



Nigeria Digital Economy Policy Reform in Education: A Qualitative Analysis of Equity, Access, and Learning Disparities

Surajudeen Olawale SADIQ

Department of Educational Foundations and Management, School of General Education, Federal College of Education, Abeokuta, Nigeria

E-mail: sosadiq@fcea-abk.edu.ng, ORCID ID: <https://orcid.org/0009-0004-8168-1940>

Nurudeen Olalekan ORUNBON

Department of Educational Management, Faculty of Education, Lagos State University, Lagos, Nigeria

E-mail: nurudeen.orunbon@lasu.edu.ng, ORCID ID: <https://orcid.org/0000-0002-7479-2624>

Isioma Stella OLAGUNJU

Early Childhood Education Unit, Department of Educational Foundations and Counselling Psychology, Faculty of Education, Lagos State University, Lagos, Nigeria

E-mail: isioma.olagunju@lasu.edu.ng, ORCID ID: <https://orcid.org/0000-0002-7236-6330>

Received 02/05/2025

Revised 10/06/2026

Accepted 28/07/2026

Abstract

Background and Aims: Nigeria's National Digital Economy Policy for Development (NDEPD) 2020–2030 positions digital literacy as a strategic driver of educational transformation and national development. However, persistent inequalities in infrastructure, digital access, and institutional capacity continue to impede equitable implementation, particularly for marginalized populations. This study examines the extent to which the NDEPD promotes equitable access, educational inclusion, and learning opportunities, while assessing the institutional and financial feasibility of its implementation across Nigeria's decentralized education system.

Methodology: A qualitative policy document review was conducted using Braun and Clarke's six-phase thematic analysis framework. Evidence was synthesized from national policy documents, government statistics, peer-reviewed literature, and reports from international organizations and civil society. Source selection followed a PRISMA-ScR-informed screening process, while Digital Divide Theory and the Capability Approach provided the analytical framework for interpreting patterns of access, use, and educational outcomes.

Results: The findings indicate that although the NDEPD provides a comprehensive policy vision, implementation remains constrained by inadequate digital infrastructure, limited internet connectivity, insufficient ICT teacher preparation, fragmented institutional coordination, and persistent gender, disability, rural–urban, and socioeconomic disparities. These structural barriers prevent equitable participation in digital learning and disproportionately exclude vulnerable learners from the intended benefits of digital education reform. The analysis further demonstrates that teacher capacity development and sustainable governance mechanisms are more critical to educational outcomes than technology provision alone.

Conclusion: The study concludes that achieving equitable digital transformation in Nigerian education requires a shift from infrastructure-centred implementation toward an equity-driven strategy prioritizing teacher professional development, inclusive policy design, coordinated governance, and sustained public investment. Without these reforms, the NDEPD is unlikely to achieve its objective of delivering inclusive and high-quality digital education nationwide.

Keywords: Digital Literacy Policy; Nigeria Education Reform; Digital Divide Theory; Equity in Education; Educational Access; Learning Disparities; Qualitative Analysis

Introduction

There is perhaps no more revealing indicator of a society's commitment to its children than the quality and accessibility of the education it provides. In Nigeria's case, the tension between aspiration and reality has never been more apparent than in the realm of digital education. In an era defined by artificial intelligence, big data, and digital commerce, a generation that cannot navigate technology will be left behind not just nationally, but globally.

The National Digital Economy Policy for Development (NDEPD) 2020–2030 was launched by the Federal Ministry of Communications and Digital Economy with the explicit goal of making Nigeria a leading digital economy in Africa. Within the education sector, this translates into an ambitious push for digital literacy across all levels of schooling, from basic education through tertiary institutions. The





policy aligns with Nigeria's broader Universal Basic Education (UBE) Act, the Sustainable Development Goal 4 (SDG 4) on quality education, and the African Union's Agenda 2063. Because Nigeria operates a decentralized federal system in which the 36 states and the Federal Capital Territory bear primary constitutional responsibility for basic and secondary education, the NDEPD's national objectives are necessarily filtered through 37 distinct implementation environments. A state's fiscal capacity, governance quality, and political priorities can produce markedly different outcomes from an identical federal mandate, so that the same policy text may translate into a functioning computer laboratory in Lagos and an empty, unelectrified room in Zamfara. This structural feature of Nigerian federalism is central to understanding why the sections that follow document such wide variation in access, use, and outcome across the country's geopolitical zones.

Despite these high-level ambitions, significant gaps in knowledge remain about whether and how the NDEPD's provisions translate into equitable educational outcomes for Nigeria's most marginalized learners. Existing literature documents infrastructure deficits and policy governance challenges in broad terms, but a systematic evaluation of the NDEPD using an integrated access–use–outcome framework, particularly in relation to gender, geography, and disability, has not yet been undertaken. Specifically, prior studies have concentrated almost exclusively on the access dimension, counting devices, connectivity statistics, and laboratory availability while paying comparatively little attention to whether that access translates into meaningful use or equitable learning outcomes. Where existing work asks whether infrastructure exists, this study asks a different and more consequential question: once infrastructure and policy provisions are in place, are they actually used, and does that use produce equitable outcomes for Nigeria's most marginalized learners? This study addresses that gap by providing a structured, theoretically grounded analysis of the policy's equity implications.

The practical realities of implementation are daunting. Nigeria's education system is decentralized, with states bearing significant responsibility for basic education delivery. Infrastructure deficits are severe: more than 47% of public primary schools lack electricity, and fewer than 20% have functional sanitation facilities (UBEC, 2022). At the basic and secondary levels, many schools experience unreliable connectivity, limited devices, and uneven teacher preparedness. Across all levels, equity goals are further constrained by the digital divide, differences in rural–urban location, gender-related access barriers, disability inclusion, and socioeconomic status, such that digital reforms may produce policy access without generating sustained use or equitable learning outcomes for all learners. It is important to acknowledge at the outset that this study relies on secondary data and publicly available policy documents. The analysis is therefore necessarily dependent on the quality and completeness of available data sources. This limitation is addressed more fully in the methodology section, but its acknowledgement here reflects the academic transparency appropriate to a qualitative policy review.

Research Objectives

The specific objectives of this study are to:

- i. examine the current state of digital access in Nigerian schools, including infrastructure, connectivity, and teacher capacity;
- ii. evaluate the equity implications of the NDEPD 2020–2030 for marginalized learner groups, including girls, children with disabilities, and rural and conflict-affected learners;
- iii. analyze the institutional and financial feasibility of the NDEPD's education components within Nigeria's decentralized federal system;
- iv. propose evidence-based, phased recommendations for more equitable implementation of digital literacy policy in Nigerian education.

Research Questions

The study is guided by the following research questions:

- i. What evidence exists regarding digital literacy interventions in comparable Sub-Saharan African contexts, and what conditions determine their effectiveness?





- ii. To what extent is the NDEPD 2020–2030 feasible given Nigeria’s institutional, financial, and infrastructural realities?
- iii. How are the benefits and limitations of the NDEPD distributed across different learner groups, and who risks being left behind in the implementation process?
- iv. What concrete policy steps can be taken to close the gap between the NDEPD’s ambitious vision and its current implementation trajectory?

Theoretical Framework

Digital Divide Theory

The concept of the digital divide was introduced by Webber and Harmon (1995, cited from Van Dijk, 2005; Warschauer, 2004) to describe the social division between those who are engaged with information technology and those who are not. Digital Divide Theory explains the gap between individuals, groups, and communities who can access, use, and benefit from digital technologies, particularly the internet and computing devices, and those who cannot. The theory has since been developed to encompass three analytically distinct dimensions: (1) Access divide: Differences in whether people have devices, reliable internet connectivity, and affordable service. (2) Use divide: Even when access exists, people differ in digital skills and the depth and quality of their technology use. (3) Outcome/benefit divide: Differential technology use leads to unequal results in education, employment, and civic participation, potentially widening pre-existing inequalities over time.

This theory directly informs the analytical framework of this study. The gender findings are interpreted as evidence that digital exclusion operates through unequal access and capability for girls and women: lower device availability, reduced connectivity, and limited instructional support mean that the NDEPD’s provisions do not translate fully into equitable outcomes for female learners. For rural–urban disparities, Digital Divide Theory supports interpreting differences in infrastructure availability, service reliability, institutional readiness, and affordability as structural constraints that determine how policy intentions translate into classroom practice.

While Digital Divide Theory provides the primary theoretical lens, this study also draws on elements of the Capability Approach (Sen, 1999; Nussbaum, 2000), which has been applied in comparable studies of educational equity in developing countries. The Capability Approach shifts analytical attention from resource provision alone to whether learners are genuinely able to convert access to digital tools into substantive educational capabilities and freedoms. This complementary lens is particularly relevant to the analysis of gender disparities and disability inclusion, where access to technology does not automatically produce equitable outcomes without addressing the social, cultural, and structural conditions that enable or constrain its use. In practical analytical terms, the Capability Approach informed the deductive coding framework by directing specific attention, during the coding and theme-development phases, to evidence of conversion factors: the social, cultural, and institutional conditions that determine whether a learner with nominal access to technology can actually convert it into a functioning educational capability. This lens guided coding most strongly in two of the four equity dimensions examined. For gender, codes captured evidence of household device-allocation norms, restricted mobility, and instructor bias that mediate whether girls’ notional access to school-based technology becomes genuine use. For disability, codes captured the presence or absence of assistive technology, accessible curricula, and trained support staff as conversion factors determining whether children with exceptional needs can transform policy access into educational benefit. The rural-urban and institutional feasibility dimensions were interpreted primarily through Digital Divide Theory, with the Capability Approach applied as a secondary interpretive lens wherever evidence of unequal conversion conditions emerged.

Conceptual Framework

The conceptual framework for this study integrates Digital Divide Theory and the Capability Approach into a tripartite analytical model structured around three core dimensions: Access, Use, and Outcome. The NDEPD 2020–2030 and related policy instruments constitute the independent variables, while regional disparities, socioeconomic status, institutional funding, and public–private sector

dynamics serve as moderating variables that shape how policy intentions translate into on-the-ground realities.

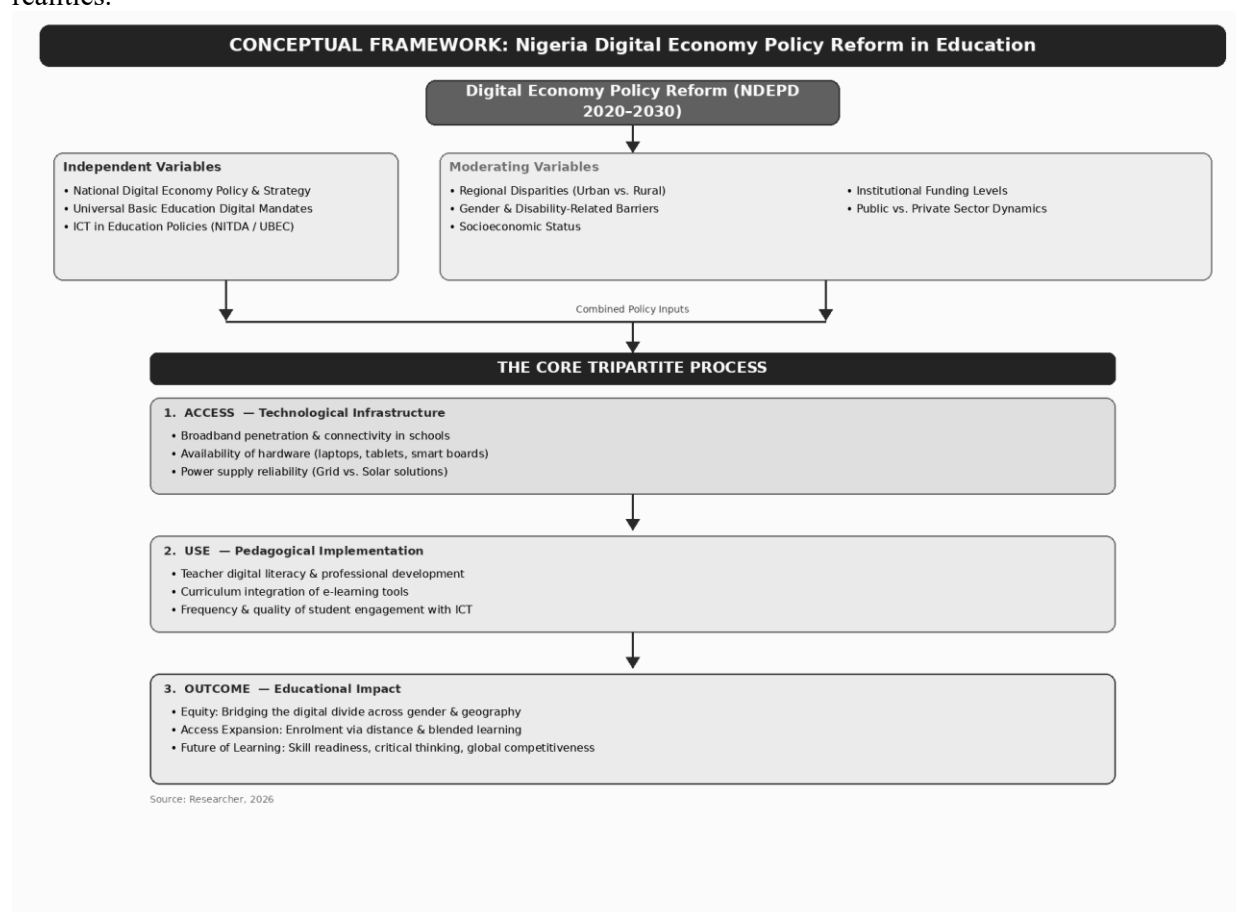


Figure 1: Conceptual Framework on Nigeria Digital Economy Policy Reform in Education: A Qualitative Analysis of Equity, Access, and Learning Disparities (2020–2030)

Source: Researcher's Conceptual Synthesis, 2026.

As depicted in Figure 1, the framework traces a linear-but-mediated pathway. Policy inputs the NDEPD 2020-2030 and its associated instruments flow through a set of moderating factors regional disparities, socioeconomic status, institutional funding, and public-private sector dynamics before producing differentiated outcomes across the three analytical dimensions of Access, Use, and Outcome, which together determine the equity profile of the policy's real-world effects. A key implication of this structure is that strong policy design at the input stage does not, by itself, guarantee equitable outcomes: the moderating factors can attenuate, redirect, or entirely block the translation of policy intent into classroom practice. This is precisely the dynamic that the empirical findings in this study document across gender, rural-urban, institutional, and financial dimensions.

Conceptual Foundations

Digital Literacy

Digital literacy refers to the ability to use digital technologies computers, tablets, smartphones, and the internet effectively and safely. However, scholars and policymakers increasingly recognize that genuine digital literacy extends well beyond basic tool proficiency, a caution Selwyn (2011) raised early in the field in warning against treating technology adoption as inherently beneficial without interrogating the social relations through which it is deployed. Pangrazio et al. (2020) define digital literacy as the ability to understand and use information in multiple formats from a wide range of sources when it is presented via computers. Lankshear and Knobel (2008) further expand this definition to include critical



thinking, information evaluation, online communication ethics, and the capacity to create digital content. The UNESCO Institute for Statistics (2018) framework on digital competencies identifies five core domains: information and data literacy, communication and collaboration, digital content creation, safety, and problem-solving. These domains underpin much of the global discourse on digital literacy policy and provide the benchmark against which Nigeria's NDEPD is assessed in this study.

Mixed Evidence on Global Digital Literacy Interventions

The global literature on digital literacy interventions in Low- and Middle-Income Countries (LMICs) offers a nuanced and often sobering picture. While there is evidence that access to digital technology can improve learning outcomes, this relationship is strongly conditional on the presence of enabling factors: well-trained teachers, reliable infrastructure, culturally relevant content, and sustained institutional support (World Bank, 2020). The evidence from Sub-Saharan Africa in particular reveals a recurring pattern: interventions that prioritize hardware procurement over human capacity development tend to underperform, while those that embed teacher professional development as a core component show more promising results.

Rwanda's One Laptop Per Child (OLPC) programme is frequently cited as a cautionary tale. Despite significant investment, a rigorous evaluation found minimal learning gains, primarily because the programme failed to sufficiently address teacher training and pedagogical integration (Cristia et al., 2017). Kenya's tablet-based literacy programme in rural schools, by contrast, embedded teacher professional development as a central component and demonstrated more promising improvements in literacy and numeracy outcomes (Pitchford et al., 2018). The key differentiator between these two cases was not the technology itself but the degree to which the human and institutional conditions for effective use were cultivated.

South Africa's experience is particularly instructive for Nigeria given the structural parallels between the two countries: similar federal governance arrangements, linguistic diversity, and deep socioeconomic stratification. The Gauteng province's e-learning rollout suffered repeated setbacks due to inadequate connectivity, theft of devices, and insufficient teacher training challenges that South African researchers attributed to a policy design that prioritized hardware procurement over human capacity development (Leshabane et al., 2025). Nigeria, Rwanda, Kenya, and South Africa all face the same fundamental challenge: translating well-intentioned digital policy into structural execution that equips teachers and learners rather than merely procuring technology. The critical lesson from these comparisons is that the conditions enabling equitable digital education are social and institutional, not merely technological.

Nigeria's Digital Literacy Policy Architecture

Nigeria's digital education policy landscape is shaped by multiple overlapping instruments. The Universal Basic Education Act (Laws of the Federation of Nigeria, 2004) mandates free, compulsory education for nine years. The National Policy on Education (Revised 2014) provides the curriculum framework within which digital literacy must be embedded. The National Information Technology Development Agency (NITDA) provides the technical infrastructure rationale, while the Universal Basic Education Commission (UBEC) is responsible for basic education funding allocations. The NDEPD 2020–2030 sits at the apex of this architecture, seeking to coordinate these instruments toward a coherent digital transformation agenda. Measured against the UNESCO Institute for Statistics (2018) five-domain benchmark used throughout this study information and data literacy, communication and collaboration, digital content creation, safety, and problem-solving the NDEPD's education provisions engage substantively with only the first domain, emphasising device and connectivity access, while the remaining four domains receive markedly less curricular or implementation detail. This asymmetry recurs throughout the findings presented below. This multiplicity of mandates and institutions creates a challenging governance environment. Inter-agency coordination has long been a challenge within Nigeria's decentralized federal education system, where responsibilities for policy formulation, financing, and implementation are distributed across federal, state, and local institutions. As a result, states often implement national education policies unevenly, reflecting differences in governance capacity, institutional arrangements, and fiscal resources. Weak accountability and fragmented





coordination have further constrained policy implementation, while the transition to a new federal administration in 2023 introduced additional uncertainty regarding policy priorities, implementation timelines, and public expenditure (World Bank, 2013, 2023).

Nigeria's Federal Ministry of Education's Smart Schools Programme, launched in 2018, provides an important precedent for evaluating the NDEPD. Independent assessments of the programme's pilot phase revealed that fewer than 30% of participating schools in Abuja had functional internet connectivity within one year of deployment, and that fewer than a quarter of teachers felt confident using the new technology (Adeniran et al., 2020). The lesson is clear: building technologically sophisticated infrastructure in environments lacking stable electricity, adequately trained teachers, and clear pedagogical goals produces hardware investment without educational return. Nigeria presents a paradox in this regard: the country possesses commendable policy frameworks but faces critical structural barriers that limit their impact on equity, access, and learning outcomes.

Methodology

Research Design

This study adopts a qualitative policy document review design. This approach is appropriate for a study that seeks to evaluate the equity implications of a national policy reform rather than to test a hypothesis through experimental or survey-based methods. A qualitative design allows for in-depth analysis of the meanings, assumptions, and structural conditions embedded in policy texts and their relationship to the social realities they purport to address.

Data Sources and Selection

The study draws on a combination of primary government data, peer-reviewed academic literature, evaluations by international organizations, and grey literature from civil society. This includes documents such as the NDEPD 2020–2030, UBEC annual reports, Joint Schools Census data, NBS statistical abstracts, UNESCO reports, World Bank education reviews, and independently commissioned policy evaluations. It is important to distinguish between peer-reviewed academic sources and grey literature: both types are appropriate for a policy-focused qualitative study, but they serve different analytical functions. Peer-reviewed sources provide the theoretical and empirical foundation for the analysis, while grey literature, such as government white papers, NGO reports, and institutional evaluations, provides the empirical data on policy implementation. Specifically, the core primary policy texts analysed were the Federal Ministry of Communications and Digital Economy's National Digital Economy Policy for Development 2020-2030 (2020 edition), the Federal Ministry of Education's Joint Schools Census 2022 report, the Universal Basic Education Commission's Annual Report 2022, the National Bureau of Statistics' Annual Abstract of Statistics 2023, and the Teachers Registration Council of Nigeria's 2022 Annual Report on Teacher Capacity and Professional Development. These were supplemented by the UNESCO Institute for Statistics' 2023 education data release for Nigeria and the International Telecommunication Union's ICT Development Index 2023, which provided cross-nationally comparable connectivity benchmarks (International Telecommunication Union. (2023).

A PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analyses for Scoping Reviews) informed screening process was applied to ensure transparent and systematic inclusion and exclusion of sources. An initial search of academic databases and grey literature repositories identified approximately 180 potentially relevant sources. Following title and abstract screening against the inclusion criteria relevance to Nigeria's digital education policy, publication or policy period between 2015 and 2025, and availability in English, 82 sources were retained for full-text review. After applying exclusion criteria related to methodological quality and direct relevance to the research questions, 31 sources were ultimately included in the thematic analysis.

Analytical Approach

Data were analyzed using Braun and Clarke's (2006) six-phase thematic analysis framework: familiarization with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the final write-up. This inductive process was complemented by a deductive coding framework derived from the three dimensions of Digital Divide Theory access, use,





and outcome and the policy objectives of the NDEPD. The deductive codes provided an initial analytical structure against which the inductively generated themes were mapped, allowing both theory-driven and data-driven insights to inform the final thematic framework. To strengthen coding credibility, a second, independent coder with expertise in Nigerian education policy applied the deductive coding framework to a randomly selected 20% subsample of included sources. Divergences between coders were resolved through discussion and, where necessary, refinement of code definitions, following which the primary coder completed coding of the remaining corpus. This process does not substitute for the inter-rater reliability statistics possible in larger-team coding exercises, but it provided a structured check against idiosyncratic interpretation and is reported here transparently as a limitation-mitigating measure rather than a claim of statistical reliability.

Researcher Positionality and Credibility

Since this is a qualitative study relying on interpretive analysis, the background, assumptions, and perspective of the researcher may influence the coding and interpretive process. The researcher brings a background in education policy and development in the Nigerian context, which informed the analytical sensitivity applied to the data. To enhance the credibility and consistency of the analysis, a systematic audit trail was maintained throughout the coding process, and analytical decisions were periodically subjected to peer debriefing.

The primary limitation of this study is its reliance on secondary and publicly available data. The analysis cannot capture the direct perspectives of teachers, students, school administrators, or community members. This constraint means that the findings reflect patterns evident in official and institutional sources, which may not fully represent the lived realities of learners in Nigeria's most marginalized communities. More specifically, reliance on secondary data means the findings are necessarily less reflective of on-the-ground realities than primary fieldwork would provide: official statistics and institutional reports can undercount informal coping practices such as shared devices, community data-bundling arrangements, or teacher-improvised offline materials that partially offset formal infrastructure gaps, just as they can overstate functionality where equipment is nominally present but poorly maintained. This limits the study's ability to capture the nuanced, often contradictory experiences of digital education access and use at the school and classroom level, and readers should interpret the equity patterns identified here as directionally robust rather than precisely quantified at the individual or school level.

Results

State of Digital Access in Nigerian Schools

The starting point for any honest assessment of digital literacy policy in Nigeria must be the current state of technological access in its schools. The picture that emerges from the data is sobering and constitutes a fundamental access divide in the sense articulated by Digital Divide Theory. According to the National Bureau of Statistics (NBS, 2023), only 34.7% of Nigeria's population has access to the internet. This national figure masks dramatic disparities: in urban centres such as Lagos, Abuja, and Port Harcourt, internet penetration exceeds 60%, while in states such as Kebbi, Zamfara, and Yobe, it falls below 10%.

Within schools specifically, the situation is even more constrained. The Joint Schools Census (Federal Ministry of Education, 2022) reports that only 14% of public secondary schools in Nigeria have any form of computer laboratory, and of these, fewer than half have laboratories with functional equipment. At the primary school level, the figure drops to less than 4%. Electricity access, a prerequisite for any digital learning environment, remains unavailable in 47% of public primary schools nationwide (UBEC, 2022). In the North-East zone, where Boko Haram insurgency has disrupted schooling for over a decade, more than 60% of schools lack electricity. These access deficits represent a fundamental barrier: the NDEPD's use and outcome dimensions cannot be realized when the foundational access infrastructure is absent.

Teacher capacity constitutes an equally significant constraint at the use dimension. The Teachers Registration Council of Nigeria (TRCN, 2022) estimated that fewer than 18% of currently serving public school teachers had received any form of ICT training, and of those who had, the training was





often limited to a single workshop of one to three days far from the sustained, practice-embedded professional development that evidence from comparable contexts shows to be necessary for effective technology integration (Darling-Hammond et al., 2017). This finding directly echoes the lessons from Rwanda and South Africa: hardware provision without concurrent investment in teacher capacity produces negligible educational outcomes.

Enrolment, Dropout, and the Digital Learning Gap

Any digital literacy intervention must grapple with a prior challenge: a significant proportion of Nigeria's school-age population is not in school at all. The UNICEF Nigeria Country Office (2022) estimates that 18.5 million children of primary and junior secondary school age are currently out of school, making Nigeria home to the largest out-of-school children population in the world. Among those enrolled, dropout rates are alarmingly high. The NBS (2023) reports a completion rate for junior secondary school of only 54% nationally, with girls in some northern states completing at rates as low as 28%. A digital literacy policy that does not simultaneously address enrolment and retention will fail to reach its most marginalized potential beneficiaries. This raises a direct question for the NDEPD's own scope: does its mandate extend to the 18.5 million children who are not enrolled in formal schooling at all? A review of the policy text finds that the NDEPD's education provisions are framed almost entirely around formal school-based delivery of digital literacy embedded in the curriculum, hardware provided to registered schools, and teacher training routed through TRCN and UBEC structures. The policy makes no substantive provision for non-formal or alternative education channels, such as Almajiri integrated schools, community learning centres, or NGO-run bridging programmes, through which a meaningful share of out-of-school children could otherwise be reached. This is a major and largely unacknowledged gap: a digital literacy policy that reaches only children already inside the formal system will, by construction, exclude the population most at risk of lifelong digital and economic marginalization.

Gender Dimension

Gender equity is perhaps the most urgent inclusion challenge facing Nigeria's digital literacy agenda. In Sokoto State, the net enrolment ratio for girls in junior secondary school was 28.4% in 2022, compared to 51.2% for boys (NBS, 2023). In Borno State, years of Boko Haram insurgency have left a generation of girls with severely disrupted schooling. These enrolment disparities directly constrain the NDEPD's reach: a policy designed to deliver digital skills through schools cannot benefit children who are not in school.

Even among girls who are enrolled in school, gender disparities in digital education remain evident. Evidence from Nigeria indicates that women and girls are significantly less likely than their male counterparts to access and use the Internet because of socioeconomic disadvantage, lower educational attainment, rural residence, and prevailing gender norms that constrain access to digital technologies (Adeleke et al., 2022). Beyond unequal access, cultural expectations and gender stereotypes may also shape classroom participation and engagement with technology, limiting girls' confidence and opportunities to develop digital competencies. UNESCO (2023) similarly reports that gender bias in technology use, unequal access to digital resources, and insufficient gender-responsive educational policies continue to restrict girls' participation in digital learning across many low- and middle-income countries. These findings support the use and outcome dimensions of Digital Divide Theory, demonstrating that expanding access alone does not necessarily translate into equitable participation or educational outcomes when structural and sociocultural barriers remain unaddressed (Adeleke et al., 2022; UNESCO, 2023).

Children with Exceptional Needs

Nigeria's National Policy on Inclusive Education (Federal Ministry of Education, 2015) commits to providing quality education to children with exceptional needs, estimated at approximately 2.5 million school-age children (UNICEF Nigeria, 2022). Digital technology, when appropriately designed, can be a powerful tool for inclusion: screen readers, alternative input devices, text-to-speech applications, and captioning tools can make education accessible to learners who would otherwise be excluded from mainstream schooling. However, the NDEPD's provisions for learners with disabilities are underdeveloped, and the infrastructure and pedagogical conditions necessary to translate inclusive





digital technology into equitable outcomes are largely absent from Nigeria's public school system. Regional evidence underscores both the scale of this gap and the potential of a more deliberate approach. The GSMA (2021) Mobile Disability Gap Report found that persons with disabilities across low- and middle-income countries are significantly less likely than non-disabled peers to own a mobile phone or access mobile internet, with cost, low digital skills, and inaccessible device design cited as the dominant barriers a pattern with direct relevance to Nigerian learners with disabilities. Evidence from Sub-Saharan Africa indicates that learners with disabilities continue to experience substantial barriers to accessing and benefiting from education. The World Bank emphasizes that inclusive education requires accessible learning environments, trained teachers, appropriate learning materials, assistive technologies, and coordinated support services to ensure meaningful participation and improved educational outcomes for learners with disabilities (Wodon et al., 2018). In Nigeria, several civil society and non-governmental initiatives have demonstrated the potential of targeted digital literacy programmes for persons with visual and other disabilities. However, these initiatives remain limited in scale and have yet to be systematically integrated into national education policy or implemented across the public education system. This pattern reinforces the Capability Approach, which suggests that access to technology alone is insufficient unless accompanied by the institutional, pedagogical, and social conditions necessary to convert digital resources into genuine educational opportunities (Sen, 1999; Wodon et al., 2018). This pattern reinforces the Capability Approach's central insight for this study: technology access alone is analytically insufficient without commensurate investment in the assistive tools, accessible content, and trained personnel that convert access into genuine educational capability for learners with disabilities.

Rural–Urban Disparities

The digital divide between urban and rural Nigeria remains a major barrier to equitable digital literacy education. Beyond limited connectivity, rural schools face persistent inequalities in infrastructure, teacher availability, institutional capacity, and socioeconomic conditions. Evidence indicates that inadequate teacher deployment and retention continue to undermine educational quality and the effective implementation of digital education initiatives in rural communities (Omoeva et al., 2018; UNESCO, 2023); qualified teachers, particularly those with digital skills, are reluctant to accept postings to rural schools without electricity, internet access, housing, or professional development opportunities. A farmer's child in Kebbi State and a civil servant's child in Lagos are nominally subject to the same national education policy, but the real educational experiences available to them are worlds apart.

Socioeconomic Exclusion

Socioeconomic status intersects with all the dimensions of digital exclusion analyzed above. The National Living Standards Survey found that children from the bottom income quintile were 4.3 times more likely to be out of school than those from the top quintile (NBS, 2023). Among enrolled children, those from poorer households had significantly lower attendance rates, higher likelihood of early dropout, and less access to educational materials. The cost of commercial internet data further restricts digital learning to those with household income sufficient to sustain connectivity, making digital education, in effect, an expensive luxury for Nigeria's poorest learners.

Institutional and Financial Feasibility

In Nigeria's decentralized federal system, responsibility for primary and junior secondary education rests primarily with state governments. This architecture creates both opportunities and risks. States with stronger governance records such as Lagos, Ekiti, and Anambra have demonstrated the capacity to design and implement education reforms with a degree of coherence and institutional continuity (Ikpuru, 2019). Lagos State's Education District structure, for example, has been recognized by the World Bank as an effective model for decentralized education delivery. These states could serve as implementation hubs and learning laboratories for the NDEPD's digital education components.

The financial dimensions of the NDEPD are perhaps the most critical and least adequately addressed aspects of the policy. Nigeria's public expenditure on education declined from 10.7% of the federal budget in 2015 to 7.9% in 2023, well below the UNESCO-recommended minimum of 15–20% (UNESCO, 2021). The financial requirements for implementing the National Digital Economy Policy





for Development (NDEPD) are substantial and extend beyond the initial procurement of ICT infrastructure. Sustainable digital transformation requires long-term investment in electricity, broadband connectivity, digital devices, software, maintenance, technical support, and continuous teacher professional development. UNESCO emphasizes that financing digital transformation in education requires coordinated public investment, development assistance, private-sector participation, and innovative financing models to ensure equitable and sustainable implementation. Similarly, UNICEF estimates that achieving universal digital learning by 2030 would require approximately US\$1.4 trillion globally, reflecting the significant costs associated with expanding electricity, internet connectivity, digital devices, and digital learning delivery. Given Nigeria's constrained fiscal space and competing development priorities, successful implementation of the NDEPD will depend on phased financing strategies, strengthened intergovernmental coordination, and well-designed public-private partnerships that support long-term sustainability rather than one-time infrastructure investments (UNESCO, 2024; Yao et al., 2021; Carvalho et al., 2025). Against the backdrop of Nigeria's macroeconomic challenges high inflation, naira depreciation, heavy external debt servicing, and the impacts of fuel subsidy removal these sums represent a formidable fiscal challenge. Disaggregating this ten-year envelope by cost type clarifies which investments are most urgent. Evidence from international studies indicates that the largest share of investment required for digital transformation in education is typically devoted to upfront capital expenditure, including electricity, internet connectivity, ICT infrastructure, computer laboratories, and digital devices. However, UNESCO emphasizes that technology investments often fail to improve learning outcomes when they are not accompanied by sustained funding for teacher professional development, technical support, maintenance, and pedagogically appropriate digital content. Initial technology procurement generally represents only a fraction of the total cost of ownership, while recurrent investments are essential for ensuring effective and sustainable implementation. This conclusion is reinforced by evidence from Rwanda's One Laptop per Child (OLPC) programme, where large-scale hardware deployment generated only limited improvements in student learning because teachers received insufficient pedagogical training and technology was inadequately integrated into classroom instruction (Cristia et al., 2017; UNESCO, 2023). In contrast, recurrent investments—including teacher professional development, internet connectivity, device maintenance, software licensing, and technical support—require sustained financing throughout implementation but are essential for ensuring that digital technologies translate into meaningful improvements in teaching and learning. International evidence consistently shows that investments in digital infrastructure alone produce limited educational benefits unless accompanied by continuous teacher capacity development and institutional support (Cristia et al., 2017; World Bank, 2020; UNESCO, 2023). These findings suggest that implementation of the NDEPD should prioritize early investment in teacher professional development and system readiness alongside infrastructure expansion, rather than emphasizing hardware procurement in isolation. Such a balanced sequencing strategy is more likely to generate equitable and sustainable improvements in learning outcomes across Nigeria's diverse educational contexts.

Research on cost-effectiveness in comparable African contexts consistently finds that investments in teacher professional development yield higher and more sustained returns than hardware provision alone (World Bank, 2020). Evidence from rigorous evaluations in Sub-Saharan Africa indicates that sustained teacher professional development can generate substantial improvements in student learning when combined with ongoing instructional support and coaching. These findings suggest that investments in teacher capacity are essential for maximizing the educational benefits of digital technologies and should complement, rather than substitute for, investments in ICT infrastructure (Cilliers et al., 2021; Popova et al., 2022). This evidence has direct implications for how Nigeria prioritizes its constrained digital education budget.

Private Sector Partnerships: Risks and Opportunities

Given Nigeria's constrained fiscal space, public-private partnerships (PPPs) are frequently proposed as a mechanism for closing the digital education financing gap, and the NDEPD explicitly anticipates private sector participation. A systematic review by Languille (2020) of PPP outcomes in Nigerian basic education found a genuinely mixed record: successful arrangements typically involved



narrowly scoped, well-monitored contracts such as device donation combined with vendor-provided maintenance and teacher training, where risk and responsibility were clearly allocated between government and private partner. Less successful arrangements shared a common failure mode: hardware or infrastructure was delivered without binding commitments to long-term maintenance, connectivity subsidy, or pedagogical support, leaving schools with equipment that degraded within a few years and no contractual mechanism to compel renewal. This mirrors the broader Sub-Saharan African evidence on EdTech PPPs, where bureaucratic delays, unclear regulatory guidelines, and misaligned incentives between the government's public-service mandate and private firms' commercial objectives frequently undermine otherwise promising collaborations. For Nigeria, this suggests that the opportunity in private sector involvement is real, particularly for technical expertise, deployment speed, and risk-sharing on capital costs, but that opportunity is only realised where PPP contracts specify enforceable, long-term obligations for maintenance and teacher support rather than one-off hardware donation. Absent such safeguards, PPPs risk reproducing the same access-without-use pattern that characterises Nigeria's state-led digital education investments, only with an additional layer of contractual and accountability complexity.

The Political Economy of Implementation

The technical feasibility analysis above the costing, sequencing, and coordination questions still leaves unanswered a prior question: why do technically sound policies so consistently fail to translate into delivery in Nigeria's education sector? Political economy factors provide part of the answer. Infrastructure procurement, particularly hardware purchase, generates more visible, more quickly claimable political credit than recurrent investment in teacher training, whose returns accrue slowly and are difficult to attribute to any single political cycle; this asymmetry in political payoff plausibly explains the procurement-first, training-last sequencing this study documents throughout the NDEPD's implementation record. Bureaucratic incentives compound the problem: because no single agency is held accountable for combined outcomes, the rational strategy for any one agency is to deliver its own component regardless of whether complementary components materialise, since programme failure can always be attributed elsewhere in the coordination chain. Corruption risk is a further, if less documented, factor: large infrastructure contracts of the scale the NDEPD envisions ₦450 billion for computer laboratories alone create rents that are more easily captured through procurement than through the diffuse, hard-to-monitor spending associated with teacher training delivery, which may itself help explain the persistent policy bias toward hardware investment identified throughout this study's findings. None of this implies that Nigerian officials are uniquely ill-intentioned; rather, it suggests that the NDEPD's technical design, however sound, is operating within an incentive structure that systematically rewards visible capital spending over the less visible, slower-return investments in human capacity that the evidence reviewed in this study identifies as most effective. Any implementation strategy that does not also address these political and bureaucratic incentives risks repeating the access-without-use pattern regardless of how well the technical plan itself is designed.

Enabling and Constraining Factors

Table 1 below presents a structured summary of the enabling and constraining factors identified across the thematic analysis. Each factor is grounded in the evidence reviewed in this study.

Table 1: Enabling and Constraining Factors for Digital Literacy Implementation in Nigerian Educational Institutions

#	Enabling Factors	Constraining Factors
1	Strong federal policy mandate and legal framework	Severe infrastructure deficits (Electricity, Connectivity)
2	Growing mobile phone penetration due to high teledensity (48% nationally)	Inadequate and poorly resourced teacher training
3	Young, tech-interested youth demographic	18.5 million children out-of-school
4	Active civil society and EdTech ecosystem	Conflict and insecurity in North-East and North-West
5	Alignment with AU Agenda 2063 and SDG 4	Fragmented inter-agency coordination



#	Enabling Factors	Constraining Factors
6	Expanding fibre optic and broadband infrastructure	Gender and disability-related access barriers
7	Growing private sector investment in EdTech	Inconsistent political will and policy continuity

Note: AU means African Union; SDG 4 means Sustainable Development Goal 4.

Source: Researcher synthesis, 2026.

Table 2 below provides a further summary of the key thematic findings across the four equity-critical dimensions analyzed in this study.

Table 2: Key Thematic Findings across Four Dimensions of the NDEPD 2020–2030

Theme	Key Evidence	Analytical Implication
Gender Disparities	In Sokoto State, girls' net enrolment in junior secondary school was 28.4% compared to 51.2% for boys (NBS, 2023). Cultural norms and insecurity compound digital exclusion.	Policy reforms have not fully addressed gendered barriers to device access and digital training environments, evidencing unequal capability outcomes (Digital Divide Theory).
Rural–Urban Disparities	Internet penetration below 10% in Kebbi, Zamfara, and Yobe; over 60% in Lagos and Abuja (NBS, 2023). Rural schools face compounded deficits in electricity, teacher quality, and ICT labs.	Structural inequalities in infrastructure, affordability, and institutional readiness constrain digital policy translation into equitable classroom practice.
Institutional Feasibility	States with stronger governance capacity, such as Lagos, Ekiti, and Anambra, have demonstrated greater ability to implement education reforms effectively. However, the decentralized governance structure of Nigeria continues to pose significant coordination challenges among key education institutions, including the Universal Basic Education Commission (UBEC), the National Information Technology Development Agency (NITDA), and the Federal Ministry of Education (FME). Weak intergovernmental coordination and uneven institutional capacity contribute to variations in policy implementation and educational outcomes across states (Babalola, 2019; World Bank, 2018).	Decentralized governance creates divergence between federal policy design and state-level implementation, weakening accountability.
Financial Feasibility	Public education spending declined from 10.7% (2015) to 7.9% of the federal budget (2023)—well below UNESCO's 15–20% benchmark (UNESCO, 2021). Full digital rollout estimated at ₦2.1–3.8 trillion over 10 years.	Constrained fiscal space, naira depreciation, and unproven PPP models limit sustainable investment in digital education infrastructure.

Source: Researcher synthesis, 2026.





Discussion

The findings presented in this study reveal a consistent and analytically significant pattern: Nigeria's NDEPD 2020–2030 is ambitious in its policy vision but structurally under-resourced in its implementation provisions. This tension between policy aspiration and implementation reality is the central dynamic that runs through all four dimensions of the thematic analysis: gender, rural–urban disparities, institutional feasibility, and financial feasibility, and it requires explicit theoretical and analytical engagement.

Interpreted through the lens of Digital Divide Theory (Webber & Harmon, 1995 cited by Van Dijk, 2005; Warschauer, 2004), the findings demonstrate that the NDEPD primarily addresses the access dimension of the digital divide through provisions for connectivity, hardware, and infrastructure without giving adequate attention to the use and outcome dimensions. The evidence from Rwanda's OLPC programme and South Africa's Gauteng e-learning initiative, reviewed in Section 4, suggests that hardware-focused interventions without commensurate investment in teacher professional development and institutional capacity reliably produce disappointing educational outcomes. Nigeria's Smart Schools Programme pilot, which found that fewer than 30% of schools had functional connectivity and less than a quarter of teachers felt confident using new technology within a year of deployment (Adeniran et al., 2020), is entirely consistent with this pattern. The NDEPD, as currently designed, risks replicating this outcome at national scale.

The Capability Approach provides an important supplementary interpretive lens here, particularly in relation to gender and disability. The finding that girls in northern states face digital exclusion not merely because of device unavailability but because of cultural norms, restricted mobility, and under-resourced instructional environments illustrates that the mere provision of access does not produce equitable capability. Nussbaum's (2000) framework draws attention to the social, cultural, and institutional conditions that must be in place for individuals to convert resources into genuine freedoms and capabilities. Nigeria's digital education policy framework has not yet engaged substantively with these conditions.

The comparison with Kenya and South Africa is instructive but must be carefully qualified. Kenya's more promising outcomes in tablet-based literacy (Pitchford et al., 2018) and South Africa's institutional models for insulating school technology investment from political cycles are genuine achievements, but both countries also face profound equity challenges of their own. The lesson for Nigeria is not that these countries have solved the problem of digital education equity, but that the specific enabling conditions they created particularly sustained teacher professional development and localized funding mechanisms represent the kinds of structural investments that Nigeria's policy framework has so far failed to prioritize. Disaggregating precisely what is and is not transferable sharpens the comparison. From Kenya, the transferable element is programme design logic: Pitchford et al.'s (2018) evaluation attributes the tablet programme's success specifically to embedding teacher professional development as a funded, mandatory component from inception rather than as an optional add-on, a sequencing choice Nigeria's federal budgeting process could adopt without requiring Kenya's specific technology platform or vendor relationships. From South Africa, the transferable element is institutional insulation: mechanisms that protect multi-year technology investment from the disruption of political and budget cycles are a governance design choice, not a resource-dependent one, and could plausibly be adapted within Nigeria's existing State Universal Basic Education Board structures. What is not transferable is the underlying fiscal and infrastructural base: both Kenya and South Africa have national electrification rates and per-capita education financing substantially above Nigeria's, and Leshabane et al.'s (2025) own findings show that even South Africa's comparatively resourced Gauteng province struggled with device theft and connectivity failures, suggesting Nigeria should not assume that adopting these countries' programme designs alone would overcome its more severe underlying infrastructure deficit. The comparison therefore yields a specific, bounded lesson for Nigeria: sequencing and insulation mechanisms are worth adapting; assumptions about baseline infrastructure adequacy are not.

The structural and political reasons for the persistence of the aspiration–implementation gap in Nigeria deserve explicit analysis. Nigeria's federal system creates genuine coordination challenges:





with 36 states and the FCT each bearing primary responsibility for basic education delivery, the national policy framework cannot mandate implementation uniformity. Political cycles further compound this problem; the 2023 change in federal administration introduced a period of policy uncertainty that affected both timelines and funding flows. These are not incidental obstacles but structural features of Nigeria's governance architecture that any serious digital education reform must address directly. The coordination challenges within Nigeria's education sector are rooted in the fragmentation of institutional mandates across multiple agencies. The National Information Technology Development Agency (NITDA) is responsible for digital economy policy and ICT development, the Universal Basic Education Commission (UBEC) oversees financing and coordination of basic education programmes, the Teachers Registration Council of Nigeria (TRCN) regulates teacher certification and professional development, while the Federal Ministry of Education (FME) is responsible for education policy, curriculum, and overall sector governance. Although these institutions perform complementary functions, overlapping responsibilities and limited inter-agency coordination often hinder coherent policy implementation across Nigeria's federal education system (Federal Ministry of Education, 2021; NITDA, 2020; UBEC, 2022). None of these four bodies has authority over the others' budget cycles or programme timelines, which means a school can receive NITDA-procured hardware in one fiscal year, UBEC-funded electrification the following year, and TRCN-delivered ICT training only in a third year if at all, producing exactly the sequencing failure that Nigeria's Smart Schools Programme pilot experienced. Because no single agency is accountable for the combined outcome, only for its own component, the NDEPD's coordinating role remains aspirational rather than operational: it can convene these agencies but cannot compel synchronised delivery. This is a structural, not merely administrative, weakness, and it recurs across virtually every policy domain that spans Nigeria's fragmented federal education bureaucracy.

The limitations of this study must be acknowledged in interpreting its findings. As a qualitative policy document review, this study cannot capture the lived experiences of teachers, learners, or community members. The findings reflect patterns in official and institutional sources, which may present an overly optimistic or overly pessimistic picture compared to actual school-level realities. A mixed-methods approach that combines this policy analysis with fieldwork in selected Nigerian states would significantly strengthen both the empirical basis and the practical relevance of the findings.

Conclusion

The case for digital literacy education in Nigeria does not need to be argued, as it is self-evident. In a world increasingly shaped by artificial intelligence, data-driven economies, and digital commerce, a generation of Nigerians without digital literacy will be economically and socially marginalized, not just within Nigeria but in the global community of nations. Digital literacy is not a luxury or an aspiration for tomorrow; it is a right that belongs to every Nigerian child today.

This study set out to examine the current state of digital access in Nigerian schools, evaluate the equity implications of the NDEPD 2020–2030 for marginalized learner groups, analyze the institutional and financial feasibility of the policy, and propose evidence-based recommendations for more equitable implementation. These objectives have been addressed through a systematic qualitative policy review guided by Digital Divide Theory and the Capability Approach.

The evidence demonstrates that Nigeria possesses a visionary policy framework that is undermined by severe infrastructure deficits, inadequate teacher training, fragmented institutional coordination, constrained fiscal space, and persistent structural inequalities of gender, geography, and socioeconomic status. The NDEPD risks becoming another aspirational policy document that delivers meaningful outcomes for a privileged minority while leaving Nigeria's most marginalized learners the 18.5 million out-of-school children, the girls in northern states, the children with disabilities, and the rural learners without electricity or trained teachers further behind.

The analytical contribution of this study lies not in identifying these individual challenges, which are documented in UNICEF, UBEC, and World Bank reports, but in analyzing them together within a policy evaluation framework and linking them systematically to the specific provisions of the NDEPD. This integrated analysis demonstrates that the access, use, and outcome dimensions of digital education





equity cannot be addressed in isolation: progress on each dimension is necessary but not sufficient for achieving the equitable digital future that the NDEPD envisions. Avoiding a further widening of Nigeria's digital divide requires urgent, specific, and adequately resourced action across all three dimensions simultaneously.

Recommendations

The following recommendations are grounded directly in the findings of this study and are offered to federal and state education ministries, donor agencies, civil society organizations, and school administrators. They are organised into short-, medium-, and long-term phases to make implementation more actionable. Critically, the electricity and connectivity infrastructure and teacher professional development recommendations below are prerequisites for every other element of this agenda, not actions to be pursued in parallel with them: curriculum rollout and full digital integration cannot succeed in schools that lack reliable power or teachers capable of using the tools provided, and phasing therefore begins with these two foundations.

Short-Term (0-2 years): Establishing the Prerequisites

i. Establish an Equity-Centred National Digital Literacy Task Force

The federal government should establish a dedicated National Digital Literacy in Education Task Force, drawing representation from the Federal Ministries of Education, Communications, Finance, and Women Affairs; UBEC; NITDA; TRCN; civil society organizations working on girls' education and disability inclusion; and private sector partners. This body should be mandated to develop a fully costed, time-bound, and equity-centred implementation plan within 12 months, with clear accountability mechanisms for federal–state coordination.

ii. **Begin Addressing Infrastructure Deficits Immediately, as a Prerequisite.** Federal and state governments should treat electricity access and basic connectivity not as one input among several but as the absolute precondition for every other digital literacy investment: within this two-year window, the Rural Electrification Agency's solar microgrid programme should be expanded with an explicit mandate to prioritise schools, beginning with the lowest-connectivity states identified in this study's findings (Kebbi, Zamfara, and Yobe), and off-grid solar solutions should be procured through a national framework agreement to achieve cost efficiency. No school should receive digital hardware under later phases of this agenda until its electricity supply is confirmed functional.

iii. **Establish a Monitoring and Evaluation Framework with Equity Indicators.** Before any large-scale rollout begins, the National Digital Literacy Task Force should establish a public monitoring and evaluation framework that tracks not only aggregate access indicators but disaggregated equity indicators by gender, disability status, rural-urban location, and geopolitical zone. This framework should set baseline measurements within the first year and report progress annually, so that the divergence between policy intent and on-the-ground outcomes documented in this study can be tracked and corrected in real time rather than discovered retrospectively.

Medium-Term (2-5 years): Building Capacity and Content

iv. Prioritize Teacher Professional Development

A minimum of 60% of all federal allocations to the NDEPD's education components should be directed toward teacher professional development. Evidence from comparable contexts demonstrates that sustained, practice-embedded ICT training produces learning outcome improvements at approximately one-quarter of the per-student cost of equivalent hardware investments (Cilliers et al., 2021). A nationally coordinated, cascaded training programme should reach all public secondary school teachers within five years, delivered through blended modalities including mobile-based learning for rural teachers and embedded within the TRCN's continuing professional development frameworks. This training must begin in parallel with, not after, the electrification programme initiated in the short-term phase: it is a prerequisite for the curriculum rollout described below, not a parallel workstream, since a nationally piloted curriculum delivered to untrained teachers would reproduce the same access-without-use failure this study documents in the Smart Schools Programme.

v. Develop a Nigeria-Specific Digital Literacy Curriculum





The Nigerian Educational Research and Development Council (NERDC) should lead the development of a comprehensive, context-specific digital literacy curriculum aligned with the UNESCO digital competency framework, available in Nigeria's major languages, and designed with accessibility standards for learners with disabilities. The curriculum should be piloted and iteratively refined in states with contrasting governance capacities before national rollout.

Long-Term (5-10 years): Achieving Universal, Equitable Coverage

vi. Complete National Infrastructure Parity and the 1:400-Equivalent Digital Ratio. Building on the short-term prerequisite phase, federal and state governments should target full electrification and functional connectivity in 100% of public basic and secondary schools by year ten, with the currently lowest-performing states prioritised for early completion so the gap between leading and lagging states narrows over the period rather than widens. By the same horizon, the national digital literacy curriculum piloted in the medium-term phase should reach full rollout across all public secondary schools, and the National Digital Literacy Task Force's monitoring and evaluation framework should confirm that equity indicators for gender, disability, and rural-urban location have converged substantially toward parity rather than merely improving in aggregate. Achieving this long-term target is what would allow Nigeria to credibly claim that the NDEPD has delivered on its founding equity ambitions rather than reproducing, at greater expense, the access-without-outcome pattern this study documents

Reference

- Adeleke, R., Iyanda, A. E., Osayomi, T., & Alabede, O. (2022). Tackling female digital exclusion: Drivers and constraints of female Internet use in Nigeria. *African Geographical Review*, 41(4), 327–343. <https://doi.org/10.1080/19376812.2021.1963296>
- Adeniran, A., Ishaku, J., & Akanni, L. O. (2020). *Is Nigeria experiencing a learning crisis: Evidence from curriculum-matched learning assessment*. *International Journal of Educational Development*, 77, 102199. <https://doi.org/10.1016/j.ijedudev.2020.102199>
- Babalola, D. (2019). *The political economy of federalism in Nigeria*. Palgrave Macmillan. <https://doi.org/10.1007/978-3-030-05493-9>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Carvalho, F., Lee, C., & Byanjeru, Y. (2025). *Innovative financing of education technology as part of maximizing financing for development* (Education Working Paper No. 19). World Bank. <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099916207092523135>
- Cilliers, J., Fleisch, B., Kotzé, J., Mohohlwane, N., Taylor, S., & Thulare, T. (2021). *Can virtual replace in-person coaching? Experimental evidence on teacher professional development and student learning* (RISE Working Paper No. 20/050). RISE Programme. https://doi.org/10.35489/BSG-RISE-WP_2020/050
- Cristia, J., Ibararán, P., Cueto, S., Santiago, A., & Severín, E. (2017). Technology and child development: Evidence from the One Laptop per Child program. *American Economic Journal: Applied Economics*, 9(3), 295–320. <https://doi.org/10.1257/app.20150385>
- Darling-Hammond, L., Hyler, M. E., & Gardner, M. (2017). *Effective teacher professional development*. Learning Policy Institute. <https://learningpolicyinstitute.org/product/effective-teacher-professional-development-report>
- Federal Ministry of Communications and Digital Economy. (2019). *National digital economy policy and strategy (2020–2030)*. Federal Government of Nigeria.
- Federal Ministry of Education. (2015). *National policy on inclusive education in Nigeria*. Federal Ministry of Education. <https://education.gov.ng/wp-content/uploads/2023/02/INCLUSIVE-EDUCATION-POLICY.pdf>
- Federal Ministry of Education. (2021). *National education policy*. Federal Ministry of Education.
- Federal Ministry of Education. (2022). *Joint schools census 2022 report*. Federal Ministry of Education.
- GSMA. (2021). *The mobile disability gap report 2021*. GSMA. <https://www.gsma.com/solutions-and-impact/connectivity-for-good/mobile-for-development/wp-content/uploads/2021/11/Mobile-Disability-Gap-Report-2021.pdf>



- Ikpuri, E. O. (2019). *Policy enactment in Nigerian secondary schools: The case of the National Policy on Education*. *South American Journal of Basic Education, Technical and Technological*, 5(3). <https://periodicos.ufac.br/index.php/SAJEBTT/article/view/2150>
- International Telecommunication Union. (2023). *ICT development index 2023*. <https://www.itu.int/itu-d/reports/statistics/idi2023/>
- Languille, S. (2020). Public–private partnerships in education and health in the Global South: A literature review. *Journal of International and Comparative Social Policy*, 36(2), 161–177. <https://doi.org/10.1017/ics.2020.2>
- Lankshear, C., & Knobel, M. (Eds.). (2008). *Digital literacies: Concepts, policies and practices*. Peter Lang.
- Laws of the Federation of Nigeria. (2004). *Compulsory, Free Universal Basic Education Act*, Act No. 66 of 2004. <https://education.gov.ng/wp-content/uploads/2022/04/Compendium-Of-Education-Sector-Laws-In-Nigeria-Third-Edition-Vol.1.pdf>
- Leshabane, E. T., Mokgosi, P. N., & Maile, S. (2025). Teachers' perspectives on the implementation of e-learning in secondary schools of Gauteng Province, South Africa. *International Journal of Learning, Teaching and Educational Research*, 24(7), 776–797. <https://doi.org/10.26803/ijlter.24.7.38>
- National Bureau of Statistics. (2023). *Annual abstract of statistics 2023*. National Bureau of Statistics.
- National Information Technology Development Agency. (2020). *National Digital Economy Policy and Strategy (2020–2030)*. <https://nitda.gov.ng/wp-content/uploads/2020/11/National-Digital-Economy-Policy-and-Strategy1.pdf>
- Nussbaum, M. C. (2000). *Women and human development: The capabilities approach*. Cambridge University Press. <https://doi.org/10.1017/CBO9780511841286>
- Omoeva, C., Moussa, W., & Adu-Agyemang, C. (2018). *The management of Nigerian primary school teachers*. *International Journal of Educational Development*, 59, 128–135. <https://doi.org/10.1016/j.ijedudev.2017.10.011>
- Pangrazio, L., Godhe, A.-L., & Ledesma, A. G. L. (2020). What is digital literacy? A comparative review of publications across three language contexts. *Learning, Media and Technology*, 45(4), 442–459. <https://doi.org/10.1080/17439884.2020.1838391>
- Pitchford, N. J., Kamchedzera, E., Hubber, P. J., & Chigeda, A. L. (2018). Interactive apps promote learning of basic mathematics in children with special educational needs and disabilities. *Frontiers in Psychology*, 9, Article 262. <https://doi.org/10.3389/fpsyg.2018.00262>
- Popova, A., Evans, D. K., Breeding, M. E., & Arancibia, V. (2022). Teacher professional development around the world: The gap between evidence and practice. *The World Bank Research Observer*, 37(1), 107–136. <https://doi.org/10.1093/wbro/lkab006>
- Selwyn, N. (2011). *Education and technology: Key issues and debates*. Continuum.
- Sen, A. (1999). *Development as freedom*. Oxford University Press.
- Teachers Registration Council of Nigeria. (2022). *Annual report on teacher capacity and professional development*. Teachers Registration Council of Nigeria.
- UNESCO Institute for Statistics. (2011). *Financing education in Sub-Saharan Africa: Meeting the challenges of expansion, equity and quality*. UNESCO Institute for Statistics. <https://doi.org/10.15220/978-92-9189-079-2-en>
- UNESCO Institute for Statistics. (2018). *A global framework of reference on digital literacy skills for indicator 4.4.2* (Information Paper No. 51). <https://uis.unesco.org/sites/default/files/documents/ip51-global-framework-reference-digital-literacy-skills-2018-en.pdf>
- UNESCO. (2023). *Global education monitoring report 2023: Technology in education—A tool on whose terms?* UNESCO. <https://gem-report-2023.unesco.org/technology-in-education/>
- UNESCO. (2024). *Financing the digital transformation of education: A toolkit for analysing financing options to support the digital transformation of education*. <https://www.unesco.org/en/dtc-financing-toolkit>
- UNICEF Nigeria, Federal Ministry of Finance, Budget and National Planning, & National Bureau of Statistics. (2022). *Situation analysis of children in Nigeria*. UNICEF Nigeria. <https://www.unicef.org/nigeria/reports/reports-child-poverty-nigeria>
- Universal Basic Education Commission (UBEC). (2022). *2022 annual report*. Universal Basic Education Commission. <https://ubec.gov.ng/document-category/dfa/>
- Van Dijk, J. A. G. M. (2005). *The deepening divide: Inequality in the information society*. Sage Publications.





- Warschauer, M. (2004). *Technology and social inclusion: Rethinking the digital divide*. MIT Press.
- Wodon, Q. T., Male, C., Montenegro, C. E., & Nayihouba, A. (2018). *The price of exclusion: Disability and education—The challenge of inclusive education in Sub-Saharan Africa*. World Bank Group. <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/160251625830159994>
- World Bank. (2013, February 4). *To help kids learn, Nigeria examines policy bottlenecks*. World Bank Blogs. <https://blogs.worldbank.org/en/education/help-kids-learn-nigeria-examines-policy-bottlenecks>
- World Bank. (2018). *Nigeria: Human capital opportunities for Africa's largest economy*. World Bank. <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/628181543883094210/nigeria-human-capital-opportunities-for-africas-largest-economy>.
- World Bank. (2020). *The promise of education in Sub-Saharan Africa: From equal access to learning for all*. World Bank. <https://doi.org/10.1596/978-1-4648-1055-2>
- World Bank. (2023). *Nigeria development update: Turning the corner—From reform and renewed hopes to results*. World Bank. <https://www.worldbank.org/en/country/nigeria/publication/nigeria-development-update-ndu>
- Yao, H., Brossard, M., Mizunoya, S., Nasir, B., Walugembe, P., Cooper, R., Rafique, A., & Reuge, N. (2021). *How much does universal digital learning cost?* UNICEF Office of Research – Innocenti. <https://www.unicef.org/innocenti/reports/how-much-does-universal-digital-learning-cost>

