, governance, and global connectedness in the twenty-first century is digital technology. According to Chinn and Fairlie (2010), it includes a wide range of electronic tools, systems, resources, and devices that produce, store, or process data. The introduction of digital technology has created new paradigms in problem-solving, data analysis, learning, and productivity, which has completely changed conventional ways of doing business in a number of industries. The binary number system, which uses a series of 0s and 1s to represent information, provides the basis for digital technology. Thanks to its binary logic, data in electronic formats can be encoded, stored, and sent. The invention of digital computers in the middle of the 20th century marked the beginning of the evolution of digital technology. Achieving digital skills is a significant tool for economic and social development in a growing and developing country (Cecilia, Ubana & Jerry 2025). The ENIAC, the first general-purpose electronic computer, was created in the 1940s, setting the stage for later advancements (Ceruzzi, 2012).

Digital technology has developed over the years to encompass not only computer systems but also the Internet, mobile communication, cloud computing, digital imagery, robots, artificial intelligence, and more. These technologies give consumers previously unheard-of access to knowledge and facilitate the efficient completion of complex activities. The convergence of technologies that make it easier to handle and distribute information across platforms and boundaries is a hallmark of the digital revolution (Castells, 2010). Helen, Catherine and Ubana (2025) opined that digital learning platforms in enhancing adult literacy skills acquisition play a pivotal role to cushioning economic empowerment and promoting economic understanding.

A number of fundamental elements make up digital technology, which works together to provide creative solutions. These consist of data systems, networks, hardware, and software. Physical gadgets, including computers, smartphones, sensors, and storage media, are referred to as hardware. Software, on the other hand, includes operating systems, applications, and utility programmes instructions that direct hardware functions. Data may move between sites easily because of the network component, especially the Internet. Cloud technology improves flexibility and scalability by allowing data to be stored and accessed through distant servers. In the meantime, data systems facilitate tasks like machine learning and predictive analytics by acting as the foundation for the organization and analysis of digital information (Brynjolfsson & McAfee, 2014).

Furthermore, Russell and Norvig, (2016), suggested that concepts like automation, connection, and real-time processing underpin the operation of digital technologies. For instance,

physical systems can be remotely controlled and monitored thanks to the Internet of Things (IoT), which links sensors and gadgets. Machines can learn, reason, and make decisions thanks to artificial intelligence (AI), which mimics human intelligence (Russell & Norvig, 2016). Digital platforms have completely changed the way that education is taught and learned. Learning Management Systems (LMS), e-books, online tests, and virtual classrooms all offer adaptable and dynamic learning settings (Selwyn, 2016). Furthermore, social media and digital communication platforms have completely changed the way individuals mobilize, interact, and communicate in the social domain (Couldry, 2012). Notwithstanding these advantages, there are serious issues with digital technology as well. The digital divide, the difference in access to digital tools and the Internet between industrialized and developing nations or between urban and rural areas, is one of the most urgent. Digital technology has many advantages, but it also has drawbacks. Global interest in cybersecurity, privacy, data protection, disinformation, and ethical AI use is growing. Due to the increase in cyber threats, stricter security procedures and awareness campaigns are now required.

Adult Literacy Education Programmes

Programmes for adult literacy education are essential for empowering people, boosting socioeconomic growth, and creating inclusive, engaged communities. Adult literacy education meets the learning needs of adults who, for a variety of reasons, were not exposed to basic education during their formative years, in contrast to formal education, which is aimed at children and youth. According to UNESCO (2015), the goal of these programmes is to give adults the fundamental abilities of reading, writing, and numeracy, as well as essential life skills that will help them contribute to society. Adult literacy is more than just reading and writing; it also includes the acquisition of the practical knowledge and abilities needed for adults to deal with the demands of a complex society. The principles of andragogy, which stress self-directed learning, relevance to the learner's life, and the use of adult experiences as learning resources, are the foundation of adult literacy education. Because of this, adult literacy programmes are usually created using a learner-centered approach that emphasizes critical thinking, problem-solving, and functional literacy that is applicable to adults' everyday lives.

Adult literacy programmes are employed as a corrective measure to overcome educational gaps brought on by poverty, family background and students' attitude towards drug abuse (Ogar, Peter and Saawua 2020). Early marriage, sociocultural norms, individual variables and crime vulnerability or conflict in many developing nations (Philip and Ambor 2022). Demographic attributes and associated risk factors play a defecting and hampering role to adult literacy (Blessing, Godwin, Kooffreh, Anthony, Cecilia, Ivon, Nseabasi, Bassey, Philip, Bassey, and Ogar 2025).

The goal of adult literacy education programmes are to give students the abilities they need to comprehend basic arithmetic, read and write simple statements about their everyday lives, and use what they have learned in real-world situations, including civic engagement, health, and finance. Adult education should include literacy instruction, post-literacy instruction, continuing education, and remedial instruction, according to the Nigerian National Policy on Education (Federal Republic of Nigeria, 2014). These levels illustrate the varied and evolving character of

adult literacy, which starts with fundamental abilities and can continue to lifelong learning and vocational training. The target group and the needs of the setting determine how adult literacy programmes are structured. Programmes might be workplace-based, community-based, or incorporated into larger development initiatives. For example, in order to make learning contextually relevant, functional literacy programmes frequently include themes like maternal health, environmental awareness, or agricultural innovation (Aderinoye, 2008). To further increase accessibility and flexibility for adult learners, adult literacy can also be taught via radio, television, mobile apps, or blended learning methods.

Participatory curriculum development is a crucial component of successful adult literacy programmes. When the curriculum takes into account adults' immediate concerns and goals, they are more inclined to study. Programme planners frequently involve stakeholders, students, and community leaders to provide course material that represents local conditions (Rogers, 2005). In addition to increasing relevance, this participatory method encourages ownership and sustainability of literacy programmes.

Benefits of Adult Literacy Education

Adult literacy instruction has many advantages that affect people on an individual, family, community, and national level. Adult literacy improves a person's capacity for critical thought, problem-solving, and self-worth. Literate adults are more likely to look for work, launch their own companies, or make significant contributions to the advancement of society. Helen Ubana and Grace (2025) asserts that literacy education is a key component for economic development. Tone of school discipline and level of morality also promote literacy education (Okpechi, & Ogar 2022). Asor, Ubana, & Abuokwen (2022) stressed that supervision is the way of guiding, stimulating, improving and overseeing activities and skills of adult. Literate parents are better able to support their children's education, efficiently manage resources, and make knowledgeable decisions about their health at the home level. Particularly literate mothers are more likely to vaccinate their children, follow a healthy diet, and seek prenatal care. Ubana, Glory, Arikpo and Oku (2024) sees administrators' supervisory role on quality service delivery as pivotal tool for promoting community education. Adult literacy's intergenerational effects help end the cycle of underdevelopment and poverty as well as youth participation in socio-economic activities and community development (Ubana, Awah, Emmanuel, Igboke, Abuokwen, Patrick and Arikpo 2025).

Adult literacy programmes implemented throughout the community promote democratic participation, social cohesion, and peacebuilding. Andong, Ubana, Eloma and Musa (2025) asserts that agricultural activities and economic involvement promotes development in societies and organizations. Literate communities are better able to organize, fight for their rights, and take part in political processes. Furthermore, literacy instruction can have a healing and integrative effect in post-conflict or marginalized communities by encouraging communication and understanding between various groups. Nnyenkpa and Bernard (2021) sees parental socio-economic status has instrument to student behavioral change.

Adult literacy boosts creativity and production in the country's economy. higher literacy rates are associated with better economic performance, higher employment rates, and lower

dependency ratios. As reflected in Sustainable Development Goal 4 (SDG 4), which seeks to guarantee inclusive and equitable quality education and encourage lifelong learning for all, literacy is therefore fundamental to sustainable development.

Challenges Facing Adult Literacy Education Programmes

Despite its importance, teaching adult literacy is fraught with difficulties, especially in emerging and low-income countries. Poor infrastructure, a lack of competent facilitators, limited political will, and insufficient money are some of the main obstacles. National education budgets frequently place a low priority on adult education, which results in inconsistent implementation and subpar quality control. Trauma-informed education and counselling is also seen as a tool for educational enhancement (Anake, Anyin, Digang and Anake 2023). Additionally, adult learners may have conflicting demands that restrict their engagement and retention, such as childcare, employment, or social responsibilities. Barriers based on gender continue to exist. Parental educational level, family size and students' attitude play a significant role to the failure and success of a learner (Nnyenkpa and Otu 2021). Impact of genetic counselling ((Effiom, Ogar, Philip, David, Ikum, Godwin, Ukpogu, Oluchukwu, Eme, Dada, Godwin, Ubi, Ignatius, and Bassey 2025). Cultural traditions in many societies either limit women's mobility or prevent them from engaging in public learning environments. This restricts the scope of adult literacy programmes and raises the rate of illiteracy among women (Stromquist, 2005). Gender-sensitive policies, flexible learning schedules, and community sensitization initiatives are necessary to remove these obstacles. Another difficulty is the absence of trustworthy data and monitoring systems. Without precise statistics on enrolment, learning outcomes, and programme impact, evaluating progress or making informed policy decisions is challenging. Because of this, many adult literacy programmes lack proper accountability systems or evidence-based planning

Adult Literacy Programmes in Cross Rivers State

The goal of Cross River State's adult literacy programmes is to meet the educational needs of adults who have not received a formal education or who need extra skills to contribute to society. Together with regional and global partners, the Cross River State Agency for Mass Literacy, Adult, and Non-Formal Education carries out these programmes. Reducing illiteracy, empowering residents economically, and fostering inclusive social development throughout the state are their primary goals. In order to satisfy the various and intricate needs of adult learners, these adult literacy programmes are changing. These programmes greatly support sustainable development, poverty alleviation, and individual empowerment by emphasizing both literacy and livelihood. The following are a few of the adult literacy initiatives offered in Cross River State to adult learners:

1. Adult Basic Education (ABE) programmes emphasize the fundamentals of reading, writing, and numeracy. These are frequently provided in rural and semi-urban areas, with a focus on civic engagement, health education, and community involvement. A gender-sensitive approach to literacy delivery is evident in the fact that women make up the majority of the recipients.
2. Entrepreneurial/Vocationally Integrated Literacy Programmes integrate literacy education with the development of skills in computer operation, agribusiness, tailoring, and catering.

This method increases students' economic empowerment by giving them both a foundational education and employable skills.

3. Initiatives for Digital/ICT-based literacy Training are also making progress, particularly thanks to collaborations with groups like the Asuquo Ekpenyong Foundation and Tech4Dev. These programmes offer computer usage, internet safety, and digital communication training to underserved populations, such as older people, those with disabilities, and rural women.
4. Facilitator Capacity-Building Programmes are essential for raising the standard of adult literacy instruction. These courses give teachers the tools and pedagogical know-how they need to interact with adult learners and oversee informal learning settings.
5. Community-Supported Functional Literacy via the UNIVA Programme, which connects literacy instruction to the daily lives of community members. To guarantee that what is learned is directly valuable for their livelihoods, literacy programmes could be integrated into artisan groups, farmers' associations, or women's cooperatives. The UNIVA Functional Literacy Programme (UFLP), which UNESCO finances, incorporates literacy into business groups such as women mechanics and traders.

Incorporating Digital Technology into Adult Literacy Education Programmes

Traditional adult literacy education in Cross River State is centered on community-based learning strategies, which are usually distinguished by in-person training. Facilitators lead students through the fundamentals of reading, writing, and math using a combination of oral instruction, chalkboards, and printed materials. In order to promote involvement, classes are frequently conducted in public areas, community centers, or houses of worship. The curriculum focuses on subjects that are pertinent to everyday living, like financial literacy, health education, and agricultural techniques, in order to meet students' functional literacy needs. Although these traditional approaches have been crucial in combating illiteracy, they face several obstacles, including limited accessibility to people in underserved or remote areas where transportation and infrastructure issues are prevalent; problems with set class schedules that clash with adult learners' obligations, such as farming, trading, or housework, which results in irregular attendance and high dropout rates; a lack of teaching resources; low motivation from adult learners, and so if A blended approach, which combines the benefits of digital tools with the strengths of traditional methods, has the potential to transform adult literacy education in Cross River State, given the rapid transformation of the global education landscape brought about by the integration of digital technology.

Cross River State's adult literacy programmes must incorporate digital technology; it is not merely a choice. Digital technologies can make education more flexible, engaging, and accessible by overcoming the drawbacks of traditional approaches. This will equip adults with the skills they need to succeed in the digital world. To fully realize this potential and guarantee that no one is left behind in the pursuit of universal literacy and sustainable development, strategic investments and partnerships are necessary. Nigerian adult literacy education could undergo a revolution with a mixed strategy that combines the benefits of digital tools with the strengths of traditional techniques, promoting social inclusion and sustainable development.

Digital Literacy Levels for Adult Learners and Facilitators

Digital literacy is the capacity to use digital technology to navigate, assess, and produce information efficiently and critically. Digital literacy is a spectrum of competencies that spans from fundamental operating skills to sophisticated digital involvement for adult learners and facilitators. Effective instructional design and learning outcomes in adult literacy programmes, especially in resource-constrained environments like Cross River State, depend on an understanding of the three levels of digital literacy: foundational, intermediate, and advanced; understanding these levels is essential.

1. Foundational Digital Literacy (Basic Level): The foundational level includes fundamental technical abilities, including turning on a device, using a keyboard and mouse, navigating straightforward interfaces, and comprehending simple digital symbols and icons. This level is where most adult learners start, especially in rural areas. According to Aderinoye, Ojokheta, and Olojede (2007), a large number of these students are digital beginners who have had little to no experience with gadgets like computers or smartphones. Accessing digital learning resources, participating in online literacy courses, and completing basic actions like texting or typing documents all require this level. Using projectors or interactive whiteboards during education, as well as simple software like Microsoft Word, are examples of foundational digital literacy for facilitators (Akpan & Igwe, 2021).
2. Functional Digital Literacy (Intermediate Level): This level emphasizes the capacity to use digital tools efficiently for productivity, teamwork, and communication. At this point, adult learners can use email, surf the Internet, take part in online forums, and interact with learning platforms such as educational applications or WhatsApp-based learning groups. Functional-level facilitators are expected to include technology in their instructional strategies. This entails creating digital teaching resources, utilizing digital presentations, interacting with students via online learning environments like Zoom or Google Classroom, and administering tests online. Cross River State is among the many adult education facilitators in Nigeria who, regrettably, still lack the necessary training to operate at this level (Okebukola, 2021). According to Ololube et al. (2015), only a small portion of adult education facilitators in southern Nigeria have the self-assurance and know-how to use ICT tools to support learning. This digital divide between facilitators and learners severely hampered the success of technology-enhanced adult literacy programmes.
3. Critical Digital Literacy (Advanced Level): Critical digital literacy is the capacity to analyze, comprehend, and appraise digital information critically. It includes understanding digital ethics, online safety, privacy, and cyberbullying, as well as being able to spot online manipulation or false information. Achieving this level requires adult learners to become active participants in the digital environment rather than merely consumers of digital content. At this stage, facilitators should be able to help students assess online sources, comprehend their digital rights, and encourage good digital citizenship. They should also be adept at curating and modifying online learning materials to meet the needs of students. In Nigeria's adult literacy market, this level is still primarily aspirational. Few adult education facilitators were prepared to teach digital safety or responsible use of digital platforms, according to a study by Adebayo and Olatunji (2020). The majority of current

training is on fundamental computer literacy, with minimal attention paid to the ethical and critical facets of digital use.

Several issues impede the advancement of digital literacy levels for facilitators and adult learners, including:

1. Infrastructure Deficits: Limited access to digital devices, the Internet, and electricity, especially in rural regions, restricts exposure to digital content
2. Capacity Gaps: Many adult education facilitators lack opportunities for continuous professional development and have little formal training in ICT integration.
3. Digital Divide: Socioeconomic differences, particularly between urban and rural learners, impact access to digital literacy resources and skills.
4. Gender Gaps: Due to cultural and financial limitations, women in rural regions are less likely to own mobile devices or have access to digital education

Notably, community-based and donor-funded projects are progressively introducing foundational skills; nevertheless, this is only at the basic or lower functional level for the majority of learners and facilitators in Cross River State. To go beyond this, it will be necessary to make investments in digital infrastructure, provide facilitators with ongoing training, and implement specialized teaching strategies that close the gap between technology and context. Unlocking the full potential of adult literacy programmes in the digital age requires digital empowerment for both instructors and learners.

Methodology

The research design adopted for this study was a descriptive survey. this design enables the researcher to characterize the attitudes, behaviors, and trends of facilitators and learners in their natural environments. This study was carried out in Cross River State Nigeria. Selected adult literacy centers throughout the state were the focus of documenting a range of experiences with digital technology integration. Three hundred adult learners participating in literacy programmes made up the population. Additionally, 100 instructors and facilitators of adult education participated in the programme's implementation. Using a multistage sampling process, a sample size of roughly 200 participants which comprised 150 adult learners and 50 facilitators was chosen. In stage one, literacy centers in both urban and rural LGAs with known digital activity were selected using the purposive sampling technique. In step two, stratified random sampling was employed to guarantee that facilitators and learners were represented. Finally, in step three, respondents were chosen at random from each stratum using simple random sampling. Data for the study was gathered using the "Incorporating Digital Technology to Adult Literacy Education Programmes Questionnaire (IDTALEPQ)," a structured modified 4-point Likert scale (very high extent, VHE=4, High extent HE=3, Low extent, LE=2, and Very low extent, VLE=1). Two professionals in the fields of adult education and measurement and evaluation validated the questionnaire's content and face. Expert recommendations were taken into consideration prior to final administration. A pilot test was carried out within the study area but outside the sample size to assess the instrument's dependability. Internal consistency was assessed using the Cronbach Alpha technique, yielding a reliability rating of 0.86. The instrument was deemed acceptable as the obtained reliability coefficient of 0.86 was higher than 0.5. The questionnaires were given out

in person by the researcher and qualified helpers. 186 of the 200 copies of the questionnaire that were distributed were found and used to analyze the data. Descriptive statistics (mean, standard deviation, frequency) were used to analyze the collected data.

Data Analysis

Research Question One: To what extent is digital technology integrated in adult literacy education programmes in Cross River State?

Table 1: Analysis of Extent to which Digital Technology is Integrated in Adult Literacy Education Programmes

S/N	Statements	VHE	HE	LE	VLE	Total	x̄	StD	Decision
1	You are aware that digital technologies such as computers, tablets, educational apps) are used in adult literacy education programmes	20 (80)	26 (78)	70 (140)	70 (70)	186 (368)	1.98	0.91	Low Extent
2	In your center, digital technology is regularly used to support reading and writing instruction in adult literacy classes	20 (80)	21 (63)	85 (170)	60 (60)	186 (373)	2.00	0.90	Low Extent
3	Audio-visual materials (e.g., videos, interactive lessons) are part of the teaching methods in my literacy programme	20 (80)	26 (78)	79 (158)	61 (61)	186 (377)	2.03	0.91	Low Extent
4	Facilitators in your adult literacy centers are trained to use digital tools in teaching	26 (104)	20 (60)	61 (122)	79 (79)	186 (365)	1.96	1.02	Low Extent
5	Digital tools make literacy classes more engaging and easier to understand.	40 (160)	36 (108)	50 (100)	60 (60)	186 (428)	2.30	1.04	Low Extent
6	You have improved in your reading and writing skills through the use of digital technology.	30 (120)	36 (108)	59 (118)	61 (61)	186 (407)	2.19	0.99	Low Extent
7	There is limited access to electricity and internet in the adult literacy centres in my area.	30 (120)	26 (78)	60 (120)	70 (70)	186 (388)	2.09	1.00	Low Extent

Table 1 findings showed that while there is some awareness of digital technology like computers, tablets, and educational applications (mean = 1.98), the actual usage of these tools to enhance reading and writing instruction in adult literacy centers is still minimal (mean = 2.00). Additionally, the incorporation of interactive lessons and movies into teaching techniques received a low grade (mean = 2.03), suggesting that these resources are not frequently used in literacy programmes. One of the significant obstacles found was the absence of training for facilitators in using digital tools for instruction. As a result, a mean score of 1.96 was obtained, highlighting the necessity of focused capacity-building initiatives to give teachers the necessary digital abilities. It's interesting to note that, with the highest mean score of 2.30, respondents largely agreed that digital technologies improve student involvement and comprehension in the classroom. The practical realities of implementation, however, stand in stark contrast to this favorable view.

Another noteworthy issue that was brought to light was the restricted availability of internet and electricity in literacy centers throughout the state (mean = 2.09). This is a significant barrier to the efficient use of digital resources. Despite a somewhat favorable opinion of digital technology's utility, the evidence indicates that institutional and infrastructure barriers significantly impede its integration into literacy instruction. The moderate diversity in replies indicated by the standard

deviation values, which range from 0.90 to 1.04, suggests that while some literacy centers may be making strides in digital integration, others are still far behind. Due to a lack of infrastructure, insufficient training, and inconsistent use, digital technologies are still not widely integrated, despite the fact that adult learners and facilitators recognize their potential to improve literacy instruction.

Research Question Two: What is digital literacy level of adult learners and facilitators in Cross River State.?

Table 2: Analysis of Digital Literacy Levels of Adult Learners and Facilitators

S/N	Statements	VHE	HE	LE	VLE	Total	x̄	StD	Decision
8	You can confidently use a smartphone to access learning resources (e.g., WhatsApp, Google, YouTube).	10 (40)	15 (45)	70 (140)	91 (91)	186 (316)	1.86	0.83	0.83
9	You have basic knowledge of how to operate a computer (e.g., turning it on/off, using a mouse and keyboard).	12 (48)	16 (48)	80 (160)	78 (78)	186 (334)	1.96	0.85	0.85
10	You can use the internet to search for information related to my learning or work.	10 (40)	16 (48)	84 (168)	76 (76)	186 (332)	1.95	0.84	0.84
11	You regularly use digital tools (e.g., online forms, emails, educational apps) in my daily life	3 (12)	5 (15)	78 (156)	100 (100)	186 (283)	1.66	0.76	0.76
12	You have received training on digital skills as part of my adult education programme	7 (28)	12 (36)	59 (118)	108 108)	186 (290)	1.70		0.79
13	You can troubleshoot basic technical issues when using digital tools in class.	5 (20)	11 (33)	62 (14)	108 (108)	186 (285)	1.67		0.77
8	You can confidently use a smartphone to access learning resources (e.g., WhatsApp, Google, YouTube).	8 (32)	11 (33)	85 (170)	84 (84)	186 (319)	1.88		0.82
9	You have basic knowledge of how to operate a computer (e.g., turning it on/off, using a mouse and keyboard).	6 (24)	5 (15)	78 (156)	97 (97&	186 (292)	1.75		0.80

Table 2 analysis showed a consistent trend of low self-assessed digital skills across all items from adult learners' responses on digital literacy competencies. Both respondents expressed a lack of confidence and competence when it came to using computers, smartphones, and online resources for learning. In particular, individuals reported having poor skills in utilizing cell phones to access learning materials, using a mouse and keyboard to operate a computer, and searching the internet for information relevant to their employment or studies. Additionally, the information revealed that they do not frequently use digital tools in their daily lives, such as emails, online forms, and educational applications. The majority of participants' adult education programmes did not include any official instruction in digital skills. Their incapacity to troubleshoot basic technical issues showed a large skills gap.

Both a lack of digital exposure and a widespread exposure and a widespread consensus among respondents regarding their limited competencies are shown by the consistently low mean scores (all below 2.00) and somewhat low standard deviations. According to these results, adult education programmes urgently need to incorporate systematic digital literacy training. Adult learners may continue to struggle with digital engagement in the absence of focused interventions, which would limit their access to knowledge, participation in lifelong learning, and potential to better their socioeconomic circumstances in a world that is becoming more and more digital.

Research Question Three: What are the challenges hindering the incorporation of digital technology into adult literacy education programmes?

Table 3: Analysis of Challenges Hindering the Incorporation of Digital Technology into Adult Literacy Education Programmes

S/N	Statements	VHE	HE	LE	VLE	Total	x̄	StD	Decision
23	Adult education instructors are not adequately trained to use digital tools in teaching	70 (280)	86 (256)	10 (20)	20 (20)	186 (548)	3.28	0.89	
24	You have access to digital devices (e.g., smartphones, tablets, computers) for teaching or learning purposes in your adult literacy center	85 (340)	60 (180)	21 (42)	20 (20)	186 (582)	3.35	0.91	
25	The cost of internet or mobile data hinders the use of digital technology in adult literacy programmes.	70 (280)	75 (225)	15 (30)	26 (26)	186 (561)	3.21	0.96	
26	Lack of electricity and internet connectivity affects the integration of digital technology in adult literacy education	79 (316)	61 (183)	20 (40)	26 (26)	186 (565)	3.18	0.99	
27	Most adult learners lack basic digital skills to use educational technologies effectively	70 (280)	65 (195)	20 (40)	31 (31)	186 (546)	3.13	1.02	
28	There is inadequate technical support or maintenance for digital equipment in adult literacy centres	61 (244)	79 (237)	26 (52)	20 (20)	186 (553)	3.18	0.90	
29	Some adult learners and facilitators resist the shift from traditional teaching methods to digital-based approaches	70 (280)	80 (240)	20	16 (16)	186 (576)	3,27	0.88	
30	Available digital learning materials are not tailored to the needs or context of adult learners.	68 (272)	71 (213)	24 (48)	23 (23)	186 (556)	3.20	0.96	

Table 3 revealed that although digital devices are reasonably accessible, there is broad agreement. Still, their effective integration into adult literacy education programmes is severely hampered by a number of issues, including high data costs, problems with electricity and the internet, a lack of technical support, skill gaps, and irrelevant content. Another layer of complexity in the shift to digital methodologies is the reluctance to change on the part of both facilitators and learners. Furthermore, a large number of adult learners are resistant to digital techniques, lack fundamental digital abilities, and encounter content that is not suited to their learning requirements. Overall, these results indicate that even though some centers have digital tools, systemic issues ranging from pedagogical relevance and cultural attitudes to human capacity and infrastructure deficiencies need to be addressed to ensure meaningful digital transformation in adult literacy education.

Discussion of Findings

There is a low level of digital technology integration in adult literacy education programmes in Cross River State as revealed in the study findings. This is consistent with a number of empirical studies that have shown comparable difficulties in developing nations, especially Nigeria and sub-Saharan Africa when it comes to the adoption of digital technologies in adult learning contexts. According to the findings of Akinyemi and Ofodu (2020), who studied digital literacy practices among adult learners in a few literacy centers in Ekiti State, Nigeria, found that the current findings reflect a lack of understanding and use of digital tools. Their research revealed that while students understood the fundamentals of digital technologies, they rarely used them in practice, mainly as a result of inadequate infrastructure and a lack of training. A similar discrepancy between knowledge and practice was found in this study, where awareness was

marginally present (mean = 1.98), but utilization in instructional activities remained low (mean = 2.00). A significant barrier to the adoption of digital technologies in adult literacy education is the lack of training that facilitators have in using them in the classroom (mean = 1.96), as revealed in this study.

This is in line with the conclusions of Olutola and Olatoye (2021), who investigated Oyo State's adult literacy instructors' ability to integrate technology. According to their research, the majority of facilitators lacked formal training in educational technology use, which made it extremely difficult for them to apply ICT-based teaching practices. This study implies that the advantages of technology in adult education will be mostly unrealized unless intentional investments are made in professional development and digital upskilling. Also, Idowu, Yusuf, and Adetimirin's (2019) findings are consistent with the problem of inadequate infrastructure, particularly the erratic electrical supply and inadequate internet access (mean = 2.09). According to their study on adult learners' preparedness for e-learning in Lagos State's public literacy centers, the main obstacles preventing facilitators and learners from using digital learning platforms were erratic electricity, expensive data, and poor internet connectivity.

These infrastructure limitations act as structural impediments that thwart policy goals and impede initiatives to digitize adult education curricula. When taken as a whole, these studies support the present conclusions and provide a more comprehensive view of the institutional and systemic constraints that Nigerian adult literacy programmes face. Although there is some promise due to the impression of digital tools as useful and engaging (mean = 2.30), it is evident that deliberate policies and real investments are required to close the ongoing gaps in infrastructure, training, and awareness.

The study found that adult learners have poor digital literacy skills in a number of areas, including using smartphones, operating computers, navigating the internet, and resolving simple technical problems. These results are consistent with earlier empirical research and show that training in digital skills needs to be more thoroughly incorporated into adult literacy education programmes. Adult literacy learners in Nigeria, as established in the findings of Aderinoye, Ojokheta, and Olojede (2007), frequently lack the fundamental digital abilities required to participate effectively in technology-enhanced learning environments. This is consistent with the current findings, which indicate that few respondents had received digital literacy training as part of their programme and that they had little ability to use cell phones or other digital tools for learning. Another comparable difficulties were noted by Oladokun and Aina (2011) in their study on ICT use in adult education facilities in Nigeria. Their findings showed that although adult learners were aware of ICT, low confidence and poor usage were caused by a lack of exposure, access to digital tools, and formal instruction. This is consistent with the study's findings, which indicated that students had little aptitude for navigating digital settings or resolving simple technological issues.

Yusuf and Balogun (2011) highlighted that the lack of trained facilitators and the failure to incorporate digital content into literacy courses are two of the most significant barriers to digital literacy in adult education. This study's extremely low use of digital tools and lack of training raise the possibility that facilitators are underprepared or that programmes do not place a high priority on developing digital competence. Together, these results highlight a structural problem: Nigerian adult literacy programmes are failing to sufficiently prepare learners for digital engagement. Since digital literacy is now required for many types of employment, communication, and civic engagement, the implications go beyond schooling to include socioeconomic factors. Furthermore, the study showed that there is widespread agreement even if digital devices are reasonably accessible. However, a variety of challenges, such as high data costs, internet and electrical concerns, a lack of technical assistance, skill gaps, and irrelevant information, make it extremely difficult to integrate them effectively into adult literacy education programmes. The resistance to change on the part of both facilitators and students adds another level of complexity to the transition to digital approaches. Additionally, many adult learners encounter content that is not appropriate for their learning needs, are averse to digital tactics, and lack basic digital skills. This study's findings suggest that in order to achieve significant digital transformation in adult literacy instruction, systemic problems ranging from pedagogical relevance and cultural attitudes to human capacity and infrastructure shortcomings must be addressed, even though some centers have digital technologies.

Conclusion

The study concluded that though the value of digital technologies in improving adult literacy instruction is generally seen favorably, actual integration is still extremely low because of a number of pedagogical, technical, and infrastructure issues. Although digital devices are reasonably accessible, their effective deployment is severely limited by inadequate electrical supplies, erratic internet connectivity, expensive data plans, and a lack of facilitator training. Furthermore, adult learners frequently exhibit poor levels of digital competency, which is indicative of limited exposure and insufficient instruction in digital literacy within the current programmes. Adoption is further hampered by learners' and facilitators' resistance to change, as well as the lack of interesting and pertinent digital content. In order to close the digital divide and improve the caliber and accessibility of adult literacy instruction, these findings highlight the critical need for all-encompassing, well-coordinated interventions that concentrate on increasing capacity, enhancing digital content, upgrading infrastructure, and putting change management techniques into practice.

Recommendations

The study based on the findings recommended that:

1. Adult literacy facilitators should have thorough training in digital literacy. The main focus of these training programmes should be the actual, hands-on use of digital technologies for instruction, such as integrating internet-based resources, educational apps, and audiovisual materials into their teaching strategies.

2. Structured and helpful digital literacy instruction that is adapted to the context and proficiency level of the learners should be included in adult literacy education programmes. This should involve practical lessons on how to use computers, smartphones, and the internet and troubleshoot common digital issues. By including these digital skills in adult literacy programmes, students will be better equipped to engage with the technologically advanced world of today and have greater access to possibilities for lifelong learning.
3. The top priority for adult literacy programmes should be creating a supporting framework with focused capacity-building activities. These should concentrate on giving instructors and students the fundamental digital skills and practical tactics they need to incorporate technology into their lessons

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