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RESEARCH ARTICLE

Preparing Nigerian Youth for the Future of Work: Rethinking Secondary Education, Digital Skills and Employability in the Age of Artificial Intelligence

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ABSTRACT

Nigeria must prepare one of the world's fastest-growing youth populations for a future of work that is uncertain, uneven and contested. This article presents a critical policy analysis of the dominant policy response: incorporating digital skills and AI literacy into secondary schooling as the route to youth employability. Drawing on Nigerian and African scholarship alongside international and institutional evidence, including reports from UNESCO, the ILO, the World Bank and Nigerian government data, it examines three assumptions underlying this agenda: that schools can build digital competencies before students secure foundational literacy and numeracy, that a skills deficit rather than a structural scarcity of decent work is the primary constraint on youth employment, and that policymakers can transplant AI literacy frameworks from the global North into Nigeria without attention to infrastructure, the informal economy or epistemic dependency. The article presents no new empirical findings; it synthesises existing evidence to advance three propositions, one responding to each assumption. It argues that a future-ready secondary education should be anchored in foundational learning, responsive to labour-market demand and grounded in local conditions: consolidating basic learning while introducing digital learning progressively alongside it, teaching AI critically as a civic and productive capability, connecting schools to the informal economy and indigenous apprenticeship traditions, and treating teacher development and implementation capacity, rather than curriculum content alone, as central constraints on reform. For policy and practice, this implies sequencing curriculum reform alongside foundational learning and teacher capacity building, and pairing supply-side education reform with demand-side economic policy.

KEYWORDS

AI literacy; digital skills; secondary education; youth employability; Nigeria; education policy analysis

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Introduction

Nigeria is at the centre of Africa's demographic transformation. With over 60% of the continent's population below the age of 25 (Zeleza & Okanda, 2022), and 58% of Nigeria's own population under the age of 30 (Mbaegbu, 2025), the country's capacity to educate and employ its youth is a question of continental significance. The scale of the labour-market problem is large. Under the methodology in use until 2023, the National Bureau of Statistics recorded a rise in youth unemployment from 15.2% in the fourth quarter of 2015 to 45.3% by the fourth quarter of 2020 (Omoju et al., 2025); by that same quarter, the unemployment rate among Nigerians aged 15–24 stood at 53.4%, compared with 33.3% for the workforce overall under the Bureau's national definition, or 17.5% under the international definition (National Bureau of Statistics, 2021). More recent figures from the revised Nigeria Labour Force Survey show much lower headline unemployment but an informal employment rate of 93.0% in the second quarter of 2024 (National Bureau of Statistics, 2024). The problem is therefore better understood as one of the availability and quality of decent work than of unemployment alone. Meanwhile, up to 20 million children and youth are out of school, among the largest such populations in the world (Nwoke et al., 2024). Debate about artificial intelligence (AI) has added a further consideration, since it is expected both to automate some work and to create new forms of digital employment.

In this article, the "future of work" means something specific: how work, jobs, and the skills needed for them are likely to change in Nigeria in the coming years, and what is driving that change. This is not only about whether machines and AI will replace jobs. It is a broader question about what kinds of work will exist, who will be prepared to do them, and whether the economy can actually create enough decent jobs for the people entering the workforce.

This matters because most discussions of the "future of work" come from wealthier countries, where the main concern is automation replacing formal, salaried jobs. Nigeria's situation is different. Most Nigerians work in the informal economy, not in formal jobs that could be automated, and the bigger problem is that not enough decent, productive jobs are being created for the number of young people entering the labour market each year. Accordingly, in this article, the "future of work" is treated less as a question of "which jobs will AI take" and more as a question of "what work will actually be available, and are young Nigerians being prepared for it?"

The prevailing digital-skills agenda rests on three assumptions, and this article advances three corresponding propositions, one responding to each. First, digital and AI skills should not be prioritised at the expense of foundational literacy and numeracy; where these foundations remain insecure, digital learning should be introduced progressively and integrated with efforts to strengthen them. Second, a shortage of skills is not the main reason young Nigerians struggle to find work; the bigger problem is that there are simply too few decent jobs, even for those who are already educated. Third, AI literacy programmes designed in the United States, Europe, or other wealthy regions cannot simply be copied into Nigeria; they need to account for Nigeria's infrastructure, its large informal economy, and the risk of relying on ideas imported from elsewhere rather than developing local ones. These three propositions are explained and supported with evidence in the sections that follow.

The analytical problem addressed in this article is not whether Nigerian youth should learn digital skills, but how the question has been posed. Policy documents, donor reports and a growing body of scholarship increasingly present the framing as established: because AI is transforming work,

secondary education must be retrofitted with digital skills and AI literacy so that graduates become employable. This article critically examines that framing. Its central argument is that the prevailing digital-skills agenda rests on three assumptions that this article argues are incomplete. The first is a sequencing problem: it privileges digital and AI competencies before the foundational literacy and numeracy that many Nigerian adolescents have not yet secured, which risks reversing the order in which these capabilities are usually acquired. The second is a demand problem: it treats skills supply as the principal constraint on youth employment and marginalises the structural scarcity of decent work in an economy that struggles to absorb even the currently educated. The third is an orientation problem: it adopts "future of work" narratives and AI literacy frameworks, developed mainly in the Global North, that position African youth as consumers of foreign technologies rather than as producers and critical shapers of locally grounded AI.

The focus on secondary education is deliberate. Secondary schooling is the stage at which participation falls sharply, with net attendance falling from 64.3% at primary level to 42.5% at junior secondary level (World Bank, 2024), and for many young people it is the last stage of formal education before they enter work. It is also the stage at which foundational learning gaps are visible in the skills of adolescents (Azubuike et al., 2024), at which technical and vocational education is delivered as a core channel for employability (Ladan, 2023), and at which the prevailing agenda proposes to add digital skills and AI literacy. The policy problem is therefore one of design and sequencing at an important stage: how to prepare young people for uncertain and largely informal labour markets without building digital and AI competencies on foundations that many learners have not yet secured.

The article proceeds as follows. The Methods section explains how sources were identified and synthesised. The Literature review then situates the debate in global and African scholarship on the future of work, examines Nigerian secondary education and youth employability, and appraises digital skills and AI literacy initiatives, defining the key constructs and identifying the gap the article addresses. The Context and evidence base section consolidates Nigeria-specific data, and the Analysis tests each of the three assumptions in turn. The article then sets out policy and practice implications, considers the challenges that condition reform, and examines implementation and capacity requirements. The Limitations and Discussion sections state the boundaries of the argument and its relevance to wider African contexts, and the Conclusion draws the argument together.

Methods

This article adopts a critical policy analysis approach rather than an empirical or systematic review methodology, given its aim of interrogating the assumptions underlying Nigeria's digital skills and AI literacy agenda rather than testing a discrete empirical hypothesis. Sources were identified through a combination of academic database searches, including Google Scholar, and AI-assisted literature discovery tools, with all AI-suggested sources independently verified for authenticity and relevance before inclusion.

The search prioritised scholarship by African and Nigerian authors, reflecting the article's commitment to grounding the analysis in regional perspectives rather than relying primarily on frameworks developed in the Global North. Where African and Nigerian scholarship was limited on a given sub-theme, international and institutional sources, including reports from the United Nations Educational, Scientific and Cultural Organization (UNESCO), the International Labour Organization

(ILO), the World Bank, the Organisation for Economic Co-operation and Development (OECD), and the African Union Commission, were incorporated to provide comparative and contextual data, particularly on labour market trends and global AI literacy frameworks. Nigerian government data, notably from the National Bureau of Statistics (NBS), was used to anchor claims about employment, education, and demographic trends in current national conditions.

Given the contemporary and fast-moving nature of the subject matter, the literature search prioritised sources published within the last five years (2021–2026), on the premise that older sources risked describing labour market and technological conditions no longer reflective of the present moment. Older or foundational sources were retained only where they remained conceptually central to the argument.

Sources were included where they addressed secondary education, digital skills, AI literacy, youth employability or the future of work in Nigerian or wider African contexts, or where they offered conceptual or comparative frameworks bearing directly on those themes. Peer-reviewed articles, institutional and intergovernmental reports, and official government documents and statistics were eligible. Sources were excluded where they could not be verified, where they did not engage with evidence relevant to the article's propositions, or where they concerned other education levels or regions without offering transferable conceptual or comparative insight.

Sources were synthesised thematically around the article's central propositions rather than through a formal systematic review protocol such as Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA), consistent with the conventions of critical policy analysis and perspective-style scholarship in this field.

Several steps were taken to reduce bias in the evidence base. Where possible, key claims were cross-checked across peer-reviewed, institutional and government sources, so that no proposition rests on a single study. Contested or conflicting findings are reported rather than resolved silently, as in the discussion of the unemployability and structural explanations of graduate unemployment, and the analysis presents plausible counter-arguments to each assumption. Because the search favoured African and Nigerian scholarship and recent publications, it may under-represent older or non-African work, and because AI-assisted discovery can reproduce the patterns of the tools used, every AI-suggested source was checked for existence and relevance before inclusion. These limits are acknowledged further in the Limitations section.

Literature review

The future of work and the changing skills landscape

The future of work is not a settled empirical fact but a field of contestation between techno-optimists and automation pessimists, and the terrain looks very different from the vantage point of the Global South. Early global estimates suggested that automation risk was concentrated precisely where wages were lowest, with the World Bank projecting job-loss risks of 69% in India, 72% in Thailand, 77% in China, and 85% in Ethiopia (Merola, 2022). Yet the technical automatability of tasks does not translate automatically into actual displacement: where labour is cheap, automation is often economically unattractive, and the pace of technological transition in developing economies has been slower than in high-income countries (Saka & Orhan, 2022). Analyses focused on Africa reinforce this caution, noting that the continent's low industrial base, high levels of subsistence and informal work, and weak structural transformation mean that the immediate threat of widespread machine

replacement of jobs remains low (Dinika, 2023). The same literature, however, is divided on whether this constitutes reassurance: some studies are faulted for relying on outdated data and non-empirical methods, while others are accused of excessive optimism about African governments' digital ambitions (Dinika, 2023).

The most recent evidence on generative AI sharpens this picture. The International Labour Organization (ILO) finds that only clerical work is highly exposed to generative AI, with 24% of clerical tasks rated highly exposed and a further 58% at medium exposure; for other occupational groups, highly exposed tasks range between 1% and 4% (Gmyrek et al., 2023). Only 0.4% of total employment in low-income countries is potentially exposed to automation effects, compared with 5.5% in high-income countries (Gmyrek et al., 2023). The likely impact, the ILO concludes, is the augmentation of work, automating some tasks within occupations, rather than wholesale automation of occupations (Gmyrek et al., 2023). For Nigeria, this suggests that extreme predictions of AI-driven joblessness should be treated cautiously, but the evidence does not support the view that the country can avoid the transformation either, since digitalisation is simultaneously reshaping the demand for skills through remote work, data services, and platform labour (African Union Commission [AUC] & Organisation for Economic Co-operation and Development [OECD], 2021).

What is less contested is that the composition of skill demand is shifting: employers in technology-rich environments increasingly value communication, problem-solving, creativity, and adaptability alongside technical competencies (Trenerry et al., 2021), and Africa's digital and green transitions are generating new skill demands that current systems are not yet well placed to supply (AUC & OECD, 2024). Research on Sub-Saharan African labour markets identifies digital skills, the digital divide, gender inequality, and an inadequately skilled workforce as the principal challenges shaping the future of work in the region (Genga, 2025). Yet there are two critical caveats. First, whether the technological change underway amounts to a "Fourth Industrial Revolution" is itself contested, and the techno-utopian language surrounding it should not be accepted at face value (McGrath, 2022). Second, the demographic dividend that a youthful population promises is conditional: it materialises only if institutions, industrialisation, and job creation are in place to absorb new entrants (Woldegiorgis, 2023), and it cannot be assumed from demography alone.

Equally important is how this global debate has been narrated about African youth. Northern accounts of the "end of work" sit uneasily with the empirical reality of young Africans who "hustle": actively seeking sporadic opportunities and skilfully negotiating unpredictable environments rather than waiting passively for formal employment (McGrath, 2022). This has led scholars to question whether skills-development systems centred on employability, as has been the dominant approach in agency and country-level advice, can meaningfully support the futures African youth actually face (McGrath, 2022). The rise of digital platform work illustrates the ambiguity: while platforms such as Uber and Bolt in Nigeria are celebrated for creating income opportunities, research documents algorithmic management, fragmented careers, and the erosion of employment protections (Adekoya et al., 2023); a gendered inequality in digital labour that mirrors offline disparities (Anwar, 2022); and a "double-edged sword" in which new technologies extend managerial control even as they enable new forms of worker solidarity (Webster & Masikane, 2023). Any education agenda oriented to the "digital future of work" must therefore confront the possibility that digital work is not automatically decent work.

Nigerian secondary education and youth employability

The starting point for any employability debate in Nigeria is the scale of exclusion and weak learning. Up to 20 million school-age children and youth are out of school (Nwoke et al., 2024), and Nigeria has been reported to account for about 45% of out-of-school children in West Africa (Bayagon, 2018, as cited in Ndanusa et al., 2021), among the largest such populations in the world. Participation falls at each successive level: in 2021, the net attendance rate was 64.3% at primary level and 42.5% at junior secondary level (World Bank, 2024). Where children remain in school, the evidence indicates serious learning deficits; only 27% of children aged 7–14 in Nigeria have foundational reading skills, and 25% have foundational numeracy skills (National Bureau of Statistics & United Nations Children's Fund, 2022). Global assessments place the share of young people below basic skill levels in sub-Saharan Africa at 94% (Gust et al., 2024). Within Nigeria, multilevel analysis of the 2015 Nigerian Education Data Survey reveals significant state- and wealth-level inequalities in the foundational literacy and numeracy skills of secondary-school-aged children, with community- and state-level wealth effects operating over and above household wealth (Azubuike et al., 2024). Low public spending on education adds to the problem: the World Bank describes public education spending, at 1.2% of gross domestic product (GDP) and US$23 per capita, as among the lowest in the world (World Bank, 2024).

In this article, foundational skills refer primarily to literacy and numeracy, together with basic capacities for reading comprehension, written communication and quantitative reasoning that enable learners to acquire more advanced knowledge and competencies (Oketch, 2021). This distinction matters because foundational skills should not be treated simply as an earlier stage of education that can be bypassed once digital technologies become available; they provide part of the basis on which subsequent digital learning depends.

It is against this backdrop that Nigeria's graduate and youth unemployment must be interpreted. The literature is animated by a productive disagreement between what has been called the "unemployability thesis" (that graduates lack workplace skills) and the "etymological myth" view, which locates the problem in structural features unrelated to graduates' attributes. A synthesis of employer surveys, policy commentary and government data suggests that both perspectives are partially correct: skill inadequacies in technical expertise and problem-solving coexist with employer biases, nepotism and wider economic constraints on job creation (Obaji et al., 2024). The gap between formal education and current industrial skills and practices is widely identified as a major driver of youth unemployment (Olajuwon, 2022), and Haruna and Kadiri (2024) report that school curricula remain misaligned with the needs of the contemporary economy.

The informal economy is also important for understanding this employment context. In this article, the term refers broadly to economic activities and forms of employment that operate outside, or only partially within, formal regulatory, institutional and social-protection arrangements. It includes many own-account workers, small-scale enterprises, casual forms of work, apprenticeships and other livelihood activities that are not fully incorporated into formal employment structures. This matters because young Nigerians do not necessarily move directly from school into stable formal employment. Many may instead enter self-employment, family enterprises, apprenticeships, casual work or other informal activities. Consequently, preparing young people for the future of work requires attention not only to the skills demanded by formal employers but also to the capabilities needed to participate productively and sustainably in informal and emerging forms of work.

This distinction between skills and employment is central to the concept of employability. Employability may be understood as the combination of knowledge, skills, capabilities and dispositions that can improve a person's ability to participate in work, but it should not be treated as equivalent to the actual availability of employment. In a labour market where demand for labour is constrained, improved employability does not necessarily produce a corresponding increase in decent employment opportunities. The Nigerian literature therefore points towards a more cautious understanding in which individual capability and structural labour-market conditions must be considered together.

The instruments intended to close this gap have struggled. Technical and vocational education and training (TVET) in Nigerian secondary schools, a core channel for employability, suffers from a shortage of qualified teachers and skilled personnel, declining quality, and an erosion of practical preparation; these shortcomings have been identified as the primary reason students fail to acquire requisite knowledge and skills before and after graduation (Ladan, 2023). Reviews conclude that these deficits leave many TVET graduates with limited employable or technical skills and less able to compete in the wider labour market (Muogahlu & Ahmad, 2023). At the level of curriculum, Nigerian basic education remains content-heavy and examination-driven, with a wide documented gap between its design and international competency-based models (Abdulganeey et al., 2025); tertiary curricula are criticised for retaining outdated content that institutions lack the equipment or personnel to implement (Adelakun, 2022).

The record of policy intervention is similarly limited. Three decades of flagship programmes, including the National Directorate of Employment, N-Power, You Win, and assorted agricultural and entrepreneurship schemes, have produced outcomes that are "limited in scope and sustainability," constrained by skill mismatches, oil-revenue dependence, weak institutional coordination, political patronage, and gender and regional exclusion (Uwah & Ekpo, 2026). Analyses of youth employment programmes find that, although numerous interventions exist, they have not produced a marked reduction in youth unemployment rates (Mabugu & Ronconi, 2025). The critical lesson here is not simply that programmes underperform, but that the dominant policy logic treats youth unemployment as a supply-side problem amenable to training fixes. As Virk and colleagues argue, the productivist focus of Nigerian youth policy may be empowering in conferring "worker" status on young people, but it detracts attention from deep-rooted structural problems, namely governance, insecurity, and the absence of labour demand, that affect youth disproportionately (Virk et al., 2024). The literature therefore suggests that skills interventions should be understood as one component of a wider employment strategy rather than as a stand-alone solution to youth unemployment.

Rethinking digital skills and AI literacy in secondary education

Nigeria's digital transformation is being pursued through an ambitious policy architecture whose centrepiece is the National Digital Economy Policy and Strategy 2020–2030, organised around eight principles that include literacy and digital skills, solid and service infrastructure, and the development of indigenous content (Federal Ministry of Communications and Digital Economy, 2019; Cros et al., 2022). Yet the implementation architecture reveals a gap: the ministry's IT director told the study's authors that it "does not have the authority to execute" the policy, and the federal government instead "encourages" the 36 states, the Federal Capital Territory, and 774 local government areas to cascade its provisions (Cros et al., 2022). The National Information Technology Development Agency's

framework similarly aims to raise the national digital literacy rate from around 50% to 95% by 2030 (Igbinovia & Aiyebelehin, 2023). The emphasis of this policy mix is uneven: infrastructure investment has dominated, while digital literacy skills, the human dimension of the digital economy, have been "less canvassed for" (Oyelakin, 2022).

This policy emphasis reflects an important distinction between access to digital technologies and the capability to use them meaningfully. Digital inclusion therefore involves more than providing devices or connectivity; it also depends on learners' prior knowledge, teachers' capacity, affordability, institutional support, and the ability to convert technological access into educational and economic opportunities.

The material conditions for a digital-skills agenda in schools are, however, unequal. National internet penetration stands at approximately 43%, but this masks a pronounced divide of 70% in urban areas versus 20% in rural regions (Eke & Azubuike, 2025). During the COVID-19 school closures, research across six Nigerian states identified the absence of ICT strategies and policies, socioeconomic status, poor internet connectivity, electricity, and high poverty levels as the primary drivers of digital gaps in remote secondary schools (Olanrewaju et al., 2021). More fundamentally, a critical review of the Nigerian experience argues that increased connectivity has not translated into equitable development benefits: digital inequality reproduces existing socioeconomic divides because disadvantaged groups lack the capabilities to convert access into education, employment, and economic participation (Aderinto et al., 2026). Connectivity, in short, is a necessary but not sufficient condition.

This matters because the sequencing question, whether digital skills come before or after foundational learning, is central. As Bashir and Daniels observe, in African contexts where children and young people sometimes lack foundational literacy and numeracy even after completing primary education, "digital skills cannot be imparted on their own"; digital skills programmes delivered in schools will succeed only to the extent that foundational skills are simultaneously strengthened, while programmes for out-of-school youth must bundle foundational literacy, numeracy, and socio-emotional skills (Bashir & Daniels, 2022). The idea of "leapfrogging" straight to digital competence reverses this sequence, and the evidence reviewed here suggests that digital fluency depends on reading, writing, and reasoning (Oketch, 2021).

On AI literacy specifically, the global reference point is now the UNESCO AI Competency Framework for Students, which structures competencies across four dimensions, namely human-centred mindset, AI ethics, AI techniques and applications, and AI system design, in three progression levels of Understand, Apply, and Create (Chiu & Rospigliosi, 2026). AI literacy can therefore be understood as broader than the technical ability to programme or build AI systems. It includes the knowledge and capabilities required to understand AI, use AI tools appropriately, evaluate their outputs and limitations, and engage with questions of ethics, bias, human agency, and social consequences (Chiu et al., 2024). This distinction is particularly relevant to secondary education because it permits AI to be treated as both a practical competence and a form of critical knowledge.

Nigerian and African scholars have engaged this agenda and have also identified tensions within it. Definitions of AI literacy for non-technical audiences have largely been developed "from an engineering perspective" and may be inappropriate for K–12 education, which is why frameworks increasingly supplement knowledge with confidence, self-reflective mindsets, ethics, and

collaboration (Chiu et al., 2024). Research in African K–12 settings has begun to identify the competencies Nigerian secondary students need to engage with AI content, including cognitive, human-tool collaboration, self-learning, skill and ethical competencies (Sanusi et al., 2022), and teacher-facing frameworks emphasise that educators' own AI digital competencies are a necessary foundation for classroom practice (Ng et al., 2023).

The Nigerian evidence points in two directions. Studies in the South–South region find strong youth interest in AI skill acquisition, particularly through micro-credential courses and AI mentorship networks (Faithpraise et al., 2023), and higher education scholarship documents a widening AI skills gap that threatens both public-sector capacity and the ambition to become an AI-driven digital economy (Ali et al., 2025). But the same literature catalogues the constraints: infrastructural deficits in power and connectivity, the high cost of premium AI tools, and algorithmic bias against local cultural contexts, prompting calls for indigenous AI model development (Chizzy et al., 2025). In higher education, the adoption of generative AI has raised concerns, including academic integrity, overreliance, and what some scholars describe as "digital colonialism" (Peters & Olojede, 2025), alongside dependency on external providers, unaffordable costs, and the lack of customisation for local needs and cultural contexts (Zlotnikova & Hlomani, 2025).

At the continental level, the African Union's Continental AI Strategy, issued in 2024, recognises AI's transformative potential, and several countries, Nigeria among them, have begun developing national strategies (Addo et al., 2026). Yet critical assessments argue that the strategy is not adequately grounded in the continent's actual educational levels, internet coverage, and state capacity, and that AI can deepen economic dependency, facilitate the exploitation of African labour, and outpace governance capacities for regulation and enforcement (Diaz Pabón & Ahmed, 2025). The structural gap is considerable: Africa accounted for just 1.1% of global AI investments in 2020, and only 0.03% of Nigeria's workforce was engaged in AI-related fields in the early 2020s, compared with 2.5% in more AI-advanced countries (Ughulu, 2025). When this is combined with the ILO's finding that the occupations most exposed to generative AI are concentrated in higher-income economies (Gmyrek et al., 2023), an implication follows for secondary schooling: training large numbers of narrow AI specialists is unlikely to be an appropriate objective for the system as a whole, whereas critical AI literacy, understanding what AI is, what it does to data, labour, and power, and how to use it responsibly, is a legitimate civic and productive capability for all learners. The task is to reconcile the selectivity of advanced AI training with the universality of critical AI literacy, and to do so in curricula that reflect Nigerian linguistic, cultural, and economic realities rather than imported ones.

Literature synthesis and gap

Taken together, the literature establishes that digital and AI competencies are becoming increasingly relevant to education and work, but it also reveals important limitations in the dominant skills-first framing. First, the literature leaves unresolved how digital learning should be sequenced alongside foundational learning. Second, the employability literature recognises skills gaps but also identifies structural constraints, including limited labour demand, informality, governance problems, and uneven economic opportunities. Third, global AI-literacy frameworks provide useful conceptual resources but cannot be assumed to transfer directly across contexts with different levels of infrastructure, teacher capacity, institutional readiness, and economic structure.

The literature also reveals a contextual gap. Much of the international discussion of the future of

work is concerned with formal employment, automation, and technologically intensive workplaces, whereas Nigerian youth encounter a labour market in which informal work, self-employment, apprenticeships, and emerging forms of digital labour are significant. Existing Nigerian scholarship addresses these issues separately, but there remains a need to bring foundational learning, digital and AI literacy, labour demand, informal work, and local institutional conditions into a single analytical framework for secondary education.

This article addresses that gap by bringing these strands of literature together through three propositions concerning sequencing, labour-market demand, and contextual adaptation. Rather than rejecting digital or AI skills, the analysis asks how they can be integrated into a broader educational and economic strategy suited to Nigerian conditions.

Context and evidence base

The Nigerian context in which digital and AI skills are being promoted is characterised by simultaneous pressures of educational exclusion, weak foundational learning, uneven digital infrastructure, and a labour market in which informal and precarious work remain important. These conditions matter because the feasibility and likely value of digital and AI-related reforms depend not only on curriculum content but also on whether learners have access to schooling, teachers have the capacity and resources to deliver the curriculum, and the wider economy can absorb or make productive use of newly acquired capabilities.

Participation and learning conditions remain uneven. Existing evidence places Nigeria among the countries with very large populations of out-of-school children and youth, while secondary participation is substantially lower than primary participation (Nwoke et al., 2024; World Bank, 2024). For those who remain in school, foundational learning is also unequally distributed. Analysis of the Nigerian Education Data Survey shows significant state- and wealth-level differences in literacy and numeracy among secondary-school-aged children, indicating that national averages can conceal substantial differences in learners' starting points (Azubuike et al., 2024). The implication for future-of-work policy is that secondary schools cannot be treated as if they are receiving a uniformly prepared population of learners.

Teacher capacity and school resources create a second layer of variation. Nigerian teachers report concerns about inadequate information and communication technology (ICT) knowledge, infrastructure, electricity, connectivity, funding, and working conditions, while evidence from teacher education and secondary schooling points to substantial urban–rural differences in digital access and use (Dele-Ajayi et al., 2021; Eke & Azubuike, 2025; Olanrewaju et al., 2021). These conditions affect not only whether schools possess devices or internet access but also whether teachers can integrate digital tools into teaching in meaningful ways. Digital access should therefore be distinguished from functional digital capability at school level.

The labour market context is similarly heterogeneous. Nigerian youth may move from schooling into formal employment, self-employment, family enterprises, apprenticeships, casual work, or other forms of informal and emerging digital labour. The literature identifies both skills mismatches and structural constraints on job creation, suggesting that employability cannot be equated with employment itself (Obaji et al., 2024; Olajuwon, 2022; Mabugu & Ronconi, 2025; Uwah & Ekpo, 2026). This makes it important to assess education reform against the kinds of work actually available to young people, rather than against a predominantly formal and technology-intensive model of

employment.

The most recent figures available give a sense of scale. Nigeria's education system enrols over 47 million children, taught by roughly 1.7 million teachers (World Bank, 2024). Participation falls at the secondary stage: in 2021, the net attendance rate was 64.3% at primary level and 42.5% at junior secondary level, and at junior secondary level it ranged from 24.7% in the North-East to 59.2% in the South-West (World Bank, 2024). An estimated 17.1 million children aged 5–14 are out of school (World Bank, 2024), and other estimates for school-age children and youth reach up to 20 million (Nwoke et al., 2024). Learning outcomes are weak. The 2021 Multiple Indicator Cluster Survey found that only 27% of children aged 7–14 had foundational reading skills and 25% had foundational numeracy skills (National Bureau of Statistics & United Nations Children's Fund, 2022), and the World Bank (2024) estimates that 37 million of the 50.7 million children in this age group cannot read and understand a simple text. Among students in the final year of junior secondary school, 71.1% demonstrate foundational reading skills and 60.2% foundational numeracy skills at Grade 2 level, so roughly three in ten and four in ten, respectively, do not (World Bank, 2024). These national figures conceal wide variation, and state- and wealth-level inequalities in the literacy and numeracy of secondary-school-aged children are significant (Azubuike et al., 2024). Public financing remains constrained: federal education allocations have been reported at roughly 5–8% of the national budget in recent years, depending on the source and on whether proposed or enacted figures are used, against the 15–20% that UNESCO recommends (Dataphyte, 2025; International Centre for Investigative Reporting, 2024), and the World Bank describes public education spending, at 1.2% of GDP and US$23 per capita, as among the lowest in the world (World Bank, 2024).

School infrastructure, connectivity and the teacher workforce shape what any reform can achieve. National internet penetration stands at approximately 43%, but this conceals a divide of roughly 70% in urban areas against 20% in rural areas (Eke & Azubuike, 2025). Research across six Nigerian states during the COVID-19 school closures identified the absence of information and communication technology (ICT) strategies and policies, poor connectivity, unreliable electricity, and high poverty as the main drivers of digital gaps in remote secondary schools (Olanrewaju et al., 2021). At junior secondary level, the average student-to-classroom ratio is 64:1, and only 53% of junior secondary schools have access to safe drinking water (World Bank, 2024), which indicates the basic conditions on which any digital provision would have to build. The teacher workforce is also stretched: the pupil-to-qualified-teacher ratio at junior secondary level is 75:1, and in 2022, 79% of basic education teachers reported receiving no training in the previous five years (World Bank, 2024). Nigerian studies add that teachers report limited awareness of ICT in education, inadequate infrastructure, technical support and training, and working conditions that make technology adoption a low priority (Dele-Ajayi et al., 2021; Srinivasan et al., 2025). The national ambition to raise the digital literacy rate from around 50% to 95% by 2030 (Igbinovia & Aiyebelehin, 2023) therefore rests on infrastructure and teacher capacity that remain uneven.

Youth labour market indicators need careful reading because the official measurement method has changed. Under the methodology used until 2023, the National Bureau of Statistics recorded youth unemployment (ages 15–34) of 42.5% in the fourth quarter of 2020, up from 34.9% in the second quarter of that year, and 53.4% for those aged 15–24 (National Bureau of Statistics, 2021). Since the revised, internationally aligned Nigeria Labour Force Survey began in 2023, headline rates are far lower: in the second quarter of 2024, unemployment was 4.3% overall and 6.5% among those aged

15–24 (National Bureau of Statistics, 2024). The two series are not comparable, and the change has been described as controversial, with some experts regarding the earlier figures as closer to lived reality (Mbaegbu, 2025). The newer survey nonetheless points to a problem of work quality. In the same quarter, 93.0% of employment was informal and 85.6% of workers were self-employed, the combined rate of unemployment and time-related underemployment was 13.0% overall and 20.6% among those aged 15–24, and 12.5% of young people were not in employment, education or training (NEET) (National Bureau of Statistics, 2024). Informality falls with education, from 94.7% among workers with lower secondary education to 67.1% with upper secondary education and 26.6% with post-secondary education (National Bureau of Statistics, 2024). These are descriptive figures and do not show that schooling causes the difference, but they suggest that completing secondary education is associated with better job quality while most workers remain in informal work. An independent survey in 2024, using a different definition and sample, found that 23% of Nigerians aged 18–35 reported being unemployed and looking for work (Mbaegbu, 2025), and youth employment programmes have not produced a marked reduction in youth unemployment (Mabugu & Ronconi, 2025).

These data have limits that affect how far they can support inference. The figures come from different years and sources, and estimates differ between them: for example, the junior secondary completion rate is 67.7% in the 2021 household survey but 45.1% in the 2022 National Personnel Audit, and out-of-school estimates range from 17.1 million to around 20 million depending on age range and definition (Nwoke et al., 2024; World Bank, 2024). Official labour statistics changed methodology in 2023, so series before and after that date cannot be compared, and the new headline rates are disputed. Foundational learning estimates rest on tasks pitched at Grade 2 level and administered regardless of age, and the World Bank notes that Nigeria does not yet have official learning poverty figures (World Bank, 2024). Analyses of state-level inequality in foundational skills draw on the 2015 Nigerian Education Data Survey (Azubuike et al., 2024), which is now more than a decade old, so the pattern it shows should be read as indicative. Education financing figures vary between proposed and enacted budgets, and the Annual School Census, which should supply school-level data, had a submission rate of only 38.6% between 2016 and 2020 and is typically published with delays of years (World Bank, 2024). The evidence reviewed here also does not provide consistent national data on school-level connectivity, information and communication technology (ICT) facilities or teacher ICT competence, or on the share of school leavers entering informal work. Where this article draws on such evidence, it treats it as indicative of direction and variation rather than as a precise national measure, and it avoids inferences the data cannot support.

Taken together, these conditions establish the evidence base for the analysis that follows. They also caution against treating Nigeria as a single, uniform educational or labour-market space. Differences across states, school types, household wealth, rural and urban locations, teacher capacity, infrastructure, and sectors of employment mean that the proposed pathway should be understood as a framework for differentiated implementation rather than a single intervention that can be applied identically everywhere.

Analysis

The sequencing assumption: Digital skills before foundational learning

The first assumption examined here is that digital and artificial intelligence (AI) competencies can be added to secondary education without first addressing weaknesses in foundational literacy and numeracy. The evidence reviewed above suggests a more conditional relationship. Digital competence is increasingly important, but it depends on learners being able to read, interpret information, communicate, and reason quantitatively. African scholarship therefore cautions against treating digital skills as a self-contained package that can simply be layered onto weak foundational learning (Bashir & Daniels, 2022; Oketch, 2021). Nigerian evidence of state- and wealth-level differences in foundational skills further suggests that the same digital curriculum will not have the same meaning or feasibility across schools (Azubuike et al., 2024).

The counterargument is important: digital technologies can themselves support literacy, numeracy, access to learning materials, and differentiated instruction. The issue, therefore, is not whether digital tools should wait until every learner has mastered all foundational skills. Rather, the issue is sequencing and integration. Where foundational learning is insecure, digital interventions should reinforce reading, writing and numeracy rather than assume that technology can substitute for them. This supports an approach anchored in foundational learning, in which digital learning is introduced progressively alongside it and used to strengthen, rather than displace, basic learning.

The policy implication is consequently one of sequencing rather than exclusion. Foundational literacy and numeracy should be treated as a first priority that continues to be strengthened through lower secondary education, while age-appropriate digital skills can be introduced alongside them. For learners who are already secure in foundational skills, more advanced digital and computing opportunities can be provided without making advanced computing the universal entry point for future-readiness.

The demand assumption: Skills supply and the availability of work

The second assumption is that youth unemployment can be addressed primarily by increasing the supply of employable skills. Nigerian evidence supports part of this proposition: employers and researchers identify gaps between formal education and workplace requirements, including technical and problem-solving capabilities (Obaji et al., 2024; Olajuwon, 2022). Curriculum reform, technical and vocational education and training (TVET) improvement and relevant digital competencies can therefore matter for individual opportunities and productivity.

However, the evidence also indicates that skills supply is only one part of the employment problem. Reviews of youth employment programmes identify constraints including limited job creation, weak coordination, oil dependence, informality, and uneven programme sustainability (Mabugu & Ronconi, 2025; Uwah & Ekpo, 2026). The existence of a skills gap does not establish that a larger supply of trained young people will automatically generate a corresponding expansion of decent work. Indeed, where labour demand is weak, training may improve individual capability without changing the number or quality of jobs available.

This does not make employability education irrelevant. It changes what it can reasonably be expected to achieve. Secondary education should develop capabilities that support formal employment, entrepreneurship, apprenticeships, self-employment and other forms of productive participation, while education policy is coordinated with policies affecting investment, infrastructure, industrial development and job creation. A demand-aware approach therefore treats education reform and economic policy as complementary rather than assuming that schools can solve unemployment

through skills provision alone.

The transfer assumption: Global AI literacy frameworks and Nigerian conditions

The third assumption concerns the transferability of AI literacy frameworks developed largely in international and Northern policy and research settings. Global frameworks provide useful concepts for organising AI education, including human-centred thinking, ethics, technical understanding, application and design (Chiu et al., 2024; Chiu & Rospigliosi, 2026). African K–12 scholarship likewise demonstrates that learners can be prepared to engage with AI as users, critics and potential creators (Sanusi et al., 2022). These frameworks are therefore useful reference points rather than irrelevant external models.

The difficulty arises when a framework is treated as transferable without sufficient adaptation to Nigerian conditions. Evidence on connectivity, electricity, affordability, teacher capacity, and unequal digital access shows that the material conditions of AI learning vary substantially across schools and communities (Dele-Ajayi et al., 2021; Eke & Azubuike, 2025; Olanrewaju et al., 2021). African scholarship also raises concerns about external technological dependency, cultural bias, and the limited representation of African contexts in AI systems and governance (Chizzy et al., 2025; Diaz Pabón & Ahmed, 2025). A framework designed around highly connected schools and formal technology-intensive labour markets may therefore require substantial adaptation before it can function effectively in Nigerian secondary education.

The appropriate response is adaptation rather than rejection. Universal critical AI literacy can focus on understanding what AI is, how data and algorithms shape outputs, how to evaluate reliability and bias, and how AI affects work, society, and human agency. More advanced programming, model development, and technical specialisation can then be offered selectively where teacher capacity, infrastructure, and learner preparation permit. This creates a locally grounded model in which global frameworks provide reference points but Nigerian educational, linguistic, infrastructural, and labour-market conditions determine how they are translated into practice.

Policy and practice implications

The analysis so far suggests that a future-ready secondary education system needs to be developed in a considered sequence, with suitable content and through suitable agents. The first priority is foundational: while the "twenty-first-century skills" agenda is pursued, basic literacy and numeracy must be actively strengthened, since the majority of children in low- and lower-middle-income countries remain off-track in mastering these basics (Oketch, 2021). The pre-pandemic global benchmark shows the scale of the gap: 53% of children in low- and middle-income countries could not read with comprehension by age ten (Azevedo et al., 2021), and Nigeria's own distribution of foundational skills is strongly stratified by state and household wealth (Azubuike et al., 2024). A future-ready system therefore begins with teaching at the right level, early-grade reading and mathematics, and the consolidation of foundational skills in the lower secondary years, with digital competence introduced progressively alongside it (Bashir & Daniels, 2022).

Second, the curriculum itself requires reform, and there is already a Nigerian template to build on. The Nigerian Educational Research and Development Council's 2017 reform of the 34 trade curricula introduced a trade and entrepreneurship curriculum that provides students with practical opportunities to acquire entrepreneurial competencies alongside trade skills, and has since introduced new content, including financial literacy education, capital market studies, and online safety education (Oliver,

2022). Scholars pressing for a paradigm shift in the secondary curriculum for youth empowerment and job creation argue that such shifts are necessary precisely because the effectiveness of a curriculum depends on how well it fulfils the needs of learners, society, and educational objectives (Padung et al., 2025). Comparative syntheses for Nigeria recommend moving from content-heavy, examination-driven design toward flexible, competency-based models supported by formative assessment, targeted teacher training, and equitable ICT access (Abdulganeey et al., 2025).

Third, the vocational dimension should be redeveloped with the informal economy in view. Revitalising technical and vocational education and training (TVET) requires curriculum modernisation, enhanced teacher training, increased and sustained funding, public–private partnerships, and deliberate efforts to shift negative societal perceptions of vocational education (Ladan, 2023); it also means integrating local content, entrepreneurship opportunities, and robust partnerships between TVET institutions, industry, and local communities (Korter, 2023). Nigeria's own history offers a resource here: the Igbo apprenticeship system, a culturally embedded model of situated skill formation that has underwritten business success across the eastern region, remains a living example of apprenticeship that bridges theoretical learning and practical skill development (Olajuwon, 2022). A future-ready system would institutionalise such indigenous models alongside formal TVET rather than treat them as lesser alternatives.

Fourth, reform is unlikely to succeed without teachers, and the evidence reviewed here suggests that teacher capacity is a major constraint. Teachers report little or no awareness of information and communication technology (ICT) in education, and their concerns are rooted in material realities: policy instability, underfunding, poor infrastructure, unreliable electricity and internet connectivity, and salaries so poor that technology adoption is not their priority (Dele-Ajayi et al., 2021). Studies of secondary teachers in southwestern Nigeria identify inadequate infrastructure, lack of technical support, and limited teacher training as the key roadblocks to ICT integration, and conclude that professional development must precede and accompany any technology investment (Srinivasan et al., 2025). Teacher professional development that builds awareness, confidence, and pedagogical competence, rather than episodic retooling in specific tools, is therefore an early priority in any implementation budget (Ng et al., 2023).

Fifth, the system must reach those it currently excludes. For out-of-school children and youth, digital and mobile learning platforms can function as complementary pathways to literacy and learning (Oloyede, 2025), and Nigerian research demonstrates that interactive radio and television instruction can significantly improve life skills among out-of-school nomadic children (Nwokedi et al., 2022). In addition, national policy must be aligned with continental frameworks, above all the African Union's (AU) Digital Transformation Strategy, which privileges "digital skills and human capacity" as one of its five foundational pillars (Bashir & Daniels, 2022), and the AU's TVET framework, which urges member states to align TVET policies so that young people acquire the skills needed for gainful employment (Cros et al., 2022), while creating the coordination mechanisms that Nigeria's current architecture lacks.

Sixth, AI should be taught as a civic and productive capability through a staged approach. Universal critical AI literacy, covering what AI is, how data and algorithms shape outputs, how to judge reliability and bias, and how AI affects work, society and human agency, can be introduced progressively in all secondary schools, while advanced programming and model development are offered selectively where teacher capacity, infrastructure and learner preparation allow (Chiu et al.,

2024; Sanusi et al., 2022). This staging depends on the preceding priorities: it is more likely to succeed where foundational skills are being strengthened in parallel, and teachers have themselves been prepared to teach AI (Ng et al., 2023); it should draw on local languages, data and cultural contexts rather than imported templates (Chizzy et al., 2025).

Seventh, assessment and school-to-work linkages must change together. Moving from content-heavy, examination-driven assessment toward competency-based models with formative assessment (Abdulganeey et al., 2025) gives schools a way to recognise the practical and critical capabilities this article emphasises, and pilot programmes should precede national rollout. Linking schools to apprenticeship systems, building on the Nigerian Educational Research and Development Council (NERDC) trade and entrepreneurship curriculum (Oliver, 2022) and on local technical and vocational education and training (TVET) partnerships (Korter, 2023), would give learners recognised routes from school into the informal and emerging digital economy. The Igbo apprenticeship system (Olajuwon, 2022) illustrates feasibility: it is an existing, locally rooted system, so reform can formalise it and connect it to schooling rather than build a new model from nothing. Table 1 sets out the responsible stakeholders, dependencies and priority sequencing for these measures.

Challenges and policy considerations

The obstacles to this agenda are considerable and largely structural. On infrastructure, the digital divide is simultaneously a divide in electricity, connectivity, device access, and affordability: rural schools and communities face gaps in each dimension (Olanrewaju et al., 2021), and urban–rural internet disparities of the order of 70% versus 20% cannot be closed by curriculum reform alone (Eke & Azubuike, 2025). On finance, an education system whose public spending the World Bank describes as among the lowest in the world (World Bank, 2024) is unlikely to be able to fund the teacher development, connectivity, and equipment that digital and AI literacy require; the stated ambition to raise digital literacy from roughly 50% to 95% by 2030 (Igbinovia & Aiyebelehin, 2023) implies a fiscal commitment that has not yet been specified.

On governance, the chronic problem is implementation. Nigerian policy has repeatedly suffered from "policy disarticulation", interventions that are not in consonance with sociopolitical and environmental realities (Deinibiteim, 2026), and the digital economy policy itself acknowledges an authority deficit in execution (Cros et al., 2022). Comparative analysis of fourth industrial revolution (4IR) policies in Nigeria, Kenya, and Rwanda identifies fragmented implementation, gender disparities, and rural–urban divides as constraints on equitable digital inclusion (Akomolehin et al., 2025), and the state capacity required to regulate AI, enforce data governance, and steer digital development remains thin (Diaz Pabón & Ahmed, 2025). Policy coherence is therefore a precondition for the reforms proposed above to work as intended.

A further and probably larger challenge is demand. Skills training alone, whether digital, vocational or otherwise, is unlikely to absorb the millions of young Nigerians entering labour markets that are not creating enough decent work (Mabugu & Ronconi, 2025; Uwah & Ekpo, 2026). The oil-revenue dependence that limits the growth of non-oil sectors (Deinibiteim, 2026) and the informal character of most employment mean that even well-prepared graduates face precarious livelihoods, and the platform economy that digital-skills agendas often promote is itself a site of algorithmic control, gender inequality, and eroded protections (Adekoya et al., 2023; Anwar, 2022). This is why the critical scholarship on skills in the Global South argues for moving "from human capital to human

capabilities": the purpose of education cannot be reduced to fitting young people to a labour market, but must enlarge the real freedoms and choices available to them (Powell, 2021), and youth policy must be reframed beyond labour markets alone, in terms of equality and collective action (Virk et al., 2024).

Implementation and capacity

Teacher development and professional learning

Teacher development is the first implementation dependency because curriculum reform cannot be separated from teachers' capacity to interpret and deliver it. Existing Nigerian evidence identifies concerns about teachers' information and communication technology (ICT) knowledge, infrastructure, funding and working conditions, while teacher-facing AI frameworks emphasise that educators' own digital and AI competencies shape classroom implementation (Dele-Ajayi et al., 2021; Ng et al., 2023). Professional development should therefore move beyond one-off technical workshops towards sustained programmes that combine digital and AI literacy with subject pedagogy, classroom practice, assessment, and critical evaluation of AI outputs. This should be accompanied by attention to workload, incentives and working conditions so that new expectations are not simply added to existing pressures.

Infrastructure, resources and delivery conditions

Infrastructure should be treated as a delivery condition rather than an optional addition to curriculum reform. Evidence of unequal connectivity, electricity access, device availability and affordability means that a single technology-intensive model would reproduce existing inequalities (Olanrewaju et al., 2021; Eke & Azubuike, 2025). Implementation should therefore use a tiered approach: establish minimum conditions for all participating schools, prioritise reliable electricity and connectivity, support shared or low-cost devices where individual provision is not feasible, and allow offline or low-bandwidth approaches where connectivity remains weak. Advanced computing should be concentrated where the required infrastructure and teacher capacity exist rather than used as a universal benchmark.

Institutional coordination, autonomy and accountability

Implementation also requires clearer coordination across the institutions responsible for education, skills, infrastructure and employment. The evidence reviewed in this article points to policy disarticulation and fragmented implementation as recurring constraints (Deinibiteim, 2026; Cros et al., 2022). Federal and state education authorities, the Nigerian Educational Research and Development Council (NERDC), teacher-training institutions, relevant boards, private-sector partners and civil-society organisations therefore need defined roles rather than overlapping initiatives. Schools and states also require sufficient operational flexibility to adapt delivery to local conditions, while national and state authorities retain responsibility for minimum standards, financing, monitoring and equity. Regular multi-stakeholder reviews can help identify implementation gaps before national scale-up.

Monitoring, evaluation and risk management

Monitoring should track implementation conditions as well as learner outcomes. Relevant indicators include foundational literacy and numeracy performance; teacher participation and demonstrated competence in professional development; availability and functionality of electricity, connectivity and digital equipment; learner digital and critical AI competencies; participation by gender, location, and socioeconomic group; and school-to-work, apprenticeship or further-training transitions. Risks include widening rural–urban inequalities, curriculum overload, insufficient teacher preparation, unreliable infrastructure, unsustainable financing, and overemphasis on narrow technical skills. These risks can be mitigated through phased pilots, minimum implementation standards, targeted support for disadvantaged schools, formative evaluation and adjustment before wider rollout.

Sequencing and feasibility

The implementation sequence should reflect the dependencies identified by the analysis. In the immediate phase, priorities are foundational learning, teacher preparation, infrastructure assessment and coordination mechanisms, while age-appropriate digital learning is introduced progressively alongside foundational teaching. In the medium term, curriculum revision, critical AI literacy, competency-based assessment and stronger school-to-work or apprenticeship links can be expanded as capacity improves. In the longer term, advanced computing, stronger school–industry partnerships and broader digital-economy integration can be scaled alongside demand-side economic reforms. This sequencing does not imply that schools must wait for perfect conditions; rather, it distinguishes the reforms that create the conditions for subsequent reforms from those that depend on them.

Table 1 summarises these recommendations alongside their implementation requirements, responsible stakeholders, and priority sequencing.

Note: Author’s synthesis based on the analysis presented in this article.

Limitations

This article is a critical policy analysis rather than an empirical study, and its claims should be read accordingly. It does not generate new primary data on Nigerian secondary school outcomes, teacher capacity or youth employment; rather, it synthesises and critically interrogates existing scholarship, institutional reports and national statistics. Where Nigerian-specific data were limited, dated or contested, as is common in areas such as informal-sector employment and school-level digital infrastructure, the analysis has noted these gaps explicitly rather than inferring beyond what the evidence supports.

The literature search, while prioritising recency and African/Nigerian authorship, was not conducted as a formal systematic review, and it is possible that relevant sources—particularly grey literature, unpublished government data or non-English-language scholarship—were not captured. The analysis is also necessarily shaped by the heterogeneity of the Nigerian context itself; conditions vary substantially across states, school types and labour-market segments, and the propositions advanced here should not be read as uniformly applicable across all these contexts.

Several priorities for further empirical research follow from these limits. First, studies are needed that measure foundational literacy and numeracy among secondary students across states and school types using current data, and that test whether strengthening foundations alongside the progressive introduction of digital learning improves later outcomes. Second, research on school-to-work

transitions should establish what share of young Nigerians enter informal work and apprenticeships and which skills these routes require, so that the demand-side proposition can be tested directly. Third, pilot evaluations of teacher development, critical AI literacy, and competency-based assessment should be conducted across contrasting settings, including urban and rural, public and private, and better- and less-resourced states, to examine feasibility and cost. Fourth, comparative work in other African countries is needed to assess how far these propositions travel.

Finally, given the rapidly evolving nature of AI technology and policy, some of the empirical and policy claims in this article may require revisiting as new data, national strategies, or technological developments emerge. This article should be read as a contribution to an ongoing and necessarily provisional debate rather than a final assessment.

Discussion

The analysis developed here implies a different pace and sequencing of action than the dominant digital-skills agenda assumes. In the short term, over the next 1–2 years, the priority is diagnostic and foundational: auditing where foundational literacy and numeracy gaps are concentrated, strengthening teacher capacity for basic instruction, and establishing the coordination mechanisms that existing policy, including the NDEPS, currently lacks. In the medium term, over roughly 3–5 years, curriculum revision, the staged introduction of critical AI literacy, and competency-based assessment reform can proceed progressively, expanding as foundational learning and teacher capacity visibly improve. In the longer term, beyond 5 years, the harder structural work of demand-side reform, economic diversification, electrification, industrial policy, and the expansion of decent work must be pursued alongside education reform, since improvements to secondary schooling alone are unlikely to resolve a shortage of decent work.

This sequencing carries real trade-offs that policymakers should confront directly rather than assume away. Prioritising foundational learning and teacher capacity ahead of large-scale curriculum digitalisation means that visible, politically attractive signals of progress, such as the large-scale rollout of new computer laboratories, AI curricula, and digital literacy targets, may need to be phased in gradually, even though these are often what donors, the public, and political cycles reward in the short term. Reallocating attention and resources from content addition to capacity building is therefore not merely a technical choice but a political one, since it requires politicians and administrators to accept slower, less visible progress in exchange for reforms that are more likely to be sustained. There is also a trade-off between standardisation and differentiation: a single national curriculum is administratively simpler, but the evidence reviewed here suggests that uniform content delivered to highly unequal schools, in infrastructure, teacher capacity, and foundational learning, risks widening rather than narrowing existing disparities. A tiered or differentiated implementation model is more defensible on the evidence, but it is also harder to govern and monitor.

The propositions advanced in this article, that sequencing matters, that skills supply is not the primary constraint on youth employment, and that global AI literacy frameworks require local adaptation, are likely to have relevance beyond Nigeria, since other African countries share comparable patterns of educational exclusion, informal labour-market structures, and policy frameworks adapted from international models. The African Union's Continental AI Strategy and Digital Transformation Strategy, discussed earlier in this article, apply across the continent, which suggests that the sequencing and demand-side arguments developed here may travel reasonably well

to similar contexts. At the same time, Nigeria's scale, its federal structure spanning 36 states and 774 local government areas, its specific history of apprenticeship traditions such as the Igbo system, and the particular trajectory of its digital economy policy are not necessarily representative of the rest of the continent. The empirical claims in this article, drawn substantially from Nigerian data and policy documents, should therefore be treated as a case analysis that generates propositions for wider African debate, rather than as a validated model ready for direct transfer to other national contexts without further country-specific evidence.

Conclusion

The debate on AI and the future of work in Nigeria often moves between two positions: that machines will destroy the livelihoods of the young, and that digital skills will greatly improve youth employment. Both positions give technology too central a role in Nigerian development. This article has argued that the skills agenda that has become prominent in policy thinking rests on three more specific weaknesses: it risks reversing the sequence of learning by privileging digital competence over the foundational literacy and numeracy that many Nigerian adolescents have not secured (Bashir & Daniels, 2022); it treats the employment problem as primarily supply-side although the evidence points to the structural scarcity of decent work as a major constraint (Mabugu & Ronconi, 2025; Uwah & Ekpo, 2026); and it adopts frameworks of the future of work and AI literacy, developed mainly in the global North, that may give too little weight to Nigeria's infrastructural and epistemic conditions and too much to the quality of the digital work on offer (Anwar, 2022; Diaz Pabón & Ahmed, 2025).

A future-ready secondary education system in Nigeria would therefore be anchored in foundational learning, be demand-aware, and be locally grounded. It would consolidate basic skills as the continuing base for all else, introducing digital learning progressively alongside them (Oketch, 2021); teach AI critically, its workings, biases, ethics, and political economy, as a civic capability rather than as a narrow vocational add-on (Chiu et al., 2024); rebuild technical and vocational education and training (TVET) and formalise indigenous apprenticeship traditions linked to the informal economy in which most young Nigerians work (Korter, 2023; Olajuwon, 2022); and place teachers and implementation capacity, not curriculum content alone, at the centre of reform (Dele-Ajayi et al., 2021). It would be aligned with continental frameworks so that African youth can participate as producers as well as consumers of AI (Addo et al., 2026; Chizzy et al., 2025). It would also avoid assuming that education alone can resolve a shortage of decent work. The future of Nigerian youth is likely to depend as much on electricity, capital, governance, and the creation of decent work as on what happens in classrooms (Virk et al., 2024). The task of scholarship and policy alike is to address both fronts together.

Declaration of interest

The author declares no known competing financial interests or personal relationships that could have appeared to influence the work reported in this manuscript.

AI usage statement

Artificial intelligence (AI) tools, including ChatGPT and Claude, were used in the preparation of this manuscript. Their use was limited to supporting the research and writing process, including

identifying potentially relevant literature and sources, organising and refining ideas, improving clarity and academic expression, and proofreading selected sections of the manuscript.

The author independently developed the central arguments, interpretations, analysis, and conclusions presented in this manuscript. AI-generated suggestions were critically reviewed, verified, and revised where necessary. The author remains fully responsible for the accuracy, originality, integrity, and final content of the manuscript, including the appropriate citation and verification of all sources.

AI tools were not used as substitutes for scholarly judgement or independent analysis, and no AI-generated content was accepted without review and appropriate revision by the author.

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